



Year Book

Semmelweis University

Faculty of Medicine • Faculty of Dentistry • Faculty of Pharmaceutical Sciences
Faculty of Health Sciences • András Pető Faculty

2024 / 2025

Budapest

www.semmelweis.hu

“Medical students can only be prepared for patient care
when practising by hospital beds;
Not only the teachers explaining diseases will teach them then,
but diseases themselves...
Let theory be combined with practice as it is in real life,
and make students visit sickhouses once they
are studying to be medical doctors;
also have them take care of patients with all the
knowledge that is expected from doctors.”

Lajos Markusovszky (1815-1893)

Y E A R B O O K

S E M M E L W E I S U N I V E R S I T Y

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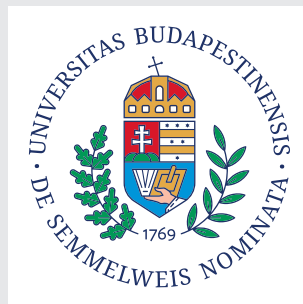
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SEMMELWEIS UNIVERSITY



Detailed history of Semmelweis University

I. The history of the Medical Faculty (1769-1951)

The Nagyszombat (now Trnava) university founded in 1635 by PÁZMÁNY Péter archbishop of Esztergom and the former Jesuit order institution was given a royal rank during Maria Theresa's reign and turned from a truncated university to a real one with the addition of the missing fourth faculty, the Medical Faculty. All of the above formed an integral part of the comprehensive, imperial level reform process with the recognition in the background that health care is a key interest of the state and requires a high level of public intervention. The plans of the Medical Faculty in Nagyszombat was elaborated by the royal physician of the queen, the Dutchman Gerard van Swieten, based on the Medical Faculty in Vienna reformed by him as well. Organisation started with the decree of Maria Theresa dated on 7 November 1769. Before this, the whole university had received a royal rank with a royal charter on 17 July that year. To host the new faculty, a separate building was constructed according to the plans of Franz Anton Hillebrandt, which was completed in May 1772. Education was able to start in 1770, first with five faculties: Physiology and Pharmacology (PRANDT Ádám Ignác), Anatomy (TRNKA Vencel), Surgery (PLENCK József Jakab), Botany and Chemistry (WINTERL Jakab József) and General Pathology (SHORETITS Mihály), i.e. the actual clinics. Due to the lack of an own clinics, the education of general pathology faced severe difficulties, and the lack of the corpses and the botanical garden was also a great problem. By moving the university to Buda in 1777, these problems seemed to be solved.

The Ratio Educationis I issued simultaneously with the transfer to Buda modified the management of the University. The consistory considered as the representative of the state, which had been heading the university since 1767, was replaced by the university council (senate), however, practically with the same members. The magistratus academicus re-elected every year, which administered mostly the ritual issues, remained on. To lead the whole institution, a president and a director general and to lead the faculties, faculty directors (faculty presidents) were elected. A bit later (in 1786), Joseph II deleted this position (except the Medical Faculty) and their scope of authority was taken away by the previously marginalised deans. This time, the method of appointment of the tutors was also regulated. Based on the opinion of the faculty, the senate submitted a proposal to the king who decided on the appointment through the Royal Council of Governors.

It was on 25 March 1780 when Maria Theresa issued the Diploma Inaugurale, called as the "Magna Charta" of the university, in which she set among other general regulations the legal status of the university and the financial basis of the maintenance thereof. The successor of the

Queen, Joseph II was also dealing with the fate of the University. During his personal visits he decided on the translocation of the institution to Pest, which took place in 1784. The Medical Faculty found a home in a former Jesuits' monastery at the corner of Hatvani (now Kossuth Lajos) and Újvilág (now Semmelweis) streets. The frequent relocations held back educational activity, since the majority of resources was directed to the establishment of the conditions. The rapidly developing Pest provided a larger and more diverse patient population than before and the number of clinical beds also increased up to 16. The reconstructed building of the monastery proved to be small for the growing number of departments (Theoretical Medicine, Natural History in 1784; Veterinary in 1787; Public Medicine and Special Medical Studies in 1793; Theoretical Surgery in 1808; Obstetrics in 1812 and Ophthalmology in 1817) and the increasing number of students. Practical Training was strongly held back by that contrary to the international practice, the clinics were located not in the city hospital, but in the building of the faculty, therefore, there was no possibility to regularly change the patient population necessary for education. Although there were many attempts by the faculty to involve the Saint Roch Hospital to expand the institutions of the faculty, they were systematically rejected due to the resistance of the city magistrate. Contrary to this, from the 20's, the clinical trend emphasising practical education was established, the main representative of which was BENE Ferenc, the introducer of vaccinations against pox.

Initially, based on the idea of van Swieten, the duration of the medical training was not regulated. First, a decree in 1774 determined the training period of physicians to be 5 years and according to the study regulation in 1786, it became 4 years. After tightening the examinations, the mutual recognition of medical diplomas had been valid since the reign of Joseph II (the principle of the so-called conformetur), at least as regards Vienna-Prague-Cracow-Pest. In 1804, Vienna left this agreement and obtained a privilege against the others. The surgeon master and civil surgeon training were 2 years long, while the pharmacist training was of 1 year. Midwives were trained in short courses started each semester. In 1787, the Veterinary course joined as well.

The end of the century, showing a vivid university life was replaced by the retrograde mentality of the era of Francis I. This is reflected by the Ratio Educationis II in 1806, created in the spirit of centralisation and the deprivation of the freedom

of education, which was dealing with the Medical Faculty in a much deeper level than the previous one. It stipulated in details the teaching material and the obligations of the professors, it updated the order of the education and comprehensive exam and increased the length of education to 5 years. The president (praeses universitatis) executing the intent of the government and his deputy and the vice president (vicepraeses) who was at the same time the chancellor of the university played a key role in the management of the university. The university magistrate consisting of rectors, deans and seniors had only limited power. At the end of the 1810's, even the faculty director position was reset, however, the professional supervision of the Medical Faculty was exercised by the national chief medical officer.

As in terms of the French revolutionary ideas feared by the government, medical training was a neutral area, at the beginning of the 19th Century, this was the only faculty able to perform considerable scientific activity and more significant developments. Contrary to the efforts, the substantial conditions of education became worse and worse due to overcrowding and the increasing demands. The devastation of the icy flood in 1838 increased on the problems in an extent that even the parliament was dealing with the situation of the Medical Faculty.

Under these narrow circumstances, the tutors of the faculty tried to keep up with the pace of international medical science which started to develop and specialise that time. In the light of the above should one consider that overtaking Vienna, Pest was one of the first cities to found an individual faculty of veterinary in 1793, which included the contracted forensic medicine and public health as well. Vaccination against pox has been applied in Hungary since 1799 and in 1824, headed by GEBHARDT Ferenc, a Central Vaccination Institute was established within the Medical Faculty. One of the most significant scientist of his era, KITAIBEL Pál was also among the tutors of this faculty. The Institute of Pathology founded in 1844 by ARÁNYI Lajos was one of the oldest similar institution in the world. At the beginning of 1847, only few months after the first experiment in the Massachussets Hospital, Balassa tried anaesthesia with ether. The first anaesthetic surgery was performed few days later by SCHOEPF-MEREI Ágost. The faculty was continuously playing key role in the fight against the great Hungarian epidemics (typhus, yellow fever, pox and the cholera leading to riots in 1831 and 1848-49).

The medical and surgical training courses were taught in Latin from the beginning. Education in Hungarian was first dealt with at the end of the 18th Century. RÁCZ Sámuel, who was the fifth professor of the medical faculty in 1793/94 to hold the position of rector, issued the first Hungarian physiology book in 1789 with the title “A physiologia rövid sommája” (Short summary of physiology), which was considered as the first Hungarian university textbook as well. In 1830, law allowed the use of Hungarian language and 3 years later, the first doctorate was written in Hungarian by FLÓR Ferenc and in 1844, Hungarian became the official language. Contrary to the national partiality of the tutors, the education in Hungarian was accepted by the Medical Faculty with reservations, since many of the students – and even some of the tutors – did not speak Hungarian and the Hungarian medical language was practically missing. Finally, the Hungarian as the language of education was introduced in 1848. The lower degree courses (surgeon master, midwife, veterinarian) had been held in the national languages since the beginnings, i.e. in Hungarian, German and Slovakian.

In the legal code of April 1848, a separate article (Art. XIX, 1848) was dealing with the university and promulgated the independence of the university and the principle of liberal freedom of education. The majority of the tutors and students actively took part in the freedom fight. Therefore, the reprisal after the surrender severely affected the tutors of the university. Many were forced to go to prison (BALASSA János), to hide (BUGÁT Pál) or to emigrate (e.g. SCHOEPPF-MEREI who later founded a children’s hospital in Manchester). Certification procedures were performed, the tutors might hold their position depending on their loyalty and authority harassments were permanent. Tutors loyal to the emperor, but often of secondary level were employed by the faculty. At the time of the absolutism, the language of education and administration became the German instead of the Hungarian. Instead of the educational order of 1848, in the spirit of the “conformetur” principle, the Vienna order of 1833 was introduced. At the same time, there were modernisations as well. In this way, the secondary school maturity became obligatory and the faculty director position was deleted. Although experts were trained still in 9 faculties, the surgeon master course slowly faded and based on the pattern in Lemberg, Olmütz and Salzburg, this training was suspended also in Pest. In 1872, the guilds were also dissolved. As regards the language issue, a shift occurred

only after the large foreign policy defeat of the royal court. In 1859, a delegation of students went to Vienna to restore the Hungarian language. In 1860, the right of autonomous rector and dean election was extended also to the university of Pest. As a result of the October Diploma, the main subjects were taught in Hungarian and the others in German, Slovakian or Latin depending on the demands. Finally, it was the Article XLIV of 1868 after the Austro-Hungarian Compromise to reinstate the Hungarian language. This time, many tutors not speaking Hungarian left the university, e.g. the outstanding physiologist, Jan Nepomuk Czermák resigned as well contrary to the efforts of his Hungarian colleagues to make him stay.

The harmonised medical training was introduced in 1872, thus, since 1878, only one medical diploma has been existed with the name “doctor of the universal medical sciences”. The new university decree in 1875 determined the order of the new and universal medical doctor comprehensive exam in addition to the provision of the freedom of education and the autonomy. In 1881, the duration of the academic year also changed. Earlier it had been between November and August and since that time, it has been between September and June. Due to the poor facilities, the main problem of the medical faculty was the lack of space. Although in 1848, the clinics were transferred from the Újvilág utca building, it proved to be only temporary, since after the suppression of the freedom fight, they returned there. The Saint Roch Hospital refused on to host the clinics and the capital failed to provide a site for the constructions for a long time. The acquisition of the Kunewalder house (located that time in the Országút, today in the Múzeum körút) in 1858 was a temporary relief that time, which was originally bought for the Institute of Veterinary. The surgery (Balassa), the zoology, the physiology and the obstetrics headed by Semmelweis that time were able to move here. The administration of the faculty and the library got temporary home in buildings nearby. A real solution was brought only by the large-scale constructions started in 1873 with a cost of 25 million kronen, which were finished only in 1911. This time, the Üllői út considered that time as a rather outer belt area became the axis of the Medical Faculty, where the clinics, the institutions and the administration were located in two sites. Simultaneously, new, often parallel departments sufficiently equipped in the level of the era were established one after the other. The number of such departments almost

quadrupled until the 1880's. In these still unique developments, EÖTVÖS József and TREFORT Ágoston ministers of the Ministry of Religion and Public Education, BERZEVICZY Albert state secretary, MARKUSOVSZKY Lajos councillor and on behalf of the Medical Faculty BALASSA János, KORÁNYI Frigyes and the later secretary of state, TÓTH Lajos played key role.

With the rapid development of the clinics, the catch-up of the lagging behind was successful. Parallely to the constructions, the "medical school of Budapest" became clear around Balassa having launched a medical weekly "Orvosi Hetilap" and Markusovszky. As an effect of Semmelweis, this was the place where the deliberate prevention of surgical infections was started. Public health was among the first to get a department in Budapest, headed by the outstanding bacteriologist, FODOR József. By continuing the work of Schoepf-Merei and Sauer, KORÁNYI Frigyes was the one to begin the establishment of a Hungarian internal medicine school on a state-of-the-art foundation. His work was carried on by his son, Sándor. JENDRASSIK Ernő, named also as the Hungarian Charcot was one of the founders of neurology, DOLLINGER Gyula was that of orthopaedics and TAUFFER Vilmos was that of the surgical obstetrics and gynaecology. LUMNICZER Sándor, the founder of modern surgery was the first to use the Lister's system of antiseptis. Owing to the work of SCHULEK Vilmos, GRÓSZ Emil and IMRE József, Hungarian ophthalmology became this time famous throughout Europe. As regards paediatrics, the Bókays and KOPITS Jenő, the international expert of hip dislocation deserve mention. The first director of the Hungarian Pasteur Institution, HÓGYES Endre set the foundations of the later Nobel prize winner invention of BÁRÁNY Róbert. With the research of the fine structure of the nervous system, the anatomist LENHOSSÉK Mihály achieved the recognition of his Nobel prize winner colleague, Santiago Ramón y Cajal who considered him as his fellow during the creation of neuron studies. In stomatology, the work of ÁRKÖVI József, while in pharmacology, that of BALOGH Kálmán were outstanding. In 1907, the Radiology got a separate institute headed by the founder of radiology in Hungary, ALEXANDER Béla. Physiology became a modern science in the Medical Faculty owing to the outstanding Czermak of Czech origin. He was followed by JENDRASSIK Jenő whose aim was the foundation of the modern Hungarian physiology school.

The number of students drastically increased. In the 1860's, their number was between 400-500, while in the 1880's, it exceeded 1000. In the 1860's, the first student associations were established. In 1862, aid society and 5 years later, a self-education association was founded. The end of the century was the first time when the issue of the admission of women arose. The medical faculty had generally a rejecting opinion thereabout. The first Hungarian female physician, countess HUGONNAY Vilma succeeded to achieve the recognition of her diploma obtained in 1879 only after 17 years of administrative struggling. In 1895, a decree made it possible for women to participate in trainings and practices in humanities, medical studies and pharmacology. The first female physician graduated in Budapest, STEINBERGER Sarolta was inaugurated on 3 November 1900. A real change in the training of female physicians was brought only by the world war.

During the World War I, the majority of the students and the tutors joined the army and the half of the beds the number of which increased to 2000 were maintained for the injured. The change to war industry and the economic exhaustion of the Monarchy drastically decreased the financial supply of education and also of the university. The war almost eliminated the students, however, after their disarmament, there was a dumping. Compared to the last year in peace, more than twice as many (6526) medical students wanted to continue their interrupted studies.

The revolution and the dictatorship of the proletariat triggered further chaos in 1918-19. The university was made subject to stringent central administration and there were significant transformations. There were changes in the personnel and the tutors considered as right wing were deprived of their positions. During the short existence of the Council Government, its measures could not be long-lasting. By rising to power of the counterrevolution, the faculty council qualified the events after 31 October 1919 as "ex lex" and further changes in personnel and certification procedures were started. Tutors were removed from the faculty, among others HEVESY György, one of the founders of nuclear medicine who later won the Nobel prize abroad or the outstanding ophthalmologist, GRÓSZ Emil, but his removal was only temporary.

From the annexed areas, a smaller migration started to the remaining "Mutilated Hungary" and especially to Budapest. Mostly the state-employed intellectuals (public officers, physicians, teachers etc.) were forced to migrate, partly as their

job was linked to the language and partly as they could have been hardly employed by a newly settling foreign state. The largest overcapacity was experienced in the field of physicians, mostly in Budapest, therefore, the fight for making a living was quite harsh. In addition to the too large number of students and the experience from the revolutions, this was also a reason of the issue of the Act XXV of 1920 also known as "numerus clausus", the initiation of which just started from the Medical Faculty of Budapest. The point of this act was to tighten the conditions of the admission to university, with which on the one hand, they tried to decrease the number of students in further education and on the other they tried to exclude anyone who had taken part in the revolution and to limit the number of Jewish students. This latter affected especially the Medical Faculty, since as it was a course of open access, many Jewish youngsters have selected the medical profession since the beginning. On the other hand, this act was beneficial for the spread of protectionism. At the same time, the faculty tried to block the admission of women as well. On 14 April 1921, the university in Budapest took the name of its founder, PÁZMÁNY Péter and had this name until 1950.

The economic crisis aggravated on by the mutilation of the country led to a financial crisis for the university it had never experienced before. The situation had just begun to normalise when the crisis in 1929 resulted again the decrease in the financial resources spent on education and health care. Unemployment appeared among the physicians as well, the workforce reduction in the university exceeded 10%, the investments stopped and the quarter of the beds had to be left empty due to financial reasons. The number of students sharply decreased as well (in 1925-26 there were 1729, in 1930-31 only 1234 students), contrary to the international trends.

The reform of the medical training which had been on agenda for a long time was introduced in 1922. As a main principle, the researcher and practising physician trainings were in focus. The duration of the education increased to 6 years instead of 5, the comprehensive exams were separated in four cycles and the number of the courses announced was also increased. Later, the system of comprehensive exams was modified on, but it was entered into force only in 1943. In 1936, the classification of the diplomas changed. This was the time when the qualifications used even today, i.e. the rite, the

cum laude and the summa cum laude were introduced. After a long time, also the pharmacist education was renewed by increasing the duration of the education from 2 years to 4 and by decreasing the practice from two years to one. Thereafter, the start of the pharmaceutical studies was not linked to a prior practice in a pharmacy, but after the maturity exam, one could immediately enrol.

Between the two world wars, internationally acknowledged schools were operating in the Medical Faculty, such as the school of KORÁNYI Sándor who developed on the school founded by his father. Among his results, the elaboration of the functional examination methods of kidney and the reduction of tuberculosis are outstanding. Many of his students became academicians and heads of department, such as RUSZNYÁK István, HETÉNYI Géza and HAYNAL Imre. The research on cancer made by KROMPECHER Ödön who described the basocellular cancer, that on nucleins, complementaries and enzymes by LIEBERMANN Leó or that on morphology by SCHAFFER Károly were significant. As regards pathoanatomy, BUDAY Kálmán clarified the pathogenesis of necrotic stomatitis and mellitis. In microbiology PREISZ Hugó, in biochemistry HÁRI Pál, in physiology FARKAS Géza and in biology HUZELLA Tivadar can be mentioned. In the fields of clinical medicine, the paediatrician HEIM Pál, BÓKAY János and BÁLINT Rezső, the surgeon VEREBÉLY Tibor and the ophthalmologists GRÓSZ Emil and BLASKOVICS László were the outstanding experts of their fields.

Apart from the military duty affecting the tutors as well and the care of the injured, the World War II had not trigger any special disturbance in the life of the Medical Faculty until 1944. With the approach of the front, the majority of the tutors were deployed. The rise to power of the Arrow Cross Party on 15 October 1944 posed new threats on the university and thus, the Medical Faculty as well. Contrary to the categorical order of the government, the university denied to move to Germany. Afterwards, there were plans to transfer the clinics and laboratories to Buda, however, they were mostly thwarted partly due to the repeat resistance of the faculty and partly due to the difficulties in transportation. Before the closure of the shell of fortress lines, the engineering, medicine, pharmacy and veterinary senior students were carried to Germany with a military call-up, i.e. the representatives of every programme considered as important regarding the continuation of the war. In this way, about 600 medical and

pharmacist students from the Medical Faculty Budapest were settled partly to Halle and partly to Austria with some of the education staff. They succeeded to return only after the war among huge difficulties and with the mediation of the university, with American passport.

Together with the city, the faculty was also heavily hit by the siege of Budapest. The damage in the buildings were enormous (four clinics were severely hit) and the majority of the equipment was also destroyed. The total damage was around 13 million golden pengő (at 1938). The largest devastation affected the Internal Medicine II, the Gynaecology I, the Dermatology, the Surgery II and the Paediatric Clinics, but several other buildings were damaged as well. This was aggravated by the freezing of the drainage system and the plundering affecting the whole city. Contrary to all these, the clinics were operating even in case of the siege, often under impossible circumstances. Even the Institute of Physiology and the Pathoanatomy department started to perform the care of the injured.

After the war, the tutors were significantly changed according to the taste of the new political forces having the power. The main tool of this was the certification procedure. It describes the ratios well that against 15 out of the 27 regular tutors of the medical faculty, procedures were launched or they were dismissed with various sanctions. In addition to this, in January 1945, IMRE József professor died which led the Ophthalmology Clinic to get empty. In addition to them, 6 honorary extraordinary tutors, 17 private professors and 11 physicians were dismissed. Out of the physicians above, 44 were still in Germany with the students carried there.

From June 1945 until his emigration, the Nobel Prize winner professor SZENT-GYÖRGYI Albert was among the tutors of the faculty, who was that time the head of the Department of Physiology and Medical Chemistry. From 1945, there was a sharp increase in the number of the students, which exceeded multiple times the capacity of the faculty, therefore, from 1947/48 onwards, they were forced to introduce admission examination. After the rising of the Communist Party to power, one of the most important factors became the origin of the candidate, therefore, the social composition of the students significantly changed. Soon, almost 25% was the ratio of the students from worker or pawn origin. The National Association of Peoples' Colleges was founded and from the academic year 1951/52, the Scientific Students' Association movement was introduced based on Soviet pattern. In 1948, education was reformed again. The examinations were tightened, education turned more pragmatic and the medical chemistry and physics were included into the curriculum, in addition to the biology in 1950. Due to political reasons, the Marxism and Leninism, the Russian language and the national defence knowledge were also added.

In this period, multiple hospitals were attached to universities by forming clinics. Therefore, the number of beds increased to 3167 in 1955 from the 1178 in 1946. In parallel, specialisation was going on within the disciplines, which led to further separations in the clinics as well. Areas with larger and larger costs entered into research, therefore, fallback behind the rich countries was evident. This was worsened on by the isolation policy in the 1950's when there was Soviet influence also in science.

II. History of the separate Medical University: BOTE, SOTE (1951-2000)

After 1949, the Hungarian higher education underwent consecutive reforms. Due to the fight against churches, the name of the university was modified, therefore, instead of its founder, PÁZMÁNY Péter, the university got the name of one of its most prominent scientist tutors, EÖTVÖS Loránd on 1 September 1950. At the end of 1950, the Council of Ministers discontinued the former practice and traditions and decided the creation of specialist universities subject to the sectoral

ministries. They wanted to reach it partly by founding new institutions and partly by the division of the currently existing ones. During the reorganisation, the Soviet higher education system of the 1930's was taken as example, disregarding that since that time, this had been significantly modified also in the Soviet Union by resetting the unified management of higher education. The deadline of the completion of the action was planned to be on 1 February 1951. Within the framework of

this, the medical faculties of the universities were separated and transformed into separate specialist universities. In a parallel way, the new medical universities were subordinated not to the Ministry of Religion and Public Education, but the newly formed Ministry of Health. Therefore, from 1 February 1951, the Faculty of Medicine of the Eötvös Loránd University continued its operation as a separate Medical University of Budapest.

In 1955, the organisational transformations went on. Within the University, 3 faculties were formed (with their former names: Faculty of General Medicine, Faculty of Dentistry and Faculty of Pharmacy). On 1 September 1955, the rectorate was established. The pharmacist training was transferred permanently to the medical university from the Eötvös Loránd University back in 1951 and in 1952, the dentist training of new system was started. Finally, on 7 November 1969, for the 200th Anniversary of the Faculty of Medicine, the university took the name of SEMMELWEIS Ignác.

Separation had, however, some disadvantages as well. From certain aspects, the distance from the humanities and the Faculty of Sciences led to drawbacks for the medical profession. The everyday life of the new university was made more difficult by that it had only the narrowest professional institutes and the conditions for the cultural and sports life or the rooms suitable for hosting large events were missing. They were able to be terminated only by the large investments of the 1970's. After the separation of the university, the separation from the BEAC university sports club also took place to form the Orvosegyetem Sport Club (OSC, Medical University Sports Club). The fencers and waterpolo players of the OSC have been the regular and successful participants of the Olympic Games and world championships.

The prints of the war had not even disappeared when as a protest against the communist power, the revolution broke

out on 23 October 1956. In the student movements, the students of the medical university also took place and after the breaking out of the armed fight, the role of our university aimed mostly at the care of the injured, since our institutions were in the centre of the war in Budapest. The staff of the affected clinics and institutions exhibited superhuman and heroic withstand multiple times. Further buildings were damaged and the most severely hit building was the Dermatology clinic. The reprisal after the communist restoration did not avoid our university either. The victim of this reprisal was the innocently slandered and executed TÓTH Ilona senior physician student who is considered today as the martyr of our university.

After consolidation, the emerging external relations from the 1960's facilitated us to keep up with the scientific international profession. In the following decades, serious developments were performed as well. The most important of them were the reconstruction of the Dermatology clinics demolished in 1956, the huge theoretical building finished in 1978, the Ophthalmology clinic I and the delivery of the Transplantation and Surgery Clinics in the beginning of the 1990's. In the clinics, healing and education took place this time with more than 3100 beds.

The increase of the ratio of the international students has started to grow since the 1970's. This time, they arrived mostly from the developing countries and mostly from the so-called democratic countries. Education in German language started in 1983 and after an experiment in 1987, the regular education in English language started in 1989.

The Act LXXX of 1993 on Higher Education made it the task of the universities to prepare for scientific degree and to award the PhD degree, based on which the Semmelweis University got its Doctoral School accredited in the same year and until 2018, it started 47 programmes.

III. The history of Semmelweis University (2000–2021)

At the end of the 1990's, the transformation of the Hungarian higher education network was put on agenda with the aim of institutional integration. The final stage of this process was determined by the Act LII of 1999 on the Transformation of the Higher Education Institutional Network. Accordingly, even in July that year, three universities (the Semmelweis University of Medicine, the Haynal Imre University of Health Sciences and the University of Physical Education) elaborated the plan of the organisational, operational and financial policy of the university to be created, together with the call for application for the rector and the director general. After the preparatory work, on 1 January 2000, Semmelweis University was established by the merger of the Semmelweis University of Medicine, the Haynal Imre University of Health Sciences and the University of Physical Education, which consisted of the following faculties: Faculty of General Medicine, Faculty of Health Sciences, College Faculty of Health, Faculty of Dentistry, Faculty of Pharmacy and Faculty of Physical Education and Sport Sciences. From this group, the Faculty of Health Sciences of the Haynal Imre University of Health Sciences was removed and based on a governmental decree, it ceased to exist. (The successor of the Haynal Imre University of Health Sciences was the new organisation, the National Medical Centre formed from it, which was known as Szabolcs utca Hospital until its closure in 2007.) The College Faculty of Health of the Haynal Imre University of Health Sciences remained on the part of the university, which continued its operation from the end of 2001 with 5 faculties: Faculty of General Medicine, College Faculty of Health (from 2007 with the name of Faculty of Health Sciences), Faculty of Dentistry, Faculty of Pharmacy and Faculty of Physical Education and Sport Sciences. In its decision no 62/2008 on 29 May 2008, the Senate of Semmelweis University decided to found its sixth faculty, the Faculty of Health and Public Services with the participation of three institutions working in the border of natural sciences and social sciences, i.e. the Health Services Management Training Centre, the Institute of Mental Health and the Institute of Health Informatics, Development and Further Training. The faculty started its activity in January 2010 and the inaugural meeting of the Faculty Council was

held on 21 April 2010. The new faculty has mostly social science orientation, however, it integrated interdisciplinary trainings at the border of sciences. With its programmes, it covers the whole educational spectrum including the basic training, the master training, the doctoral training and the postgraduate specialist training courses in the field of health-care management, mental and community health and health informatics.

In addition to the structural reorganisation, the new millennium brought significant developments as well. In 2003, the College Faculty of Health succeeded to move to a new site instead of its earlier fragmentation (Óbuda, Újpest, Józsefváros), to the Vas utca close to the centre of the university, into the fastidiously renovated building of the former Pajor sanatorium and later Balassa János Hospital. The Educational Centre of the Faculty of Dentistry was built between 2006-2007 in the site of the Pátria printing house, in the Szentkirályi utca. Almost all of the clinics and departments of the faculty moved to this state-of-the-art building. In September 2008, the plan of a long-standing desire of a second theoretical building, back from the 1960's came true in the form of the Theoretical Medical Centre in the Tűzoltó utca, which won several architectural professional prizes. In the gross 27,000 m² of the building, there are research laboratories, study rooms, student laboratories, lecture rooms, a modern animal house and seven seminar rooms. The two latter investment was performed in the so-called PPP construction. Among the renovations of buildings, the multistage project of the Central Management Building (Üllői út 26) started in 2008 has to be mentioned, the first stage of which, the renovation, was finished in 2009 and the project was completed by the formation of the loft in 2012. The Ophthalmology Clinic in the Mária utca and the 1st Department of Pathology and Experimental Cancer Research were renovated in 2013. In the summer of 2012, the large-scale development of the Outer Clinical Site, the Korányi project was started, which is one of the most significant investment of the previous century of the university.

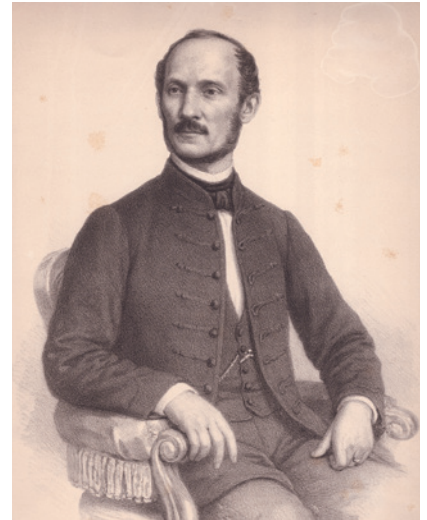
Between 2008 and 2010, Semmelweis University started three off-site trainings abroad. The first was the Asklepios Campus Hamburg, within the framework of which the stu-



BENE Ferenc,
tutor of internal medicine
1775-1858



BÓKAI János,
tutor of paediatrics
1822-1884



BALASSA János,
tutor of surgery, the director of the
Medical Faculty in 1848/49
1814-1868



ARÁNYI Lajos,
the first tutor of pathology
1812-1887



SEMMELWEIS Ignác,
painted by THAN Mór
1818-1865



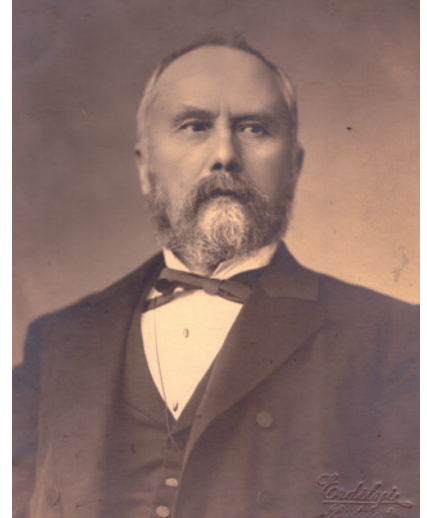
WAGNER János,
tutor of internal medicine
1811-1889



JENDRASSIK Jenő,
tutor of physiology
1824-1891



LENHOSSÉK József from 1864,
tutor of anatomy
1818-1888



GENERSICH Antal,
tutor of pathology
1842-1918



LUMNICZÉR Sándor,
tutor of surgery
1821-1892



MIHALKOVICS Géza,
tutor of anatomy
1844-1899



HÓGYES Endre,
tutor of general medicine
1847-1906



FODOR József,
the first tutor of the independent
public health
1843-1901



TAUFFER Vilmos,
tutor of obstetrics and gynaecology
1851-1934



KORÁNYI Sándor,
tutor of internal medicine
1866-1944



NÉKÁM Lajos,
tutor of dermatology
1868-1957



KROMPECHER Ödön,
tutor of pathology
1870-1926



HUZELLA Tivadar,
the director of the Institute of Histology
and Embryology
1886-1950



BALOGH Károly,
the first dean of the Faculty of Dentistry
1895-1973



HAYNAL Imre,
the director of the Department of Internal
Medicine II
1892-1979



MOZSONYI Sándor,
the first dean of the
Faculty of Pharmacy
1889-1976



SZENT-GYÖRGYI Albert,
Nobel Prize winner,
tutor of biochemistry
1893-1986



BALÓ József,
tutor of pathology
1895-1979



SZENTÁGOTHAJ János, neuroscientist,
tutor of anatomy
1912-1994

Changing the operating model (2021—)

On its decision 1/2021 (I. 28.) the Senate of Semmelweis University - including its six faculties, public education and vocational institutions, as well as its clinical centre forming an organic unit with its medical and health sciences training - supported the change of the operating model of Semmelweis University. The state transfers its maintenance rights to a public interest foundation to be established by the state for the maintenance of Semmelweis University, thus contributing to the achievement of the university's strategic goals and the development of Hungarian medical and health science education and patient care.

Semmelweis University is already an elite university of international reputation, known and respected, which has reached the limits of its development due to current environmental constraints. A change of model could create the opportunity to achieve the goal of becoming one of the world's top 100 universities.

The vision of Semmelweis University is to be recognised as one of the world's leading universities, and as such, ensuring the unity of theoretical education, basic and translational research and clinical care, while respecting tradition. The university's further goal is to implement the training of excellent professionals in medical and health sciences along with closely related pedagogical fields by widely applying the results of modern technology. The university employs methods of the highest level of healing, focusing on the areas of health preservation, disease prevention, personalized medicine, and societal expectations, and serving the rise of the nation.

The operational model (public law framework) of the University has not changed significantly in the last three decades. Since its establishment, it has operated as a central budgetary body, as part of public finances, regarding its management, financing, employment and motivation. The socio-economic environment of the University, as well as the sectoral governance of higher education, poses challenges to the current operating model which the institution can hardly meet within its current operational framework.

A change in operation model is necessary to enable the university to meet its own quality expectations and those of the market and knowledge industry.

The new model that will emerge as a result of the transformation will make it possible to achieve strategic goals:

1. **By 2030, Semmelweis University will become one of Europe's five most successful universities in the medical sciences and one of the top 100 out of 28,000 universities in the world.**
2. **Ensuring the sovereignty of Hungarian-language healthcare in Hungary and the nation, the entire system of medical and health professional training will be renewed as part of the curriculum reform launched in the year of the 250th anniversary of Semmelweis University.**
3. **Semmelweis University will train some of Europe's top doctors, dentists, pharmacists, conductors, health and health related management as well as social science professionals.**
4. **A key export product of Semmelweis University is its foreign-language medical training, which generates significant revenues at national level, and which can be expanded by various means in the coming years.**
5. **Graduates of Semmelweis University are doctors and health professionals who know the Christian cultural roots that are so important in the field of medicine, and who not only understand the value of health, but live it.**
6. **Semmelweis University's clinical patient care activities will be renewed by developing a complete public care portfolio., thus enhancing the health security of the Hungarian population and increasing trust in healthcare.**
7. **Health and pharmaceutical developments that ensure national sovereignty are implemented on the research and innovation base of the University.**
8. **The research output of Semmelweis University can be significantly increased in a practical, translational direction as a result of patient-centred health industry cooperation with national and international partners in line with governmental goals. In this process domestic health industry players will be given a prominent role.**
9. **Leadership in data-driven support for health and healthcare industry paradigm shift.**

The aim of Semmelweis University is to contribute to the creation of a world-class medical and health sciences university in Hungary, to become a national educational and scientific base for disease management, and to support the re-launch of the economy through its developments.

In accordance with the provisions of Act XX of 2021 on „public trusts funds performing public function” and Act XX of 2021 on the “National Foundation for Health and Medical Training, the transfer of assets to the Foundation for National Health Care and Medical Education and Semmelweis University”, the Semmelweis University will continue to operate as a public interest university in the form of a foundation from 1 August 2021. The executive body of the foundation

is the board of trustees, which exercises all the powers that do not fall within the competence of the founder or other foundation organization or body, in particular the maintenance rights of the university specified in the act on higher education. The Board of Trustees consists of five (5) natural persons. The members of the Board of Trustees are the Chairman and the members of the Board of Trustees.

Written by:
dr. László Molnár
Zenina Sági
Pálma Dobozi
Beatrix Valyon

HONORARY DOCTORS OF THE MEDICAL FACULTY OF BUDAPEST DURING THE UNIVERSITY'S SCIENCE ERA

1895/96	Tivadar Károly, royal prince from Bavaria John Shaw Billings, professor from Philadelphia Rudolf Virchow, professor from Berlin Joseph Lister, professor from London Adolf Anders Retzius, professor from Stockholm Guido Bacelli, professor from Rome Pierre-Paul-Émile Roux, professor from Paris Károly Than, professor of Budapest	1914/15	Otto Karl Schjerning, professor of Berlin
		1928/29	Friedrich Schmidt-Ott, Minister of State of Prussia
		1930/31	Harvey Williams Cushing, professor of Harvard University in Cambridge
		1934/35	Jenő Sipőcz, Lord Mayor of Budapest
		1935/36	Ferdinand-Jean Darier, Chairman of the French Society of Dermatology Anton Freiherr von Eiselsberg, professor from Vienna Karl Albert Ludwig Aschoff, professor from Freiburg August Krogh, professor from Copenhagen Granville Harrison Ross, professor at Yale University Charles Scott Sherrington, professor from Oxford Frederick Gowland Hopkins, professor from Cambridge Gustave Roussy, professor from Paris
1899/1900	Tivadar Duka, chief doctor Col. Emeritus of the royal Bengal army of England, on the occasion of his 50th anniversary of operation	1942/43	Károly Szendy, Mayor of Budapest
1909/10	Albert Apponyi, Minister of Culture, on the occasion of the XVI. International Medical Congress held in Budapest		
1911/12	Heinrich Wilhelm Waldeyer, professor from Berlin, on occasion of his 50th jubilee as a doctor		

LIST OF PERSONS AWARDED WITH THE „DOCTOR HONORIS CAUSA” TITLE AT THE BUDAPEST/SEMMELWEIS UNIVERSITY OF MEDICAL SCIENCES

1967	Boris Vasilyevich Petrovsky (Soviet Union)	1972	Marcelino G. Candau (Switzerland)
1969	Pyotr Kuzmich Anohin (Soviet Union) Assen Hadyolov (Bulgaria) György Békéssy (USA) Vasily Vasilyevich Parin (Soviet Union) Daniel Bovet (Italy) Stefan Milcu (Romania) Karl Fellingner (Austria) Samuel Rapaport (Germany) Jules François (Belgium) Pyotr Grigoryevich Sergiyev (Soviet Union)	1976	Britton Chance (USA) Leonid Semyonovich Persyanilov (Soviet Union) Tadeusz Krwawicz (Poland) Vasyl Vasilyevich Zakusov (Soviet Union)
		1978	Uktam Aripov (Soviet Union)
		1980	Nikolai Nikolaevich Blohin (Soviet Union)
		1982	George Weder (USA)
		1983	Philip Gerald Mechanick (USA) Viking Olov Björk (Sweden)

1984	Walter Birkmayer (Austria) Arje Scheinen (Finland)	1995	Takao Yamauro (Japan) H. W. Wouters (Netherlands)
1985	Jens J. Pintborg (Denmark) Armand Hammer (USA) Klaus Thureau (Germany)	1996	Károly Balogh (USA) Thomas Rabe (Germany) Horst Cotta (Germany) Eberhard Ritz (Germany) Viktor E. Frankl (Austria) Heikki Ruskoaho (Finland) John A. Hobkirk (England) Thomas Schiff (USA) Dieter Ernst Lange (Germany) Volkmar Schneider (Germany)
1986	Hans Altmann (Austria) Mitropan Studenikin (Soviet Union)	1997	Theodor Hellbrügge (Germany) Hans-Günter Sonntag (Germany) Thomas Kenner (Austria) Moussa B. H. Youdim (Israel) Edward R. Perl (USA)
1987	John Gergely (USA) Halfdan I. Mahler (Denmark) Shogo Sasaki (Japan) Ludwig Mecklinger (Germany) F. Gotthard Schettler (Germany)	1998	Bernd Brinkmann (Germany) Frank A. Chervenak (USA) Asim Kurjak (Croatia) Ferenc Robicsek (USA) Werner Schmidt (Germany) André Haynal (Switzerland)
1988	László Ernster (Sweden) Jan Solich (Czechoslovakia) Dieter Schleger (Germany) Emeric Szilágyi (USA) Thomas P. Singer (USA) George B. Udvarhelyi (USA)	1999	Luis Gabriel Navar (USA) Nikolaus Freudenberg (Germany) Stefan Pollak (Germany) Tamás Hacki (Germany) Norbert Schwenzer (Germany) Thomas D. Kerényi (USA) Georg Stingl (Austria) Thomas Michael Krieg (Germany) Michael Wahl (Germany) Juhani Leppäluoto (Finland) Klaus Wolff (Austria)
1989	Douve D. Breimer (Netherlands)		
1990	Yoshinori Nozawa (Japan) Walter Künzel (Germany) Herbert Oelshcläger (Germany) Jerzy Maj (Poland) Martin Reivich (USA)		
1991	Friedrich Wilhelm Ahnefeld (Germany) László Róbert (France) Endre A. Balázs (USA) Benno Runnebaum (Germany) Herbert Braunsteiner (Austria) Heitaroh Iwata (Japan)		
1992	Merton Sandler (England) Hans Weidinger (Germany)		
1993	György Ács (USA) László Iffy (USA)		
1994	Ursula Lachnit-Fixon (Germany) Milan Chalabala (Slovakia) Felix Unger (Austria) Ulrich Joos (Germany) Isaac van der Wald (Netherlands) Sergio Ferri (Italy)		

LIST OF PERSONS AWARDED WITH THE „DOCTOR HONORIS CAUSA” TITLE AT SEMMELWEIS UNIVERSITY

2000	Allen Cowley (USA) Péter Illés (Germany) Iván Kiss (Germany) Ryszard Jerzy Gryglewski (Poland) Emmanuel van Praagh (France) Claes B. Wollheim (Switzerland) Gottfried O. H. Naumann (Germany) Gabriel P. Haas (USA) Gerd Schmitz (Germany) Elemér Zsigmond (USA)	2004	Stephen Katz (USA) Sebastian G. B. Amyes (England) Sir George Radda (England) Michael Marberger (Austria) István Seri (USA) Peter Gängler (Germany) Osmo Hänninen (Finland) Albert William Taylor (USA) Barry D. Kahan (USA)
2001	Pekka Juhani Saukko (Finland) Leo M. Sreebny (USA) N. Joan Abbott (England) Christopher Squier (USA) Ádám Tegzess (Netherlands) Gottfried Heinisch (Austria) Herbert Rübber (Germany) Han C. G. Kemper (Netherlands)	2005	Vilmos Vécsei (Austria) Louis Ignarro (USA) Gyöngyi Szabó (USA) Heinrich Schmidt-Gayk (Germany) Jos Hendrik Willem Hoogmartens (Belgium) Cynthia K. Larive (USA) Tibor Hortobágyi (USA) Vladimir Brusic (Australia)
2002	Jacques Rogge (Belgium, Switzerland) Sataro Goto (Japan) Matthias Brandis (Germany) John Holloszy (USA) János Alpár (USA) Denys Wheatley (England) Angelo Benedetti (Italy) Ferenc Jolesz (USA) Tatsuo Nagai (Japan)	2006	Uwe Wilhelm Joseph Heemann (Germany) Philippe Morel (Switzerland) Rolf Christian Gaillard (Switzerland) Mátyás Sándor (USA) Hideki Ohno (Japan)
2003	Thomas E. Andreoli (USA) Michael Georgieff (Germany) László Víg (Hungary) György Gosztanyi (Germany) Martin Black (England) Helmut Hahn (Germany) Thomas Detre (USA) Carl Hermann Lücking (Germany) David B. Ferguson (England) Marteen J. H. Slooff (Netherlands)	2007	John Raymond Garrett (England) Michael Landthaler (Germany) Kamal K. Midha (Canada) Gertrud Pfister (Denmark) Roberto Romero (USA) Heinz Schilcher (Germany) Jörg Schubert (Germany) Clemens Sorg (Austria)
		2008	Olaf Bodamer (Austria) Péter Pál Bucsky (Germany) Kelvin Davies (USA) Gabor Kaley (USA) Anton Sculean (Netherlands)

2009	Maynard R. Case (England) Christopher R. Chapple (England) László Endrényi (Canada) Zsuzsanna Fábry (Hungary – USA) Bruno Grandi (Italy) Jerzy Kosiewicz (Poland) Karl-Heinz Kuck (Germany) Peter Malfertheiner (Germany) Franco Mantero (Italy) Éva Mezey (Hungary – USA) Georg Petroianu (Germany – USA) Tamás Péter Sótonyi (Hungary)	2013	Peter Gabor Medveczky (USA) Arthur J. Moss (USA) Gerhard M. Kostner (Austria) Marie T. O'Toole (USA) Peep Veski (Estonia) Kai-Ming Chan (China) Paul G. M. Luiten (Netherlands)
2010	Roger Y. Tsien (USA) Masaki Kitajima (Japan) Hartmut P. H. Neumann (Germany) István Boldogh (USA) Constantin Copotoiu (Marosvásárhely, Romania)	2014	Richard M. Satava (USA) René Sylvain Kahn (Netherlands) Péter Gloviczki (USA) Herbert Ehringer (Austria)
2011	Péter Ferenczi (Austria) Dirk Pickuth (Germany) Andrzej Wiecek (Poland) Renato V. Iozzo (USA) Örs Nagy (Romania) István Bocskai (Romania) James S. Skinner (USA)	2015	Shigeru Saito (Japan) Pál Pacher (USA) Jacques Marescaux (France) Leena Kaarina Bruckner-Tudermann (Germany) Stephan Züchner (Germany) Fausto J. Pinto (Portugal) György Kálmán Béla Sándor (Finland) Panos Macheras (Greece) Attila A. Hincal (Turkey)
2012	Pierre Corvol (France) Tibor Juhász (USA) George Berci (USA) Axel Ullrich (Germany) Jozef Corveleyn (Belgium) Joseph Kutzin (Switzerland) Daan Braveman (USA) Imre G. Csizmadia (Canada) Árpád Gyéresi (Marosvásárhely, Romania) Vinod P. Shah (JSS University of Mysore, India) Jürgen Michael Steinacker (Germany)	2016	László Bögre (England) Walter Klepetko (Austria) Lajos Okolicsányi (Italy) György Kúnos (USA) Josep Figueras (Spain) Henning H. Blume (Germany) Gábor Tigyi (USA)
		2017	Gerhard Hindricks (Germany) Christine Baylis (USA) Rainer Schulz (Germany) Mikael Björnstedt (Sweden) Keiichi Maruyama (Japan) Josef Smolen (Austria) Clive G. Wilson (England) Stefan Offermanns (Germany)

2018	Dr. Miklos Sahin-Toth (USA) Dr. Maria Antonietta Stazi (Italy) Dr. Piotr L. Chlosta (Poland) Dr. Jianguang Xu (China) Dr. Daan J. A. Crommelin (Netherlands) Dr. Olavi Pelkonen (Finland) Prof. Dr. Scott David Solomon (USA) Offermans, Stefan (Germany)	2021	Prof. Stefan Anker (Germany) Prof. Mariann Pavone-Gyöngyösi (Austria) Prof. Gary Francis Baxter (England) Prof. Olschewski Andrea (Austria) Prof. Shahrokh Francis Shariat (Austria) Prof. Carlos J. Bustamante (USA) Prof. Ondrej Viklicky (Czech Republic) Prof. Hans Henri Marcel Paul Kluge (Denmark)
2019	Komajda, Michel (France) Hausenloy, Derek John (Singapore) Bax, Jeroen (Netherlands) Hogendoorn, Pancras (Netherlands) Madonna, Rosalinda (Italy-USA) Schirmacher, Peter (Germany) Mühlebach, Stefan (Switzerland) István Tóth (Australia)	2022	Prof. Dr. Alan B. Lumsden (USA) Prof. Dr. Bruno Podesser (Austria) Prof. Dr. Henk L. Granzier (USA) Prof. Dr. Marc Dewey (Germany) Prof. Dr. Falkai Péter (Germany) Prof. Dr. Rade D. Paravina (USA) László Záborszky (USA) Prof. Franz Weidinger (Austria) Prof. Marc Alan Pfeffer (USA) Prof. Thomas G. Allison (USA)
2020	Prof. Hans Henkes (Germany) Prof. Gerasimos Filipatto (Greece) Dr. Markó-Varga György (Sweden) Prof. Dr. Jude Fitzgibbon (England) Prof. Dr. Udo Hoffmann (USA)		

PRIVATE TUTORS OF SEMMELWEIS UNIVERSITY

- 1995 Dr. Árpád Mayer head physician, Uzsoki Hospital, Oncology Centre
Dr. László Takácsi Nagy deputy head physician, Uzsoki street Hospital, Oncology Centre
- 1996 Dr. Elemér Nemesánszky head physician, Buda Hospital of the Hospitaller Order of Saint John of God
Dr. István Hartyánszky, chief physician, National Institute Of Cardiology
Dr. János Strausz medical director, Törökbálint Institute of Pulmonology
Dr. Szabolcs Ottó deputy director-general chief physician, National Oncological Institute
Dr. András S. Szabó associate professor, Head of Department, Saint Stephen University
Dr. Endre Ludwig head physician, Péterfy Sándor street Hospital
- 1997 Dr. Béla Goldschmidt head physician, Saint Roch Hospital
Dr. János Hamar head physician, National Institute of Traumatology
Dr. György Jermendy head physician, Bajcsy-Zsilinszky Metropolitan Hospital
Dr. György Karmos senior research fellow, Hungarian Academy of Sciences, Institute of Psychology
Dr. Elek Kisida head physician, Buda Hospital of the Hospitaller Order of Saint John of God
Dr. Tibor Rapos head physician, Saint Stephen Metropolitan Hospital
Dr. Géza Tasnádi head physician, Pál Heim Metropolitan Municipality Children's Hospital
Dr. István Péter Temesvári head physician, National Institute of Rheumatology and Physiotherapy
Dr. József Tóth head physician, National Oncological Institute
Dr. Károly Sándor Tóth head physician, Saint Margaret Hospital
Dr. Valéria Váradi head physician, Saint Margaret Hospital
Dr. Gábor Pethő director of quality assurance, Pharmavit Ltd.
- 1998 Dr. Hedvig Bodánszky consultant, National Medical Centre
Dr. István Láng chief physician, National Oncology Institute
Dr. Béla Lombay head physician, B-A-Z County Hospital, Radiology Institute, Department of Paediatric Radiology
Dr. János Radó physician, Virányos Clinic
Dr. Károly Simon head physician, Saint Emeric Hospital-Clinic
- 1999 Dr. György Bodoky chief physician, Saint Ladislaus Hospital
Dr. Kristóf Nékám head physician, Buda Hospital of the Hospitaller Order of Saint John of God
Dr. Gyula Poór director-general chief physician, National Institute of Rheumatology and Physiotherapy
Dr. László Simon head physician, Tolna County Municipal Hospital, Szekszárd
Dr. Attila Tankó medical specialist, District II. Municipality Clinic
Dr. Gábor Veres director-general chief physician, Balatonfüred State Hospital
Dr. István Vermes chief physician, Medical Spectrum, Twente (Netherlands)
Dr. Bosco Camelo associate professor, University of Rome
Dr, Péter Göblyös head physician, National Insitute of Hematology and Immunology
- 2000 Dr. Miklós Bély head physician, Buda Hospital of the Hospitaller Order of Saint John of God
Dr. György Berencsi head physician, Béla Johan National Epidemiology Centre
Dr. Tamás Szabó Head of the scientific group, Central School of Sport

- 2001 Dr. Sándor Frenyó head physician, National Traumatology Institute
 Dr. Ferenc Horkay head physician, National Cardiology Institute
 Dr. Krisztina Kádár chief physician, National Cardiology Institute
 Dr. Lajos Kotsis chief physician, National Korányi Institute of TBC and Pulmonology
 Dr. Ilona Kovaszkó senior research fellow, No. I. Institute of Pathology and Experimental Cancer Research
 Dr. Aladár Rónaszéki head physician, Elizabeth Hospital of Péterfy Sándor street Hospital
 Dr. Ágnes Szebeni head physician Emeritus, Ministry of Home Affairs Central Hospital
 Dr. András Véghe head physician, Pál Heim Metropolitan Municipality Children's Hospital
 Dr. Gábor Winkler head physician, Saint John Hospital
- 2002 Dr. Mátyás J. Baló (Banga) head physician, Central Hospital of the Hungarian Homeland Defence Forces, Department of Internal Medicine
 Dr. Béla Büki chief physician, Kremsi Hospital, Department of Otolaryngology
 Dr. Sándor Cziráj head physician, Deputy Director-General, National Scientific Institute of Neurosurgery
 Dr. Gyula Domján head physician, Saint Roch Hospital, No. I. Department of Internal Medicine
 Dr. Sándor Dubecz chief physician, National Oncology Institute, Department of General Surgery and Thoracic Surgery
 Dr. Lajos Kullmann director-general chief physician, National Medical Rehabilitative Institute
 Dr. Ádám László head physician, Bajcsy-Zsilinszky Hospital, Department of Obstetrics and Gynecology
 Dr. Károly Nagy deputy scientific director, National Institute of Dermatology and Venereology
 Dr. Erzsébet Temesvári senior research fellow, National Institute of Dermatology and Venereology
- 2003 Dr. Áron Altorjay head physician, Fejér County Saint George Hospital
 Dr. István Bodrogi head physician, National Oncology Institute
 Dr. Károly Cseh head physician, Sándor Korányi Hospital and Clinic
 Dr. Gábor Faludi head physician, Kútövölgyi Clinical Array
 Dr. Irén Herjavec head physician, National Korányi Institute of TBC and Pulmonology
 Dr. Kálmán Róna scientific consultant, Department of Forensic Medicine
 Dr. György Szeifert chief physician, National Scientific Institute of Neurosurgery
 Dr. Imre Klebovics head of science department, EGIS Pharmaceuticals PLC
- 2004 Dr. Jenő Julow head physician, National Scientific Institute of Neurosurgery
 Dr. László Bognár head physician, National Scientific Institute of Neurosurgery
- 2005 Dr. György Bagdy head of laboratory, scientific director, National Institute of Psychiatry and Neurology
 Dr. Katalin Borbély head physician, National Scientific Institute of Neurosurgery
- 2006 Dr. Ildikó Horváth head physician, National Korányi Institute of TBC and Pulmonology, doctor of the Hungarian Academy of Sciences
 Dr. László Dézsi research supervisor, Gedeon Richter PLC Research Department of Pharmacology and Drug Safety
 Dr. Tamás Szamosi consultant, No. II. Clinic of Paediatrics
- 2007 Dr. Róbert Veres head physician, National Scientific Institute of Neurosurgery

FOUNDATION FOR NATIONAL HEALTH CARE AND MEDICAL EDUCATION

Act IX of 2021 on „public trusts funds performing public function” and Act XX of 2021 on the “Foundation for National Health Care and Medical Education, the transfer of assets to the Foundation for National Health Care and Medical Education and Semmelweis University”

The executive body of the foundation is the Board of Trustees, which exercises all the powers that do not fall within the competence of the founder or other foundation organization or body, in particular the maintenance rights of the university specified in the act on higher education. The Board of Trustees consists of five (5) natural persons. The members of the Board of Trustees are the Chairman and the members of the Board of Trustees.

Members of the Board of Trustees

CHAIRMAN

Dr. Gábor Orbán
(Chief Executive Officer of Gedeon Richter Plc.)

MEMBERS

Dr. Jonathán Róbert Bedros
(Director General of Szent Imre University Training Hospital)

Dr. Péter Gloviczki
(Professor of Vascular Surgery at Mayo Clinic)

Dr. Béla Péter Merkely
(Rector of Semmelweis University, Director of the Heart and Vascular Centre)

Dr. Miklós Szócska
(Director of the Health Services Management Training Centre and the Institute of Digital Health Sciences, Dean of the Faculty of Health and Public Administration)

Supervisory Board

CHAIRWOMAN

Dr. Róza Nagy
(Chief Adviser to the President of Magyar Nemzeti Bank i.e. Hungarian National Bank)

MEMBERS

Dr. Zoltán Hankó
(President of the Hungarian Chamber of Pharmacists)

István Havas
(Executive Director)

Senate

The Senate is the supreme autonomous leading body endowed with rights of decisional authority, initiative, review and control. The chairman of the Senate is the rector of Semmelweis University.

The makeup of the Senate

The member of the Senate may be such a person – excluding representatives of the Student's Union and other representative organisations – who is employed by Semmelweis University in an employment relationship or as a full-time working public servant, i.e. lecturer, researcher, teacher, or other scope of activity. The Senate consists of 45 members. This number is determined according to the seats available based on position, election and delegation as a result of election, defined in Section 13, part (4)-(5) of the Organisational and Operational Rules. The Rector and Chancellor are ex officio members of the Senate.

Members of the Senate

RECTOR	Dr. Béla Merkely
CHANCELLOR	Dr. Lívia Pavlik
FACULTY OF MEDICINE	Dr. Miklós Kellermayer Dr. Edit Buzás Dr. Péter Ferdinandy Dr. Alán Alpár Dr. Zoltán Jakus
FACULTY OF HEALTH SCIENCES	Dr. Gabriella Bednárikné Dörnyei Dr. István Vingender Dr. Zoltán Balogh
FACULTY OF DENTISTRY	Dr. Gábor Gerber Dr. Károly Bartha Dr. Csaba Dobó Nagy Dr. Zsolt Németh
FACULTY OF PHARMACEUTICAL SCIENCES	Dr. Romána Zelkó Dr. Tamás Tábi Dr. István Antal Dr. Szabolcs Béni
FACULTY OF HEALTH AND PUBLIC ADMINISTRATION	Dr. Miklós Szócska Dr. Eszter Zimányiné Sinkó Dr. Beáta Judit Pethesné Dávid
ANDRÁS PETHŐ FACULTY	Dr. Andrea Tenk Miklósné Zsebe Dr. Éva Szabó Dr. Feketené Dr. Ibolya Túri
KÁROLY RÁCZ SCHOOL OF PHD STUDIES	Dr. Zoltán Benyó

CLINICAL CENTRE

Dr. Attila Szabó
Dr. Ferenc Bánhidly
Dr. Péter Hermann
Dr. Balázs Hankó
Dr. Péter Nyirády
Dr. Attila Szijártó
Dr. Kálmán Tory

STUDENT'S UNION

Réka Csenge Gecsey
Imre Richárd Nagy
Benedek Bakó
Loretta Enikő Nyirády
Alexandra Pop
Gábor Koós
Botond Boldizsár Bényi
Csaba Mészáros

DOCTORANDUS STUDENT UNION

Dr. Boldizsár Kiss

PUBLIC SERVICE COUNCIL

Dr. Zoltán Berki
Zoltánné Arany

SEMMELWEIS LABOUR ORGANISATION

(according to Section 13. Parts (2) and (3)
of the Organisational and Operational Rules)

Dr. Katalin Antmann
Dr. Gábor Élő

INVITEES

Dr. Ágoston Szél
Irénné Baumgartner Holló
Dr. Zsolt Kovács
Dr. Levente Török
Dr. Andrea Kormos
Dr. Marcel Pop
Dr. József Gajdácsi
István Mészáros
Gábor Czinderi
Tünde Falatovics
Dóra Szepesi
Dr. Zsolt Antóny
Gábor Orbán
Prof. Dr. Zoltán Nagy
Prof. Imre Klebovich
Dr. Zoltán Szabolcs

GOVERNMENT SEMMELWEIS UNIVERSITY



RECTOR: **Prof. Dr. Béla Merkely** M.D., Ph.D., D.Sc.



CHANCELLOR: **Dr. Livia Pavlik**

VICE RECTORS:

Prof. Dr. Ferenc Bánhidy M.D., Ph.D., D.Sc.
General Affairs

Prof. Dr. Péter Hermann D.M.D., M.Sc., Ph.D.
Educational Affairs

Prof. Dr. Péter Ferdinandy M.D., Ph.D., D.Sc., MBA
Scientific Affairs

Prof. Dr. Attila Szabó M.D., Ph.D., D.Sc.
Clinical Affairs

Dr. Éva Feketéné Szabó
Strategical and Developmental Affairs

Prof. Dr. Alán Alpár M.D., Ph.D., D.Sc.
International Studies

DEANS:

Prof. Dr. Péter Nyirády M.D., Ph.D.
Faculty of Medicine

Prof. Dr. Gábor Gerber D.M.D., Ph.D.
Faculty of Dentistry

Prof. Dr. István Antal dr. pharm., Ph.D.
Faculty of Pharmaceutical Sciences

College Prof. Dr. Gabriella Dörnyei Ph.D.
Faculty of Health Sciences

Dr. Miklós Szócska, Ph.D.
Faculty of Health and Public Administration

Dr. Andrea **Zsebe-Tenk**, Ph. D.
András Pető Faculty

PRESIDENT OF THE DOCTORAL COUNCIL:
Prof. Dr. Zoltán Benyó M.D., Ph.D., D.Sc.

HEAD OF THE CENTER OF INTERNATIONAL TRAINING PROGRAMS
Prof. Dr. Alán Alpár M.D., Ph.D., D.Sc.

DIRECTOR of the DIRECTORATE OF INTERNATIONAL STUDIES
and ACADEMIC PROGRAM DIRECTOR FOR MEDICINE,
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Wednesday: CLOSED
Thursday: 10 a.m. – 12 p.m. Friday: 10 a.m. – 12 p.m.

**SCHEDULE FOR THE 2024/2025 ACADEMIC YEAR
(Faculty of Medicine, Faculty of Dentistry, Faculty of Pharmaceutical Sciences)**

The dates are subject to change!

University events

Freshmen's Camp	August 19 – August 22, 2024
Summer School - EOK	August 29-30, 2024
Opening Ceremony (MVM Dome)	August 31, 2024
National Holidays	October 23, 2024 November 1, 2024
Semmelweis Symposium – EOK	November 11-13, 2024
Winter Break	December 23, 2024 – January 5, 2025
TDK Conference	February 5-6-7, 2025
National Holidays	March 15, 2025 April 18 – April 21, 2025 May 1, 2025 June 9, 2025
Exam Outside Academic Year	August 21 – August 27, 2025

Faculty of Medicine

Enrollment	I year	August 26-30, 2024
Registration	VI year	July 5 – July 11, 2024
Registration 1st semester	I – V year	August 26-30, 2024
Fall Study Period	I – III year IV – V year	September 2 – December 6, 2024 September 2, 2024 – January/February, 2024
Fall Exam Period	VI year I – III year	July 15, 2023 – January, 2024 December 9 – December 20, 2024 and January 6 – February 7, 2024
Board Exam Period		November 19 – November 27, 2024
Written Board Exam		November 19, 2024
Oral and Practical Board Exam		November 26, 2024
Registration 2nd semester	I – VI year	February 3–7, 2025
Spring Study Period	I – III year IV – V year VI year	February 10 – May 26, 2025 January/February 2025 – June 27 + 2 make up weeks until July 11 January, 2025 – April 25, 2025
Spring Exam Period	I – III year	May 19 – July 4, 2025
Board Exam Period		May 27 – June 11, 2025
Written Board Exam		May 27, 2025
Oral and Practical Board Exam		between May 29 - June 11, 2025
Graduation Ceremony		June, 2025

Faculty of Dentistry

Enrollment	I year	August 26, 2024
Registration 1st semester	II – V year	August 26–30, 2024
Late Registration		September 2-3, 2024
Fall Study Period		September 2 – December 6, 2024
Fall Exam Period	I – III year	December 9 – December 20, 2024 and January 6 – February 7, 2024
	IV– V year	December 9 – December 20, 2024 and January 6–31, 2024
Board Exam Repeat Written Exam (test)		September 2, 2024
Board Exam Repeat Oral and Practice		September 4, 2024
Board Exam Correctional Written Exam (test)		December 9, 2024
Board Exam Correctional Oral and Practice		December 11, 2024
Registration 2nd semester	I – III year	February 3 – February 7, 2025
	IV – V year	January 27 – February 7, 2025
Late Registration		February 10-11, 2025
Spring Study Period	I – III year	February 10 – May 16, 2025
	IV year	February 3 – May 9, 2025
	V year	February 3 – April 25, 2025
Spring Exam Period	I – III year	May 19 – July 4, 2025
	IV year	May 12 – June 27, 2025
	V year	April 28 – June 13, 2025
Board Exam Written Exam (test)		June 16, 2025
Board Exam Oral and Practice		June 18-20, 2025
Graduation Ceremony		Early July, 2025

Faculty of Pharmaceutical Sciences

Enrollment	I year	August 27, 2024
Registration	V year	July 8-12, 2024
Registration 1st semester	II – IV year	August 26-30, 2024
Fall Study Period	I – IV year	September 2 – December 6, 2024
	V year	September 16 – December 13, 2024
Fall Exam Period	I – V year	December 9 – December 20, 2024 and January 6 – February 7, 2024
Registration 2nd semester	I – IV year	February 3-7, 2025
	V year	January 27 – February 7, 2025
Spring Study Period	I – IV year	February 10 – May 16, 2025
4 months internship practice for	V year	January 29 – May 30, 2025
Spring Exam Period	I – IV year	May 19 – July 4, 2025
Board Exam Period		June 4-20, 2025
Graduation Ceremony		Late June, Early July, 2025

THE WORDS OF THE VOW AT REGISTRATION

I....., student of Semmelweis University promise under oath that I will respect the Hungarian laws and the Fundamental Law of Hungary. I promise that I shall abide by the regulations of Semmelweis University. I promise solemnly that I will respect the professors and teachers of the University, and that my conduct will be in keeping with the honor of my profession. I will keep the secrets of the patients that I learn about in the course of my studies. I will pursue my studies with full sense of responsibility to prepare myself to the best of my abilities for all my duties and obligations in my profession so as to be able to serve with my knowledge the progress of mankind. So help me God!

THE WORDS OF OATH AT GRADUATION

Faculties of Medicine and Dentistry

"I, swear that I will devote myself to the medical profession at all times. I will use the knowledge acquired in the field of medicine to prevent and cure diseases, and to benefit the physical and mental well-being of my patients. I will not betray the confidence of those who turn to me, nor will I take advantage of their defenselessness, nor will I disclose their secrets. I will treat every person with equal care and attention. I will maintain the high quality of my knowledge and skills by continuous education, but will also acknowledge the limits of my knowledge and abilities. I will submit myself to the ethical requirements of my medical practice. I will strive to enhance the reputation of the medical profession and SEMMELWEIS University."

"Én, esküszöm, hogy orvosi hivatásomhoz mindenkor méltó magatartást tanúsítok. Orvosi tudásomat a betegségek megelőzésére, a betegek testi-lelki javára, betegségük gyógyítására fordítom. A hozzám fordulók bizalmával, kiszolgáltatott helyzetével visszaélni nem fogok, titkaikat fel nem fedem. Egyenlő figyelemmel és gondossággal gyógyítok minden embert. Tudásomat és gyakorlati ismereteimet állandó képzéssel magas szinten tartom, de ismereteim és képességeim korlátait is tudomásul veszem. Az orvosi működéssel kapcsolatos etikai követelményeket tiszteletben tartom. Arra törekszem, hogy az orvostudomány, valamint a SEMMELWEIS Egyetem jó hírnevét öregbítsem és megbecsülését előmozdítsam."

Faculty of Pharmaceutical Sciences

I, swear that in virtue of my acquired knowledge of pharmaceutical sciences, I shall do my professional duty with the utmost diligence, and I shall always behave worthy of my profession. I shall place before all things the care for and the healing of my patients. I shall not reveal any data concerning the health status or the medication of my patients. I shall maintain my theoretical and practical knowledge at a high level. I shall never use my knowledge for activities that are contrary to the ethical code of pharmacists. As a participant in the activity of healing, I shall use my knowledge only for the defense and restitution of health to my fellow humans. I shall do my best to promote the science of pharmacy and keep the good name of the Semmelweis University.

PLAGIARISM DECLARATION

at the Faculty of Medicine

(Declaration on compliance with regulations on preparing thesis work)

I, the undersigned, name:

(Neptun code:) hereby declare by signing this declaration that this thesis work, entitled:

.....
.....
....."

is my own work, and I adhered to the provisions of Act LXXVI of 1999 on Copyright in the preparation of the thesis work and respected the rules laid down by the University.

I acknowledge by signing this declaration that Semmelweis University refuses accepting the thesis provided it can be proved that this thesis work was not carried out by me or violation of copyright law arises with regard to the thesis.

I am also aware, that the authorization holders may take action against me because of violation of copyright law, which may result in legal consequences, including consequences of civil law, infringements act and criminal law.

Budapest,, 20.....

.....
student's signature

Rectorial Circular

on the independent work of students and on certain questions concerning lecture and practice policies

In order to meet the requirement for independent student work and to ensure the smooth functioning of lectures and practices, I hereby draw the attention of the students of Semmelweis University to the following:

- I. In the course of testing one's knowledge and practical skills, it is prohibited, under disciplinary liability, to use any unauthorized material, or to secure any illicit advantage. For the purpose of this provision, advantages ensured to disabled students in accordance with legal provisions or university regulations and allowances based upon individual decisions made in accordance with Chapter III Part III of The Rules of Operation and Organization of Semmelweis University qualify as allowed advantages.

- II. The independent creation of original work, as well as the true and accurate citation, and the precise and complete indication of the sources used are not only scientific requirements, but also obligations arising from legal regulation.

Intellectual property is protected by the laws of Hungary. The content of this protection is defined particularly by the Copyright Act, the acts on inventions and patents, and on trademarks and the Civil Code of Hungary. The intellectual property of another person is only allowed to be used in accordance with these regulations.

All creations of literature, science and art shall fall under copyright protection as defined by Act No LXXVI of 1999 on copyright. According to this act, from a work disclosed to the public any part may be cited by indication of the source and naming the author indicated therein. Such citation shall be true to the original and its scope shall be justified by the nature and purpose of the borrowing work. The free use is permitted only so far as it does not conflict with a normal exploitation of the work and does not unreasonably prejudice the legitimate interests of the author, and it is in compliance with the requirements of fairness and is not designed for a purpose incompatible with the intention of free use.

The consequences of the abuse of rights relating to intellectual property are provided by law, thus the abuse of these rights may also fall under disciplinary liability.

- III. In the absence of previous authorization, it is prohibited, under disciplinary liability, to take photos or make video or sound recordings at lectures and practices. In addition, any misuse of the likeness or recorded voice of another person shall be deemed as a violation of inherent rights and may result in other consequences. The disclosure of likeness or recorded voice of another person shall be authorized by that person.

I request all students to take notice of the above.

Attention to Students of Foreign Language Programs at Semmelweis University

In recent years, Semmelweis University has built a valuable student community by maintaining high academic standards and placing much emphasis on the ethical integrity of our education. The overwhelming majority of our students appreciate our efforts. Unfortunately, a small minority does not want to accept our ethical guidelines, and tries to take undue advantage at exams by using unacceptable techniques.

We therefore do implement the following sanctions:

Against students who are found at exams possessing forbidden items, including electrical devices, such as mobile phones, ipods, etc. a disciplinary action will be initiated that can end with immediate discharge with disgrace from Semmelweis University. By implementing this rule, we wish to preserve the academic and material value of the Semmelweis Diploma.

NEPTUN.NET Unified Education System

Summary for Students

At Semmelweis University, the education system NEPTUN.Net is used for performing administrative tasks related to education. The users of the system – registry clerks, faculty secretaries, instructors and students – have different authorities to access the information stored in the system.

For the students of the institution, the system provides the following functions:

- To check their personal data and information related to their studies,
- To register for subjects,
- To register for exams,
- To check grades entered into the system,
- To monitor the grants transferred,
- To get information on their payment obligations,
- To manage their finances,
- To receive messages within the system from registry clerks, secretaries of institutions and instructors.

You get your user ID and password to the NEPTUN.Net system from the Dean's Office or the Registry of the Faculty where you have been admitted. Users with students' rights may only manage their own data. In order to prevent unauthorized access, it is very important that you change your password from time to time. It is recommended that you change the password immediately upon entering the system for the first time. The password should be minimum 6 characters long, consisting of letters, numbers or a mixture of both.

Students can access the NEPTUN.Net system on any computer located in students' terminal rooms (in the Student Centre /NET/ and in the Central Library) or any other computer with Internet access using a browser (Internet Explorer 7 or Mozilla Firefox version 2) from the official university Neptun Portal (<http://net.neptun.sote.hu>).

(For a detailed description of the Students' WEB please check the Neptun Portal – Support / Neptun usage / Aids by role / Aids for students).

Entering the system

On the Neptun Portal, click on the Student icon to enter. Then choose the server you wish to use. Enter the Neptun code (ID) and the password on the window which appears.

Once you enter you can choose from the following data groups at the top of the page:

Personal data, Studies, Subjects, Exams, Finances, Information, Administration

Upon entering the Neptun.Net system, students have to perform the following operations during a term:

- Registration
- Subject registration
- Exam registration

Registration

You can access the registration function in the “Administration” menu. Here you can register for the next term by clicking on the link “Registration”. On the page “Registration requests”, when clicking on “New” in the status column of the current semester, a window is displayed where you have to declare whether you choose to register with an “Active” or a “Passive” status. After you have chosen the appropriate option, click on the button “I declare”. (Such registration is only available if Registration period is displayed under “Periods” in the “Information” menu! If you have not chosen any course for the semester yet, but you intend to register with an “Active” status, the program will ask you to make sure whether you really want to continue the registration process. If you choose the option “no” at this stage, this means that registration will not be completed, and before you do so, you can take up your courses. If you choose “OK”, you can continue registration. Naturally, you are free to take up courses afterwards.)

Subject registration (choosing subjects, choosing courses)

Choose the link “*Subject registration*” in the “*Subjects*” menu.

1. **Displaying the list of subjects:** Select the appropriate semester (e.g. 2022/23/1) and the curriculum, then select “Subject list of the chosen curriculum” under „Subject type” to display obligatory and elective subjects. The option “Other elective subjects” may be used if the institution concerned manages its elective subjects separated from the curricula. If you do not find any subject in this list, this only means that at your institution these elective subjects are also integrated into the curricula. In this case, you should choose the option “Subject list of the chosen curriculum” at this question. By ticking “Show only those subjects that will be launched” you can make sure that only those subjects appear in the displayed subject list which will be launched in the semester selected. You can display the subject list filtered according to the conditions set by clicking on the “List subjects” button.
2. **Display, search and ordering options in the subject list:** On the top of the list you can set the number of subjects to be displayed on one page. If the list is longer than one page, you can use the two-way arrows on the top of the list or the drop-down menu to turn pages. By clicking on the printer icon, you can print the page displayed. When you find the subject required, click on any detail and all details of the selected subject will be displayed in a pop-up window.
3. **Subject details / Current courses tab:** Here you can see the courses launched in the given semester for the selected subject. You can now choose the subject and its course or courses. You can choose the courses by marking the checkbox on the right of the course list, then confirm your choice by clicking on “Save” at the bottom of the page. You have to choose more than one course for the same subject if more than one course type (e.g. theoretical and practical) are announced. In this case, you need to choose one course for each course type. This is not true for exam courses which must be chosen independently in all cases, which means that you cannot choose an exam course and another course type for the same subject at the same time. Course registration will only be successful if:
 - you have fulfilled the requirements for subject and course registration,
 - none of the courses selected is booked out (in the students/limit column the number of students is under the limit),
 - **you have selected one course for each course type (e.g. theoretical, practical),**
 - **it is preliminary or final subject and course registration period,**
 - you have not completed the subject so far.
 For more information on a given course, click on any detail of the given course in the list to display the course information in a new pop-up window.
4. **Deregistering subjects:** If for any reason you would like to drop a chosen subject, you can do so under “Registered subjects” in the “Subjects” menu. On this page you can see the subjects you have chosen in the current registration period; you can change courses or deregister subjects here. If in any subject line you click on “Deregister subject”, the system will first ask whether you really want to drop the given subject and if you answer yes, the subject will be dropped and deleted from the list of registered subjects. Naturally, this means that your registration for the courses of the deregistered subjects is also deleted and you will be informed of this. (Subject deregistration is possible during the preliminary or final subject or course registration period.)
5. **Changing courses:** If you want to change the course(s) you have chosen in a given subject you can do this by clicking on any detail of the given subject to display the pop-up window “Subject details”. Here on the “Current courses” tab in the last column of the list you have to select the course(s) required and unmark the course(s) to be dropped, then confirm the change by clicking on the „Save” button. The system will report on the change or the reasons for potential errors.

Exam registration

You can find “Exam registration” in the “Exams” menu. On this page you can register for exams or cancel your registration. In the exam list, exams which you have already registered for will appear in blue. To cancel an exam registration, go to the „Selected exams” menu.

1. **List exams:** On entering the page for the first time all future exam dates announced in the current semester will appear, but you can filter the list. If you only want to see the exam dates of a given subject, select the subject from the “Subjects” roll-down menu, then click on the button “List exams”.
2. **Exam registration:** To register for an exam, click on “Register” in the line of the given date. The program will report on the success or failure of exam registration.
3. **Cancelling exam registration:** If you register for an exam by mistake or you simply change your mind and want to cancel your registration, click on „Cancel” next to the given exam. (Normally this can be done prior to the exam within the cancellation deadline.)
4. **Payment of retake exam fee:** By clicking on “Payment” under “Finances”, you will be taken to the page where the list of settled and payable items is displayed. Here you can also fulfill your financial obligations. On the “Payment” tab, click on the “Transcribe item” button and on the appearing “Transcribe item” window, enter the payment title (retake exam), then select the subject for which you would like to transcribe the exam fee from the roll-down list. Finally, click on the „Create item” button. You can take over the invoice of the item created in the Dean’s Office. To list current items, select the current semester using the “Semester” roll-down menu under “Filters” on the 1.) “List items” tab. (Items you have displayed are marked as “Own item” in the “Status” column.) To view the details of a given item, click on “Details” in the line of the item concerned.

Message management

During term time, students may receive messages on various topics. This menu can be found on the left-hand side of the page. Here you can see the messages sent to the student by the Dean’s Office clerk in charge of his/her year or the instructor of a chosen course. You can view the text of the message on a new window by clicking on the required topic in the list of messages.

The NEPTUN system assists students and university employees in the accurate and effective performance of administrative tasks related to their studies. **In order to ensure faultless operation, it is indispensable that authority rules are complied with and that accurate data is provided. Therefore, please note that data changes or wrong data must be corrected within 8 days using „Modify data”.**

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Background The Department of Neurosurgery was established in 1977 and is operated by the Center of Neurosurgery and Neurointervention, which is a stand-alone neurosurgical hospital. It has 156 beds in its wards, which includes the only paediatric neurosurgical department in Hungary. The Center is the third largest neurosurgical service-provider in Europe.

Profile The Department of Neurosurgery is involved in virtually the entire spectrum of neurosurgical practice. All other specialities needed for modern neurosurgery (e.g. neuroradiology, neuroophthalmology, neurootology, electrophysiology, neuropathology and neurology) are also present, and are organised in a multidisciplinary structure. The biggest neuro-intensive care department, with separate units for paediatric cases, is maintained and operated by the Department.

Education Lectures are given on neurosurgery to medical undergraduates in Hungarian and English. Postgraduate resident training is also provided, in addition to further training courses.

Health Care Annually, around 3500 major operations are performed in five theatres, including endovascular interventions, stereotactic surgery, endoscopic and laser surgery, neuro-implantation, in addition to the so-called classical micro-neurosurgical operations. The outpatient turnover is 50,000. The Department has the highest case mix index in Hungary, indicating the most complicated cases, which makes a unique background for both undergraduate and postgraduate teaching.

Research Multidisciplinary organisations with a high patient turnover are ideal for basic and clinical research. Cerebral vascular malformations, tumours of the base of the skull, pituitary adenomas, functional neurosurgery and interventions, neurooncology, spine surgery as well as intra- and post-operative patient monitoring are the major fields of interest for the Department's staff members.

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Assistant lecturer:

Dr. Réka Brubel, Dr. Noémi Csibi, Dr. Ákos Gasparics, Dr. András Mihály Géczi, Dr. István Madár, Dr. Mária Prosszer, Dr. Péter Varga, Dr. Zsófia Varga-Magyar

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Administrator:

Szilvia Kristóf

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Lecturer:

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Dr. Attila Keszthelyi

Assistant professor:

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Assistant lecturer:

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Dr. Erzsébet Péntes, Dr. Gergely Bánfi

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Head of the Department:

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Tutor:

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Deputy head of Department:	Dr. Gábor Orosz, Dr. István Mártai
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Clinical specialist:	Dr. Ádám Péter
Executive of educational affairs:	Mrs. Beáta Flóra Németh
Departmental secretariat:	Mrs. Melinda Könyves
International affairs:	Balázs Nándor Marczin

The department was founded on July 1st, 1970 (EüM 43/1969) – first under the name of Department of Military Medicine (as part of the Institution of Medical Training), then as the Institution of Military Medicine, and later as the Institution of Military and Disaster-Medicine. From 2001 it was named ÁOK (Faculty of Medicine) Department of Military and Disaster Medicine, Semmelweis University. The name has undergone further changes since July 1st, 2004 as university reorganization affected and integrated a number of sub-divisions (the former Department of Oxyology and the Department Group of Emergency Care Training) into this department. Since March 27th, 2014, by legislation of the senate (40/2014), the present name of the institution is the **Department of Military-, Disaster- and Order Enforcement Medicine**. It is currently located at the Medical Centre, Hungarian Defence Forces complex, where the functionality of the institution is provided by a series of separate contracts of cooperation.

PROFESSIONAL PROFILE

- Coordination, education and science-related questions regarding military and disaster medicine
- Maintaining an established and widely expanding network of local and international cooperation in the fields of military, disaster, and order enforcement medicine
- Continuing the long-running collaboration between the NATO Centre of Excellence for Military Medicine and Semmelweis University
- Contract-governed scientific collaboration between departments of the National University of Public Services and Semmelweis University
- The observing and analysing of disasters either occurring in the present or that are historically documented throughout the World - and application of the findings under Hungarian circumstances
- Establishing training programmes related to the department's field and organising such courses for the doctors and professionals, both civilian and military-employed.
- Providing the graduate education course "The Medical Fundamentals of Disaster Resolution" in Hungarian, English and German languages
- The education of trainee specialists at both theoretical and technical levels, coordination of these projects
- Preparation of candidates for the Military-, Disaster and Order Enforcement exam
- Hosting Qualification Examinations and organising the related preparation course

FACULTY OF DENTISTRY

Department of Prosthodontics

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Assistant professor:	Dr. János Gerle, Dr. László Kádár, Dr. Endre Somogyi, Dr. Katalin Károlyházy (tutor 5 th year)
Assistant lecturer:	Dr. Péter Faluhelyi, Dr. Marianna Jáhn, Dr. Katalin Kalocsai, Dr. Mercédesz Linninger, Dr. Krisztina Mikulás, Dr. Zsuzsanna Tóth, Dr. Pál Sajgó, Dr. Katalin Nemes, Dr. Dénes Palaszko (tutor 2 nd year, 3 rd year 2 nd semester), Dr. Ildikó Bercze (tutor), Dr. Alexandra Czigola
Clinical specialist:	Dr. Péter Schmidt, Dr. János König (tutor)

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Assistant professor:	Dr. Miklós Kaán, Dr. Ibolya Kéri
Assistant lecturer:	Dr. Mária Budai, Dr. Beáta Szádeczky, Dr. Adrienn Barta, Dr. Attila Soós, Dr. Kinga Deseő

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Full professor:	Prof. Dr. Zsolt Németh med. habil
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Assistant professor:	Dr. Pál György Nagy (tutor), Ph.D
Assistant professor:	Dr. Palkovics Dániel Ph.D
Assistant lecturer:	Dr. Csifó-Nagy Boróka Ph.D
Assistant lecturer:	Dr. Dobos Andrea
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The Department of Pharmacodynamics at the Faculty of Pharmaceutical Sciences was founded in 1979. The Department is responsible for the teaching of three obligatory subjects; the Pharmacology and Toxicology, the Basic Medical Pathophysiology, and the Drug Therapy in the undergraduate pharmacy program. We also teach elective subject and take part in the postgraduate education of pharmacists.

The Department is located on the 8th floor of the Nagyvárad Tér building (NET) of the University, but some of our offices and laboratories can be found on the ground floor, on the 3rd floor and on the 11th floor.

Pharmacology and toxicology

This page contains information for 7th and 8th semester pharmacy students of the English Program about *pharmacology and toxicology*. The thought in 112 lessons of lectures and 56 lessons of practice over two semesters on the basis of internationally recognized textbooks. The mechanism of action and pharmacokinetic properties of drugs as well as their clinical indications and adverse effects are emphasized. In the toxicology part in addition to the toxic effect of various drugs, environmental toxicology and the most common acute and chronic poisonings are discussed.

Requirements: Weekly 4 lessons of lectures and 2 lessons of practice in both semesters (7th and 8th). Exams: Practical mark (2 credit points) based on 2 midterm written exams in both semesters. Oral exam (4 credit points) at the end of 7th semester. Oral final exam (4 credit points) at the end of 8th semester.

Education materials published on the MOODLE site!

Basic medical pathophysiology

This page contains information for 7th and 8th semester pharmacy students of the English Program about Basic medical pathophysiology. They are taught in 56 lessons of lectures over 2 semesters. The program is based on the special demands of pharmacy students. Pathophysiologic basis of the common disorders is discussed to help the understanding the principals of (pharmaco)therapy.

Teacher and tutor: Prof. Kornélia Tekes

Requirements: Weekly 2 lessons of lectures in both semesters (7th and 8th).

Exams: Written exam (2 credit points) at the end of 7th semester. Oral final exam (2 credit points) at the end of 8th semester.

Drug therapy

This page contains information for 9th semester pharmacy students of the English Program about Drug therapy. The subject is taught in 24 lessons and 24 lectures of practices. Evidence based pharmacotherapy of the most common disorders and the adverse effects and interactions of the used drugs are discussed. Information about the over-the-counter medications and treatment of chronic disorders are specially emphasized.

Requirements: Weekly 2 lessons of lectures and 2 lessons of practices in the 9th semester.

Exam: exam (4 credit points) at the end of 9th semester.

MTA-SE Neuropsychopharmacology and Neurochemistry Research Group

Duration of the project: 07.01.2013-06.30.2018

Link: <http://semmelweis.hu/gyogyszerhatastan/mta-se-research-group/>

The MTA-SE Neuropsychopharmacology and Neurochemistry Research Group supported by the Hungarian Academy of Sciences examines the different interactions of genetic and environmental factors involved in the development of depression using genomic and imaging methods.

NAP-2-SE New Antidepressant Target Research Group

Duration of the project: 2017.12.01.-2021.11.30.

Link: <http://semmelweis.hu/gyogyszerhatastan/nap-2-research-groups/nap-2-se-new-antidepressant-target-research-group/>

Supported by the National Research, Development and Innovation Office and as a part of the Hungarian Brain Research Program 2.0 the research group tries to identify new drug targets for the treatment of depression using genome-wide gene-environment interaction analysis (GEWIs).

The project based on the results of the previous *NAP-A-SE New Antidepressant Target Research Group*.

SE-NAP 2 Genetic Brain Imaging Migraine Research Group

Duration of the project: 12.01.2017. – 11.30.2021.

Link: <http://semmelweis.hu/gyogyszerhatastan/nap-2-research-groups/se-nap-2-genetic-brain-imaging-migraine-research-group/>

Supported by the National Research, Development and Innovation Office and as a part of the Hungarian Brain Research Program 2.0. the research group is investigating the neural response (brain activity) and genetics of people with migraine, tension headache and in healthy control subjects to identify biomarkers of migraine and new drug targets.

The project based on the results of the previous *MTA-SE-NAP B Genetic Brain Imaging Migraine Research Group*.

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The Department of Organic Chemistry was founded in 1957 and its first head was Prof. Ottó Clauder. The infrastructure of the Department (the students' and tutors' laboratories, the equipment for preparative work and the library) was gradually built up and finally a spectroscopic unit was established. In 1977, Prof. László Szabó took over as head of the Department and after it, in 1997 Dr. Ákos Kocsis was appointed as acting director. After that from 1997 Prof. Péter Mátyus was the head of the Department. Since 2016 to June 2017 Dr. Gábor Krajsovsky was the acting director. The present head of the Department is Dr. István Mándity.

The aim of the education in organic chemistry is to create an organic chemical basis for subsequent subjects in the curriculum of students at the Faculty of Pharmaceutical Sciences. To attain this goal, besides the main lectures (112 hours in the 3rd and 4th semesters) and parallel laboratory practicals (110 hours) in organic chemistry, the Department offers a choice of a special course to its students (*Drug Syntheses*, and *Named Reaction in Organic Chemistry*), and meanwhile, continuous enlargement of number of special courses is planned. The available methods based on Computational Chemistry and Molecular Modelling have been involved in the official education material since 1998. The teaching activities at the Department also include the introduction of selected students into research in organic and medicinal chemistry, the direction of diploma work and participation in the postgraduate (Ph.D.) education. The Department takes part in several international research and educational cooperation programmes (such as ERASMUS).

The main research fields at the Department were the synthesis and chemical properties of heterocycles, including some natural products. In the last few years, important results have been achieved in the fields of synthesis strategies, including palladium-catalysed cross-coupling reactions of pyridazines and uracils, and mechanistic studies and the synthetic development of certain thermal rearrangement reactions. Another research field at the Department involved medicinal chemistry with the design and synthesis of antiarrhythmic compounds, ligands of α -adrenoceptors and inhibitors of semicarbazide-sensitive amine-oxidase.

The Department cooperated in both research and education with several academic (e.g. the Semmelweis University Department of Pharmacodynamics, Department of Pharmacology and Pharmacotherapy, Department of Ophthalmology, and II. Department of Internal Medicine; Peter Pazmany Catholic University Faculty of Information Technology, the University of Debrecen, Pécs, and Szeged; the Hungarian Academy of Sciences Chemical Research Centre; the University of Vienna, Palermo, Cagliari, Universidad de CEU San Pablo (Madrid), National University Singapore); and industrial (Richter Gedeon, EGIS, Pannonpharma) organizations.

The main research profiles in the Department are involving primarily – preserving the departmental traditions at least partially – heterocyclic syntheses, preparation of compounds with chloride ion transporter effect, peptide chemistry, chemistry of bifunctional compounds, introduction of processes of „green chemistry” (such as use of solvents carbon dioxide neutral, elaboration of organic chemical reactions taking place in water, application of continuous-flow chemical technologies). The research work is facilitated by separation, spectroscopic and computational methods.

Institute of Clinical Experimental Research – Teaches at the Faculty of Pharmaceutical Sciences

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: 210-0306

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Full professor:

Prof. Dr. Péter Sándor,

Associate professor:

Dr. Tamás Ivanics, Dr. Zsuzsanna Miklós (tutor)

Institute of Digital Health Sciences

1094 Budapest, Ferenc tér 15. floor II.

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Dr. Miklós Szócska Ph.D.

Professor Emeritus:

Dr. habil Elek Dinya Ph.D.

Associate professor:

Dr. Zoltán Ádám Tamus Ph.D.

Assistant professor lecturer:

Péter Dombai, Dr. Tamás Iváncsy Ph.D., Zoltán Sándor,

Tamás Tóth, Dr. Gergely Zajzon

Tutor:

Mr. Gergely Marosi

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OPENING HOURS

CENTRAL LIBRARY (extension 60514)

Monday to Friday 24/7 (Mikszáth tér 5.)

EOK LIBRARY (extension 60008)

Monday to Friday 24/7 (Tűzoltó u. 37-47.)

The Central Library holds nearly 280,000 volumes making it the country's largest medical and life science collection. Operates in two locations and has altogether 1940 m2 floor space, with 300 reader's seats, and 83 computers available to visitors 24/7 all year round. The library curates the university's healing, teaching, and research-supporting electronic resource infrastructure, provides access to more than 9000 current subscribed, 5700 online open access journals, more than 8700 online e-books, 35 databases, and supports open access publication. The library organically contribute to the university's teaching activities: it showcases the most important resources and their proper use during lectures with credit points. Included in the bibliographic activities, are the checking and verifying necessary bibliometric data in the MTMT (Hungarian Science Bibliography) database based on uploaded records for university appointments and degrees, applications (research associate, (university/college professor, habilitation, assistant/associate professor, PhD, etc.).

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Research fellow:	Dr. Balázs Babarczy
Biostatistician:	Dávid Nagy
Data manager:	Lilla Julianna Budai
Administrator:	Dóra Czintula, Csaba Istvánfi
PhD. Students:	Dr. Zsuzsanna Petykó, Ildikó Ádám, Dalma Erdősi, Manna Tóth, Dr. Ágota Mészáros, Dr. Judit Tittmann, Thanh Tu Nguyen, Dr. Attila Imre, Zsuzsa Réka Pozsár, Dr. Barnabás Kiss, Dr. Kristóf Gyöngyösi, Said Wani Said Al-Rashdi

FACULTY OF MEDICINE

BASIC MODULE



Faculty of Medicine
1st year

STUDY PROGRAMME
First year in the 2024/2025 academic year
1st Semester

Course name	Neptun code	lecture (h/week)	lecture (h/semester)	practice (h/week)	practice (h/semester)	seminar (h/week)	seminar (h/semester)	credit points	prerequisite(s)	examination
OBLIGATORY										
Cell Science	AOKGEN666_1A	1		2				3		examination
History of Medicine and Semmelweis University	AOKNEI1144_1A	2		0				2		practical examination
Macroscopic Anatomy and Embryology I	AOKANT1089_1A	2		6				8		examination
Medical Biophysics I	AOKFIZ1090_1A	1		3				4		examination
Medical Chemistry	AOKMBT829_1A	3		3				6		examination
Medical Communication	AOKMAG1091_1A		10		18			3		examination
Medical Hungarian I.	AOKNYE906_1A	0		4				2		practical mark
Medical Terminology	AOKNYE1125_1A	0			28			2		practical examination
Physical Education (PE) I	AOKTSI1093_1A	0		1				1		practical mark
OBLIGATORY ELECTIVE										
Basics of Medical Chemistry	AOVMBT797_1A	2		0				3		practical mark
Mathematical and Physical Basis of Medical Biophysics	AOVFIZ1097_1A	1		1				2		practical mark
Personal Development and Professional Socialisation in Healthcare	AOVMAG1145_1A	0		2				3		practical examination
Practise Course for Instrumental Improvisation	AOVMAG813_1A	1		1				2		
Sport and Lifestyle 1.	AOVTSI1098_1A	0		1				1		practical mark
Translational Aspects of Respiratory Medicine	AOVTLM1057_1A	2						2		

2nd Semester

Course name	Neptun code	lecture (h/week)	lecture (h/semester)	practice (h/week)	practice (h/semester)	seminar (h/week)	seminar (h/semester)	credit points	prerequisite(s)	examination
OBLIGATORY										
First Aid	AOKSGO1092_1A	1		1				2		practical mark
Introduction to Patient Care	AOKCSA1138_1A	0,5		2				2		practical mark
Macroscopic Anatomy and Embryology II	AOKANT1089_2A	4		6				10	Macroscopic Anatomy and Embryology I	comprehensive examination
Medical Biochemistry I	AOKBMT1099_1A	2		2				4	Medical Chemistry	examination
Medical Biophysics II	AOKFIZ1090_2A	1		2,5				3	Medical Biophysics I	comprehensive examination
Medical Hungarian II.	AOKNYE906_2A	0		4				2	Medical Hungarian I	practical mark
Microscopic Anatomy and Embryology I.	AOKANT854_1A	1		4				5	Cell Science	examination
Physical Education (PE) II	AOKTSI1093_2A	0		1				1		practical mark
Summer Practice - Nursing	AOKNSG1127_1A	0			168			3		practical examination
OBLIGATORY ELECTIVE										
Introduction to Medical Informatics	AOVIN244_1A			1				1		
Medical Informatics	AOVDEI1126_1A	0		1		2		2		practical examination
Sport and Lifestyle 2.	AOVTSI1098_2A	0		1				1		practical mark
Terminology of Clinical Specialties	AOVNYE1130_1A	0				2		2	Medical Terminology	practical examination

LIST OF TEXTBOOKS (The list may change!)

- 1 McMinn and Abrahams' Clinical Atlas of Human Anatomy with STUDENT CONSULT Online Access , 7th Edition By Abrahams, Spratt, Loukas & van Schoor ISBN-13: 9780723436973 Publication Date: 22/03/2013
- 2 Sobotta Atlas of Human Anatomy (Package), 15th English ed. Musculoskeletal system, internal organs, head, neck, neuroanatomy, By Waschke & Paulsen, ISBN-13: 9780702052507 Publication Date: 25/06/2013
- 3 Gray's Anatomy for students with STUDENT CONSULT Online Access, 3rd Edition by R. Drake, A. W. Vogl, A. Mitchel Elsevier; 03/04/2014; ISBN 9780702051319
- 4 C.Rosse-P.Gaddum-Rosse: Hollinshead's Textbook of Anatomy. Lippincott-Raven. 4th ed. 1997. ISBN 0-397-51256-2
- 5 Stevens & Lowe's Human Histology , Elsevier, 4th ed. 2015 ISBN 978-0-723435020
- 6 Wheater's Functional Histology, A Text and Colour Atlas, 6th Edition by B Young, G O'Dowd and P Woodford Churchill Livingstone, Edinburgh, 2013, ISBN 9780702047473
- 7 Histology: A Text and Atlas: With Correlated Cell and Molecular Biology; 7th Edition by MH Ross and W Pawlina ; Wolters Kluwer 2015, ISBN 9781451187427
- 8 Langmann's Medical Embryology, 13th Edition by TW Sadler, Wolters Kluwer 2014, ISBN 9781469897806
- 9 Ebbing, D.D.-Grammon, S.D: General Chemistry, 9th ed. 2009. Houghton Mifflin Co. Boston. ISBN 10:0-618-85478-6 / 13:978-0-618-85478-7
- 10 Harper's Illustrated Biochemistry, 30th edition, Lange, ISBN-10: 0071825347
- 11 Seminar manuals: published on homepage: semmelweis.hu/biokemia/
- 12 Tóth: Concise Inorganic Chemistry for Medical Students. Bp. Semmelweis Kiadó
- 13 Laboratory Manual; Medical Chemistry and Biochemistry. Bp. Semmelweis Kiadó
- 14 Bauer-Csermely-Hrabák: Principles of Organic Chemistry (ed. A. Hrabák) Bp. Semmelweis Kiadó
- 15 Hrabák: Selected Collection of Chemical Calculations and Biochemical Exercises. Bp. Semmelweis Kiadó
- 16 Garzó-Müllner-Sasvári: Bioorganic compounds. Bp. Semmelweis Kiadó
- 17 Damjanovich – Fidy – Szöllösi (eds) Medical Biophysics, Medicine, Budapest, 2009. ISBN 978-963-226-127-0
- 18 Miklós Kellermayer: Medical Biophysics Practices. Semmelweis Publishers, Budapest, 2015. ISBN 978-963-331-349-7.
- 19 Borda Szandra-Hetesy Bálint: Magyar orvosi szaknyelv I-II. Students can download the book in pdf format from the moodle interface.
- 20 Zimonyi-Bakó A. Medical Terminology. (available on Moodle in pdf)
- 19 Borda Szandra-Hetesy Bálint: Magyar orvosi szaknyelv I-II. Students can download the book in pdf format from the moodle interface.
- 21 Zimonyi-Bakó A. Medical Terminology. (available on Moodle in pdf)
- 22 Alberts et al.: Essential Cell Biology. Garland Science/Taylor & Francis Group Publ. 2013. (4th edition, ISBN: 9780815344544)
- 23 Anne-Marie Barry, Chris Yuill: Understanding the Sociology of Health: An Introduction. Sage, London, 2016.
- 24 János Pilling: Medical Communication in Practice. Medicina, Budapest, 2020.

Recommended textbooks:

- 1 Gray's Anatomy. The Anatomical Basis of Clinical Practice; 41st edition by S.Standing: 2015 ISBN : 9780702052309
- 2 RMH McMinn: Last's Anatomy, Regional and Applied. Churchill Livingstone, Edinburgh 1990. ISBN 0-443-03484-4
- 3 A.L. Kierszenbaum Histology and Cell Biology: An Introduction to Pathology 3rd Edition, Paperback with STUDENT CONSULT Online Access and E-Book ISBN: 9780323085885 Copyright: 2012
- 4 Junqueira's Basic Histology: Text and Atlas; 13th Edition by Anthony Mescher, New York, McGraw-Hill Medical, 01/03/2013 ISBN13 9780071780339
- 5 W.Kahle-H.Leonhardt-W.Platzer: Color Atlas and Textbook of Human Anatomy (in 3 volumes) 3rd revised ed. Thieme Inc. New York, 1986.
- 6 Human Anatomy, Color Atlas and Textbook, 6th Edition by J Gosling, P Harris, J Humpherson, I Whitmore and P Willan; Elsevier, 2016, ISBN 9780723438274
- 7 Stryer: Biochemistry. 4th ed. 1995. ISBN 0-7167-2009-4
- 8 Zumdahl: Chemical Principles. 3rd ed. 1998. Houghton-Mifflin Co. Boston. ISBN 0-395-83995-5
- 9 First Aid Manual: The Authorised Manual of St. John Ambulance, St. Andrew's Ambulance Association and the British Red Cross by the British Red Cross Society published on 21/03/2011 by Dorling Kindersley Publishers Ltd ISBN 9781405362146
- 10 Cooper-Hausman: The Cell: A Molecular Approach, 5th Edition, Sinauer Associates, 2006, ISBN 0-87893-300-X
- 11 Graham Scambler: Sociology as Applied to Medicine. 6th edition. 2008, Saunders Elsevier, London

MACROSCOPIC ANATOMY AND EMBRYOLOGY I.

Department of Anatomy, Histology & Embryology

Head of Department: *Dr. Alpár Alán*

Course Director: *Dr. Andrea D. Székely*

Credit value : 7

Number of lessons per week: 7 lectures: 1 practical course: 6 seminars: 0

Subject type: obligatory course

Name of the course leader: Dr Alpár Alán (full professor)

Objectives of the subject, its place in the medical curriculum:

Demonstration of the macroscopical composition of the human body specifically to provide the future clinicians/medical doctors with a valid body of information with relevance to clinically significant morphological structures. General Embryology describes the intrauterine development of a human embryo/fetus and introduces the development of the locomotor system. Teaching is done in the form of lectures and dissection classes.

Place where the subject is taught (address of the auditorium, seminar room, etc.):

Semmelweis University, Department of Anatomy, Histology and Embryology
Budapest 1094, Tűzoltó utca 58.

Successful completion of the subject results in the acquisition of the following competencies:

Understanding the macroscopical composition of the human body together with the position and topographical relation of organs. Clear understanding of structure and function. Ability to perform basic preparatory tasks during dissection. Identification of general directions/landmarks on the cadaver together with the recognition of significant organs/body parts. Acquiring knowledge of surface features and/or sectional anatomy forming basis for clinical diagnostics (palpation, auscultation, etc.) and the use of radiological imaging methods. Clear understanding of the beginning of human development (general embryology) together with the development of the musculoskeletal system.

Course prerequisites:

None (subject is offered in the 1st semester)

Number of students required for the course (minimum, maximum) and method of selecting students):

obligatory for all registered students, on the basis of registration via the NEPTUN system

How to apply for the course:

Via the NEPTUN system.

Detailed curriculum:*List of lectures*

1. week:	General introduction, terminology
2. week:	Joints and movements of the shoulder and shoulder girdle,
3. week:	Joints and movements of the elbow and the hand
4. week:	Joints and movements of the hip
5. week:	Pelvis. Joints and movements of the knee
6. week:	Joints and movements of the foot
7. week :	Composition of thorax, diaphragm
8. week:	Composition of the abdominal wall. Inguinal and femoral canals
9. week:	Composition and movements of the vertebral column. Muscles of the nape and back.
10. week:	Gametes, fertilization, cleavage
11. week:	Implantation, structure of the placenta, placental circulation. Fetal membranes
12. week:	Gastrulation, formation and derivatives of germinal layers
13. week:	Folding of the embryo, neurulation. Body axes, cranio-caudal and dorsoventral differentiation.
14. week:	Development of the skull, vertebral column and limbs

Topics for the dissection classes

1-6 weeks:	Bones, joints and muscles of the limbs. Dissection of the limbs.
7-9. weeks:	Cadaver dissection. Dissection of the superficial layers of the trunk, inspection of the structure of the body wall on prosected specimens (torso).
8-12. weeks:	Inspection of the bony skull together with head and neck prosections
13-14. weeks:	Embryology consultations, revision

Other subjects concerning the border issues of the given subject (both obligatory and optional courses). Possible overlaps of themes: Microscopic Anatomy and Embryology I - II.

Special study work required to successfully complete the course:

All students are required to *demonstrate their knowledge and motivated practical work* by the completion and demonstration of a dissected specimen or region once during the two semesters of the Academic year.

Requirements for participation in classes and the possibility to make up for absences:

Active participation in practical lessons is obligatory. Students should attend at least 75% of the scheduled hours, absences therefore are limited in 25%. Attendance will be recorded in the dissection room classes.

Methods to assess knowledge acquisition during term time:

During the semester, both practical and theoretical knowledge will regularly be evaluated. Attendance is obligatory at the two mid-term tests (held on weeks 7 and 12). Anatomy mid-terms are oral exams.

Midterm 1 – week 7 – Anatomy of the upper and lower limbs (bones, joints, muscles, blood supply and innervation)

Midterm 2 – week 12 – Anatomy of the axial skeletal structures (bones, joints, muscles, blood supply, innervation of the head, neck, trunk)

Students absent from the mid-term test should reattend at one of the two further occasions (week 8 or 13, week 13 or 14, respectively) or their semester will not be accepted.

Valid marks, earned at the official midterm, cannot be upgraded or corrected on the retake midterms which are solely offered to those being absent.

The time and topics of midterm tests will be announced in the departmental homepage at the beginning of the semester (<http://semmelweis.hu/anatomia>).

Requirements for signature:

Active participation in at least 75% of dissection room sessions, including the midterm tests (irrespective of the result) is obligatory for every student.

Type of examination:

Semifinal (written and oral) examination, topics: subject matter of the semester.

Semifinal examinations consist of written (theoretical) and oral (practical) parts. Examiners are delegated by the Course Director with the consent of the Head of Department.

Requirements of the examination:

During the semifinal examination the knowledge of students will be tested. The examination starts with a written pretest (e-learning module "Moodle") to be followed by an oral test in Macroscopic Anatomy (identification of structures on true anatomical specimens) including relevant theoretical questions from the subject matter of the semester.

Topic list for the semifinal examination:

Macroscopic Anatomy I.

Musculoskeletal Anatomy

- General osteology, classification of bones
- Continuous connections of bones. Classification of joints; components, movements and mechanisms
- General myology
- Structure of the vertebral column, the gross anatomy of the muscles acting upon it
- Movements and muscles of the head&neck (atlantooccipital and atlantoaxial joints)
- Joints of the shoulder girdle, the gross anatomy of the muscles acting upon them
- Shoulder joint, the gross anatomy of the muscles acting upon it
- Axillary fossa, quadrangular and triangular spaces
- Muscle compartments and cross section of the arm
- Elbow joint, the gross anatomy of the muscles acting upon it. Cubital fossa
- Muscles and cross section of the forearm
- Structure and movements of the radiocarpal joint, gross anatomy of the muscles acting upon it
- Osteofibrous spaces and muscle compartments of the hand, tendinous sheaths
- Carpometacarpal, metacarpophalangeal and interphalangeal joints of the thumb and fingers, the gross anatomy of the muscles concerned with the movements
- Osteofibrous structure of the thoracic cage (bones, joints, ligaments, movements)
- Thoracic muscles
- Diaphragm
- Muscles and spaces of the abdominal wall, rectus sheath
- Composition of the pelvis (bones, ligaments and membranes)
- Muscles of the buttock, the posterior abdominal wall and the pelvis (external and internal muscles of the hip)
- Inguinal canal, femoral canal
- Subinguinal hiatus, vascular and muscular compartments; adductor canal, femoral canal
- Hip joint and the gross anatomy of the muscles concerned with the movements
- Osteofibrous compartments, muscles and cross section of the thigh
- Knee joint and the gross anatomy of the muscles concerned with the movements. Popliteal fossa
- Osteofibrous compartments, muscles and the cross section of the leg
- Ankle joint together with the gross anatomy of the muscles acting upon it
- Subtalar and talocalcaneonavicular joints, the muscles acting upon them

- Osteofibrous compartments and structure of the foot, arches of the foot
- Bones, spaces and connections of the skull, external and internal skull bases
- Neurocranium, components and cavities (anterior, middle and posterior cranial fossae)
- Viscerocranium, components and cavities (walls and connections of the nasal cavity, orbit, oral cavity, pterygopalatine and infratemporal fossae)
- Temporomandibular joint and the gross anatomy of the muscles of mastication
- Superficial muscles of the neck, muscle triangles
- Deep muscles of the neck and the laminae of the cervical fascia
- Muscles of facial expression

Further topics with relevance to the musculoskeletal system

- Lymphatic drainage of the thoracic wall including the mamma
- Dorsal branches of the spinal nerves, intercostal nerves
- Cervical plexus, brachial plexus, lumbar plexus, sacral plexus.
- Innervation of limbs
- Innervation of the trunk
- Cutaneous innervation
- Axillary artery and branches. Arteries and veins of the arm, forearm, and hand
- Arteries and veins of the lower limb
- Lymph nodes and lymphatic drainage of the upper and lower limbs

General Embryology and development of the musculoskeletal system

- Spermatogenesis, spermiogenesis
- Oogenesis
- Fertilization, cleavage of the zygote
- Blastocyst formation; the bilaminar embryonic disc
- Implantation
- Formation of body axes, parts of the early embryo (yolk sac, amnion, chorion, body stalk)
- Gastrulation
- Formation of the intraembryonic mesoderm; the notochord
- Neurulation (neural tube and neural crest)
- Derivatives of ectoderm, endoderm and mesoderm
- Folding of the embryo
- The structure and function of the placenta
- Development of the fetal membranes (chorion and amnion), umbilical cord
- Twin formation
- Membranous and cartilaginous neurocranium and viscerocranium
- Development of the limbs and vertebral column
- Development of the muscular system

Method and type of evaluation:

The first part of the semifinal examination is a written test (e-learning module "moodle") composed of simple or multiple choice questions. Passing rate: 60%

The second part of the examination is an oral/practical test in Macroscopic Anatomy (identification of structures on true anatomical specimens) including relevant theoretical questions from the subject matter of the semester.

Students are given separate marks for each part of the examination. Upon the termination of the examination the Chairman of the Examination Committee composes the final mark from the partial marks earned in the written and practical parts.

Evaluation of the written test: passing rate 60% - 2, 70% -3, 80% - 4, 90% - 5.

In case the result of the test falls between 50%-59,999%, the mark is fail (1), but the students may continue with the oral examination – i.e., having a "discretionary fail".

Students scoring below 50% have an unsuccessful examination (i.e., fail the examination) therefore they may not continue with the oral part. Further unsuccessful examination parts result in the failure of the semifinal examination. When failing at the practical part, the written test will not have to be repeated in case the result was a 4 or a 5 only.

Exemption from the oral test could be earned from the results of the two midterm tests. A mark 4 (good) can be earned if the midterm average is 4,00 (4+4 or 3+5); while a mark 5 (excellent) will be earned if the average of the midterm marks is at least 4,50 (4+5 or 5+5). These students may be exempted from the oral part of the semifinal examination and thus will have to sit only for the written (moodle test) part. Exemptions are solely based on the result of the marks earned from the official (first) midterms, but not from the retakes.

How to register for the examination?

Via the NEPTUN system.

Possibilities for exam retake:

According to the Study and Examination Policy

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

Recommended textbooks

1. Sobotta Atlas of Human Anatomy, 15th English ed. Musculoskeletal system, internal organs, head, neck, neuroanatomy, By Waschke & Paulsen, ISBN-13: 9780702052507 2013
2. Gray's Anatomy for students with STUDENT CONSULT Online Access, 3rd Edition by R. Drake, A. W. Vogl, A. Mitchel, Elsevier; 2014; ISBN 9780702051319
3. THIEME Atlas of Anatomy, General Anatomy and Musculoskeletal System, 2014 by Schuenke, ISBN: 9781604069228
4. THIEME Atlas of Anatomy, Head, Neck and Neuroanatomy, 2016 by Schuenke, ISBN: 9781626231207
5. THIEME Atlas of Anatomy, Internal Organs, 2016 by Schuenke, ISBN: 9781626231665
6. McMinn and Abrahams' Clinical Atlas of Human Anatomy with STUDENT CONSULT Online Access, 7th Edition By Abrahams, Spratt, Loukas & van Schoor ISBN-13: 9780723436973, 2013
7. Netter: Atlas of Human Anatomy, Including Student Consult Interactive Ancillaries and Guides, 6th Edition, 2014.
8. Human Anatomy, Color Atlas and Textbook, 6th Edition by J Gosling, P Harris, J Humpherson, I Whitmore and P Willan; ISBN 9780723438274 Elsevier, 2016.
9. Functional Anatomy, Histology and Embryology for medical and dental students by M. Réthelyi and J. Szentágothai, Medicina, 2018.
10. Gray's Anatomy. The Anatomical Basis of Clinical Practice; 41st edition by S. Standring; 2015 ISBN : 9780702052309
11. Netter's Clinical Anatomy with Online Access, 3rd Edition, by J. Hansen, 2014, **eBook ISBN: 9781455770632 eBook ISBN: 9780323312899 014**
12. Anatomy, A Photographic Atlas, 8th Edition by Rohen, Yokochi; Wolters Kluwer, 2016, ISBN: 978-1-4963-0870-2
13. Bräuer: Sobotta Flashcards (Muscles; Bones, Ligaments, and Joints) URBF1, 2013.
14. RMH McMinn: Last's Anatomy, Regional and Applied. Churchill Livingstone, Edinburgh 1990. ISBN 0-443-03484-4
15. Regional Anatomy, by T Tömböl, Medicina 2008, ISBN 963 242 186 8
16. Sectional Anatomy – Workbook, by A. Nemeskéri; István Apáthy's Foundation, 2001.
17. Neuroanatomy An Illustrated Colour Text, 4th Edition by Crossman & Neary Publication Date: 13/04/2010 ISBN-13: 9780702030864
18. *The Developing Human – Clinically Oriented Embryology, 10th ed. by KL Moore, TVN Persaud and M Torchia, Saunders, 2015; ISBN 9780323313384*

Further study aids:

To be downloaded from the homepage of the Department of Anatomy, Histology and Embryology (<http://semmelweis.hu/anatomia>) or from Knowledgebase on the Library homepage: (https://lib.semmelweis.hu/knowledge_base).

MACROSCOPIC ANATOMY AND EMBRYOLOGY II.**Credit value: 9****Number of lessons per week: 9 lecture: 3 practical course: 6 seminar: 0****Type of the course: obligatory course**Name of the course leader: **Dr. Alpár Alán** (full professor)**Objectives of the subject, its place in the medical curriculum:**

Demonstration of the macroscopical composition of the human body specifically to provide the future clinicians/medical doctors with a valid body of information with relevance to clinically significant morphological structures. Development of internal organs – this part describes the intrauterine differentiation and growth of internal organs with relevance to the general medical curriculum. Teaching is done in the form of lectures and dissection classes.

Place where the subject is taught (address of the auditorium, seminar room, etc.):

Semmelweis University, Department of Anatomy, Histology and Embryology
Budapest 1094, Tűzoltó utca 58.

Successful completion of the subject results in the acquisition of the following competencies:

Understanding the macroscopical composition of the human body together with the position and topographical relation of organs. Clear understanding of structure and function. Ability to perform basic preparatory tasks during dissection. Identification of general directions/landmarks on the cadaver together with the recognition of significant organs/body parts. Acquiring knowledge of surface features and/or sectional anatomy forming basis for clinical diagnostics (palpation, auscultation, etc.) and the use of radiological imaging methods. Understanding of human development in order to draw parallels with macroscopical anatomy.

Course prerequisites:

Macroscopic Anatomy and Embryology I.

Number of students required for the course (minimum, maximum) and method of selecting students:

Obligatory for all registered students, on the basis of registration via the NEPTUN system

How to apply for the course:

Via the NEPTUN system.

Detailed curriculum:

List of lectures

1. week:	Nasal cavity, paranasal sinuses Oral cavity, tongue, palate, faucial isthmus Salivary glands
2. week:	Morphology and development of teeth Pharynx, esophagus Larynx
3. week:	Development of the face, malformations Development of the pharyngeal arches, development of the foregut Thoracic cavity, mediastinum. Chambers of the heart, external features. Structure of heart wall, valves, fibrous skeleton. Pericardium
4. week:	Cardiac vessels and nerves, conducting system. Surface projection. Auscultation points. Development of the heart Development of arteries and veins
5. week:	Morphology of trachea and the lung. Pleura. Development of the respiratory system. Postpartum adaptation of the circulatory system Stomach and small intestines (duodenum, jejunum, ileum)

6. week:	Liver, gall bladder, pancreas, spleen. Large intestine, rectum
7. week:	Peritoneal relations of abdominal organs. Development of the peritoneum, separation of body cavities Morphology of the kidney, capsules of the kidney, ureter, urinary bladder. Morphology and coats of the testicle
8. week:	Morphology of the epididymis, spermatic cord, seminal vesicle and prostate Morphology of penis and male urethra. Male perineum Ovary, Fallopian tube and uterus
9. week:	Vagina, female perineum, external genital organs Development of the urinary system Development of genital organs
10. week:	Topographical divisions of the central nervous system, developmental units Meninges, epidural and subarachnoidal spaces, ventricles, choroidal plexus, CSF Lobes of the cerebral cortex, topographical subdivisions, structure and function of the medial, lateral and basal cortical fields
11. week:	Topography and components of the basal ganglia and the diencephalon (thalamus, hypothalamus), the 3 rd ventricle. Topography and components of the brainstem (midbrain, pons and medulla oblongata), the 4 th ventricle. Arterious, venous and lymphatic circulation of the brain
12. week:	The autonomic nervous system. Sympathetic and parasympathetic nervous system. Cranial nerve nuclei Trigeminal nerve (CN 5), facial nerve (CN 7)
13. week:	Glossopharyngeal nerve (CN 9), vagus nerve (CN 10) Spinal cord, spinal ganglia, spinal segment. Spinal nerves, nerve plexuses Lymphatic system. Regional lymphatic drainage of organ, lymph nodes.
14. week:	Intracranial topography, orbit Topographical relations of the thoracic cavity Topographical relations of the abdominal cavity

Topics of dissection classes

1-2. weeks:	Dissection of the head and neck organs.
3-6. weeks:	Opening of the thoracic and abdominal cavities, dissection of thoracic and abdominal organs
7-9. weeks:	Dissection of the retroperitoneal region and perineum together with organs of the lesser pelvis.
10-12. weeks:	Dissection/ inspection of the brain and spinal cord. Intracranial topography.
13-14. weeks:	Cranial nerve branches. Cross sections of the trunk. Revision

Other subjects concerning the border issues of the given subject (both obligatory and optional courses). Possible overlaps of themes:

Microscopic Anatomy and Embryology I - II..

Special study work required to successfully complete the course:

All students are required to *demonstrate their knowledge and motivated practical work* by the completion and demonstration of a dissected specimen or region once during the two semesters of the Academic year.

Requirements for participation in classes and the possibility to make up for absences:

During the semester, both practical and theoretical knowledge will regularly be evaluated. Attendance is obligatory at the two mid-term tests (held on weeks 7 and 13). Anatomy mid-terms are oral exams.

Midterm 1 – week 7 – Anatomy of the internal organs of the head, neck, thorax and abdomen (together with their development, topography, blood supply and innervation)

Midterm 2 – week 13 – Anatomy of the retroperitoneum and the pelvis (urinary system, external and internal genital organs, pelvic floor, perineum (together with their development, topography, blood supply and innervation)

Students absent from the mid-term test should reattend at one of the two further occasions (week 8 or 13, week 14, respectively) or their semester will not be accepted.

Valid marks, earned at the official midterm, cannot be upgraded or corrected on the retake midterms which are solely offered to those being absent.

The time and topics of midterm tests will be announced in the de-

partmental homepage at the beginning of the semester (<http://semmelweis.hu/anatomia>).

Requirements for signature:

Active participation in at least 75% of dissection room sessions, including the midterm tests (irrespective of the result) is obligatory for every student. Missed practical classes cannot be made up for.

Type of examination:

Final (written and oral) examination, topics: subject matter of the subjects Macroscopic Anatomy and Embryology I-II. Final examinations consist of written (theoretical) and oral (practical) parts. Examiners are delegated by the Course Director with the consent of the Head of Department.

Requirements of the examination:

During the final examination the knowledge of students will be tested. The examination starts with a written pretest (e-learning module "Moodle") to be followed by an oral test in Macroscopic Anatomy (identification of structures on true anatomical specimens) including relevant theoretical questions from the subject matter of the semester.

Topic list for the semifinal examination:**Macroscopic Anatomy I.**

(see there)

Macroscopic Anatomy II.**Internal organs of the head & neck region (morphology and development)**

- Oral cavity (divisions, boundaries)
- Floor of mouth, sulcus lateralis linguae
- Macroscopy of the tongue
- Types and morphology of teeth, blood supply and innervation
- Tooth development
- Salivary glands together with topography
- Facial isthmus, palate. Tonsils
- Pharynx and parapharyngeal spaces
- Blood supply and innervation of pharynx
- Pharyngeal muscles
- Nose, nasal cavity (boundaries, nasal meatus, vessels)
- Paranasal sinuses (connections, vessels)
- Larynx (shape, position, muscles, vessels, nerves)
- Skeleton and joints of larynx together with the fibroelastic membranes, mucous membrane
- Common and external carotid arteries and their branches. Maxillary artery and its branches
- Venous drainage of face and neck
- Lymph nodes and lymphatic vessels of the head&neck

- Development of the face, including the development of the oral and nasal cavities
- Development and differentiation of the foregut
- Derivatives of the branchial arches
- Derivatives of the branchial pouches and grooves
- Development of the teeth and tongue

Circulatory system (morphology and development)

- Shape, external features of heart
- Chambers of heart
- Endocardium, ostia, valves of heart
- Skeleton of heart, anuli fibrosi
- Structure of heart wall
- Pulse generating and conducting system of heart
- Pericardium
- Position and surface projections of heart
- Percussion and auscultation (area of cardiac dullness, heart sounds)
- Radiology of heart
- Early circulation (formation of vessels, basis vascular systems of the embryo/fetus)

- Heart development
- Pulmonary circulation
- Ascending aorta, arch of aorta and its branches
- Subclavian artery and its branches
- Thoracic aorta and its branches
- Abdominal aorta and its branches
- Development of arteries (aorta, branchial arterious arches, umbilical arteries)
- Celiac trunk and its branches
- Superior mesenteric artery and its branches
- Inferior mesenteric artery and its branches
- External and internal iliac arteries and their branches
- Internal pudendal artery and its branches
- Superior vena cava and its tributaries
- Inferior vena cava and its tributaries
- Azygos and hemiazygos veins and their tributaries
- Portal vein and its tributaries, portocaval anastomoses
- Development of veins (inferior v. cava, portal v., superior v. cava, azygos and hemiazygos veins)
- Fetal circulations
- Lymphatic drainage of the abdominal and pelvic organs
- Thoracic duct, right lymphatic trunk
- Renal pelvis and calyces. Ureter
- Urinary bladder (shape, position, muscles, vessels)
- Female urethra
- Male urethra, bulbourethral gland
- Development of kidneys
- Development of urinary passages
- Testis (shape, position, vessels). Scrotum, coats of testis
- Epididymis, vas (ductus) deferens, spermatic cord
- Seminal vesicle, prostate
- Penis (shape, position, mechanism of erection, vessels, nerves)
- Pelvic floor, male perineum (connective tissue spaces)
- Hernia canals (inguinal and femoral)
- Ovary (shape, position, vessels)
- Uterine tube (shape, position, vessels)
- Uterus (shape, parts, position, supporting structures, vessels) Broad ligament
- Vagina, female perineum (connective tissue spaces)
- External female genital organs (mons pubis, labia, vestibule of vagina, greater vestibular gland, vessels)
- Development of gonads, formation and migration of primordial germ cells
- Development of male genital system
- Development of female genital system
- Development of the external genital organs

Morphology and development of the thoracic, abdominal and pelvic organs

- Trachea and bronchial tree
- Lung (shape, parts, surfaces, hilum)
- Lung (position, topography, vessels, nerves)
- Surface projection of pleura and lung
- Pleura, pleural cavity
- Mediastinum (divisions and content)
- Development of the lower airways including the lung
- Description and topography of the esophagus
- Stomach (shape, position, parts, blood supply and innervation). Peritoneal relations
- Duodenum (shape, position, divisions, vessels)
- Jejunum-ileum (shape, position, vessels)
- Large intestine (shape, position, vessels)
- Rectum, anal canal (shape, position, vessels)
- Liver (shape, position, peritoneal relations, vessels)
- Gall bladder and biliary passages (anatomy)
- Pancreas (shape, position, vessels)
- Peritoneum, greater and lesser omentum, mesentery, omental bursa
- Formation and differentiation of the midgut
- Formation and differentiation of the hindgut
- Development of liver and pancreas
- Development of the peritoneum
- Formation of body cavities, development of the diaphragm
- Kidney (shape, position, hilum, sinus, capsules, vascular architecture)

Macroscopy of the nervous system

- Intracranial topography Dura mater, dural sinuses
- Arachnoid mater, pia mater, cisterns, CSF circulation
- Description and meninges of the spinal cord
- Brain stem (medulla oblongata, pons, midbrain)
- Cerebellum
- Diencephalon (parts, blood supply). Thalamus, hypothalamus
- Lateral ventricles, III. ventricle, IV. ventricle
- Hemispheres
- Internal carotid artery (course, parts and branches)
- Vertebral artery (course and branches)
- Circle of Willis
- Veins of the brain
- Cranial nerve nuclei, macroscopy of cranial nerves together with the brain, dural and skull exits
- Branches of cranial nerves (CN 3, CN 4, CN 5, CN 6, CN 7, CN 9, CN 10, CN 11, CN 12)
- General composition of the autonomic nervous system
- Sympathetic nervous system (cranial, cervical, thoracic and lumbar parts)
- Sympathetic trunk
- Parasympathetic system (cranial and sacral parts)
- Topography of the orbit. Extraocular muscles. Eye movements.
- Eyelids, conjunctiva, fasciae of the orbit, lacrimal apparatus

Method and type of evaluation:

Final examinations are composed of written theoretical and oral practical parts.

Students are given separate marks for each part of the examination. Upon the termination of the examination the Chairman of the Examination Committee composes the final mark from the partial marks earned in the written and practical parts.

Evaluation of the written test: passing rate 60% - 2, 70% -3, 80% - 4, 90% - 5.

In case the result of the test falls between 50%-59,999%, the mark is fail (1), but the students may continue with the oral examination – i.e., having a “discretionary fail”.

Students scoring below 50% have an unsuccessful examination (i.e., fail the examination) therefore they may not continue with the oral part.

Further unsuccessful examination parts result in the failure of the semifinal examination. When failing at the practical part, the written test will not have to be repeated in case the result was a 4 or a 5 only.

Exemptions from the written test may be earned from the result of the annual competition. All students with an average of 4,0 from

the two midterms are invited to participate in a written (moodle) competition from the topics of the 2 semesters of the subject held on Week 13.

Students achieving good marks (4 or 5, i.e., at least 80%) at the test may be exempted from the written part of the final examination and thus will have to sit only for the oral/dissection part.

Bonus dissection mark – Students may earn a bonus dissection mark (4 or 5 only) from the average of the two oral tests (only the official, first, midterm dates matter). A mark 4 (good) can be earned if the midterm average is 4,00 (4+4 or 3+5); while a mark 5 (excellent) will be earned if the average of the midterm marks is at least 4,50 (4+5 or 5+5). This bonus mark will be added to the marks of the practical part of the final examination in case it positively influences the final mark.

How to register for the examination?

Via the NEPTUN system.

Possibilities for exam retake:

According the Study and Examination Policy

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:**Recommended textbooks**

1. Sobotta Atlas of Human Anatomy, 15th English ed. Musculo-skeletal system, internal organs, head, neck, neuroanatomy, By Waschke & Paulsen, ISBN-13: 9780702052507 2013
2. Gray's Anatomy for students with STUDENT CONSULT Online Access, 3rd Edition by R. Drake, A. W. Vogl, A. Mitchel, Elsevier; 2014; ISBN 9780702051319
3. THIEME Atlas of Anatomy, General Anatomy and Musculoskeletal System, 2014 by Schuenke, ISBN: 9781604069228
4. THIEME Atlas of Anatomy, Head, Neck and Neuroanatomy, 2016 by Schuenke, ISBN: 9781626231207
5. THIEME Atlas of Anatomy, Internal Organs, 2016 by Schuenke, ISBN: 9781626231665
6. McMinn and Abrahams' Clinical Atlas of Human Anatomy with STUDENT CONSULT Online Access , 7th Edition By Abrahams, Spratt, Loukas & van Schoor ISBN-13: 9780723436973 , 2013
7. Netter: Atlas of Human Anatomy, Including Student Consult Interactive Ancillaries and Guides, 6th Edition, 2014.
8. Human Anatomy, Color Atlas and Textbook, 6th Edition by J Gosling, P Harris, J Humpherson, I Whitmore and P Willan; ISBN 9780723438274 Elsevier, 2016.
9. Functional Anatomy, Histology and Embryology for medical and dental students by M. Réthelyi and J. Szentágothai, Medicina, 2018.
10. Langmann's Medical Embryology, 13th Edition by TW Sadler, Wolters Kluwer, ISBN 9781469897806, 2014
11. Gray's Anatomy. The Anatomical Basis of Clinical Practice; 41st edition by S. Standing: 2015 ISBN : 9780702052309
12. Netter's Clinical Anatomy with Online Access, 3rd Edition, by J. Hansen, 2014, eBook ISBN: 9781455770632
eBook ISBN: 9780323312899 014
13. Anatomy, A Photographic Atlas, 8th Edition by Rohen, Yokochi; Wolters Kluwer, 2016, ISBN: 978-1-4963-0870-2
14. Bräuer: Sobotta Flashcards (Muscles; Bones, Ligaments, and Joints) URBF1, 2013.
15. RMH McMinn: Last's Anatomy, Regional and Applied. Churchill Livingstone, Edinburgh 1990. ISBN 0-443-03484-4
16. Regional Anatomy, by T Tömböl, Medicina 2008, ISBN 963 242 186 8
17. Sectional Anatomy – Workbook, by A. Nemeskéri; István Apáthy's Foundation, 2001.
18. Neuroanatomy An Illustrated Colour Text, 4th Edition by Crossman & Neary Publication Date: 13/04/2010 ISBN-13: 97807020308
19. The Developing Human – Clinically Oriented Embryology, 10th ed. by KL Moore, TVN Persaud and M Torchia, Saunders, 2015; ISBN 9780323313384

Further study aids:

To be downloaded from the homepage of the Department of Anatomy, Histology and Embryology (<http://semmelweis.hu/anatomia>) or from Knowledgebase on the Library homepage: (https://lib.semmelweis.hu/knowledge_base).

MICROSCOPIC ANATOMY AND EMBRYOLOGY I.**Department of Anatomy, Histology & Embryology****Head of Department:** *Dr. Alán Alpár***Course Director:** *Dr. Andrea D. Székely***Credit value:** 5**Number of lessons per week:** 5 lectures: 1 practical course: 4 seminars: 0**Type of the course:** obligatory course

Name of the course leader Dr Alpár Alán (full professor)

Objectives of the subject, its place in the medical curriculum:

Demonstration of the fine structure of cells and tissues composing the organs of the human body specifically to provide the future clinicians/medical doctors with a valid body of information describing the microscopical elements of clinically significant morphological structures (including cell biology, general histology and the histology of organs).

Teaching is done in the form of lectures and histology laboratory classes

Place where the subject is taught (address of the auditorium, seminar room, etc.):

Semmelweis University, Department of Anatomy, Histology and Embryology
Budapest 1094, Tűzoltó utca 58.

Successful completion of the subject results in the acquisition of the following competencies:

Understanding the microscopical composition of the human body together with the understanding of human development in order to draw parallels with macroscopical anatomy. Clear understanding of histological structure and function. Ability to identify basic structural elements within the tissue specimen. Identification of general directions/landmarks within digitized tissue slides.

Course prerequisites:

Cell science

Number of students required for the course (minimum, maximum) and method of selecting students):

Obligatory for all registered students, on the basis of registration via the NEPTUN system

How to apply for the course:

Via the NEPTUN system.

Detailed curriculum:*List of lectures*

1. week:	Epithelial tissues, cell contacts, intercellular connections Glandular epithelium
2. week:	Connective tissue cells and fibres. Extracellular matrix
3. week:	Supporting tissues (cartilage, bone)
4. week:	Ossification, bone remodelling. Blood, erythropoiesis, leukopoiesis
5. week:	Muscle tissues
6. week:	Histology of lymphatic organs. Cellular components of lymphatic tissue. Thymus, tonsils, MALT. Structure and circulation of lymph nodes and spleen
7. week:	Histology of the tongue and teeth. Histology of the esophagus
8. week:	Histology of the stomach. Microscopical anatomy of the small and large intestines
9. week:	Histology of the liver and pancreas
10. week:	Histology of the airways
11. week:	Microscopical anatomy of urinary organs
12. week:	Histology of the male genital systems
13. week:	Histology of the female genital system I.
14. week:	Histology of the female genital system II. Placenta, mammary gland

Histology laboratories

1. week:	Introduction, epithelial tissues
2. week:	Connective tissue cells and fibres
3. week:	Blood, Cartilage, bone
4. week:	Bone formation. Nerve tissue
5. week:	Smooth, skeletal and cardiac muscle types. Histology of vessels
6. week:	Lymph nodes, tonsils, thymus, spleen
7. week:	Lip, tongue, lingual papillae Tooth bud
8. week:	Esophagus, stomach. Duodenum, jejunum, ileum, colon
9. week:	Liver, gall bladder, pancreas
10. week:	Larynx, trachea, lung
11. week:	Urinary system
12. week:	Male genital system
13. week:	Female genital system
14. week:	Placenta, revision

Other subjects concerning the border issues of the given subject (both obligatory and optional courses). Possible overlaps of themes:

Macroscopic Anatomy and Embryology I - II.

Cell sciences, cell biology

Certain chapters of Biochemistry and/or Physiology

Special study work required to successfully complete the course:

none

Requirements for participation in classes and the possibility to make up for absences:

Active participation in histology laboratory classes is obligatory for every student. Students should attend at least 75% of the scheduled hours to gain a signature proving the validity of the semester. Absences are therefore limited in **25%**. Attendance will be recorded in the histology laboratory classes.

Methods to assess knowledge acquisition during term time:

The knowledge of students will be checked in written (electronic) midterm tests.

Midterm 1 – week 5 (basic tissues)

Midterm 2 – week 11 (histology of internal organs)

Attendance is obligatory at the two midterm tests. Students absent from the tests should reattend at one of the offered retakes (week 7 or 13 and week 12 and 13, respectively). Histology midterms are written examinations organised as e-learning type (Moodle) examination composed of images and theory questions, where a valid SeKa account (including user name&password) is required.

Requirements for signature:

Active participation in at least 75% of histology laboratory sessions, including the midterm tests (irrespective of the result) is obligatory for every student.

Type of examination:

Semifinal (written and oral) examination, topics: subject matter of the semester (Microscopic Anatomy and Embryology I.).

1. Written pretest (e-learning module – 40 simple and multiple choice theory questions, passing rate: 60%)
2. Microscopic Anatomy - identification of structures on digitized tissue slides - including relevant theoretical questions from the subject matter of the semester

Examiners are delegated by the Course Director with the consent of the Head of Department

Requirements of the examination:

During the semifinal examination the knowledge of students will be tested. Semifinal examinations are composed of written (theoretical) and oral (practical) parts with the latter being conducted with the use of digitized histological tissue slides.

Topic list for the semifinal examination:

Microscopic Anatomy and Embryology I.***General Histology***

- Concept of basic tissues
- Definition and classification of epithelial tissue
- Simple epithelia
- Stratified epithelia
- Membrane specializations of epithelia
- Glandular epithelia
- Pigment epithelium, sensory neuroepithelium
- Cells of connective tissue
- Ground substance and fibres of connective tissue
- Types of connective tissue
- Blood and the corpuscular elements of blood
- Histology of the bone marrow, maturation of erythrocytes and platelets
- Differentiation of granulocytes, lymphocytes and monocytes
- Histology of cartilage
- Histology of the bone tissue
- Intramembranous ossification
- Endochondral ossification
- Growth and remodeling of bone
- Smooth muscle and myoepithelial cells
- Skeletal muscle tissue
- Cardiac muscle tissue
- Nervous tissue

Histology of organs

- Histological structure of arteries and arterioles
- Composition of capillaries and veins
- Lymphatic tissues in general, cellular components
- Histological structure of lymph nodes
- Spleen (fine structure and circulation)
- Thymus
- Tonsils, MALT
- Wall structure of hollow organs
- Histology of the lip, tongue and teeth
- Structure of the esophagus
- Histology of the airways (epiglottis, larynx, trachea, lung)
- Histology of the stomach
- Structure of the small and large intestines
- Histology of the liver and biliary passages including the gall bladder
- Histology of the pancreas
- Histology of the kidney and the urinary passages (ureter, urinary bladder)
- Histology of the testicles together with the epididymis
- Histology of the prostate, seminal vesicle, spermatic cord
- Histology of the penis
- Histology of the ovary, uterine tube; corpus luteum
- Histology of the uterus
- Histology of the vagina
- Placenta, umbilical cord

Method and type of evaluation:

Semifinal examinations are composed of written theoretical and oral practical parts. The written theoretical examination is done using an e-learning module (40 questions, passing rate: 60%) while the practical examination is conducted with the help of digitized histological tissue slides.

Evaluation of the written test: passing rate 60% – 2, 70% – 3, 80% – 4, 90% – 5.

In case the result of the test falls between 50%-59,999%, the mark is fail (1), but the students may continue with the oral examination – i.e., having a “discretionary fail”.

Students scoring below 50% have an unsuccessful examination (i.e., fail the examination) therefore they may not continue with the oral part. Students are given separate marks for each part of the examination. Unsuccessful partial examinations result in the failure of the semifinal examination. When failing at the practical part, the written test will not have to be repeated in case the result was a 4 or a 5 only. Upon the termination of the examination the Head of the Examination Committee composes the final mark from the partial marks earned in the written and practical parts.

Students may earn an exemption from the written part of the semifinal examination with a 4 or a 5 calculated from the average of the two written tests. A mark 4 (good) can be earned if the midterm average is 4,00; while a mark 5 (excellent) will be earned if the average of the midterm marks is at least 4,50. These students will have to sit only for the second, oral, part of the semifinal examination.

How to register for the examination?

Via the NEPTUN system

Possibilities for exam retake:

According the Study and Examination Policy

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

List of textbooks

1. Langmann's Medical Embryology, 13th Edition by TW Sadler, Wolters Kluwer, ISBN 9781469897806, 2014
2. Histology: A Text and Atlas: With Correlated Cell and Molecular Biology; 7th Edition by MH Ross and W Pawlina ; Wolters Kluwer 2015, ISBN 9781451187427
3. Wheater's Functional Histology, A Text and Colour Atlas, 6th Edition by B Young, G O'Dowd and P Woodford Churchill Livingstone, Edinburgh, 2013, ISBN 9780702047473
4. Stevens & Lowe's Human Histology , Elsevier, 4th ed ISBN 978-0-723435020, 2015.
5. Functional Anatomy, Histology and Embryology for medical and dental students by M. Réthelyi and J. Szentágothai, Medicina, 2018.
6. The Developing Human – Clinically Oriented Embryology, 10th ed. by KL Moore, TVN Persaud and M Torchia, Saunders, 2015; ISBN 9780323313384
7. Histology Manual 1-3. by A. Nemeskéri and K. Kocsis: István Apáthy's Foundation, 2019.
8. A. L. Kierszenbaum Histology and Cell Biology: An Introduction to Pathology, 4th Edition, Paperback with STUDENT CONSULT Online Access and E-Book ISBN: 9780323085885; 2015
9. Junqueira's Basic Histology: Text and Atlas; 13th Edition by Anthony Mescher, New York, McGraw-Hill Medical, 01/03/2013 ISBN13 978007178033

Further study aids:

To be downloaded from the homepage of the Department of Anatomy, Histology and Embryology (<http://semmelweis.hu/anatomia>) or from Knowledgebase on the Library homepage: (https://lib.semmelweis.hu/knowledge_base).

CELL SCIENCE

Department of Genetics, Cell- and Immunobiology

Address: NET Building, H-1089 Budapest, Nagyvárad tér 4.

Course director: *Edit Buzás MD, DSc*

Course coordinator: *Orsolya Láng MD, PhD*

Office hours are given on the Department website (<http://gsi.semmelweis.hu/index.php/en/education/information>)

Credit: 3

There is no midterm-check.

Aim of the course:

Course Cell Science is developed for medical students as a part of the Basic Module. The Course presents the most important aspects of cell-morphology and cell function. Cell Science Course provides a detailed discussion of compartmentalization in the eukaryotic cell as well as describes the most significant characteristics of the basic cellular functions (migration, endocytosis, cell-cell communication, division, stem cell differentiation, ageing and cell death). The practices introduce the students to the microscopic techniques used for cell morphological studies. The purpose of the course is to demonstrate the complexity of cell structure and function relationships as well as to present basic methods of in vitro cell culturing and their potential medical applications.

Location of the course:

Selye János Lecture Hall and Lab rooms L13-L16 are located on the first floor of the NET building (1089 Budapest, Nagyvárad tér 4.)

Lecturers: Prof Edit Buzás, Dr. András Kristóf Fülöp, Dr. Hargita Hegyesi, Dr László Kőhidai, Dr. Eszter Lajkó, Dr. Orsolya Láng

Lectures (1 hours per week):

1. Cell theory. Model cells in Medicine
2. Cell membrane
3. Structure and function of nucleus
4. Endoplasmic reticulum
5. Golgi complex, vesicular transport and secretion
6. Endocytosis. Autophagy
7. Cell adhesion and cell junctions
8. Cytoskeleton
9. Cellular movement
10. Structure and function of mitochondria and peroxisomes
11. Cell communication. Extracellular vesicles.
12. Cell cycle and mitosis
13. Stem cells and differentiation
14. Cellular aging and cell death

Practices (2 hours per week):

1. The light microscope
2. The general cell structure. Light microscopic microtechnique
3. The electron microscope. Cell membrane
4. The interphase nucleus. Cyto(histo)chemistry
5. Immunohistochemistry. Super-resolution microscopy
6. Cell and tissue culture
7. Endoplasmic reticulum
8. Golgi complex and secretion
9. Endocytosis and lysosomes
10. Cell surface differentiation, enzyme-histochemistry
11. Store and supply of energy. Mitochondria. Peroxisome.
12. Mitosis
13. Meiosis
14. Cell death (necrosis and apoptosis)

The order of topics may vary

Course requirements: Students must participate at least 75% of the classes. More than three absences from the practice invalidate the semester, no signature is given. There are no extra practices.

Midterms: During the semester two Moodle exam will be organized at weeks 6th and 12th.

Writing the tests is not obligatory, but students who achieve 80% of the total score will be invited to the competition. In addition, in case of a successful examination, those students who obtain more than 50% of the total score in the exam, will get one better mark. This option is only available until the end of the regular examination period, and cannot be transferred to the extended exam period, CV, and FM courses. The competition is expected to take place in week 13, students can obtain offered grades in accordance with the Study and Examination Policy.

Exam: The course ends with a written exam. It contains multiple choice, essays, drawings, etc. covering both theoretical and practical part of the subject. The written exam score should achieve 50% of the total scores for passing. At 13th week of the semester, a competition will be organized. Those who achieve the good or excellent level get the exam grade. Further details will be announced at the website of the department (<http://gsi.semmelweis.hu>) and in the Moodle.

Core text: Alberts et al. Essential Cell Biology (4th edition) Garland Science ISBN-13: 978-0815344544 ISBN-10: 0815344546
Lecture and practice presentations and additional texts are available on the homepage: <http://gsi.semmelweis.hu> (The user name and password is on course datasheet of the Neptun)

MEDICAL BIOPHYSICS I.**Tutor: Dr. István Voszka****First Semester**

Week Lecture (1.5 hours per week) **Laboratory** (2,5 hours per week)

1	Radiations (basic concepts)	Telemedicine
2	Properties of electromagnetic radiations; wave and corpuscular nature	Fundamentals of biomathematics
3	Attenuation of radiation	Emission spectroscopy. Light sources
4	Luminescence and its applications	Spectrophotometry
5	Lasers and their medical applications	Optical lenses; light microscope
6	Thermal radiation, thermography. Biological effects of light	Detection of nuclear radiations
7	Production and spectrum of X-radiation Cyclotron; Linear accelerator;	Amplifier
8	Attenuation of X-radiation, interactions	Special light microscopes Resonance
9	Atomic structure; Radioactive decay law Gamma-radiation and its detection	Optics of the eye
10	Radiotherapy, radiosurgery; Isotope diagnostics	Polarimeter
11	SPECT, PET Beta-radiation, beta-decay	The attenuation of gamma-radiation
12	Alpha-radiation, alpha-decay Interaction with matter	Dosimetry
13	Dosimetry	Concentration determination with refractometer
14	Radiation protection; estimation of risk	Repetition

MEDICAL BIOPHYSICS II.**Second Semester**

Week **Lecture** (1,5 hours per week) **Laboratory** (2,5 hours per week)

1	Bonds and their significance in macromolecular structure; Boltzmann distribution, examples	Coulter counter
2	Liquid crystals, membranes	Determination of skin-impedance
3	Electronic properties of condensed materials (solids, macromolecules)	X-ray diagnostics
4	Ultrasound properties, generation of ultrasound	Gamma energy determination
5	Ultrasonography, Doppler methods	Pulse generators (e.g. pacemaker, defibrillator)
6	Methods for structure examination	Ultrasound
7	Basic concepts of Thermodynamics, First law	Audiometry
8	General description of transport phenomena, Onsager's equation, examples	Isotope diagnostics
9	Diffusion; transport across membrane	Densitography (CT)
10	Resting potential and its local changes	Flow of fluids.
11	Action potential, properties, interpretation	Electrocardiography
12	General characteristics of sensory function, hearing, vision	Diffusion
13	Biophysics of muscle function	Sensory function
14	Motor proteins	Repetition

MATHEMATICAL AND PHYSICAL BASES OF MEDICAL BIOPHYSICS**First Semester**

Tutor: *Dr. István Voszka*

Altogether 14 hours lecture during the first four weeks of the semester

Credit 1**Topics of lectures:**

1. Mathematics, necessary for the understanding of biophysical laws
2. Physical quantities and units
3. Kinematics – motions
4. Statics – changes of shape, forces, mechanical stress, pressure
5. Dynamics – work, energy
6. Oscillations, waves
7. Fluid mechanics
8. Thermodynamics
9. Electricity – charges in rest and in motion
10. Magnetism, magnetic induction

MEDICAL CHEMISTRY**Institute of Biochemistry and Molecular Biology****Department of Molecular Biology**

EOK Building, H-1094 Budapest, Tűzoltó u. 37-47.

Lecturer of the course: Miklós Csala MD, DSc (csala.miklos@med.semmelweis-univ.hu)

Course coordinator: Gergely Keszler MD, PhD (keszler.gergely@med.semmelweis-univ.hu)

Credit: 6

Number of lessons per week: lectures: 3; practicals: 3

The principal aim of the course is to prepare students for the understanding of the subjects of Biochemistry, Molecular cell biology, Physiology and Pharmacology. This requires a firm knowledge of the foundations of general, organic and inorganic chemistry.

Lectures:*General chemistry*

1. Atomic structure; the periodic table of elements
2. Chemical bonds, hybrid states
3. Secondary bonds and interactions
4. Chemical equilibria
5. Acid-base theories, pH
6. pH of strong or weak acids and bases
7. The theory of buffers
8. Buffers of physiological importance, cation and anion hydrolysis, pH of salt solutions
9. Solubility of salts and bases, the solubility product
10. Laws of dilute solutions. Specific and equivalent conductivity
11. Thermodynamics 1 – Enthalpy
12. Thermodynamics 2 – Entropy
13. Thermodynamics 3 – Direction of reactions
14. Electrochemistry 1
15. Electrochemistry 2
16. Electrochemistry 3
17. Reaction kinetics
18. Complex compounds, reactive oxygen species

Organic chemistry

1. Principles of organic chemistry
2. Nomenclature of organic compounds, constitution of organic compounds
3. Configuration and conformation of organic compounds
4. Saturated and unsaturated hydrocarbons
5. Reactions of alkyl halides and aromatic compounds
6. Classification and reactions of hydroxyl compounds
7. Classification and reactions of oxo compounds
8. Structure, function and reactions of organic acids
9. Nitrogen-containing organic compounds
10. Sulphur or phosphorus-containing organic compounds

Practicals:

1. Introduction, acid-base titration 1 (titration of strong acids) (4×45 min)
2. Concentration, pH, problems (2×45 min)
3. Acid-base titration 2 (titration of weak acids). Relationship between conductivity and dissociation (4×45 min)
4. Salts (2×45 min)
5. Titration curves, consultation (buffers) (4×45 min)
6. Physiological buffer systems (2×45 min)
7. Electrochemistry, consultation (4×45 min)
8. Thermochemistry, thermodynamics (2×45 min)
9. Permanganometry (4×45 min)
10. Electrochemistry (2×45 min)
11. Determination of the ionization constant of phenol red by photometry (4×45 min)
12. Structure of organic compounds (2×45 min)
13. Complexometry. Precipitation titration (4×45 min)
14. Isomers, molecule models (2×45 min)

Lectures and practical lessons

Two lectures are held every week; practical lab lessons (duration: 4×45 min) and seminars (2×45 min) are held in alternating weeks. For detailed schedules see the Moodle website of the subject.

Prerequisites for acknowledging the semester

Attendance of at least 75% of the practical lessons is obligatory. Students not attending (i) more than 2 labs or (ii) more than 5 seminars or (iii) more than 1 lab and 3 seminars are not going to be allowed to sit for the semifinal exam. Missed practicals and seminars can only be made up in the same week with another group; certificate of participation issued by the host teacher needs to be presented by the student to his/her own teacher.

However, only one missed class can be made up during the semester.

Midterm examination

An optional written midterm test (30 min) is held in week 13 about the laboratory experiments performed during the semester. Performance at the laboratory work during the whole semester is also taken into account at the evaluation.

Examination and grading system

The oral and written exam is based on the topic list announced in the beginning of the semester, and it takes place before a two-member committee (examiner and co-examiner). The exam can be passed if all these topics are sufficiently answered. Students pick 3 questions (general chemistry, organic chemistry, practice) and a calculation problem to be solved in writing. Students, who perform well in at the practical midterm and in the labs during the semester, get exempted from picking the practical question. The bonus is valid during the whole exam period (in case of an unsuccessful exam).

Exemption from attending the course

Students who learned general, and organic chemistry at university levels prior to the commencement of their studies at Semmelweis University might be exempted from attending the Medical Chemistry course. Students are kindly asked to present their official documents (academical transcripts and a detailed syllabus on the courses they have completed) to the tutor (Gergely Keszler).

Recommended textbooks

Ebbing-Gammon: General Chemistry, latest edition

Hrabák-Csermely-Bauer: Principles of Organic Chemistry (2nd edition, 2007, editor: A. Hrabák)

Hrabák: Selected Collection of Chemical Calculations and Biochemical Exercises (latest edition)

E-learning system (Moodle) (<https://itc.semmelweis.hu/moodle>)

Topic list

1. General chemistry
2. The periodic table of the elements, quantum numbers
3. The covalent bond, the molecular geometry of inorganic molecules (e.g. carbon monoxide, carbon dioxide, ammonia). Ionization energy, electron affinity, electronegativity. The ionic bond, hydroxylapatite and fluoroapatite
4. The structures of polyatomic ions, the complexes
5. The secondary bonds and interactions between molecules
6. Laws of dilute solutions: vapor pressure, freezing point depression, boiling point elevation
7. The phenomenon of osmosis, its biological significance, isotonic, hypotonic and hypertonic solutions
8. Chemical equilibria, the equilibrium constant and the degree of dissociation, their correlation. The Le Châtelier principle (example: formation, properties, salts, practical use of hypochlorous acid.)
9. Gas mixtures: partial pressure, volume %. The composition of the air. Dissolution of gases in liquids, Henry's law, the decompression sickness
10. The structure and dissociation of water. Acid-base theories. The pH and pOH concept, calculation of the pH of strong acids or bases, and their titration curves. Acid-base indicators
11. The dissociation of weak acids and bases, the concept of specific and equivalent conductivity, their correlations with the dissociation. Titration curves of weak acids
12. Types of salts and their reactions with water. pH of salt solutions
13. The buffers: principle, mechanism of action, calculation of the pH. The titration curves of polyprotic acids (phosphoric acid)
14. Buffers of physiological importance
15. The solution equilibria of solid substances, the solubility product
16. The first law of thermodynamics. Heat of reaction, combustion heat, heat of formation. Hess' law
17. The second law of thermodynamics. The direction of the chemical reactions, Gibbs free energy
18. Oxidation, reduction, oxidation number, standard reduction potential
19. The galvanic cells: arrangement, reactions, calculation of the electromotive force
20. Types of electrodes, redox systems of biological importance
21. The concentration cells, the principle of measuring the pH
22. Reaction rate, order and molecularity, factors influencing the reaction rate

II. Organic chemistry

1. The electronic structure of the carbon atom, its hybrid states, the spatial structures of organic compounds
2. The concept of isomerism, types of structural isomerism, nomenclature of organic compounds
3. Geometric isomerism in unsaturated and cyclic compounds
4. Stereoisomerism, chiral compounds, optical activity, D-L and R-S nomenclature
5. Conformations of organic compounds, examples with open chain and cyclic molecules
6. Reaction types and mechanism in organic chemistry
7. Properties and reactions of alkanes
8. Properties and reactions of alkenes
9. Characteristics, reactions and biological roles of aromatic compounds
10. Alcohols, enols, phenols
11. Oxo compounds: aldehydes and ketones. Their chemical reactions, the mechanism of the nucleophilic addition. Oxo-enol tautomerism
12. Properties and reactions of compounds containing a carboxyl group
13. Substituted carboxylic acids (Halogenated, oxo-, hydroxy-; aromatic; mono-, di- and tricarboxylic acids)
14. Organic compounds containing sulfur or phosphorus
15. Nitrogen-containing organic compounds: classification and properties of amines
16. Carboamides, amides of the carbonic acid, imines

III. Laboratory

1. Principle of concentration determination by volume measurement: titrations
2. Titration of strong acids and bases
3. Titration of weak acids and bases
4. Conductivity measurement, determination of weak acid dissociation
5. Titration of gastric juice
6. Titration curves of mono- and polyprotic acids
7. Titration based on redox reaction: permanganometry
8. Complexometry: determination of copper concentration
9. Electrochemical measurements: the Daniell cell, concentration cell, redox and non-polarizable electrodes
10. Principle of spectrophotometry, areas of application: determination of the K_d value of the phenol red indicator
11. Precipitation titration

MEDICAL BIOCHEMISTRY I.**Department of Medical Biochemistry****Credits:** 5**Total number of hours: 70; lectures (hours): 42; practices (hours): 28****Type of the course:** obligatory**Academic year:** 2023/2024**Name of Head of the Department:** Professor László Csanády M.D. Ph.D. D.Sc.**Contact details:** H-1094 Budapest, Tűzoltó u. 37-47. **tel:** +36-1-459-1500#60010 **e-mail:** csanady.laszlo@med.semmelweis-univ.hu**Position:** Temporary Head of Department**Date of Habilitation:** 2013 **Its number:** 341**Objectives of the subject, its place in the medical curriculum:**

The aim of this course is to examine biologically important molecules - namely amino acids, carbohydrates, lipids and nucleotides - identify their contributions to metabolic processes emphasized from a medical point of view, examine the structure and function of proteins, and address mechanisms of catalysis performed by enzymes. Furthermore, three basic biochemistry modules are outlined: The enzymology module, encompassing general principles of enzyme kinetics and how enzymes influence efficiency and controllability of chemical processes in biological systems, as well as how they affect structure and regulation of metabolic pathways; the bioenergetics module, addressing the relationships between mass-energy conversions in the human body emphasizing nutritional aspects, also elaborating on thermodynamic aspects of metabolism; and the 'first' intermediary metabolism module, presenting the salient features of carbohydrate and lipid metabolism which are essential for understanding physiological and pathological processes of the human body. During practices, students apply the theoretical knowledge acquired at lectures as part of case-oriented discussions in an effort to interpret - from a molecular point of view - medically relevant conditions.

Location of the course (lecture hall, practice room, etc.):

Premises located in the Basic Medical Sciences building (laboratory rooms located on the first floor and lecture halls located on the ground floor).

Upon the successful completion of the curriculum, the student should be able to:

Identify biochemical structures, know and understand the reactions in which medically important molecules participate; know and understand inter-organ biochemical processes; know and understand integrated metabolic functions of the human body. Overall, such knowledge is essential for understanding physiological and pathological processes and, consequently, for making sound medical decisions.

Prerequisite (s) for admission to the course:

Medical Chemistry

Number of students required for the course (minimum, maximum) and method of selecting students:

Not applicable for obligatory subjects

How to apply for the course:

Application is through the Neptun online system

Detailed curriculum:

Lectures: weekly 2x70 min (3 hours)

Lecturers: Prof. Csanády László (CSL), Prof. Kolev Kraszimir (KK), Dr. Christos Chinopoulos (CC), *Dr. Komorowicz Erzsébet* (KE), Dr. Kardon Tamás (KT), Dr. Törőcsik Beáta (TB), Prof. Tretter László (TL)

Practices (P): 2 hours every week

Week	Lectures	Practices (P): 2 hours every week
1	The chemical structure of the amino acids that make up proteins. Formation of peptide bonds and their spatial structure. Primary structure of proteins. (CSL) Hierarchical structure of proteins, secondary and tertiary structure. Process of unfolding of proteins, protein denaturation. (CSL)	Structural and chemical characteristics of amino acids from the point of view of physiological functions (pH and temperature dependent properties).
2	Quaternary structure and posttranslational modifications of proteins. Structure of collagen. Structural basis of protein-nucleic acid interactions. (CSL) Structure-function relationships of haemoglobin and myoglobin. (CSL)	Current protein diagnostic and structural analysis methods and their medical applications.
3	A description of the general properties of enzymes. The chemical nature of enzymes. Thermodynamics of catalysis. The role of activation energy. Isoenzymes. The role of coenzymes and vitamins. Mechanism of action of serine proteases. (KK) Kinetic models of enzyme function. Michaelis-Menten kinetics. Initial reaction rate criteria. Michaelis constant (Km) and its significance. Inhibition of enzyme reactions, kinetics of inhibition. The importance of inhibition types in drug design. (KK)	Interpreting protein structure-related pathological conditions in light of atomic resolution protein structures
4	Allosteric and cooperativity. Levels of regulation of enzyme reactions: regulation by compartmentalization, regulation of gene expression, regulation by reversible modification of catalytic activity of enzymes. Regulation by proteolytic activity. (KK) Structure and kinetics of metabolic pathways. Principles of metabolic control. Strategies for identifying drug target enzymes. (KK)	Determination of enzyme kinetic parameters, regulation of enzyme activity
5	Thermodynamics of biochemical processes. Reversible and irreversible reactions. Compounds with high group transfer potential. The central role of ATP in cellular energy metabolism. Reducing equivalents. (TL) Substrate level phosphorylation as a possible mechanism for ATP synthesis. Reactions and regulation of the citrate cycle. Acetyl-CoA sources of the citrate cycle. Pyruvate dehydrogenase complex. (TL)	Identification of metabolic pathways.
6	Mechanism of ATP synthesis in mitochondria: oxidative phosphorylation. The so-called terminal oxidation, also known as respiratory chain redox reactions, and the enzyme complexes that catalyse these reactions. (CC) Transfer of energy released during exergonic redox reactions to the synthesis of ATP. Function of ATP synthase, reversibility. Respiratory control, P/O ratio. Mechanisms inhibiting oxidative phosphorylation. Physiological role of uncoupling. (CC)	The structure of carbohydrates. Carbohydrate components in the diet. Dietary fibers and additives.
7	Carbohydrates in food, their digestion, absorption of carbohydrates in the intestinal tract. Membrane transporters in general. Glucose transporters, their tissue localization, regulation. (TB) The process and regulation of glycolysis. (TB)	Experimental determination of P/O ratio (practice)
8	Metabolism and molecular pathology of fructose, galactose and lactose. Glycogen degradation and synthesis. (TB) Gluconeogenesis. Anaplerotic reactions. Energetics of gluconeogenesis, its significance in starvation. Cori cycle. Regulation of gluconeogenesis. Effect of glucagon. (TB)	Lactic acidosis
9	Regulation of blood glucose I. Glycogen mobilisation in liver and muscle. Phosphorylation cascade. Enzymes regulated by glucagon. Lactose synthesis (TB) Regulation of blood glucose II. Hyperglycaemia. Insulin secretion, its receptor and its effects on the organs (TB)	Structures and bioenergetic functions of the main lipids in the body and in foodstuffs
10	The biochemistry of diabetes. Type 1 and type 2 diabetes (TB) Dietary lipids, their digestion, absorption, metabolism of kilomicros. Essential fatty acids (TL)	Measurement of blood glucose levels according to the oral glucose tolerance test. Non-enzymatic glycation of haemoglobin.
11	Mobilisation of fatty acids in adipose tissue and its regulation. Transport in the circulation. Free fatty acids, VLDL, IDL (TL) Oxidation of fatty acids and its regulation. Production and utilisation of ketone bodies (TL)	Role of insulin in metabolism and signal transduction
12	Synthesis and regulation of fatty acids. Saturated and unsaturated fatty acids. Synthesis and regulation of triglycerides and phospholipids (TL) Characterisation and grouping of biotransformation reactions: phase I reactions - microsomal cytochrome P450 isoenzymes, phase II reactions - glucuronidation, conjugation with glutathione. Regulation of biotransformation processes (KT)	The role of lipoprotein lipase in determining the metabolic profile of organs. Lipoprotein lipase deficiency.

Week	Lectures	Practices (P): 2 hours every week
13	Cholesterol metabolism, cholesterol transport in the circulation (KK) Synthesis, metabolism and role of bile acids in the digestion of fats. Cholesterol deposition and uptake in cells (KK)	Determination of cholesterol and triglycerides (medical implications of plasma cholesterol levels)
14	Steroid hormone synthesis in the adrenal cortex. Biochemical background of adrenocortical stratification. Synthesis of mineralocorticoids, preceptor specificity. Types of steroid receptors and signal transduction, classical and non-genomic mechanisms of action. (KE) Synthesis of glucocorticoids, cortisol effects, regulation of cortisol synthesis. Synthesis of sex hormones. Progesterone and estradiol synthesis in the placenta. Testosterone synthesis in the testis, formation and significance of dihydrotestosterone. KE)	Membrane-forming lipids; precursors of signalling molecules.

Other subjects concerning the border issues of the given subject (both obligatory and optional courses!). Possible overlaps of themes: none

Special study work required to successfully complete the course: None.

Requirements for participation in classes and the possibility to make up for absences:

Practices and seminars are mandatory. It is not possible to make up for missed practices/seminars. In case of absences amounting to more than 3 occasions, the semester is not acknowledged. Arriving to a practice /seminar with a delay of more than 10 minutes is considered an absence.

Methods to assess knowledge acquisition during term time:

Practice/seminar participation performance will be evaluated by the tutor: as such, maximum 10 points per semester can be obtained that may count towards the examination grade, see under "Grading system".

Midterms: A midterm will take place in the 6th and another in the 11th week, during the practice/seminar (allocated time per midterm: 30 minutes). Each midterm will consist of multiple choice questions (MCQs) from which max 30 points can be obtained (15 points per midterm).

It is not obligatory to pass a midterm in order to be allowed to sit for the exam.

The midterm points will be added as "points" to the score of the semi-final exam, as detailed in "Grading system". In case of justified absence from the midterm (certificates to be sent to biochem.teaching.secretary@gmail.com), retake opportunity is provided in the last week of the semester during the practice/seminar allocated time.

Lectures: At the end of each lecture, there will be a Kahoot on the topic of the lecture, consisting of 5 questions. Maximum 1 point can be earned per lecture, as outlined by the lecturer. Through the Kahoots, students may obtain points that will be added to the points earned at the exam, as detailed in "Grading system".

Competition: The competition consists of two rounds: a written and an oral one. The written part is held on the last week and consists of 70 multiple-choice questions (MCQs) and will last 40 minutes. Only students who cumulatively amass 21 or more points from the midterms may participate in the competition. Points obtained from midterms, or practice/seminar performance, do not count toward the score of the competition. Students who score at least 90% of the best result achieved by any student in the course will be invited for the oral exam; this short oral exam will take place on the last day of the last week (after 2 pm, exact time and place will be announced in the last week). On the basis of the written and oral part exemption from the semifinal exam may be granted with a grade of 5 (top 5 % scorers) or 4 (top 5.1-10% scorers).

Requirements for signature: No credit will be given for absences exceeding 6 hours (3 occasions).

Type of examination: semi-final; Form: written and oral test based on material of the official textbooks, lectures and practices/seminars published at the department's Moodle e-learning system (<https://itc.semmelweis.hu/moodle/>). See under "Grading system" for further details.

Requirements of the examination:

The material covered in the exam is the material of the lectures and practices/seminars in the topic, with the corresponding textbook chapters as announced in the detailed syllabus posted in the department's Moodle e-learning system.

Method and type of evaluation:

Grading system: The grade of the final exam is based on the points obtained at the written MCQ semi-final exam, the two midterms, the practice points, and the oral exam following the written MCQ exam as detailed below.

Grading of the written part:

- Block1: 30 MCQ (30 min) on proteins and enzymes (threshold to pass 12 points)
- Block2: 30 MCQ (30 min) on bioenergetics and carbohydrate metabolism (threshold to pass 12 points)
- Block3: 30 MCQ (30 min) on biotransformation and lipid metabolism (threshold to pass 12 points)

Subtotal threshold: the sum of scores from Block1, Block2, and Block3 should be at least 45 points Total grade of the written part: if the subtotal threshold is achieved, the points of the midterms (max. 30 points) and practices (max. 10 points) are added and the grade is determined as follows:

Fail (1): if the score in any block is less than 12,
OR the subtotal is less than 45,
OR the total is less than 60
Pass (2): 60 - 74 points

Satisfactory (3): 75 – 89 points
Good (4): 90 – 109 points
Excellent (5): 110 – 130 points

Oral part

Only students who pass the written part proceed to the oral part held on the same day. The examiner chooses 5 MCQ that have been correctly answered by the student in the written part, and the student should interpret them. If the student has achieved amass 15 or more points from the two midterms, they need to answer only 3 oral questions.

Final grade

The final grade is based on the total written grade weighted by a factor determined by the examiner based on the student's performance in the oral part. In case of failure students must retake both the written and oral parts.

In the case of retakes, students must retake both the written and oral parts.

How to register for the examination?: The exam dates are announced on the 12th week of the semester. At least two exam dates per week will be provided. Applications are made in the Neptun system in accordance with the University Study and Exam Rules.

Possibilities for exam retake: An exam can be retaken according to the general rules of the university. In case of a retake to bettering the mark, the most recent result will be registered, not the highest mark.

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

Harper's Biochemistry (30th edition, or later)

Online material published at the department's Moodle e-learning system (<https://itc.semmelweis.hu/moodle/>).

THE SOCIOLOGY OF HEALTHCARE AND MEDICINE

Semester: half class in the first semester and half class in the second semester

Institute of Behavioural Sciences

Type of the course: obligatory

credit: 2

Course leader: Dr. György Purebl

Groups 1-11 in the first semester, groups 11-24 in the second semester

Course objectives:

By the mid to late 20th century, the biomedical model in medicine was replaced by the biopsychosocial model. There are biological, psychological and social factors in the background of illness. This is the approach we take in this course in looking at various aspects of health, illness and medical work. Our aim is to introduce future medical doctors to the social factors they must be familiar with in working with patients. Topics include social stratification and health inequalities, the principles of health care systems, medicalisation and the changing medical profession, illness behaviour, intercultural issues in health care as well as the challenges of digital health.

Course Syllabus:

1. Introduction to medical sociology, basic concepts and principles. (lecture)
2. Health and illness in society, a historical transformation of mortality and morbidity patterns. (lecture)
3. Social stratification, social inequalities and health (lecture)
4. Intercultural healthcare (lecture)
5. The challenges of digital health (lecture)
6. Healthcare systems (Lecture)
7. Society and health in Hungary (Lecture)
8. Preparation for project work and for health care system workshop (practical)
9. Health care systems workshop (practical)
10. Global poverty and inequalities, Inequalities and health- social class (practical)
11. Inequalities and health: age, ethnicity and gender (practical)
12. The doctor- patient relationship in the 21st century (practical)
13. Illness behaviour (practical)
14. The challenges of health care professionals- coping with stress (practical)

Participation and making up for absences:

No less than 75% of all practices must be attended. One practical absence can be made up by undertaking an extra task set by the practical leader or by participating in the practical with another group.

Justification of the absence in the lectures and examinations:

Medical certificate

Checks during the semester (reports, written checks):

Students will be given topic related tasks during the practices, which they will have to complete in groups. The tasks will involve finding topic related data in class, interpreting it and presenting it to the group, relating the topics discussed in class to the students' own countries and experiences and sharing it with others, reading articles and summarizing them and participating in games and activities. More information will be provided separately. The tasks are graded and contribute towards the final grade. 30% of the final grade is made up of the tasks.

Requirements for the signature at the end of the semester:

Doing 75% of the tasks in practices.

Method of the calculation of marks:

The written examination is 100% of the final grade

30% of the final grade is made up of the tasks done during practices.

Grades:

0-50 points	1
51- 60 points	2
61-74 points	3
75-84 points	4
85 points and over	5

Type of the exam:

Written final exam to be held during the examination period consisting of, true or false questions and an essay type case analysis based on lecture materials and the textbook. This is 70% of the final grade.

30% of the final grade is given for the short tasks done in class.

Requirements for the exam:

The material needed to study will be made available on Moodle. In order to undertake the exam successfully, students must know the material made available to them as well as the textbook.

The material covered in the exam:

- Basic sociological concepts (Culture, structure, roles, statuses, social stratification, social institutions, social mobility)
- Health and Illness through history, basic epidemiological ideas
- Health inequalities and social inequalities (Age, gender, ethnicity, material conditions)
- Global inequality
- Intercultural factors in healthcare
- Healthcare systems
- Digital health cultural and social aspects
- The doctor-patient relationship
- Illness behaviour
- Health Behaviour
- The medical profession- sociological aspects

Application for the exam: Neptun

Changing the application for the exam:

Neptun

Justification of the absence from the exam:

Medical certificate

Course and recommended textbooks:

Graham Scrambler (ed): Sociology as Applied to Health and Medicine, Palgrave Macmillan 2018 - selected chapters only.

MEDICAL COMMUNICATION

Institute of Behavioural Sciences

Name of the course director: *Dr. Adrienne Stauder, Ph.D., habil*

Name of the course leader: *Dr. János Pilling*

Credit value: 2 credits

Total number of hours: 28 lectures: 14 practices: 14 seminars: 0

Subject type: obligatory course

Objectives of the subject, its place in the medical curriculum:

Proper communication is an essential element of effective healing. Good communication helps to form a trusting relationship between the physician and the patient, it allows the doctor to gather effectively the information that underpins the diagnosis, and it improves the patient's cooperation and adherence with treatments. The aim of education is partly to teach communication techniques that can make the daily tasks of doctors more effective: listening to, interviewing, informing and promoting cooperation of the patients. The subjects of education are also elements of the everyday doctor-patient relationship, which have recently come to the fore, such as e.g. shared decision making, suggestive effects of medical communication, communication aspects of patient safety.

In addition to describing the general regularities of medical communication, the course also presents the specialities of communication in various areas of the health care. Thus, we deal with the peculiarities of communication with children or the elderly, discussion about sexual topics and the cultural competence of the doctor. In our education, we place great emphasis on the difficult issues of the doctor-patient relationship, so we deal with the communication of bad news and the prevention and management of aggression.

The main goal of the course is to teach special communication knowledge to medical students that can help them create proper doctor-patient relationship and improve their effectiveness in medical practice.

Place where the subject is taught (address of the auditorium, seminar room, etc.):

SU NET and EOK buildings

Successful completion of the subject results in the acquisition of the following competencies:

Upon successful completion of the subject, the students will be able to

- effectively gather information to make a diagnosis by using appropriate questioning techniques;
- use communication techniques that facilitate the understanding and remembering during patient information;
- know and apply specific communication techniques to express their attention and empathy;
- use several communication techniques to improve the patient's therapeutic cooperation;
- inform the patient about the possible risks of the treatments in accordance with the legal regulation, in an objective, yet non-alarming way;
- can activate the patient in order to become a partner in his own treatment as much as possible, and empower the patient himself to contribute as much as possible to his own recovery or improvement of his condition;
- have effective methods to facilitate lifestyle change;
- be aware of the suggestive effects that doctor's communication can have; be able to use communication methods that put the positive effects of the doctor's words at the service of cooperation and healing;
- be able to communicate in a way that suits the individual characteristics of the patient (age, different social and cultural backgrounds, different levels of health understanding, possible mental disorders or disabilities);
- be able to communicate on intimate issues without embarrassment;
- know and be able to use communication methods to manage tensions and conflicts;
- breaking bad news in a compassionate way (eg news of incurable disease, news of death, news of congenital malformation);
- can effectively use modern technology for the purposes of medical communication;
- know and be able to use communication tools that increase patient safety.

Course prerequisites:

There are no prerequisites.

Number of students required for the course (minimum, maximum) and method of selecting students:

The completion of the course is obligatory for all students. Course is taught only in the first semester of the academic year, all students can register for the course. The recommended maximum number of students for practice is 15 students per group.

How to apply for the course:

Through the Neptun system.

Detailed curriculum:

(Theoretical and practical lessons shall be given separately by numbering the lessons (by weeks). Please provide the names of the teachers of the lectures and practical lessons and indicate guest lecturers. Do not use attachments!

Always attach a CV for guest lecturers!

LECTURES: Week 1-7

Week 1:	Introduction. Communication difficulties and possible solutions in the everyday medical practice. (Dr. János Kollár)
Week 2.	Promoting behavior change. The development of the patient-physician collaboration. (Dr. Adrienne Stauder)
Week 3.	Breaking bad news. Disclosing medical errors. (Dr. János Kollár)
Week 4.	The specialities of age in medical communication. (Dr. Mónika Ditta Tóth)
Week 5.	Suggestive communication in medical practice. (Dr. János Kollár)
Week 6.	Communication about functional complaints. (Dr. Adrienne Stauder)
Week 7.	E-health: use of technological tools in health communication. (Dr. Mónika Ditta Tóth)

Practice: Week 8-14 (exact times, venues and teachers to be announced in the Neptun and on our website:)

<https://semmelweis.hu/magtud/en/education/faculty-of-medicine/medical-communication/seminars-and-course-schedule/>)

Week 8.	Seminar. Communication in everyday life and in the medical practice.
Week 9.	Seminar. The active listening. Communication aspects in empathy.
Week 10.	Patient information, patient education.
Week 11.	Seminar. Promoting lifestyle change. suggestive communication techniques, motivational interview, shared decision-making.
Week 12.	Seminar. Communicating bad news (practice). Communicating with depressed patients. Recognizing the risk of suicide.
Week 13.	Seminar. Communication with tense, hostile patients, strategies to prevent violence. Communicating about intimate issues.
Week 14.	Seminar. The cultural competence of the doctor. Communicating about complementary and alternative therapies.

All planned lecturers: Dr. Kollár János, Dr. Stauder Adrienne Dr. Tóth Mónika Ditta, are employees of Semmelweis University

Other subjects concerning the border issues of the given subject (both obligatory and optional courses!). Possible overlaps of themes:

- The Sociology of Healthcare and Medicine (possible overlap: the impact of modern technology on medical communication)
- Medical Psychology, Psychiatry (possible overlap: relationship and communication with people with mental disorders.)
- Bioethics (possible overlap: medical communication deals with the implementation in everyday practice of principles described in bio-ethics.)

Special study work required to successfully complete the course:

(E.g. field exercises, medical case analysis, test preparation, etc.)

no special study work required

Requirements for participation in classes and the possibility to make up for absences:

The participation at minimum 75% of the practice seminars is the prerequisite of the signature.

It is possible to make up for ONE absence by participating in another seminar group the same week (only once in a semester, upon agreement with both teachers!)

Methods to assess knowledge acquisition during term time:

(E.g. homework, reports, mid-term test, end-term test, etc., the possibility of replacement and improvement of test results)

There is no assessment during the term time.

Requirements for signature:

The participation at minimum 75% of the practice seminars is the prerequisite of the signature.

Requirements of the examination:

(In case of a theoretical examination, please provide the topic list; in case of a practical exam, specify the topics and the method of the exam)

Exam topics list A:

1. The significance of medical communication. Misconceptions and facts about medical communication.
2. Doctor-patient consultation.
3. Promoting lifestyle change: the 5A and 5R methods; the transtheoretical model of behavior change.
4. Promoting lifestyle change: motivational interviewing.
5. Communication options for developing health literacy.
6. Communicating risks of treatments.
7. Shared decision making.
8. Suggestive communication in medical practice.
9. Communication with children.
10. Communication with older people. Communication with elderly having age-related mental disorders.
11. Cultural competence of the physician.

Exam topics list „B“

12. Communication about functional symptoms
13. Communication with patients using complementary and alternative treatments.
14. Communicating about intimate issues.
15. Communication with tense, hostile people.
16. Communication with depressed patients. Recognizing the risk of suicide.
17. Communication with patients having anxiety symptoms or addictions.
18. Breaking bad news.
19. Communication aspects of patient safety.
20. Communication with people living with disabilities.
21. Communication with the victims of abuse.
22. E-health: use of technological tools in health communication.

Method and type of evaluation:

(Method of calculating the final mark based on the theoretical and practical examination. How the mid-term test results are taken into account in the final mark.)

Final mark is based on an oral exam. Two topics – one from A list and one from B list should be reported on, at least at satisfactory (2) level. The average of the marks given for each topic gives the final mark.

How to register for the examination:

Through the Neptun system.

Possibilities for exam retake:

Through the Neptun system

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

The oral exam is based on the course text book and the lecture handouts posted in Moodle.

Course text book:

Pilling, János: Medical Communication in practice. Medicina, Budapest, 2020.

INTRODUCTION TO MEDICAL INFORMATICS

Name of the educational organizational unit: SE EKK

Type of the subject: 1 practice / week

credit value: 1

Name of the lecturer of the subject:

Dr. Miklós Szócska

Teachers:

Dr. Tamás Iváncsy (PhD, lecturer)

Dr. Ádám Zoltán Tamus (PhD, associate professor)

Tamás Tóth (PhD, senior lecturer)

Zoltán Sándor (PhD, senior lecturer)

Zoltán Tóth (PhD, senior lecturer)

Administrator: Ms Júlia Nagy

Term: spring

The exercise of the subject in the in the realization of the aim of the education:

To introduce the students to the medical application of informatics, the characteristics of modern, integrated information systems with respect to quantitative aspects and to decision demands of the modern sciences. The medical informatics leans on methods of mathematics, statistics and computer sciences and it also includes from the different engineering, management and informatics procedures.

Select the desired course in Neptun when registering to the subject! Changing topics/groups is possible only according to the rules of the registration in Neptun! You must attend the course you have selected in Neptun!

OPTIONAL courses:

I. SCIENTIFIC COMMUNICATION COURSE

The course gives an introduction to the paper based and oral publications and presentations. The students have to find a medical problem (a topic) to work out during the course.

1. **Creation and retrieval of medical knowledge. Finding and studying scientific publications via the electronic library of the university.**
2. **Structure of a scientific publication. The importance and meaning of the sections of the paper. Structure of an oral presentation.**
3. **Scientific publication in practice: finding and evaluating information and creating paper and presentation on the selected topic.**

II. DATABASES COURSE

The course gives an introduction to structuring and retrieving data using databases. The students perform practical examples of data management and query using a current software solution.

1. **Introduction to database theory and data modelling principles (the application, logical and physical models, basic concepts and objects).**
2. **Data handling in practice: planning a relational database, managing tables and fields**
3. **Information retrieval from databases: the role and structure of queries, performing basic queries**
4. **Data management via user interfaces – basic concepts and principles**

III. BIOMEDICAL SIGNAL PROCESSING COURSE

The students learn about the basics of biomedical signals, their acquisition, digital storage and processing. They perform practical analysis of selected signal examples.

1. **Introduction to biomedical signal processing, objectives of signal analysis, Components of human-instrument system**
2. **Examples of biomedical signals (electrical and mechanical signals), and transducers.**
3. **The basics of signal processing, the digitalizing (sampling, Shannon-theory, quantization).**
4. **Analysis of a phonocardiogram (heart sound, calculation of the pulse, murmurs). Spectral analysis.**
5. **Analysis of ECG signal. Basics of removing noise and artefacts.**

IV. PRESENTATION TOOLS

The course provides an overview of visual representation of medical information for various audience. The students learn the use of several related tools, and work up a selected topic.

1. **Introduction to presentation techniques: How to make a good presentation? – technical and non-technical skills, best practices**
2. **Types of medical information, online information sources**
3. **Visual representation of information: word cloud, infographic etc.**
4. **Online tools for creating and sharing presentations**

Requirements of participation of the lessons and the possibility of substitution of the absence:

According to rules of the Studies and Exam Code. Attendance on at least 3 of the 4 practices is mandatory.

The mode of the certificate in case of absence from the lessons:

According to rules of the Studies and Exam Code. No certificate accepted.

The requirements of signature at the end of the term (including also the number and the type of the students' exercises which are solved individual by them)

Attendance on at least 3 of the 4 practices is mandatory

The mode of acquisition of the mark:

Practical exercise

List of lecture notes, course books, study-aids and literature which can be used to acquisition of the syllabus:

The educational materials are available at <http://dei-cloud.semmelweis.hu>

Username and password is announced at the first practice.

INTRODUCTION TO PATIENT CARE

Name of the host institution (and any contributing institutions):

Host - Department of Family Medicine;

Contributing departments: Dpt. of Pediatrics, Dpt. of Neurology, Dpt. of Psychiatry, Dpt. of Internal Medicine and Oncology, Dpt. of Internal Medicine and Hematology, Dpt. of Cardiology, Dpt. of Surgery, Gastroenterology and Transplantation, Dpt. of Gynecology and Obstetrics and Dpt. of Anesthesiology and Intensive Therapy - SIM Center

Name of the subject: Bevezetés a betegellátásba
in English: Introduction to Patient Care
in German: Berufsfelderkundung

Credit value: 2

Semester: 2nd semester (as defined in the curriculum)

Total number of classes per week: 2/ 6weeks, 3/another 6 weeks

lectures: 2 lessons for 6 weeks

practical lessons: 3 lessons for 6 weeks

seminars: 0

Type of subject: obligatory

Academic year: 2024/2025

Language of instruction, for optional or elective subjects:

Course coordinator: Prof. Peter Torzsa M.D. Ph.D.

Place of work, phone number: H- 1085 Budapest, Stáhly u. 7-9. Phone: +36-1-355-8530

Position: Professor, Head of Department

Date and number of habilitation: 2020.07.21, 11/2020

Course description, contact: semmelweis.hu/csot/en/english-program/english-program-first-year/

Objectives of the course and its place in the medical curriculum:

An overview of medical profession. Formation of the consciousness of profession, personal careers. The attitude of the medical doctor. Communication with colleagues and the members of the medical staff. An overview of different levels of health care. The organization and the functional activity of clinical departments and the general practitioner's office. Characteristics of the clinical work. Overview of the scientific activity of the clinical departments.

Place of instruction (address of lecture hall or seminar room etc.):

Lectures are in the Basic Medical Science Center. The practicals are held all around the University's different departments and contracted GPs' surgeries in Budapest.

Competencies acquired through the completion of the course:

- Basics of medical interviewing, making a rapport with patients.
- Exploring anamnesis and basic communication techniques
- Approach to the physical examination, basic skills
- Introduction to nursing skills: e.g. hand disinfection and blood taking – Skills LAB

Student headcount conditions for starting the course (minimum, maximum) and method of student selection:

max. 16 students/study group

Detailed course description:**LECTURES**

1st semester week: family medicine lecture
 2nd week: cardiology lecture
 3rd week: obstetrics and gynecology lecture
 4th week: surgery lecture
 5th week: pediatrics lecture
 6th week: psychiatry lecture

PRACTICALS

7th week: internal medicine, surgery, pediatrics, psychiatry, obstetrics and gynecology, family medicine, cardiology, neurology according to the attendance sheet
 8th week: internal medicine, surgery, pediatrics, psychiatry, obstetrics and gynecology, family medicine, cardiology, neurology according to the attendance sheet
 9th week: internal medicine, surgery, pediatrics, psychiatry, obstetrics and gynecology, family medicine, cardiology, neurology according to the attendance sheet
 10th week: internal medicine, surgery, pediatrics, psychiatry, obstetrics and gynecology, family medicine, cardiology, neurology according to the attendance sheet
 11th week: internal medicine, surgery, pediatrics, psychiatry, obstetrics and gynecology, family medicine, cardiology, neurology according to the attendance sheet
 12th week: internal medicine, surgery, pediatrics, psychiatry, obstetrics and gynecology, family medicine, cardiology, neurology according to the attendance sheet
 13th week: makeup/replacement classes if needed
 During the semester until the 14th week:
 Skills Lab opportunity: an Introduction to Patient Care – Nursing skills in cooperation with Department/Clinic of Anaesthesiology and Intensive Care, SIM Centre – details, application on MOODLE
 14th week: Essay upload on MOODLE.

Attendance requirements; conditions under which students can make up for absences and the method of absence justification: completed attendance sheet and/or individual certificates from the tutors. It's obligatory for the student to attend 75 percent of the training sessions, but if needed students can join another training group for a makeup class to be able to meet this requirement. Please contact the Department (Tutor) in this case by email.

Form of assessment in the study period: essay

Number and type of assignments for individual work and the deadline for submission:

1 essay until the end of semester

Requirements to obtain the teacher's signature: attending at least 75% of the practicals (5 out of 6 total), so completed attendance sheet and/or individual certifications uploaded to MOODLE.

Type of assessment: essay (practical mark)

Examination requirements:

Essay, typed, 1600 characters as the minimum length WITHOUT spaces, e.g. Times New Roman font, font size 12, single spacing.
 Topic: A report of students' experiences of lectures and practices about medical profession e.g. with short case reports, impressions, personal situations. Which specialty of the medical profession was attractive for you, why?
 Deadline for upload to MOODLE is the end of 14th week.

Method and type of grading:

- Grade 1: Deadline was missed, number of characters < 1600,
- Grade 2: no personal example or practical experience at all (just theoretical or technical reports)
- Grade 3: too general drafting without any personal opinion
- Grade 4: minor formal mistakes with personal point of view
- Grade 5: precise writing with personal examples

List of course books, textbooks, study aids and literature facilitating the acquisition of knowledge to complete the course and included in the assessment, precisely indicating which requirement each item is related to (e.g., topic by topic) as well as a list of important technical and other applicable study aids: lecture slides on MOODLE and the Department's homepage:
semmelweis.hu/csot/en/english-program/english-program-first-year/

Second Semester

Thematic:

- An overview of medical profession.
- Formation of the consciousness of profession, personal careers.
- The attitude of the medical doctor. Communication with colleagues and the members of the medical staff.
- An overview of different levels of health care.
- The organization, function activity of the clinical department and general medicine praxis.
- Characteristics of the clinical work.
- Overview of the scientific activity of the clinical department. Raising interest on joining to it.

FIRST AID

Tutor: *Dr. Kuti Nikoletta, Dr. Gulyás Csilla*

Topics

1. System of the emergency medicine. Chain of emergency
 - Goal of first aid and levels.
 - Safety on the scene
 - Emergency call
 - Extrication, Moving the patient.
 - Critical state, recognition.
 - Quick look and simple assessment, the ABCDE approach

2. The unconscious patient
 - Secure the airway
 - Chain of survival
 - Cardiac arrest recognition.
 - CPR - resuscitation

3. Critical illness or critical situations – complains and symptoms (red flags) and immediate measures
 - Chest pain
 - SONB, Dyspnoe
 - Syncope
 - Shock
 - Allergy
 - AMS – seizures – stroke- hypoglycemia,
 - Injuries, Bleeding control, Fixations, Covers. Burns. Frostbites.
 - Hypo/hyperthermia.
 - Intoxications
 - Major incidents

Practices

- Stabil – recovery position, basic airway skills,
- BLS – basic life support
- BLS-AED – use of AED
- VKV – Fixations for fractures, Burns and frost injuries, Bleeding control, Practical exam

Due to our short time for practices, the topics listed above will be discussed in more detail during the lectures.

Note: Participation at 75% of practices is necessary. Compensation of absences is possible in subsequent practices.

Development in learning skills will be controlled all the time during the practices in the semester.

Mode of certifying absences: oral – referring to practices.

Requirements: The student should be able to recognize emergencies, and call for help start with BLS + AED provide airway management in unconscious patients provide first aid for patients complaining for chest-pain, shortness of breath, signs for hypoglycaemia and having suffered from fainting, shock condition, convulsion, injuries.

The performance of the above mentioned requirements at the last practice will be evaluated with “accepted” or “not accepted”.

MEDICAL TERMINOLOGY

Responsible organisational unit:

Department of Languages for Specific Purposes

Programme director:

Katalin Fogarasi PhD, habil., director, habilitated associate professor

90 minutes/week

Assessment: 2 written tests

Role of subject in fulfilling the aim of training:

Medical Terminology is a course designed for medical students to ease their everyday studies by providing them with linguistic and terminological knowledge. The material is closely built on the terminology of Anatomy and the clinical terminology of the Musculoskeletal system. Students get familiarized with the most sufficient grammatical rules governing medical terminology and become able to decode anatomical names and formulate both Latin and Greek diagnostic phrases.

Syllabus

- 1 Latin nouns in Anatomy
- 2 The dictionary form of Latin nouns
- 3 Latin possessive phrases in Anatomy
- 4 The plural form of Latin nouns
- 5 The dictionary form of Latin adjectives and their agreement to nouns
- 6 The dictionary form of Latin adjectives and their agreement to nouns
- 7 test 1
- 8 Anatomical adjectives from nouns
- 9 Anatomical adjectives from nouns
- 10 Muscle names
- 11 Muscle names
- 12 Diagnostic terminology - musculoskeletal disorders
- 13 Diagnostic terminology - musculoskeletal disorders
- 14 test 2

Course material, recommended text book(s), professional literature and supplementary reading(s)

Bakó, Alexandra. Medical Terminology, manuscript. 2022 (available on the moodle course of the subject in pdf)

MEDICAL HUNGARIAN I.

Responsible organisational unit:

Department of Languages for Specific Purposes

Programme director:

Katalin Fogarasi PhD, habil., director, habilitated associate professor

4 lessons per week, 2 credits,

Assessment: 2 oral tests (on weeks 7 and 14)

The aim of the subject:

The role of this subject is to help students acquire the Hungarian language skills that enable them to take anamnesis, ask the patient about medical history and present complaints and to develop strategies that help understanding Hungarian patients in their clinical practice.

Students learn how to communicate with the patient during the examination of the thoracic organs, circulation, abdomen, locomotor and nervous systems. Furthermore, they get familiarised with basic medical documentation (e.g., patient's chart). They develop the vocabulary necessary in their clinical practice, such as the names of symptoms and conditions.

This is the first semester of a 4-semester medical language course. The aim of the course is to enable students to take anamnesis, to be informed about past illnesses and present complaints, and to have appropriate strategies for understanding the patient in clinical practice. Students will get familiar with the instructions used in the examination of patients, be able to examine patients independently, and be able to give relevant instructions (examination of the thoracic organs, circulation, abdomen, musculoskeletal system, nervous system - based on the medical chart). Students will get familiar with the forms of medical documentation (fever chart, chart, etc...). Students will be able to understand the symptoms of diseases – according to the list proposed by the clinics – in Hungarian and ask the patients relevant questions about their illness.

Course content of practical lessons:

weeks	curriculum
1	Introduction, the alphabet, formal greetings.
2	Introduction. What would you like to drink?
3	What languages do you speak? Where are you from?
4	General personal information.
5	Numbers.
6	Time and date.
7	Oral test
8	The human body; body parts
9	Present complaints
10	At the pharmacy
11	Location of the pain. Where does it hurt?
12	Timing of the pain. When does it hurt?
13	At the clinic. Basics of history taking in Hungarian
14	Oral test

Course material provided by the Department of Languages for Specific Purposes

Weidinger Andrea: Magyar orvosi szaknyelv 1. Students can download the book in pdf format from the moodle interface.

MEDICAL HUNGARIAN II.**Responsible organisational unit:**

Department of Languages for Specific Purposes

Programme director:

Katalin Fogarasi PhD, habil., director, habilitated associate professor

4 lessons per week, 2 credits,

Assessment: 2 oral tests (on weeks 7 and 14)

The aim of the subject:

This is the second semester of a 4-semester medical language course. The aim of the course is to enable students to take anamnesis, to be informed about past illnesses and present complaints, and to have appropriate strategies for understanding the patient in clinical practice. Students will get familiar with the instructions used in the examination of patients, be able to examine patients independently, and be able to give relevant instructions (examination of the thoracic organs, circulation, abdomen, musculoskeletal system, nervous system - based on the medical chart). Students will get familiar with the forms of medical documentation (fever chart, chart, etc...). Students will be able to understand the symptoms of diseases – according to the list proposed by the clinics – in Hungarian and ask the patients relevant questions about their illness.

Course content of practical lessons:

weeks	curriculum Hungarian language competences related to the following topics
1	Structure of the anamnesis. Why were you hospitalized?
2	Complaints and present symptoms. How do you feel? (abdominal pain, diarrhea, stool)
3	Complaints and past symptoms (dizziness, shortness of breath, swollen legs, cough)
4	Internal organs
5	Known diseases (diabetes, hypertension, asthma, allergies)
6	Known diseases (heart, lung, liver, biliary, kidney and thyroid problems)
7	Oral test
8	Medications (what, when, how much)
9	Medications and past surgeries. Allergies, intolerance, surgical complications
10	Past surgeries (what kind, when), transfusion
11	Smoking, alcohol, present occupation
12	Smoking, alcohol, past occupation
13	Revision, practice
14	Oral test

Course material provided by the Department of Languages for Specific Purposes

Weidinger Andrea: Magyar orvosi szaknyelv 2. Students can download the book in pdf format from the moodle interface.

PHYSICAL EDUCATION I.

Department of Physical Education

Type of Subject: Obligatory

Credit: 0

Name of the Lecturer: *Várszegi Kornélia*

His/her workplace, phone number: 1107 Budapest, Zágrábi utca 14. +36-1/264-1408

Position: director

Objectives of the subject, its place in the medical curriculum:

The short-term goal of the course is to maintain and improve the students' current state of health, to create the physical conditions for a better quality of life by learning and practicing (new) branches of sports that can be practiced after graduation as well. The long-term goal is to improve the quality of life and life prospects of future physicians, and to provide students with credible preventive attitudes and lifestyle advice - so that they can represent those in their later practice, through their own health-promoting behaviour.

Place where the subject is taught (address of the auditorium, seminar room, etc.):

Testnevelési és Sportközpont (Gymnasium) 1107 Budapest Zágrábi utca 14.

Gabányi László Sportcsarnok 1116 Budapest, Hauszmann Alajos utca 5.

Successful completion of the subject results in the acquisition of the following competencies:

One aim of the course is to improve the health status of medical students, maintaining and increasing physical performance, creating the conditions for better physical quality of life.

Number of students required for the course (minimum, maximum) and method of selecting students:

According to the Neptun admission system (20 – 60 students)

How to apply for the course:

via Neptun system

Detailed curriculum:

1st Week:	General information	Health and Safety, Fire and Environmental protection. The mid-year adoption requirements, the construction of the classes and the presentation of the university recreational and sports opportunities for extra – curricular activities. Heart rate measurements, Ruffier test and evaluation of the results.
2nd Week:	Athletic	Exercises to improve stamina. Preferably outdoors, on grass ground running, with the aim of developing good running and breathing techniques.
3rd Week:	Flying disc	Introduction the basic of frisbee rules and practicing the basic technical elements in pairs and game situation.
4th Week:	Tennis	Introducing the basis technical elements of tennis (forehand and backhand shot), improving hand-eye coordination.
5th Week:	Agility ladder	Introducing different running, skipping techniques using agility ladder.
6th Week:	Football	Introducing the basic technical elements of football. Single exercises and exercises in pairs to improve the ball skill development.
7th Week:	Badminton	Introducing the basic technical and tactical elements of badminton. Introducing the basic rules and game.
8th Week:	Circuit training	Bodyweight exercises and exercises with basic equipment to learn the correct functional movement pattern.
9th Week:	Ball skill developing exercises	Compare the results with the previous test to bring the importance of the health of the cardiovascular system to the attention.
10th Week:	Meta	Introducing the game and the basic rules. Aim to improve the ball skill development, improve reaction time, speed and explosiveness.
11th Week:	Obstacle course	To complete a built-up obstacle course using different creeping-climbing, hovering, pulling, skipping, throwing techniques for general skill development.
12th Week:	Core training	Postural correction exercises using the own bodyweight especially to strengthen the core muscles to prevent the health of the vertebrae.
13th Week:	Skipping rope	Endurance and coordination developing exercises at different levels using skipping rope.
14th Week:	Dumbbell exercises	Strengthening exercises with dumbbells.

P.E. Teachers:

Doharné Buczkó Anikó, Farkas Dominika, Kalmus Dániel, Lehel Zsolt, Sótonyiné Hrehuss Nóra, Várszegi Kornélia, Weisz Miklós

Requirements for participation in classes and the possibility to make up for absences:

The number of active participations for physical education classes is 10, regardless of the number of school breaks, which is to be completed during the hours assigned to the group. Two hours can be recovered in the first week of the exam period, on two separate days. Lessons missed do not need to be certified; however, catching up is mandatory. The days of study breaks do not qualify as automatic attendance. Practice leaders follow an online presence registration at the beginning and end of the lessons, which can be individually tracked on semmelweis.hu/sportkozpont homepage.

Methods to assess knowledge acquisition during term time:

There is no mandatory control during the term.

Requirements for signature:

Active participation in practice classes 10 times under the conditions described above.

May be exempted from attending classes the student who

1. whose diagnosis and the opinion of the sports doctor do not allow to exercise, or
2. does sports regularly and submits a certificate of association and federation in the Neptun system during the exemption period at the beginning of the semester.

PHYSICAL EDUCATION II.

Type of Subject: Obligatory

Credit: 0

Name of the Lecturer: *Várszegi Kornélia*

His/her workplace, phone number: 1107 Budapest, Zágrábi utca 14. +36-1/264-1408

Position: director

Objectives of the subject, its place in the medical curriculum:

The short-term goal of the course is to maintain and improve the students' current state of health, to create the physical conditions for a better quality of life by learning and practicing (new) branches of sports that can be practiced after graduation as well. The long-term goal is to improve the quality of life and life prospects of future physicians, and to provide students with credible preventive attitudes and lifestyle advice - so that they can represent those in their later practice, through their own health-promoting behaviour

Place where the subject is taught (address of the auditorium, seminar room, etc.):

Testnevelési és Sportközpont (Gymnasium) 1107 Budapest Zágrábi utca 14.

Gabányi László Sportsarnok 1116 Budapest, Hauszmann Alajos utca 5.

Successful completion of the subject results in the acquisition of the following competencies:

One aim of the course is to improve the health status of medical students, maintaining and increasing physical performance, creating the conditions for better physical quality of life.

Number of students required for the course (minimum, maximum) and method of selecting students:

According to the Neptun admission system (20 – 60 students)

How to apply for the course:

via Neptun system

Detailed curriculum:

1st Week:	General information	Accident, fire and environmental knowledge. Requirement for acceptance of the semester system, the structure of the classes and the presentation of the university recreational sports opportunities for extra-curricular activities.
2nd Week:	Basketball	Dribbling, passing and shooting drills in order to improve fine motor skills.
3rd Week:	Bench exercises	Using the dimensions of the sport bench by running, skipping, jumping, lifting etc. exercises.
4th Week:	Rubber band exercises	Strength and coordination training by taking advantage of the elastic features of the object.
5th Week:	Floorball	Introducing the sport to the Students by exposing the major rules, proper technique of stick handling. Passing and shooting drills.
6th Week:	„Double-trouble“	Strength and stretch training in pairs by applying different starting positions. Functional movements executed in pairs.
7th Week:	Volleyball	Introducing the fundamental elements of the game (serves, hits, digs etc.) Exposing the major rules and techniques.
8th Week:	Frisbee	Taking the next step into the game by applying tactical elements in match situations. Passing and catching drills in different moving forms.
9th Week:	Ruffier test and ball skill developing exercises	Compare the results with the previous test to bring the importance of the health of the cardiovascular system to the attention. Sport games on the side (Dodge-ball, King of the court etc.)
10th Week:	Circuit training	General strengthening drills at each stations. Applying different intensity level, regarding the various conditions of the Students.

11th Week:	Tennis	Involving the new strokes into the learning process: form of serves, the volleys, the smash etc.
12th Week:	Badminton	Introducing the new technical and tactical elements of the game (drop shots, lobs, smash etc.) Exposing the rules of doubles.
13th Week:	Core exercises	Relative (own body) weight exercises applying different equipment (hand weights, rubber band etc.) with the aim of postural correction, by strengthening the core muscles in order to avoid spinal deformations.
14th Week:	Box exercises	Applying the sport box by jumping, lifting, slaloming, carrying (etc) it. By this enhance the level of strength and stamina.

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes! (2x90 mins./week sport training (competitive sport, for qualified only): cheerleader, men's football, handball, basketball, volleyball)

P.E. Teachers:

Doharné Buczkó Anikó, Farkas Dominika, Kalmus Dániel, Lehel Zsolt, Sótonyiné Hrehuss Nóra, Várszegi Kornélia, Weisz Miklós

Requirements for participation in classes and the possibility to make up for absences:

The number of active participations for physical education classes is 10 (for trainings 15 times!), regardless of the number of school breaks, which is to be completed during the hours assigned to the group. Two hours can be recovered in the first week of the exam period, on two separate days, after registration in the Neptun system. Lessons missed do not need to be certified; however, catching up is mandatory. The days of study breaks do not qualify as automatic attendance. Practice leaders follow an online presence registration at the beginning and end of the lessons, which can be individually tracked on semmelweis.hu/sportkozpont homepage.

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes

Methods to assess knowledge acquisition during term time:

There is no mandatory control during the term.

Requirements for signature:

Active participation in practice classes 10 times under the conditions described above.

May be exempted from attending classes the student who

1. whose diagnosis and the opinion of the sports doctor do not allow to exercise, or
2. does sports regularly and submits a certificate of association and federation in the Neptun system in the exemption period preceding the semester.

Obligatory SUMMER PRACTICE

SUMMER (NURSING) PRACTICE

Credit point: 2

Total hours: 160 practice

Type of course: obligatory

Aim of the course, its position in the medical curriculum:

Introduction of the structure of the clinic/hospital and the operating of the given ward. Learning the process of patient care and nursing through practical training. Learning basic skills of everyday nursing tasks, which will be used during further medical practice and after completion of the medical training.

Acquired competences after successfully completing the course:

- Ability to assess basic nursing needs of the patient.
- Ability to detect, observe, and document patient's vital signs (pulse, blood pressure, respiration, temperature).
- Ability to administer subcutaneous and intramuscular injection, collect blood, place venous cannula under supervision, recognise minor complications.
- Knowledge of basic skills of resuscitation.

Student enrolment requirements (minimum, maximum), method of student selection:

Number of attending students as given by the practical site. Valid Occupational Medical Examination certificate, certificate of occupational, fire, and environment protection training.

How to apply for course:

After applying on the NEPTUN site, contact clinical head nurse of the practical site/in case of a hospital contact hospital nursing board, regarding the beginning of the practice.

Detailed syllabus:

- 1st week: Introduction to the operating of the ward. Observing nursing activities, assessment and documentation of nursing needs, and patient's environment. Actively taking part in everyday nursing care of patients with the support of nurses. Observing and acquiring communication skills with patients. Observing laboratory and other examination procedures, as well as preparation of patient for surgery/examination. Learning the use of personal protective equipment, as well as hygienic and antiseptic hand washing. Learning basic skills, protocol, and ward devices for resuscitation.
- 2nd week: Independent nursing care patient admission, measurement of weight, height, blood pressure, pulse, temperature, respiration, blood glucose, assessment of needs, documentation. Development of patient's environment. Assistance with performance of ECG. Observe administration of medication, blood collection, administration of injection, placement of venous cannula, infusion and transfusion therapy, assistance in preparation, recognition of minor local complications. Administration of subcutaneous and intramuscular injection under supervision of nurse.
- 3rd week: Blood collection, administering injection, placement of venous cannula under supervision of nurse. Continuous practice of knowledge acquired during the first two weeks.
- 4th week: Continuous practice of knowledge acquired during the first three weeks.

Requirements for participation in classes and opportunities to make up for absences:

Two classes may be missed, further absences cannot be made up.

The criteria for end-of-term signatures:

Regular attendance of the practical. According to the Studies and Exams Code, the criteria for obtaining signature is at least 75% participation in the practical.

Type of exam:

practical

Exam requirements:

Student chooses one task from the list of given tasks, and performs the given task in practice. In connection with the task the student assesses the patient's nursing care needs, and detects, observes, and documents vital signs (pulse, blood pressure, temperature, respiration).

Method and type of class marks:

Criteria for obtaining a signature is regular attendance of the practical, for the performance of the chosen item a mark is given: passed with excellence (5) – passed (3) – not passed (1) .

How to apply for the exam:

The practical exam takes place on the last day of the practice.

Opportunity to repeat the exam:

The practical exam can be repeated two times.

The list of printed, electronic and online notes, textbooks, study aids and literature to be used to learn the curriculum (in case of online sources, html address):**Recommended literature:**

Bokor, Nándor: Általános ápolástan és gondozástan (Medicina 2013.)

Oláh, András (ed). Az ápolástudomány tankönyve http://eta.bibl.uszeged.hu/906/1/0061_apolastudomany_magyar.pdf

EXAMINATION ITEMS

1. Describe and demonstrate the process of hygienic hand disinfection.
2. Describe the daily routine of the ward, and the content of the nursing documentation.
3. After the patient left, tidy up the bed and its environment.
4. Describe possibilities of positioning patient in bed. Perform positioning taking patient's comfort and safety needs into consideration.
5. Prepare for and perform tidying up patient's bed, and bathe patient. Describe patient's hygiene, comfort and safety needs, and inform patient about the nursing procedure.
6. Prepare for a non-independent patient's need to defecate, and perform the necessary nursing procedure. Describe aspects of observation regarding the quality and quantity of the exudates.
7. Describe possible nutrition and fluid intake needs of the patient. Describe nursing tasks of enteral nutrition and sufficient hydration of the patient. Demonstrate leading a fluid chart.
8. Describe disinfection methods of the instruments and devices of the ward; explain asepsis and antisepsis.
9. A new patient is admitted to the ward. Assign patient to a hospital room, take nursing history, and fill out patient admission chart.
10. Measure weight, height, temperature, and respiratory rate of newly admitted patient, and indicate these values on patient's chart and nursing documentation.

11. Prepare for and perform blood pressure measurement. Take the pulse. Indicate these values on patient's chart and nursing documentation.
12. Describe nursing tasks for monitoring of bodily discharges. Indicate quality and quantity of discharges on patient's chart and nursing documentation.
13. Prepare subcutaneous injection for administration. Describe procedure and possible complications of administration. Perform administration under supervision of nurse, fill out necessary documentation.
14. Prepare intramuscular injection for administration. Describe procedure and possible complications of administration. Perform administration under supervision of nurse, fill out necessary documentation.
15. Prepare blood pressure measurement and perform procedure under supervision of nurse. Describe possible complications of taking blood pressure.
16. Prepare for placing permanent venous cannula. Describe means of fixing venous cannula, observation points, and possible complications. Perform placement of cannula under supervision of nurse, fill out necessary documentation.
17. Prepare for placing and intravenous drip administered for patient. Set up the infusion. Perform documentation regarding the infusion therapy.
18. Prepare for blood group determination and transfusion. Describe nursing tasks.
19. Prepare for and perform bedside blood glucose measurement. Explain what the device indicates in case of high or low blood glucose levels. Indicate these values on patient's chart and nursing documentation.
20. Prepare for placement of permanent catheter. Describe procedure and possible complications of placement. Document procedure.
21. Prepare 12 channel ECG with standard and chest leads for patient. Describe procedure of placement of ECG electrodes.
22. Describe options and methods of decubitus risk assessment. Perform and document decubitus risk assessment. Describe prevention methods.
23. Prepare for changing protective dressing and wound treatment. Describe procedure of changing dressing and wound treatment. Examine condition of the wound. Document procedure.
24. During medical rounds an elastic bandage was ordered for the patient's lower limb. Apply elastic bandage and document procedure.
25. Describe nursing tasks regarding medication (distributing and administering medication). Perform identification of patient, administration of medication, and necessary documentation.
26. Describe possibilities and procedures of special medication administration forms (drip, inhalant, rectal, vaginal).
27. Describe personal protective equipment used at ward, and their application. Possible methods for prevention of nosocomial infections.
28. Describe general and specialist diagnostic methods of the ward, and the preparations necessary for the examinations.
29. A patient in shock is admitted to the ward during night shift. Describe symptoms of circulatory and respiratory failure, and their recognition. Prepare for initiation of basic resuscitation, and describe procedure.

BASIC MODULE



Faculty of Medicine
2nd year

STUDY PROGRAMME

Second year in the 2024/2025 academic year

3rd semester

Course name	Neptun code	lecture (h/week)	lecture (h/semester)	practice (h/week)	practice (h/semester)	seminar (h/week)	seminar (h/semester)	credit points	prerequisite(s)	examination
OBLIGATORY										
Introduction to Clinical Medicine	AOVCSA249_1A	0		2				2	Introduction to Patient Care	practical mark
Medical Biochemistry II.	AOKBMT794_2A	3		2				5	Medical Biochemistry I	comprehensive examination
Medical Hungarian III.	AOKNYE906_3A	0		4				2	Medical Hungarian II	practical mark
Medical Physiology I.	AOKELT792_1A	5,5		5				10	Macroscopic Anatomy and Embryology II, Medical Biophysics II, Medical Biochemistry I	examination
Microscopic Anatomy and Embryology II.	AOKANT674_2A	2		2				4	Microscopic Anatomy and Embryology I, Macroscopic Anatomy and Embryology II, Cell Science	comprehensive examination
Molecular Cell Biology I.	AOKMBT795_1A	2		2				4	Medical Chemistry, Medical Biochemistry I	examination
Physical Education III.	AOKTSI009_3A	0		1				0		signature
OBLIGATORY ELECTIVE										
Developmental Biology II. (Principles of regenerative medicine)	AOVANT834_2A	2						2	Developmental Biology II (Principles of regenerative medicine)	practical mark
Sport and Lifestyle 3.	AOVTSI1098_3A	0		1				1		practical mark

4th Semester

Course name	Neptun code	lecture (h/week)	lecture (h/semester)	practice (h/week)	practice (h/semester)	seminar (h/week)	seminar (h/semester)	credit points	prerequisite(s)	examination
OBLIGATORY										
Genetics and Genomics	AOKGEN738_1A	2		1,5				3	Molecular Cell Biology I, Medical Biochemistry II	examination
Immunology	AOKGEN737_1A	2		1,5				3	Molecular Cell Biology I, Medical Biochemistry II	examination
Medical Hungarian IV.	AOKNYE906_4A	0		4				2	Medical Hungarian III	comprehensive examination
Medical Microbiology I.	AOKMIK736_1A	2		2				4	Medical Biochemistry II	examination
Medical Physiology II.	AOKELT792_2A	5,5		4,5				10	Medical Physiology I, Macroscopic Anatomy and Embryology II	comprehensive examination
Medical Psychology	AOKMAG1079_1A	1		0		2,5		4	Medical Sociology, Medical Communication	examination
Molecular Cell Biology II.	AOKMBT795_2A	3		2				5	Molecular Cell Biology I, Medical Biochemistry II	comprehensive examination
Physical Education IV.	AOKTSI009_4A	0		1				0		signature
OBLIGATORY ELECTIVE										
Clinical anatomy - propedeutics	AOVANT458_1A	2						2	Macroscopic Anatomy and Embryology II, Microscopic Anatomy and Embryology II	
Developmental Biology I. (Stem cells and Organoids)	AOVANT834_1A	2						2	Macroscopic Anatomy and Embryology II	practical mark
Pathobiochemistry	AOVMBT800_1A	2						2	Medical Biochemistry II	
Sport and Lifestyle 4.	AOVTSI1098_4A	0		1				1		practical mark

LIST OF TEXTBOOKS (The list may change!)

- 1 Harper's Illustrated Biochemistry, 30th edition, Lange, ISBN-10: 0071825347
- 2 Berne-Levy-Koeppen-Stanton: Physiology, 7th edition, Mosby. ISBN-10: 0323393942
- 3 Lodish: Molecular Cell Biology, 8th edition (2016); ISBN-13: 978-1-4641-8339-3
- 4 Cockerham, William C.: Medical Sociology. Prentice Hall, Upper Saddle River, 2006.
- 5 Marthy A. & Végh Á. Egészségére! Magyar orvosi szaknyelv. Semmelweis Egyetem Egészségtudományi Kar, 2010.

- 6 Immunology seminars (e-book): <http://gsi.semmelweis.hu>
- 7 Abbas, Lichtmann, Pillai, Basic Immunology 6th Edition, Elsevier, 2019
- 8 Medical Genetics and Genomics (e-book)

Recommended textbooks:

Murray, Robert K-Granner, Daryl K-Mayes, Peter A-Rodwell, Victor W: Harper's Illustrated Biochemistry. 26th ed. McGraw-Hill. ISBN 0-07-138901-6 (online version: www.lib.sote.hu)

MEDICAL PHYSIOLOGY I.**Department of Physiology****Name of subject: Medical Physiology I.****Type of subject: Obligatory subject****Credit Points: 10**Head of the Department: **Dr. Attila Mócsai, Full Professor**Course Director: **Dr. Péter Várnai, Full Professor**Tutor: **Dr. András Balla****Aim of Medical Physiology course:**

The goal of Medical Physiology course is to give the students the understanding of the concepts and principles of medical physiology. The lectures provide the information base while the seminars and practices provide the student with an opportunity to assimilate and integrate the material. Appropriate clinical perspectives are presented throughout the course.

Schedule of the subject:**Lectures:**

1. Introduction, body fluids. Functions of cellular membranes, transport across membranes. Transepithelial transports.
2. Signal transduction: receptors, G proteins, second messengers. Cellular calcium metabolism, receptors of growth factors and cytokines. Membrane trafficking and vesicular transport.
3. Ion channels and resting membrane potential. Action potential. Physiology of nerve cells, synaptic transmission in the central nervous system.
4. Neuromuscular junction and physiology of skeletal muscle. Autonomic neurotransmitters and physiology of smooth muscle.
5. Physiology of the blood.
6. Physiology of the heart I.: origin and spread of cardiac excitation Cardiac cycle. Regulation of cardiac output.
7. Electrocardiography (ECG). Physiology of blood circulation: introduction.
8. Hemodynamics, systemic circulation. Microcirculation.
9. Venous circulation and lymph flow. Local control of circulation. Reflex control of circulation.
10. Circulation of blood in the brain and coronary circulation. Splanchnic circulation, circulation of skin and skeletal muscle.
11. Respiration: pulmonary ventilation. Gas exchange in the lungs. Pulmonary circulation, ventilation-perfusion relationship.
12. Gas transport, hypoxias. Regulation of respiration. Adaptation of cardiovascular and respiratory system.
13. Renal function: renal circulation, glomerular filtration. Tubular functions. Concentration, dilution.
14. Regulation of body fluids and osmotic concentration. Introduction to acid-base balance. Acid-base balance: role of lungs and kidneys.

Practices:

- Blood cell counting, determination of hemoglobin concentration and hematocrit, measurement of erythrocyte sedimentation rate
- Leukocyte differential count on peripheral blood smear
- Typing of Blood Groups, Blood Coagulation Test
- Measurement of transport rate on red blood cells. Hemolysis
- Investigation of cardiac functions *in situ*
- Blood pressure measurement in humans
- Echocardiography
- Computer simulation: Neuromuscular junction
- Electromyography (EMG), nerve conduction velocity
- Recording and analyzing the human ECG
- Computer simulation: Skeletal and smooth muscle
- Effects of vagal nerve stimulation on cardiac functions

- Respiratory physiology calculations
- Evaluation of acid-base parameters with the Siggaard-Andersen nomogram

Attendance at classes: The lecture hours per week are 5.5; the practice hours per week are 5. The attendance of a minimum of 75% of practices is necessary for the end-term signature.

Absences:

No more than three absences from practices are allowed for any reason; otherwise the semester will not be credited. There are no extra practices.

Requirements for signature:

- 1) The attendance in minimum 75% of practices is necessary for the end-term signature. Students must write a lab report for each practice using the Practical Book. The Practical Book should be signed by the teacher not later than one week after the practice. Participation in the practices is obligatory. No more than three absences from practices are allowed for any reason; otherwise, the semester will not be credited.
- 2) The average of the taken in account weekly tests must be above 50% to obtain the end-term signature. Students who do not meet this requirement need to take a written test covering the material of the semester in the 14th week of the semester during the “Competition exam”, and achieving a result of 50% or higher is necessary to obtain the end-term signature.

Requirements of the examination:

Requirements of the semi-final exam: material of the Medical Physiology I.

The semi-final exam is oral exam. The students need to bring ID card and the laboratory report book to participate in the exam. Lists of the theoretical questions can be found in the webpage of the Department of Physiology. The following rules will be enforced during the exams: electronic devices must be kept in the baggage; baggage and coats should be placed next to the wall of the exam place; any form of communication is disallowed; students not complying with these rules will be disqualified immediately.

Registration for the exam:

Registration for the exam must be recorded through the NEPTUN system.

Modification in the registration must be recorded through the NEPTUN system.

Absences from the exams:

Failing to certify absence or denying it cause registering “absence” = “nem jelent meg” in the lecture book and/or in the NEPTUN system.

List of textbooks:

Textbook: Koeppen-Bruce M- Stanton- Bruce A: Berne & Levy Physiology (7th edition). 2017. ISBN: 9780323393942

Practice book: Practices in Medical Physiology (Edited by: Péter Enyedi and Levente Kiss). 2017. ISBN: 9789633314159.

MEDICAL PHYSIOLOGY II.

Type of subject: Obligatory subject

Credit Points: 10

Head of the Department: **Dr. Attila Mócsai, Full Professor**

Course Director: **Dr. Péter Várnai, Full Professor**

Tutor: **Dr. András Balla**

Prerequisite: Medical Physiology I. (subject to change by introducing the new curriculum), Microscopic Anatomy and Embryology II.

Aim of Medical Physiology course:

The goal of Medical Physiology course is to give the students the understanding of the concepts and principles of medical physiology. The lectures provide the information base while the seminars and practices provide the student with an opportunity to assimilate and integrate the material. Appropriate clinical perspectives are presented throughout the course

Schedule of the subject:

Lectures:

1. General principles of regulation in the gastrointestinal tract. Motor functions of the gastrointestinal tract.
2. Secretory functions of the gastrointestinal tract. Digestion and absorption of food.
3. Endocrine regulations. The hypothalamo-adenohypophyseal system; growth hormone, somatomedins.
4. Function of the adrenal cortex. Function of the thyroid gland. Energy balance, quality and quantity requirement of food.
5. Hormonal regulation of intermediary metabolism.
6. Calcium metabolism, bone tissue, growth. Function of the reproductive system: endocrinology of the sexual differentiation and development.
7. Function of the reproductive system: male sexual function; female sexual function; endocrinology of pregnancy, parturition, and lactation.
8. Introduction to neurophysiology. Physiology of nerve & glia cells.
9. Sensory functions.
10. Physiology of hearing and equilibrium.
11. Physiology of vision.
12. Motor functions.
13. Integration of autonomic responses.
14. Electroencephalogram (EEG); sleep phenomena. Learning and memory. Regulation of behavioural mechanisms, motivation; emotion.

Practices:

- Studies on circulatory reactions of a virtual rat
- Circulatory and respiratory reflexes in rabbit (Demonstration, Practice)
- Smooth muscle of rabbit small intestine
- Human pulmonary function tests – Spirometry
- Measurement of cardiac output in rat
- Pulse wave in human
- Oral glucose tolerance test (OGTT)
- Human pulmonary function tests – Body plethysmography
- Electrooculography (EOG) and investigation of the vestibular system
- Spiroergometry
- Human visual physiology
- Investigation of reflexes
- Practice for lab exam. Lab exam

Attendance at classes:

The lecture hours per week are 5.5; the practice hours per week are 4.5. The attendance of a minimum of 75% of practices is necessary for the end-term signature.

Absences:

No more than three absences from practices are allowed for any reason; otherwise the semester will not be credited. There are no extra practices.

Methods to assess knowledge acquisition during term time:

The knowledge of the students is tested in a written form on a weekly base. The written short tests cover the material of lectures of the previous week.

Requirements for signature:

- 1) The attendance in minimum 75% of practices is necessary for the end-term signature. Students must write a lab report for each practice using the Practical Book. The Practical Book should be signed by the teacher not later than one week after the practice. Participation in the practices is obligatory. No more than three absences from practices are allowed for any reason; otherwise, the semester will not be credited.
- 2) The average of the taken in account weekly tests must be above 50% to obtain the end-term signature. Students who do not meet this requirement need to take a written test covering the material of the semester in the 14th week of the semester during the "Competition", and achieving a result of 50% or higher is necessary to obtain the end-term signature.

Final exams

In the examination period the students have to give final exam in the second semester.

Requirements of the examination:

Requirements of the final exam: material of the Medical Physiology I. and Medical Physiology II.

The final exam consists of practical, written and oral parts. The students need to bring student identity card and the laboratory report book to participate in the exam. The practical part (lab exam) takes place in the last week of the second semester. Passing the lab exam is not a prerequisite to participate on the other parts of the final exam. A failed or missed lab exam is taken into account in grading the final exam as fail (1) partial grade (a successful lab exam does not result in any grade). The written and oral part of the final exam is held on the same day. The topics of the final exam can be found in the webpage of the Department of Physiology (<http://semmelweis.hu/elettan/teaching/second-semester>). The following rules will be enforced during the exams: electronic devices must be kept in the baggage; baggage and overcoats should be placed next to the wall of the exam rooms; any form of communication is disallowed; students not complying with these rules will be disqualified immediately

Registration for the exam:

Registration for the exam must be recorded through the NEPTUN system.

Modification in the registration must be recorded through the NEPTUN system.

Absences from the exams:

Failing to certify absence or denying it cause registering "absence" = "nem jelent meg" in the lecture book and/or in the NEPTUN system.

List of textbooks:

Textbook: Koeppen-Bruce M- Stanton- Bruce A: Berne & Levy Physiology (7th edition). 2017. ISBN: 9780323393942

Practice book: Practices in Medical Physiology (Edited by: Péter Enyedi and Levente Kiss). 2017. ISBN: 9789633314159

MEDICAL BIOCHEMISTRY II.**Institute of Biochemistry and Molecular Biology, Department of Biochemistry****Credits: 5****Number of lessons per week 70; lectures 42; practical course/seminar: 28****Type of the course: obligatory**

Academic year: 2021/2022

Name of Head of the Department: Professor László Csanády M.D. Ph.D. D.Sc.**Contact details:** H-1094 Budapest, Tűzoltó u. 37-47. Phone: +36-1-459-1500#60010 e-mail: csanady.laszlo@med.semmelweis-univ.hu**Position:** Head of Department**Date of Habilitation: 2013 Its number: 341****Objectives of the subject, its place in the medical curriculum:**

The aim of this course is to provide a comprehensive description of the metabolic processes in the human body, with particular emphasis on the medical aspects of these processes. The main focus of the semester is on intermediate metabolism, i.e. the amino acid and nucleotide metabolism following carbohydrate and lipid metabolism as described in Medical Biochemistry I and the integration of these processes in the individual organs and the human body as a whole. Furthermore, the course aims to develop the skills of medical students to understand the complex physiological processes in the human body at the molecular level. Medical students will learn clinical biochemical methods in case-oriented studies, and in addition, particularly promising and rapidly developing areas („medicine of tomorrow”) will be addressed. The medical biochemistry orientation of the course is the molecular basis of diseases that are of major public health concern (cardiovascular, neurodegenerative, cancer), with particular emphasis on potential molecular targets for therapy.

Place where the subject is taught (address of the auditorium, seminar room, etc.):

Premises located in the Basic Medical Sciences building (laboratory rooms located on the first floor and lecture halls located on the ground floor).

Successful completion of the subject results in the acquisition of the following competencies:

The knowledge of the structure, interactions and reactions of biological molecules and the interactions between organs of the higher integrated regulatory functions of the human body, is of paramount importance from a medical point of view and is essential for understanding physiological and pathological processes and, as a consequence, for making informed medical decisions.

Prerequisite (s) for admission to the course: Medical Biochemistry I.**Number of students required for the course (minimum, maximum) and method of selecting students:**

Not applicable to obligatory subjects

How to apply for the course: Application is through the Neptun online system.**Detailed curriculum:****Lectures:** 2x70 minutes per week (3 hours)**Lecturers:** Prof. Csanády László (CSL), Prof. Kolev Kraszimir (KK), *Dr. Komorowicz Erzsébet* (KE), Dr. Töröcsik Beáta (TB), Prof. Tretter László (TL)**Practices (P):** 2 hours each week

Week	Lectures	Practices: 2 hours every week
1	Nitrogen balance. Protein digestion. Function and regulation of proteases. Amino acid absorption, amino acid transporters. (KK) Amino acid degradation. Ammonia removal. Reactions and regulation of the ornithine cycle.	Determination of transaminase and creatine kinase activity, medical implications
2	Amino acid degradation: the fate of the carbon skeleton. The role of vitamins in amino acid metabolism. Biosynthesis and degradation of heme. Iron homeostasis (KK)	Elimination of ammonia in the human body.
3	Nucleotide structure/functions. Fate of nucleotides of nutrient origin. Formation and elimination of uric acid, its biological role in the human body. Molecular background of gout (KK). Synthesis and degradation of purine and pyrimidine nucleotides. Effects of cytostatic drugs on nucleotide metabolism. (KK)	Metabolic role and medical significance of vitamin B12 and tetrahydrofolic acid
4	Organ biochemistry. Red blood cell metabolism and enzymopathies. Intermediate metabolism of the kidney. Metabolic properties of the renal cortex and marrow. Renal metabolism in starvation and acidosis. Comparison of gluconeogenesis in kidney and liver. The metabolism of striated muscle and myocardium. Metabolic adaptation to exercise. (TL)	Biochemical-bioenergetic aspects of muscle work.
5	Metabolic characteristics of brain and adipose tissue. Metabolism of intestinal epithelial cells and lymphocytes. (TL) Starvation-fatigue cycle and its regulation, processes in the liver. Inter-organ communication during satiety and starvation. Regulation of biochemical processes in the satiated liver. (TL)	The role of the liver in metabolism. Metabolic rearrangements in liver diseases.
6	Membrane transporters. Na,K-ATPase isoforms. Secondary active transporters. Na ⁺ /H ⁺ exchange transporter (TB) Molecular basis of nerve transmission. Acetylcholine synthesis, receptors, acetylcholinesterase. Properties of synaptic vesicles; key proteins involved in exocytosis of synaptic vesicles (TB)	Metabolic characteristics of rapidly dividing cells and tumours.
7	Synthesis and metabolism of adrenaline and noradrenaline. Transporters in neurons (TB) Adrenergic receptors. Adrenaline and molecular mechanisms of the action of adrenaline and noradrenaline in different organs (TB)	Extracellular matrix: transformations in physiological and pathological states.
8	The synthesis and production of dopamine and serotonin and their metabolism. Molecular properties of transporters and receptors. Biochemical basis of Parkinson's disease. (TB) Synthesis, metabolism, transporters and molecular properties of glutamate and GABA. (TB)	The relationship between metabolism and nervous system function I
9	General characteristics of ion channels. Methods for the study of ion channels. Molecular mechanisms of gating and permeation. Spatial structure of the K ⁺ channel. (CSL) Ion channel families. Voltage dependent, Ca ²⁺ activated, and ATP-sensitive K ⁺ channels. Voltage-dependent Cl ⁻ channels. CFTR Cl ⁻ channel. Nicotinic Ach receptor. (CSL)	The relationship between metabolism and nervous system function II
10	General overview of blood clot formation and dissolution. Fibrinogen and fibrin. Regulation of thrombin. Activation of prothrombin. Initiation of coagulation and amplification of the initiation signal. (KK) The coagulation inhibitor system and negative feedback mechanisms. (KK)	Molecular background of congenital thrombophilia. APTI, PTI tests
11	Fibrinolysis. Activation of plasminogen. The plasmin inhibitor system. (KK) Cellular factors in coagulum formation and dissolution. Platelets and von Willebrand factor. (KK)	Molecular background of acquired thrombophilia. Fibrin stabilization and the study of soluble fibrin monomers
12	The role of neutrophil leukocytes and endothelial cells in hemostasis. Hemodynamic and biochemical interactions in hemostasis. (KK) Function and role of pattern recognition receptors (TLR, scavenger receptors) in the vascular wall. Cholesterol-induced pyroptosis and its molecular basis. (KK)	Risk factors associated with cholesterol homeostasis in atherosclerosis (diabetes, hypertriglyceridemia). Biochemical basis of atherosclerosis prevention.

Week	Lectures	Practices: 2 hours every week
13	The role of gene expression level regulation by dietary components in the regulation of metabolism. (TL). Regulatory, adaptive signals driven by the current metabolic state of the cell and their mechanism of action. Biochemical effects of thyroid hormone and its role in complex metabolic regulation, thermogenesis. (TL).	Molecular basis of weight regulation in physiological and pathological states.
14	Central molecules and drug targets of proliferation, differentiation, survival, angiogenesis, metastasis I (TB) Focal molecules and drug targets of proliferation, differentiation, survival, angiogenesis, metastasis II (TB)	Molecular basis of energy expenditure and its dysregulation in metabolic syndrome

Other subjects concerning the border issues of the given subject (both obligatory and optional courses!). Possible overlaps of themes:
None.

Special study work required to successfully complete the course: None.

Requirements for participation in classes and the possibility to make up for absences:

Practices and seminars are mandatory. It is not possible to make up for missed practices/seminars. In case of absences amounting to more than 3 occasions, the semester is not acknowledged. Arriving to a practice /seminar with a delay of more than 10 minutes is considered an absence

Methods to assess knowledge acquisition during term time:

Practice/seminar participation performance will be evaluated by the tutor: as such, maximum 10 points per semester can be obtained that may count towards the final grade, see under "Grading system".

Midterms: A midterm will take place in the 6th and another in the 11th week, during the practice/seminar (allocated time per midterm: 20 minutes). Each midterm will consist of multiple choice questions (MCQs) from which max 20 points can be obtained (10 points per midterm).

It is not obligatory to pass a midterm in order to be allowed to sit for the final exam. However, the midterm points will be added as "points" to the result of the final exam, as detailed in "Grading system".

Lectures: At the end of each lecture, there will be a Kahoot on the topic of the lecture, consisting of 5 questions. Maximum 1 point can be earned per lecture, as outlined by the lecturer. Through the Kahoots, students may obtain points that will be added to the points earned at the final exam, as detailed in "Grading system".

Competition: The competition is held on the last week and consists of 70 multiple choice questions (MCQs). Only students who amass 14 or more points from the midterms may participate in the competition. Points obtained from midterms, Kahoot quizzes, or practice/seminar performance (see below), do not count in the competition. Winners will be exempted from the final exam.

Requirements for signature: No credit will be given for absences exceeding 6 hours (3 occasions).

Type of examination: final; Form: written and oral test based on material of the official textbooks, lectures and practices/seminars published at the department's Moodle e-learning system (<https://itc.semmelweis.hu/moodle/>). See under "Grading system" for further details.

Requirements of the examination:

The material covered in the exam is the material of the lectures and practices/seminars in the topic, with the corresponding textbook chapters.

Method and type of evaluation:

Grading system: The grade of the final exam is based on the points obtained i) in Kahoot quizzes at the lectures, ii) during the seminars/practices, iii) at the two midterms, iv) at the written MCQ semifinal exam, and v) in an oral exam following the written MCQ exam. The written MCQ exam and the oral exam will take place on the same day of the examination period.

The grading system is as follows:

- (i) Kahoot: maximum 1 point per lecture.
- (ii) Seminar/practice points: maximum 10 points.

Total points from (i) and (ii) cannot exceed 20 points.

(iii) Two midterms: maximum 20 points.

(iv) Written MCQ exam: This test consists of multiple choice questions (MCQs) from which max 100 points can be obtained (allocated time: 100 minutes).

If the score of the MCQ exam is 49 or below, then the grade of the final exam is 'fail'.

If students reach 50 points on the MCQ exam, the midterm points, practice/seminar performance points and lecture Kahoot points (total max. 40 points) will be added to the MCQ score.

Grade calculation of the written part of the final exam from the total points (MCQ+semester):

95- 140: grade 5 (excellent)

85- 94: grade 4 (good)

70- 84: grade 3 (satisfactory)

55- 69: grade 2 (pass)

Only those students who obtained at least 50 points at the semifinal MCQ test will be invited for an oral exam. During the oral exam, the examiner will pick three questions from those MCQs that were correctly answered by the student. The student will have to elaborate properly on these questions. The final grade will be given based on the written and oral part of the exam.

How to register for the examination?: The exam dates are announced on the 12th week of the semester. At least one exam date per week will be provided. Applications are made in the Neptun system in accordance with the University Study and Exam Rules.

Possibilities for exam retake: An exam can be retaken after two calendar days.

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material: Harper's Biochemistry (30th edition, or latest)

Online material published at the department's Moodle e-learning system (<https://itc.semmelweis.hu/moodle/>)

MOLECULAR CELL BIOLOGY I

Institute of Biochemistry and Molecular Biology
Department of Molecular Biology
EOK Building, H-1094 Budapest, Tűzoltó u. 37-47.

Lecturer of the course: Miklós Csala MD, DSc (csala.miklos@semmelweis.hu)

Course coordinator: Gergely Keszler MD, PhD (keszler.gergely@semmelweis.hu)

Credit: 4

Number of lessons per week: lectures: 2; practicals: 2

The subject provides the foundations of modern molecular medicine, emphasizing points of interest for diagnostics, intervention and therapeutic applications. It serves as a base for several fields in medicine, such as molecular pathology, molecular diagnostics, pharmacology, gene therapy and medical biotechnology.

Prerequisites for subject registration:

Successful exams in Medical Chemistry as well as in Medical Biochemistry I.

Lectures:

1. Introduction to molecular cell biology
2. Structure and function of nucleotides and nucleic acids. Packaging of DNA into chromatin
3. Structure of the human genome 1
4. Structure of the human genome 2
5. Principles of DNA replication. Replication in prokaryotes
6. Replication in eukaryotes
7. DNA repair
8. Methods in molecular biology 1: genetic polymorphisms
9. Methods in molecular biology 2: PCR, investigation of length variations
10. Methods in molecular biology 3: Investigation of SNPs
11. Transcription in prokaryotes 1
12. Transcription in prokaryotes 2
13. Transcription in eukaryotes, mRNA processing
14. Regulation of transcription
15. Alternative ways to regulate eukaryotic gene expression
16. The genetic code, translation 1
17. The genetic code, translation 2
18. The genetic code, translation 3
19. Posttranslational modification of proteins
20. Protein folding, quality control
21. Protein targeting into metabolic compartments 1
22. Protein targeting into metabolic compartments 2
23. MicroRNAs
24. Epigenetics
25. Methods in molecular biology 4: real-time PCR
26. Methods in molecular biology 5: gene expression analysis
27. Methods in molecular biology 6: DNA cloning
28. Quality control Protein targeting into metabolic compartments
29. Protein targeting into metabolic compartments 1Methods in molecular biology 1: genetic polymorphisms
30. Protein targeting into metabolic compartments 2Methods in molecular biology 2: PCR, investigation of length variations

31. Proteostasis, the ubiquitin–proteasome system Methods in molecular biology 3: Investigation of SNPs
32. Mechanisms of autophagy Methods in molecular biology 4: real-time PCR
33. Molecular biology of viruses 1 Methods in molecular biology 5: gene expression analysis
34. Molecular biology of viruses 2 Methods in molecular biology 6: DNA cloning

Practicals: (4x45 min every other week):

35. Introduction, Column chromatography
36. Genotyping of a taste receptor polymorphism (PCR-RFLP I)
37. PCR-RFLP II
38. PCR-RFLP III
39. Midterm examination
40. Induction of beta-galactosidase in *E. coli*
41. Biuret test, Ellmann's reaction

Acknowledgment of the semester:

Attendance of at least 75% of the practical lessons is prerequisite of acknowledging the semester. In case of more than two missed labs the semester cannot be acknowledged and the student is not going to be allowed to sit for the terminal exam. Missed practicals can be made up only in the same week with another group; certificate of participation issued by the host teacher has to be presented by the student to his/her own teacher. However, only one make-up class can be attended during the semester. Students can collect “practical points” during the labs. These points are taken into account in the Molecular cell biology II. final exam at the end of the academic year.

It is obligatory to pass the theoretical midterm in week 9 or 10.

Theoretical midterm examination

The theoretical midterm exam will take place during weeks 9–10. The midterm exam is oral; one has to pick just one question from the topic list. The examiner cannot be your own lab teacher. Passing the midterm is prerequisite of getting the signature at the end of the semester. Students earning “excellent (5)” or “good (4)” midterm marks will earn 2 or 1 practical points, respectively, to be added to the practical points collected during the semester. Failed or missed midterms can be made up twice. In case of medically certified absences one may receive any grade in the retake midterm. In the case of retaking a failed or unexcusedly missed midterm, the maximum grade one can receive is a “pass (2)”.

Examination and grading system:

The oral exam is based on the topic list announced at the beginning of the semester, and it takes place before a two-member committee (examiner and co-examiner). Students pick three random questions from the DNA, RNA and Protein group of the following topic list. The exam can be passed if all three topics are sufficiently answered.

Topic list:

I. DNA

1. Chemical structure of nucleotides; primary and secondary structures of nucleic acids (DNA and various RNAs)
2. Condensation levels of DNA in the eukaryotic cells; the role of topoisomerases and chromatin proteins
3. Structure of the human genome: coding and gene regulatory sequences; non-coding genomic sequences: introns, pseudogenes, repetitive sequences
4. Principles of the semiconservative DNA replication; replication fork, leading and lagging strand
5. DNA replication in the pro- and eukaryotic cells; comparison of the enzymes, proteins involved
6. The telomere; function and significance of the telomerase; biological and medical significance of its presence or absence
7. Common types of DNA damage and repair mechanisms; DNA lesions versus mutations
8. Repair of DNA deamination
9. Formation and repair of thymine dimers

10. Formation and repair of DNA mismatch
11. Formation of spontaneous point mutations
12. Possible effects of point mutations or single nucleotide polymorphisms on the encoded proteins
13. The principles and mechanisms of PCR and real-time PCR; their application in research and medicine
14. Meaning of genetic mutations and polymorphisms and methods of their analysis (RFLP, allele-specific PCR, DNA sequencing and primer extension)
15. II. RNA
16. Structure and function of RNA polymerase of *E. coli*; initiation of transcription in prokaryotes; the prokaryotic transcription unit
17. Termination of transcription in prokaryotes; post-transcriptional RNA modifications in prokaryotic cells
18. Regulation of transcription in prokaryotes
19. The eukaryotic transcription unit; initiation and termination of transcription in the eukaryotic cells
20. Regulation of transcription in eukaryotes
21. Maturation of mRNA
22. Regulation of the eukaryotic gene expression by proteins binding to UTR segments of mRNA
23. Formation and regulatory functions of microRNAs in eukaryotic cells
24. Significance of DNA methylation and histone modifications
25. Alternative maturation of eukaryotic mRNA, and subsequent modifications in their coding sequence – their roles in the control of gene expression
26. DNA-binding proteins and their characteristic structural motifs with examples
27. *In vitro* analysis of gene expression by reverse transcription real-time PCR and DNA microarray
28. III. Proteins
29. The genetic code; codon-anticodon interaction; function and role of aminoacyl-tRNA synthetases
30. Structure and function of the ribosome; the ribosome cycle; role of tRNA in translation
31. Initiation of translation in pro- and eukaryotic cells
32. Regulation of eukaryotic translation; the role of eIF2 α phosphorylation
33. Elongation and termination of translation in pro- and eukaryotic cells; pharmacological inhibitors of translation
34. Post-translational modifications of collagen, membrane tethering posttranslational modifications, protein phosphorylation
35. Regulation of transcription by posttranslational modifications; glycosylation
36. Maturation and quality control of proteins; ERAD
37. Intracellular protein trafficking by gated transport
38. Intracellular protein trafficking by transmembrane transport
39. The role of genetic variations in the development of diseases, the importance and possibilities of identifying genetic factors
40. Production of recombinant DNA (cloning), and its main applications (reporter and expression vectors)

Recommended textbook

1. Lodish: Molecular Cell Biology (8th edition)

MOLECULAR CELL BIOLOGY II.

Institute of Biochemistry and Molecular Biology
Department of Molecular Biology
EOK Building, H-1094 Budapest, Tűzoltó u. 37-47.

Lecturer of the course: Miklós Csala MD, DSc (csala.miklos@semmelweis.hu)

Course coordinator: Gergely Keszler MD, PhD (keszler.gergely@semmelweis.hu)

Credit: 5

Number of lessons per week: lectures: 3; practicals: 2

The subject provides the foundations of modern molecular medicine, emphasizing points of interest for diagnostics, intervention and therapeutic applications. It serves as a base for several fields in medicine, such as molecular pathology, molecular diagnostics, pharmacology, gene therapy and medical biotechnology.

Prerequisites for subject registration:

Successful exams in Molecular Cell Biology I and Medical Biochemistry II

Lectures:

1. Control of the cell cycle 1
2. Control of the cell cycle 2
3. Control of the cell cycle 3
4. Control of the cell cycle 4
5. Programmed cell death – apoptosis 1
6. Programmed cell death – apoptosis 2
7. Molecular basis of tumorigenesis
8. Types of non-apoptotic programmed cell death
9. Proteostasis, the ubiquitin–proteasome system
10. Mechanisms of autophagy
11. Molecular biology of viruses 1
12. Molecular biology of viruses 2
13. Methods in molecular biology knock-out techniques
14. Methods in molecular biology gene therapy
15. Nuclear receptors. Transcriptional factors, DNA-binding domains
16. Signal transduction 1
17. Signal transduction 2
18. Signal transduction 3
19. Signal transduction 4
20. Intracellular signals: mTOR, AMP kinase, hypoxia
21. Mechanisms of ageing
22. Components of the cytoskeleton. Molecular motor proteins
23. Vesicular transport. Mechanisms of exo- and endocytosis
24. Formation of the metabolome of cellular compartments 1
25. Formation of the metabolome of cellular compartments 2
26. Endoplasmatic and mitochondrial stress response
27. Extracellular matrix, tissue architecture, adhesion molecules
28. Methods in cell biology (cell cultures, cell fractionation, *in vivo* microscopy)

Practicals: (4x45 min every other week):

1. Molecular cloning and *in vitro* protein synthesis 1: recombinant DNA construction, bacterial transformation
2. Molecular cloning and *in vitro* protein synthesis 2: analysis of the DNA construct, *in vitro* mRNA synthesis
3. Molecular cloning and *in vitro* protein synthesis 3: protein expression by *in vitro* translation
4. Purification of a bacterially expressed protein by affinity chromatography
5. Theoretical midterm exam
6. SDS-page and western blot
7. Analysis of subcellular fractions

Acknowledgment of the semester:

Attendance of at least 75% of the practical lessons (i.e. not missing more than two labs) is prerequisite of acknowledging the semester. It is also obligatory to pass the theoretical midterm exam (see below).

Theoretical midterm examination

The theoretical midterm exam will take place during weeks 9–10. The midterm exam is oral; one has to pick just one question from the topic list. The examiner cannot be your own lab teacher. Passing the midterm is prerequisite of getting the signature at the end of the semester. Students earning “excellent (5)” or “good (4)” midterm marks will earn 2 or 1 practical points, respectively, to be added to the practical points collected during the semester. Failed or missed midterms can be made up twice. In case of medically certified absences one may receive any grade in the retake midterm. In the case of retaking a failed or unexcusedly missed midterm, the maximum grade one can receive is a “pass (2)”.

Practical midterm examination

An optional, written practical midterm online Moodle test can be taken at the end of the semester. The test consists of 20 questions (each question worth 1 point) covering the experiments performed in the 1st and 2nd semesters. The questions are to be answered in the (random) order as they appear; i.e. it is not possible to page back or forth. Performance at the laboratory activity during both semesters and theoretical midterm scores are also taken into account in the evaluation. Scores earned in the practical midterm (max. 20) will be added to the max. 6–6 practical points and max. 2–2 theoretical midterm points that could be collected during both semesters. Students who have earned at least 25 points (out of a possible maximum of 36) will receive exemption from the practical topics in the comprehensive exam.

Examination and grading:

The oral exam is based on the topic list announced in the beginning of the semester, and it takes place before a two-member committee (examiner and co-examiner). Students pick five random questions from each group of the following topic list. The exam can be passed if all five topics are sufficiently answered. Students who have achieved at least 25 practical points during the two semesters, receive a bonus: no practical question has to be answered. This bonus is valid during the whole exam period (in case of a retake exam), as well as in the next semester (in a “CV”-course).

Topic list**I. DNA and RNA**

1. Chemical structure of nucleotides; primary and secondary structure of nucleic acids (DNA and different types of RNA)
2. Condensation of the genetic material in pro- and eukaryotic cells; the role of topoisomerases and chromatin proteins
3. Structure of the human genome: coding and regulatory sequences; noncoding genomic sequences: introns, pseudogenes, repetitive sequences
4. The role of genetic variations in the pathogenesis of diseases; methods to study genetic factors
5. Principles of the semiconservative DNA replication; replication fork, leading and lagging strand synthesis
6. Comparison of DNA-replication in pro- and eukaryotes
7. Telomeric repeat sequences: replication of the telomeric regions of eukaryotic chromosomes; functions and importance of the telomerase
8. The most important types of DNA damage; repair of base deamination

9. Formation and repair of thymine dimers; mismatch repair
10. Types of point mutations; mechanisms of their development; possible effects of DNA sequence variations on the corresponding protein
11. Structure and function of the RNA-polymerase of *E. coli*; initiation and termination of transcription in prokaryotes
12. Characterization, role and synthesis of different types of RNA
13. Regulation of transcription in prokaryotes, definition of operon; positive and negative regulation
14. Structure of the eukaryotic genes, initiation and termination of transcription in eukaryotes
15. Regulation of the transcription in eukaryotes
16. Processing of the eukaryotic mRNA
17. Function and application of PCR and real-time PCR
18. Methods for the investigation of genetic mutations and polymorphisms (RFLP, allele-specific PCR, DNA-sequencing and primer extension)
19. Generation and application of recombinant DNA, reporter- and expression vectors

II. Post-transcription

20. Regulation of eukaryotic gene expression at post-transcriptional level (alternative splicing, RNA editing, regulation of RNA stability, RNA quality control)
21. Regulation of eukaryotic gene expression by RNA interference (miRNA, siRNA)
22. Epigenetic regulation of eukaryotic transcription: the role of DNA methylation and histone modifications
23. The genetic code; structure and function of tRNAs; aminoacyl-tRNA synthetases; codon-anticodon connections
24. The structure of prokaryotic and eukaryotic ribosomes; the ribosome cycle; binding of tRNA to ribosomes
25. Initiation of the translation in pro- and eukaryotes; regulation of eukaryotic translation; the role of phosphorylation of eIF2
26. Elongation and termination of pro- and eukaryotic translation; pharmacological inhibitors of translation
27. Post-translational modifications of proteins
28. Types, structure and synthesis of collagen
29. Investigation of gene expression by real-time PCR and DNA-microarray methodology
30. Definition of proteostasis; types of intracellular protein degradation
31. Structure and function of the proteasome; role of immune-proteasome and TAP
32. Types, mechanism and role of autophagy
33. Lytic and lysogenic replication cycles of bacteriophages
34. Classification of animal viruses; structure and replication of retroviruses
35. Principles of human gene therapy (*in vivo* vs. *ex vivo* methods, gene augmentation, CRISPR/Cas9 system)
36. Biomedical application of genetic engineering processes (transgenic animals; knock-out, knock-in and knock-down techniques; cloning)

III. Signal transduction and cell cycle

37. Nuclear receptors: steroid, thyroid, retinoid and Ah receptors
38. Classification and function of membrane receptors
39. Types and functions of GTP-binding proteins in signaling
40. Activation mechanisms of serine / threonine protein-kinases with examples
41. cAMP signaling pathway; regulation of gene expression by cAMP
42. Phosphatidylinositol signaling pathways
43. NFκB and TGFβ signaling
44. Structure and function of tyrosine kinase receptors, the Erkl / Erk2 MAP kinase cascade
45. Insulin signaling
46. Integrating role of mTOR, and its effects on translation
47. Role of AMPK in the regulation of the metabolism and autophagy
48. Mechanisms of cellular oxygen sensing; adaption to hypoxia
49. Regulation of the cell cycle in the G₁ phase, transition to S phase
50. Regulation of the cell cycle in the G₂ and M phases
51. Molecular sensors detecting DNA damage and completion of DNA replication during the cell cycle
52. Molecular background of tumor generation
53. Structure and function of the apoptosome, DISC and PIDDosome complexes

54. Members of the Bcl-2 superfamily and their roles in various apoptotic pathways, the „survival signal“
55. Function and activation of apoptotic caspases, role of granzyme B
56. Types of non-apoptotic programmed cell death
57. Regulation of p53 levels and activity; role of p53 in determining the cell's fate
58. Molecular mechanisms involved in aging

IV. Cell Biology

59. Principles of the organization of the eukaryotic cells; compartmentation; main features of subcellular organelles
60. Structure of cytoskeleton; structure and function of motor proteins
61. The protein secretory pathway; role of the rab cycle in the regulation of vesicular transport
62. Endo- and exocytosis
63. Formation of the proteome of subcellular organelles; principles and mechanisms of protein sorting
64. Protein targeting in the secretory pathway
65. Protein targeting into mitochondria and peroxisomes; uptake of substrates into lysosomes
66. Nuclear import and export of macromolecules
67. Endoplasmic reticulum stress, connection between the Unfolded Protein Response (UPR) and apoptosis
68. Protein quality control in the endoplasmic reticulum; the fate of misfolded proteins; ERAD
69. Characteristics of the proteome of subcellular organelles; maintenance of the internal milieu of subcellular organelles
70. Role of the extracellular matrix in signal transduction (e.g., integrin receptors), role of the extracellular matrix in the formation of metastasis
71. Methods in cell biology: cell culturing, cell fractionation, *in vivo* microscopy, flow cytometry, FACS

V. Lab

72. Quantification of proteins by biuret reaction and Ellmann-method
73. Investigation of subcellular cell fractions
74. Investigation of the gene expression in prokaryotes: induction of β -galactosidase in *E. coli*
75. Purification of a bacterially expressed protein by affinity chromatography
76. SDS-polyacrylamide gel electrophoresis and Western blot
77. *In silico* tools in molecular biology
78. Genotyping of the TAS2R38 tasting receptor by PCR-RFLP
79. Analysis and generation of a recombinant DNA
80. *In vitro* transcription and translation

MEDICAL MICROBIOLOGY I.**Institute of Medical Microbiology**Program Director: **Prof. Dr. Dóra Szabó**Tutor: **Dr. Ágoston Ghidán****Second Semester**

Week	Lectures (2 hours per week)
1.	Introduction. General information about the tuition. The place of Medical Microbiology among natural sciences, its significance, sub-fields and short history. Fundamentals of the morphology, physiology and genetics of bacteria.
2.	Pathogenic nature and virulence of bacteria. Pathomechanism, molecular pathogenesis, virulence factors. Infection and disease.
3.	Defence mechanisms of the host against infections. Active and passive immunisation. Vaccines.
4.	Antibacterial drugs: Modes of action and interactions of antibacterial drugs. Principles and practice of the antibacterial chemotherapy. Origin, mechanisms, induction, transfer, spreading, elimination and control of resistance of bacteria against antibacterial drugs
5.	Introduction to the classification of medically important bacteria: fundamentals of taxonomic, epidemiological, nosological, as well as pathogenetical classification. Gram-positive non-spore forming rods: <i>Corynebacterium</i> , <i>Listeria</i> , <i>Erysipelothrix</i> , <i>Lactobacillus</i> Normal flora of the vagina.
6.	Gram-positive aerobic cocci: <i>Streptococcus</i> and <i>Staphylococcus</i> genus. Normal flora of the skin.
7.	Gram-negative aerobic and microaerophilic cocci and coccobacilli: <i>Neisseriaceae</i> , <i>Pasteurellaceae</i> , <i>Haemophilus</i> genus Normal flora of the upper respiratory tract.
8.	Gram-negative aerobic rods and coccobacilli: <i>Pseudomonas</i> , <i>Legionella</i> , <i>Brucella</i> , <i>Bordetella</i> , <i>Francisella</i> genus.
9.	Gram-negative facultative anaerobic rods Normal flora of the gastrointestinal tract. Extraintestinal diseases caused by Gram-negative enteral bacteria. Pathogens of the gastrointestinal tract I: <i>Vibrio</i> , pathogenic <i>Escherichia coli</i> , <i>Campylobacter</i> , <i>Helicobacter</i> .
10.	Pathogens of the gastrointestinal tract II: <i>Yersinia</i> (<i>yersiniosis</i>), <i>Shigella</i> (<i>shigellosis</i>), <i>Salmonella</i> (<i>salmonellosis</i>). The enteral fever (<i>Salmonella typhi</i> and <i>paratyphi</i>), as well as <i>Yersinia pestis</i> .
11.	Gram positive aerobic and anaerobic spore-forming bacteria: <i>Bacillus</i> and <i>Clostridium</i> genus Obligate anaerobic bacteria and associated infections: Gram-positive: <i>Peptostreptococcus</i> , <i>Propionibacterium</i> , <i>Eubacterium</i> , <i>Bifidobacterium</i> , <i>Arachnia</i> , Gram-negative: <i>Veillonella</i> , <i>Bacteroides</i> , <i>Fusobacterium</i>
12.	Acid-fast bacteria: <i>Mycobacterium</i> , <i>Nocardia</i> , <i>Actinomyces</i>
13.	Spirochaetales: <i>Treponema</i> , <i>Borrelia</i> , <i>Leptospira</i> .
14.	Rickettsiales, Chlamydiales, Mycoplasmatales

Second Semester

Week	Bacteriology Practicals (2 hours per week)
1.	Introduction. Rules and instrumentation of the safe handling of microbes. Safety in the laboratory. Basic microbiological methods I: Microscopic examinations.
2.	Basic microbiological methods II: Cultivation of bacteria and biochemical activity of bacteria
3.	Basic microbiological methods III: Sterilisation. Disinfection
4.	Basic microbiological methods IV: Susceptibility of bacteria to antimicrobial drugs
5.	Basic microbiological methods V: In vitro immunological reactions
6.	Midterm examination I. and Systematic bacteriology I: Identification of Gram-positive aerobic rods
7.	Systematic bacteriology II: Identification of Gram-positive cocci: Staphylococcus
8.	Systematic bacteriology III: Identification of Gram-positive cocci: Streptococcus
9.	Systematic bacteriology IV: Identification of Gram-negative cocci and coccobacilli, and Gram negative aerobic rods
10.	Systematic bacteriology V: Identification of Gram-negative facultative anaerobic rods
11.	Systematic bacteriology VI: Identification of the aerobic and anaerobic spore-forming bacteria, as well as the obligate anaerobic and microaerophilic bacteria
12.	Midterm examination II. and Systematic bacteriology VII: Identification of irregular Gram-positive rods
13.	Systematic bacteriology VIII: Spirochaetes
14.	Systematic bacteriology IX: Rickettsiae, Chlamydiales and Mycoplasmatales

MICROSCOPIC ANATOMY AND EMBRYOLOGY II.**Department of Anatomy, Histology & Embryology****Credit value: 4****Number of lessons per week: 4 lectures: 2 practical course: 2 seminar: 0****Type of the course: obligatory course**Name of the course leader: ***Dr. Alán Alpár, Professor, Head of Department***

Contact details: : Semmelweis University, Department of Anatomy, Histology and Embryology, +36 1 459 1500 / 53609

Objectives of the subject, its place in the medical curriculum:

Demonstration of the fine structure of cells and tissues composing the organs of the human body specifically to provide the future clinicians/ medical doctors with a valid body of information describing the microscopical elements of clinically significant morphological structures (including cell biology, general histology and the histology of organs).

The part covering the microscopy of the CNS provides the students with a basic knowledge concerning the major roles of the brain together with the spinal cord with special reference to function and structure. The development of the nervous systems together with the detailed morphological/histological/developmental description of organs of special senses as well as the endocrine system will also be discussed. Teaching is done in the form of lectures and histology laboratory classes

Place where the subject is taught (address of the auditorium, seminar room, etc.):

Semmelweis University, Department of Anatomy, Histology and Embryology
Budapest 1094, Tűzoltó utca 58.

Successful completion of the subject results in the acquisition of the following competencies:

Understanding the microscopical composition of the human body together with the understanding of human development in order to draw parallels with macroscopical anatomy. Clear understanding of histological structure and function. Ability to identify basic structural elements within the tissue specimen. Identification of general directions/landmarks within digitized tissue slides.

Course prerequisites:

Cell science,
Microscopic anatomy and embryology I,
Macroscopic Anatomy and Embryology II.

Number of students required for the course (minimum, maximum) and method of selecting students):

Obligatory for all registered students, on the basis of registration via the NEPTUN system.

How to apply for the course:

Via the NEPTUN system.

Detailed curriculum:
List of lectures

1. week:	1. 2.	Nerve tissue Development of the neural tube, craniocaudal and dorsoventral differentiation. Divisions of the central nervous system
2. week:	3. 4.	Formation and derivatives of the neural crest and placode ectoderm Fine structure of the spinal cord (spinal reflexes, receptors, effectors)
3. week:	5. 6.	Brain tracts, neurotransmitters, neuronal circuits, <i>“connectomics”</i> Central autonomic nervous system. Monoaminergic and cholinergic neurones and pathways. <i>„Ascending Reticular Activating System”</i> (ARAS)
4. week:	7. 8.	Somatosensory system. Spinal and trigeminal sensory pathways. Thalamus, cortical areas. Viscerosensory system. Role of the reticular formation, thalamus, insula and the prefrontal cortices in visceral sensory activities.
5. week:	9. 10.	Neuroanatomy of pain. Referred pain. Cerebral inhibition of pain sensation. Neuroanatomy of movements/locomotion I. Motor cortical areas, planning and programming of movements. Motor pathways
6. week:	11. 12.	Neuroanatomy of movements/locomotion II. The role of cerebellum and basal ganglia in eliciting movements. Gait control mechanism. Visceromotor system. Control of micturition. Spinal motor reflexes.
7. week:	13. 14.	External ear. Middle ear Inner ear. Bony and membranous labyrinth. Development of the organ of hearing.
8. week:	15. 16.	Spiral organ of Corti. Auditory pathway. Neuroanatomy of hearing, understanding and control of speech. Fine structure of the labyrinth, tracts of the vestibular system. Control of balancing and posture together with the movements of the eye and head. Awareness of spatial position
9. week:	17. 18.	Fibrous and vascular coats of the eyeball. Lens, chambers of the eye, vitreous body, accommodation. Lacrimal gland, lacrimal apparatus. Inner coat of the eyeball, retina. Development of the eye.
10. week:	19. 20.	Neuroanatomy of vision. Visual pathway, visual recognition, neuroanatomy of reading and understanding of written/text. Endocrine system I. Hypothalamus, the hypothalamo-hypophysial system, epiphysis
11. week:	21. 22.	Endocrine system II. Thyroid, parathyroid, adrenal glands. Energy metabolism, neuroanatomy of food intake, taste sensation and olfaction. Structure and functional significance of the reward system
12. week:	23. 24.	Limbic system. Amygdala, hippocampus. Circadian rhythm, sleep/wake cycle; neuroanatomy of resting state and activation.
13. week:	25. 26.	Behaviour and motivation. Neuroanatomy of emotions, empathy, well-being, aggression, fear, anxiety and depression. Cognitive functions. Neuroanatomy of determination, planning, alertness together with learning&memory, personality, consciousness and creativity.
14. week:	27-28.	Histology revision I-II. (basic tissues, histology of internal organs)

Histology laboratories

1. week:	Histology of the peripheral nervous system
2. week:	Microscopy of the CNS – consultation 1
3. week:	Histology of the central nervous system
4. week:	Microscopy of the CNS – consultation 2.
5. week:	Microscopy of the CNS – consultation 3.
6. week:	Midterm test
7. week:	Histology of the organ of hearing
8. week:	Histology of the organ of vision I.
9. week:	Histology of the organ of vision II
10. week:	Skin. Endocrine system 1.
11. week:	Midterm test
12. week:	Endocrine system 2.
13. week:	Histology revision
14. week:	Histology revision

Other subjects concerning the border issues of the given subject (both obligatory and optional courses).**Possible overlaps of themes:**

- Macroscopic Anatomy I - II.
- Cell sciences, cell biology
- Certain chapters of Biochemistry. The endocrine and central nervous systems are also discussed in Physiology

Special study work required to successfully complete the course:

none

Requirements for participation in classes and the possibility to make up for absences:

Active participation in histology laboratory classes is obligatory for every student. Students should attend at least 75% of the scheduled hours to gain a signature proving the validity of the semester. Absences are therefore limited in **25%**. Attendance will be recorded in the histology laboratory classes

Methods to assess knowledge acquisition during term time:

The knowledge of students will be checked in written (Moodle) tests in the form of 4 weekly tests from the microscopy of the CNS followed by two midterm tests.

Midterm 1 – week 8 – microscopy of the CNS

Midterm 2 - week 13 – histology and development of the endocrine sőorgans together with the organs of special senses.

The midterm tests are composed of images and theory questions (20 questions, passing rate: 60%) Attendance is obligatory at the two midterm tests. Students absent from the tests should reattend at one of the offered retakes (week 9 or 13, week 13 or 14, respectively) or their semester is not accepted.

Requirements for signature:

Active participation in at least 75% of dissection room sessions, including the midterm tests (irrespective of the result) is obligatory for every student.

Type of examination:

Final (written and oral) examination, topics: subject matter of the two semesters (Microscopic Anatomy and Embryology I-II.). Examiners are delegated by the Course Director with the consent of the Head of Department.

Final examinations consist of written theoretical and oral practical parts.

Requirements of the examination:

Final examinations are composed of written theoretical and oral practical parts. The written theoretical examination is done using an e-learning module while the practical examination is conducted with the help of digitized histological tissue slides.

1. Written pretest (e-learning module)
2. Microscopic Anatomy - identification of structures on digitized tissue slides - including relevant theoretical questions from the subject matter of the semester
3. One CNS question (exemptions could be earned during the semester in case the result of the 1st midterm is 4 or 5)

Students are given separate marks for each part of the examination. Unsuccessful partial examinations result in the failure of the semi-final examination. When failing at the practical part, the written test will not have to be repeated in case the result was a 4 or a 5 only. Upon the termination of the examination the Head of the Examination Committee composes the final mark from the partial marks earned in the written and practical parts.

Topic list for the final examination:

Microscopic Anatomy and Embryology I.

(see there)

and

Lymphatic organs

- Lymphatic tissues in general, cellular components
- Histological structure of lymph nodes
- Spleen (fine structure and circulation)
- Thymus
- Tonsils, MALT

Microscopic Anatomy and Embryology II.**Lymphatic organs**

- Lymphatic tissues in general, cellular components
- Histological structure of lymph nodes
- Spleen (fine structure and circulation)
- Thymus
- Tonsils, MALT

Development of the nervous system and organs of special senses

- Development and primary differentiation of the neural tube
- Development of brain vesicles
- Development of the peripheral nervous system (neural crest, placodes)
- Development of the organ of vision
- Development of the organ of hearing&equilibrium

Neurohistology

- Histology of neurons developing from the neural tube
- Glial cells
- Histology of the neurons and supporting cells developing from the neural crest
- Fine structure of peripheral nerves
- Receptors and effectors
- Interneuronal synapses

Microscopy of the central nervous system

- Fine structure (microscopy) of the spinal cord
- Proprioceptive reflexes
- Nociceptive reflexes
- Autonomic reflexes
- Brain tracts, neurotransmitters, neuronal circuits, "*connectomics*"
- Central autonomic nervous system. Monoaminergic and cholinergic neurones and pathways.
- „*Ascending Reticular Activating System*" (ARAS)
- Somatosensory system. Spinal and trigeminal sensory pathways. Thalamus, sensory cortical areas.
- Viscerosensory system. Role of the reticular formation, thalamus, insula and the prefrontal cortices in visceral sensory activities.
- Neuroanatomy of pain. Referred pain. Cerebral inhibition of pain sensation.
- Motor cortical areas, planning and programming of movements. Motor pathways.

- The role of cerebellum and basal ganglia in eliciting movements. Gait control mechanism.
- Visceromotor system. Control of micturition. Spinal motor reflexes.
- Energy metabolism, neuroanatomy of food intake, taste sensation and olfaction. Structure and functional significance of the reward system.
- Limbic system. Amygdala, hippocampus.
- Circadian rhythm, sleep/wake cycle; neuroanatomy of resting state and activation.
- Behaviour and motivation. Neuroanatomy of emotions, empathy, well-being, aggression, fear, anxiety and depression.
- Cognitive functions. Neuroanatomy of determination, planning, alertness together with learning&memory, personality, consciousness and creativity.

Endocrine organs

- Microscopical anatomy and development of the pituitary gland. Portal circulation
- Microscopical anatomy and development of the pineal gland
- Microscopical anatomy and development of the thyroid gland
- Microscopical anatomy and development of the parathyroid gland
- Microscopical anatomy and development of the suprarenal gland
- Histology of the islands of Langerhans

Organs of special senses

- Microscopical structure of the skin and skin appendages
- Coats of the eyeball
- Chambers of the eye, vitreous body
- Lens, accommodation
- Neuroanatomy of vision. Visual pathway, visual recognition, neuroanatomy of reading and understanding of written/text.
- External ear, tympanic membrane. Middle ear, auditory tube, hearing ossicles.
- Spiral organ of Corti. Auditory pathway. Neuroanatomy of hearing, understanding and control of speech.
- Fine structure of the labyrinth, tracts of the vestibular system. Control of balancing and posture together with the movements of the eye and head. Awareness of spatial position.

Method and type of evaluation:

Final examinations are composed of written theoretical and oral practical parts. The written theoretical examination is done using an e-learning module while the practical examination is conducted with the help of digitized histological tissue slides.

1. Written pretest (e-learning module)
2. Microscopic Anatomy - identification of structures on digitized tissue slides - including relevant theoretical questions from the subject matter of the semester
3. One CNS question (exemptions could be earned during the semester in case the result of the 1st midterm is 4 or 5)

Students are given separate marks for each part of the examination. Unsuccessful partial examinations result in the failure of the semifinal examination. When failing at the practical part, the written test will not have to be repeated in case the result was a 4 or a 5 only. Upon the termination of the examination the Head of the Examination Committee composes the final mark from the partial marks earned in the written and practical parts.

How to register for the examination? Via the NEPTUN system

Possibilities for exam retake:

According to the Study and Examination Policy

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

List of textbooks

1. Langmann's Medical Embryology, 13th Edition by TW Sadler, Wolters Kluwer, ISBN 9781469897806, 2014
2. Histology: A Text and Atlas: With Correlated Cell and Molecular Biology; 7th Edition by MH Ross and W Pawlina ; Wolters Kluwer 2015, ISBN 9781451187427
3. Wheater's Functional Histology, A Text and Colour Atlas, 6th Edition by B Young, G O'Dowd and P Woodford Churchill Livingstone, Edinburgh, 2013, ISBN 9780702047473
4. Stevens & Lowe's Human Histology , Elsevier, 4th ed ISBN 978-0-723435020, 2015.
5. Functional Anatomy, Histology and Embryology for medical and dental students by M. Réthelyi and J. Szentágothai, Medicina, 2018.
- 6.
7. *The Developing Human – Clinically Oriented Embryology, 10th ed. by KL Moore, TVN Persaud and M Torchia, Saunders, 2015; ISBN 9780323313384*
8. *Histology Manual 1-3. by A. Nemeskéri and K. Kocsis: István Apáthy's Foundation, 2019.*
9. A. L. Kierszenbaum Histology and Cell Biology: An Introduction to Pathology, 4th Edition, Paperback with STUDENT CONSULT Online Access and E-Book ISBN: 9780323085885; 2015
10. Junqueira's Basic Histology: Text and Atlas; 13th Edition by Anthony Mescher, New York, McGraw-Hill Medical, 01/03/2013 ISBN13 978007178033

Further study aids:

To be downloaded from the homepage of the Department of Anatomy, Histology and Embryology (<http://semmelweis.hu/anatomia>) or from Knowledgebase on the Library homepage: (https://lib.semmelweis.hu/knowledge_base).

GENETICS AND GENOMICS

Department of Genetics, Cell- and Immunobiology

Course director: **Prof. Dr. Edit Buzás**

Course coordinator: **Dr Hargita Hegyesi**

Credit: 3

Number of lessons per week: 3.5 **lecture:** 2 **practical course:** 1.5

Academic year: 2021/2022 II. semester

Name of the course leader: Prof. Edit Buzás

Department of Genetics, Cell- and Immunobiology, +36-1-210-2929 / 56241

Position: Professor and Chairman

Objectives of the subject, its place in the medical curriculum:

Introductory course in classical and molecular genetics and functional genomics, as well as basic course for the clinical module. It addresses the types, general laws of human inheritance, characteristics, organization and structure of the human genome, and the most important methods and / or their application in theoretical and clinical medicine, according to the needs of medical students, and evaluates the results (in practice). It presents the forms of genetic and epigenetic variability, their mechanisms and their consequences for human health. Through selected examples, the pathway from gene to disease is analyzed using a systems biology approach.

Place where the subject is taught (address of the auditorium, seminar room, etc.):

Semmelweis University, Department of Genetics, Cell- and Immunobiology, H-1089 Budapest, Nagyvárad tér 4. Hungary, NET building lecture rooms, L13-L16

Successful completion of the subject results in the acquisition of the following competencies:

Basics of cytogenetics. Setting up and interpreting pedigrees. Basic knowledge of human genetics and human genomics. Background of monogenic and multifactorial diseases. Basics of prenatal diagnosis, detection of monogenic diseases by molecular genetic methods. Basic knowledge of oncogenetics, epigenetics, population genetics, nutrigenetics, evolutionary genetics, pharmacogenetics with biomedical approach. Role of gene-gene and gene-environment interactions in various diseases. Basic knowledge of bioinformatics and systems biology related to medical genetics and genomics. Basics of gene therapy.

Course prerequisites:

Molecular Cell Biology I.,

Medical Biochemistry II.

Number of students required for the course (minimum, maximum) and method of selecting students:

According to Study and Exam Policy

How to apply for the course:

in Neptun system

Detailed curriculum:**Lectures (2 hours per week)*:**

11. Introduction to human genetics
12. Genetic variations
13. Chromosomal aberrations
14. Autosomal inheritance I.
15. Autosomal inheritance II.
16. Role of sex in inheritance
17. Epigenetics
18. Genetics of biological processes, oncogenetics
19. Introduction to genomics
20. Methods in genomics, systems biology
21. Genomic approach of complex inheritance Population genetics
22. Gene therapy
23. Pharmaco- and nutrigenomics
24. Genome and environment, Evolution genetics

Practices (1.5 hours per week):**

1. Genetic aspects of cell cycle and cell division disruptions (Atypical mitosis / meiosis)
2. Cytogenetics I.
3. Cytogenetics II.
4. Introduction to pedigree analysis
5. Autosomal dominant inheritance I.
6. Autosomal dominant inheritance II.
7. Autosomal recessive inheritance I.
8. Autosomal recessive inheritance II.
9. Sex-linked inheritance
10. Complex inheritance I.
11. Complex inheritance II.
12. Gametogenesis, prenatal genetic testing
13. Genetherapy
14. From genes to bedside

Other subjects concerning the border issues of the given subject (both obligatory and optional courses!). Possible overlaps of themes:

Understanding of Genetics and Genomics is based on the knowledge of molecular biology and molecular genetic techniques studied at Medical Biochemistry I-II. Elective subjects taught by our institute (Sex Genetics, Epigenetics, Genomics) elaborate on some of the subchapters of "Genetics and Genomics", with overlaps needed for understanding, focusing on topics not covered in the main subject. Understanding the subject of Clinical Genetics is based on the knowledge of Genetics and Genomics.

Requirements for participation in classes and the possibility to make up for absences:

Completion of prerequisite subject.

Practices can only be attended to in an appropriate mental and health condition. Practical absence can be remedied during the current training week, in parallel courses, after prior consultation with the practice instructors.

Methods to assess knowledge acquisition during term time:

Bonus lecture scores can be collected at lectures and midterm tests. Written midterm from the topics of taught lectures and practices. We provide an opportunity to retake the midterm, only for students who have proven absence.

Requirements for signature:

According to the Study and Exam Policy the students must visit at least 75% of the lectures and practices.

Type of examination: written (lectures and practices) Moodle test

* The order of the lectures may vary (depending on holidays and workday transfers). Colleagues with senior teaching status may also act as lecturers, if the lecturer on schedule is prevented.

** The order of the practices may vary (depending on holidays and workday transfers). Practice instructors: Colleagues with teaching status at the Institute of Genetics, Cell and Immunobiology

Requirements of the examination:**1.) Introduction to human genetics and genomics.**

MGGe: Chapter 1, pages 9-21; Lecture: Introduction to human genetics

Basic genetic terms, e.g.: genome, genetics, genomics, **homologous chromosomes**, gene, locus, allele, wild type allele, genotype, phenotype, homozygote, heterozygote, hemizygote, dominant, recessive, cytogenetics; Mendel's laws, Model organisms in genetics; DNA: structure, function, amount, organization (chromatin, chromosome). Replication, transcription, mRNA maturation (splicing, alternative splicing), types of RNA-s, features of genetic code. Translation and posttranslational modifications. Human genome: nuclear and mitochondrial. Structure of eukaryotic gene. Intergenic DNA; Specific sequences of nuclear genome. Repetitive sequences. Human Genome Project, ENCODE Project

2.) Transmission of genetic information from cell to cell in an organism.

MGGe: Chapter 2, pages 22- 41, Practice presentation: Atypical mitosis

Features of mitotic phases. Functional parts of chromosomes (telomere, centromere, kinetochore, sister chromatids. Cytokinesis. Changes of DNA amount and chromosome number during cell cycle. Types, causes and consequences of atypical mitosis.

3.) Transmission of genetic information from generation to generation.

MGGe: Chapter 2, pages 41-51; Practice presentation: Typical and atypical meiosis

Significance and source of genetic variability. Significance of meiosis. Stages of meiosis: meiosis I. and II. Features of phases of first prophase (leptotene, zygotene, pachytene, diplotene, diakinesis; synapsis, crossing over, chiazma). Random alignment and assortment of homologous chromosomes in meiosis I anaphase. Atypical meiotic process: non-disjunction. Change of DNA amount and chromosome number during meiotic process.

4.) Pedigree analysis

Practice: Introduction to pedigree analysis

Mendelian or monogenic inheritance, Construction of pedigree: main symbols that are used in pedigrees. Pedigree analysis (characteristics pedigree patterns of monogenic inheritances: AD, AR, XD, XR, Y-linked, mitochondrial). Disease examples for monogenic inheritances (AD, AR, XD, XR, mitochondrial); **Important terms:** gene, genome, locus, allele, multiple allelism, wild type (normal) allele, genotype: homozygote, heterozygote, complex heterozygote, hemizygote, phenotype: dominant, codominant, recessive.

5.) Mendelian Inheritance: autosomal inheritance

MGGe: Chapter 6, pages 102 -121; Lecture: Monogenic inheritance (Autosomal inheritance); Practice: Autosomal dominant inheritance

Properties and disease examples of autosomal inheritance:

AD (osteogenesis imperfecta, acondroplasia, Marfan syndrome, familial hypercholesterolemia, Huntington disease, Polycystic kidney disease). Ecogenetic diseases (porphyria, malignant hyperthermia). AR (albinism, phenylketonuria, xeroderma pigmentosum, deafness, cystic fibrosis, sickle cell anemia, thalassemias). **Important terms:** gene, genome, locus, allele, multiple allelism, wild type (normal) allele, genotype: homozygote, heterozygote, complex heterozygote, hemizygote, phenotype: dominant, codominant, recessive. Genetic heterogeneity (locus heterogeneity, allele heterogeneity), Factors affecting pedigree patterns: reduced penetrance, variable expressivity, pleiotropy, heterogeneity (locus and allele), phenocopy, anticipation, „de novo“, new mutation, Influence of the age, Lethal/sublethal genes, „Modifier genes“, Epistasis; Heterozygote advantage, The influence of the environment.

6.) Role of sex in inheritance

MGGe: Chapter 7, pages 122-131; Lecture: Role of sex in inheritance

Properties and disease examples of Sex-linked inheritance:

XR (hemophilia A and B; Duchenne and Becker muscular dystrophy), XD (hypophosphatemia, incontinentia pigmenti, Fragile X). Y-linked inheritance; Sex influenced inheritance (e.g. boldness). Sex limited inheritance (e.g. precocious puberty). Genomic imprinting, X-chromosome inactivation. Mitochondrial inheritance (homoplasmy, heteroplasmy)

7.) Cytogenetics

Practice: Cytogenetics I

Structure and types of eukaryotic chromosome. Karyotyping (chromosome preparation, principle, significance and types of banding techniques, principle and significance of multicolor-FISH, and M-banding); kariogram, idiogram; X inactivation. Study of sex chromosomes in interphase. Characteristics of human karyotype. Mutagenicity tests: micronucleus and sister chromatid exchange. Chromosome territories.

Light microscopic slides: 54, 60, 64

8.) Structural chromosome mutations

MGGe: Chapter 4, pages 69-80; Lecture: Chromosomal aberrations; Practice: Cytogenetics II

Structural chromosome aberrations. Types of structural aberrations: deletion (terminal, interstitial), duplication, translocation (reciprocal, Robertsonian), inversion (paracentric,

pericentric), ring chromosome, isochromosome. Balanced and unbalanced mutations. Chromosomal translocations in leukemia. Consequence of structural aberrations.

9.) Numerical chromosome mutations

MGGe: Chapter 4, pages 80-90; Lecture: Chromosomal aberrations; Practices: Cytogenetics

Numerical chromosome aberrations: euploidy, polyploidy, aneuploidy, mixoploidy (mosaicism, chimerism). Possible cause of aneuploidy (non-disjunction in meiosis I and II). Autosomal (Patau, Edwards and Down syndromes) trisomies. Numerical aberrations of sex chromosomes (Klinefelter, XYY, triplo X, Turner syndromes). Uniparental disomy (UDP). Cause and consequence of polyploidy and mixoploidy (mosaicism and chimerism).

10.) Mutations and polymorphisms

MGGe: Chapter 3, pages 52-68; Lecture: Genetic variations

Different meanings of mutation and polymorphism. Significance of mutation. Classification of mutations: by cause (spontaneous, induced, different DNA repair mechanisms, consequence of their failure), by site (in the organism: somatic, germline, in the gene), by function (loss-of-function, gain-of-function, dominant negative, lethal, back), by fitness (neutral, beneficial, harmful), by size (genome, chromosome, gene: insertions, deletions, substitutions). Repetitive insertions, triplet repeat: polyglutamine and polyalanine disorders. inDel mutations: frame shift and in frame mutations. Nucleotide substitutions: transition, transversion, sense (synonymous) missense and nonsense (non-synonymous) mutations. Types, size and significance of genetic polymorphism.

11.) Epigenetics

MGGe: Chapter 5, pages 91-101; Lecture: Epigenetics

Meaning of epigenetics. Relationship of genome, epigenome and phenotype. Epigenetic mechanisms: transcriptional (DNA methylation, histone modifications), posttranscriptional (RNAi, miR). X chromosome inactivation, role of XIST. Autoimmunity and X inactivation. Genomic imprinting, evidences of nonequivalence of parental genome. Mechanism of genomic imprinting. Causes of Prader Willi and Angelman syndromes. Possible role of genomic imprinting. Relationship between genomic imprinting and cancer. Position effect. Epigenetic changes caused by aging and by in vitro fertilization. Transgenerational effects.

12.) Introduction to genomics. Methods in genomics

MGGe: Chapter 9, pages 148-173; Lecture: Introduction to genomics. Methods in genomics; Practice: Molecular genetic methods and applications in human genetics I-II.

Genomics, Human Genome, DNA sequencing, Participants in

the Human Genome Project, Some results of the HGP, Variations in the human genome, Some novel data about gene expression and genetic variability, Junk DNA in the human genome, Comparative genomics, ENCODE project, Genetic markers, GWAS, Principle of molecular genetic methods: hybridization, restriction enzymes, DNA isolation, Visualization of genosomal DNA, separation of DNA fragments by gelelectrophoresis, capillary gelelectrophoresis), non-specific staining of DNA (EtBr), Allele-Specific Oligonucleotide (ASO) test, RFLP, microarray, PCR, PCR-RFLP, Multiplex PCR, MLPA, Significance of real time-PCR. Significance and detection of VNTR. VNTR and trinucleotid diseases. Significance of polymorphism detection in forensic medicine. DNA fingerprint. Foreign DNA (bacterial, viral) detection. Sequencing in genotyping. NGS, RT(reverse transcriptase)-PCR.

13.) Complex inheritance.

MGGe: Chapters 10, pages 174-177; Lecture: Complex inheritance, Practice: Complex inheritance

Features of complex inheritance. Environmental factors. Heritability of the complex diseases. Disease examples

14.) Pharmacogenomics

MGGe: Chapter 14, pages 266-286; Lecture: Pharmacogenomics and nutrigenomics

Pharmacogenetics and pharmacogenomics. Pharmacokinetics, -dynamics, **Drug development Adverse drug response, Genomic background of adverse effects, CYP (cytochrom P-450) gene family, Warfarin, Mercaptopurine, Genes influencing pharmacodynamics, Examples of pharmacogenetic studies, Pharmacogenetics of statins, Clopidogrel, Pharmacotherapy of asthma, MODY, Succinylcholine sensitivity, Thiopurin methyltransferase variations, Role of membrane receptors in drug effects.**

15.) Nutrigenomics

MGGe: Chapter 13, pages 255-263; Lecture: Pharmacogenomics and nutrigenomics

Genetic variations and food, food and gene expression.

16.) Gene therapy

Practice: Genetherapy

Genetherapy types (real, gene expression modification) and forms (in vivo, ex vivo). Nucleic acids applied in gene therapy: DNA, RNA. Forms of introduction of nucleic acids into target cells. Vectors applied in gene therapy: adenovirus, adeno associated virus, retrovirus, lentivirus, nonviral integrating vectors. Comparison of viral vectors. Examples of successful gene therapy trial.

17.) Population genetics

MGG: Chapter 12, pages 215-224; Lecture: Population and evolution genetics

Types of sample collection, prospective and retrospective studies. Selection of populations for genetic studies. Hardy Weinberg equilibrium. Linkage, haplotype, linkage disequilibrium. Founder populations. Association studies, population stratification, population admixture. Risk calculation, odds ratio and relative risk, p-value.

18.) Evolution genetics

MGG: Chapter 12, pages 225-236; Lecture: Population and evolution genetics

Gene environmental interactions and the human genome. Natural selection. Role of infections in formation of the genome. Genetic drift, bottleneck effect. Why are some lethal mutations frequent? Examples for effects forming the genome.

19.) Genome and environment

MGG: Chapter 13, pages 238-254; Lecture: Population and evolution genetics

Penetrance of the genetic variants; Interactions between highly

and low penetrant variations and the environment; smoking-genome interaction, gene-environmental interactions;

20.) Gametogenesis, prenatal genetic testing

Practice: Gametogenesis, prenatal genetic testing

Comparison of spermatogenesis and oogenesis; Genetic aspects of infertility; Genetic aspects of assisted reproduction techniques; CGH; aCGH prenatal genetic testing; Non-invasive prenatal testing

21.) Genetics of biological processes

MGG: Chapter 8, pages 132-147; Lecture: Genetics of biological processes

Genetics of development: development potentials (totipotent, pluripotent, multipotent, unipotent), cell differentiation, significance of stem cells. Role of morphogens and their concentration gradient (Sonic hedgehog), homeotic genes. Genetics of sex: sex determination, male sex determination. Causes of maldevelopment. Oncogenetics: oncogenes and tumor suppressor and mutator genes. Activation mechanisms of oncogenes. Tumor suppressor genes, LOH. Immunogenetics: somatic gene rearrangement, role of epigenetics, genetic background of antibody diversity.

Method and type of evaluation:

Final grade will be calculated from the result of the exam scores and bonus scores. Bonus scores are the grade calculated from the scores collected at the midterm, homeworks and lectures. Competition will be organized during the semester.

How to register for the examination?:

In the Neptun system, according to current university and faculty settings.

Possibilities for exam retake: According to the Study and Exam Policy

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

Cs. Szalai (Editor): Medical Genetics and Genomics e-book, 2018

Power Point presentations of the lectures and practices; The e-book and presentations available at the homepage: <http://gsi.semmelweis.hu/index.php/en/education/>

IMMUNOLOGY

Department of Genetics, Cell- and Immunobiology

Course Director: **Prof. Edit Buzás**

Course instructor: **Dr. Marianna Csilla Holub, PhD**

Credit: 3

Aim of the subject and its place in the curriculum:

A pre-clinical course for medical students that introduces the essentials of the immune system, natural and adaptive immune responses. It discusses the structure of the human immune system: organs, cellular and molecular components involved in the immune response; the development of genetic diversity of antigen receptors, and the role of diversity in an efficient immune response. It introduces to the students the processes of immunological regulation in healthy organism, including the immunology of pregnancy. It also discusses the course and alteration of immunological processes in certain pathological conditions, such as infections, tumors, hypersensitivity reactions, autoimmunity, immunodeficiency and transplantation, therefore provides a basis for other subjects. In related practices, students will be introduced to the basic methods required to test the functionality of the immune system, to the immunological assays and immunologically relevant procedures used in current diagnostics and therapy.

Competencies gained upon the successful completion of the subject: Understanding the relationships between immunological processes and the role of the immune system in the prevention, development and course of diseases. Theoretical knowledge of basic immunological diagnostic and therapeutic techniques.

Prerequisite(s) for admission to the subject:

Molecular Cell Biology I, Medical Biochemistry II

Detailed topics of the course:

	Lectures 2×45 minutes/week	Practices 1×70 minutes/week
1.	The role, processes, organs and cells of the immune system	Basic terms
2.	Principles of natural immunity	The role of the immune system in the lab
3.	The complement system; inflammation and acute phase reaction	Methods based on antigen-antibody interactions I. Immunoserology
4.	Antigen, antigen presentation and MHCs	Methods based on antigen-antibody interactions II:immuno-assays
5.	Antigen receptors and their formation	Methods based on antigen-antibody interactions III Flow cytometry
6.	T lymphocytes and cell-mediated immune response	Complement assays
7.	B lymphocytes and humoral immune response	Biological therapies I
8.	Immune response in infections	Biological therapies II
9.	Immunodeficiencies	Immunization and vaccination I
10.	Hypersensitivity reactions	Immunization and vaccination II
11.	Mucosal immunity	Hypersensitivity I.
12.	Immunological tolerance; natural and pathological autoimmunity	Hypersensitivity II-IV.
13.	Antitumor immunity	Screening methods for autoantibodies
14.	Immunology of transplantation and pregnancy immunity	HLA-typing

Policy regarding the attendance and making up absences:

Attendance of a minimum of 75% of the practices is necessary for the end-term signature. The presence at the seminars (practices) are registered weekly, more than three absences from the seminars invalidate the semester as well. The sessions can be attended in an appropriate mental and health condition.

Means of assessing the students' progress during the semester⁴:

Discussing the topics of the lecture under the guidance of the practice teacher to establish diagnostic and therapeutic methods.

Requirement for acknowledging the semester (signature): Attendance of a minimum of 75% of the practices.

Bonus points can be collected during the semester at the lectures and by the midterms. Students who collected bonus points over a threshold during the semester will get a simplified exam. All students

Topic list of lectures:

1. The concept of immunity, Principles of the immune response: antigen specificity, sensitivity, memory, clonal selection based operation.
2. Components (primary, secondary immune organs, cells, molecules) of the immune system.
3. Features of innate and adaptive, cell-mediated and humoral, primary and secondary response.
4. The immune homeostasis.
5. Migration of immune cells and adhesion molecules;
6. Cytokines and cytokine receptors.
7. Chemokines and chemokine receptors.
8. Fc-receptors; PAMP, DAMP, Pattern recognition receptors.
9. Phagocytes and phagocytosis.
10. Role of neutrophils, eosinophils and basophils/mast cells.
11. Types and role of dendritic cells.
12. Inflammasome/ inflammasomopathies.
13. Innate lymphoid cells.
14. The activation pathways and the regulation of the complement system;
15. Complement receptors;
16. Complement genetics;
17. The biological role of complement activation
18. The inflammation and the acute phase response, the provoking factors and mechanisms, periods;
19. The acute phase plasma proteins.
20. The major histocompatibility complex;
21. The ways of antigen processing and presentation.
22. Types and structures of antigen receptors;
23. The immunoglobulin and TCR genes, the sources of antigen receptor diversity;
24. Expression and production of antigen receptors.
25. Differentiation and activation of T cells
26. Types of the T cells
27. The cell mediated immunity.
28. The activation and differentiation of B cells
29. Types of the B-cells
30. The humoral immunity.
31. Antimicrobial immune response.
32. Mucosal Immunity
33. Hypersensitivity reactions: Type I-II-III-IV reactions
34. Immunological background of transplantation and GVH disease
35. The natural autoimmunity.
36. Idiotype regulation and network.
37. Pathological autoimmunity.
38. Mechanisms of immune tolerance.
39. Primary and acquired immune deficiencies.
40. Tumor antigens.
41. Anti-tumor immunity.
42. Escape strategies of tumor cells.
43. Possibilities of anti-tumor immune-therapy.
44. The immunology of pregnancy

that achieved bonus points over a set threshold (calculated from the midterms and lecture points) are invited for a competition. Participation in the competition is not obligatory.

Type of the examination: The semifinal exam is a Moodle exam with personal attendance.

The test includes tasks for 60 points. Students collected bonus points over a threshold during the semester, will get simplified exam.

Exam requirements⁵:

The topics are based on the textbooks, the e-book, the presentations in the lectures and practices. At the exam, it is not sufficient to repeat memorized topics from the textbook and presentations, but you have to be able to synthesize and integrate your knowledge from different parts of the subject.

Topic list of practices:

1. The cells and organs of immune system.
2. Communication between the immune cells.
3. Antigen and haptens.
4. Features of diagnostic antibodies.
5. Immunoserological techniques: Detection of antibodies in body fluids, or detection of antigens based on the antibody-antigen reaction.
6. Serum electrophoresis and densitograms,
7. Immune complex and immune precipitates.
8. Turbidimetry and nephelometry.
9. Methods based on immune precipitation: radial immunodiffusion, immunofixation.
10. Clinical application of immunoserology methods.
11. Direct, indirect and passive agglutination, methods based by agglutination, fields of use.
12. Features of diagnostic antibodies.
13. The labelling of diagnostic antibodies,
14. ELISA, Western blot. Immunocyto (histo)chemistry, fields of use.
15. Lateral flow test, fields of use.
16. Principles of flow cytometer and cytometry.
17. Identification of cell populations by size and granularity, scatter plot.
18. Immune phenotyping, histogram, dot plot.
19. Role of flow cytometry in clinical practice.
20. The ways of activation of complement system.
21. In vitro complement activation.
22. Measuring the complement activation (CH50).
23. Diseases of complement system. HAE disease.
24. HLA nomenclature.
25. HLA typing methods: Microcytotoxicity test and mixed lymphocyte culture test.
26. HLA associated diseases.
27. Definition of targeted molecular therapy and immune modulation.
28. Monoclonal antibodies in the therapy: Types of the monoclonal antibodies.
29. Monoclonal antibodies in the tumor therapy: checkpoint blockade, induction of ADCC, bispecific antibodies.
30. Antibody therapy in transplantation.
31. Antibody therapy in chronic inflammatory diseases.
32. TNF alpha, T- and B cells as therapeutic targets in RA.
33. IVIG
34. Cytokine therapy
35. Dendritic cell-therapy.
36. The aims and practical implementation of immunization.
37. Adjuvants.
38. Immunodominant epitope.
39. Oral tolerance.
40. The aim of immune stimulation, active immunization.
41. Passive immunization
42. The features of effective vaccines.
43. Types of vaccines, cell-based vaccination
44. Hypersensitivity reactions I.: Penetration of antigens, types of IgE mediated responses.
45. Release of histamine and its effects.
46. Allergy tests.
47. Immune Anaphylaxis vs. Non-immune anaphylactoid reaction; urticaria vs. angioedema.
48. Food intolerance vs. food allergy.
49. Basics of allergy pharmacotherapy; Desensitization and prevention.
50. Clinical examples for Hypersensitivity reactions II-III-IV.
51. Diagnostic tests used in Hypersensitivity reactions II-III-IV.
52. Types of systemic and organ specific autoantibodies
53. Screening methods of autoantibodies,
54. Detection of autoantibodies.

Literature, i.e. printed, electronic and online notes, textbooks, tutorials (URL for online material):

1. Abul Abbas, Andrew Lichtman, Shiv Pillai, Basic Immunology 6th Edition, Elsevier, 2019.
2. Practice and lecture ppt-s): <http://gsi.semmelweis.hu>
3. Immunology seminars (e-book): <http://gsi.semmelweis.hu>

MEDICAL HUNGARIAN III.**Responsible organisational unit:**

Department of Languages for Specific Purposes

Programme director:

Katalin Fogarasi PhD, habil., director, habilitated associate professor

4 lessons per week, 2 credits

Assessment: midterm (oral interview) and endterm (oral interview)

Role of subject in fulfilling the aim of training:

The aim of the subject is to enable students to take patient's history, ask about medical history and present complaints. We focus on developing skills and strategies necessary to understand Hungarian patients during their clinical practice. Students learn to give instructions during examination and get familiarised with relevant clinical documents (charts, discharge papers, etc.). Vocabulary building is centred around symptoms of common conditions.

Brief description of subject:

This is the third semester of a 4-semester medical language course. The aim of the course is to enable students to take anamnesis, to be informed about past illnesses and present complaints, and to have appropriate strategies for understanding the patient in clinical practice. Students will get familiar with the instructions used in the examination of patients, be able to examine patients independently, and be able to give relevant instructions (examination of the thoracic organs, circulation, abdomen, musculoskeletal system, nervous system - based on the medical chart). Students will get familiar with the forms of medical documentation (fever chart, chart, etc...). Students will be able to understand the symptoms of diseases – according to the list proposed by the clinics – in Hungarian and ask the patients relevant questions about their illness.

weeks	Topics: Hungarian language competencies in taking medical history in the following topics:
1.	Revision: Present complaints
2.	Family history 1: Is there any disease in the family?
3.	Family history 2: Is there any disease in the family?
4.	Pain 1: Questions about pain
5.	Pain 2: Questions about pain
6.	Respiratory complaints 1
7.	Oral test
8.	Respiratory complaints 2
9.	Cardiovascular complaints 1
10.	Cardiovascular complaints 2
11.	Gastrointestinal problems; urine 1
12.	Gastrointestinal problems; urine 1
13.	Revision
14.	Oral test

Course material, recommended text book(s), professional literature and supplementary reading(s)

Teaching materials and audio recordings of authentic medical documentation, edited by the instructors of the Department of Languages for Specific Purposes.

Borda Szandra-Hetesy Bálint: Magyar orvosi szaknyelv III. Students can download the book in pdf format from the moodle interface.

MEDICAL HUNGARIAN IV.

Responsible organisational unit:

Department of Languages for Specific Purposes

Programme director:

Katalin Fogarasi PhD, habil., director, habilitated associate professor

4 lessons per week, 2 credits

Assessment: oral test on week 7; mock-comprehensive exam on week 14; comprehensive examination

Role of subject in fulfilling the aim of training:

The aim of the subject is to enable students to take patient's history, ask about medical history and present complaints. We focus on developing skills and strategies necessary to understand Hungarian patients during their clinical practice. Students learn to give instructions during examination and get familiarised with relevant clinical documents (charts, discharge papers, etc.). Vocabulary building is centred around symptoms of common conditions.

Brief description of subject:

This is the fourth semester of a 4-semester medical language course. The aim of the course is to enable students to take anamnesis, to be informed about past illnesses and present complaints, and to have appropriate strategies for understanding the patient in clinical practice. Students will get familiar with the instructions used in the examination of patients, be able to examine patients independently, and be able to give relevant instructions (examination of the thoracic organs, circulation, abdomen, musculoskeletal system, nervous system - based on the medical chart). Students will get familiar with the forms of medical documentation (fever chart, chart, etc...). Students will be able to understand the symptoms of diseases – according to the list proposed by the clinics – in Hungarian and ask the patients relevant questions about their illness.

Brief description of subject:

weeks	<i>Topics: Sentences, instructions used during the medical examination Preparing for the comprehensive exam</i>
1.	Revision: Medical history taking
2.	Examination 1: Informing the patient
3.	Examination 2: Instructions
4.	Examination 3: Further instructions
5.	Diseases, anamnesis 1, listening (revision) 1-2, listening practice for the comprehensive exam 1-2, situations 1.
6.	Diseases, anamnesis 2, listening (revision) 3-4, listening practice for the comprehensive exam 3-4, situations 2.
7.	Revision, oral test
8.	Anamnesis 3,4, listening (revision) 5-6, listening practice for the comprehensive exam 5-6, situations 3.
9.	Anamnesis 5, listening (revision) 7-8, listening practice for the comprehensive exam 7-8, situations 4.
10.	Anamnesis 6, listening practice for the comprehensive exam 9-10, situations 5-6.
11.	Anamnesis 7, listening practice for the comprehensive exam 11-13, situations 7-8.
12.	Anamnesis 8, listening practice for the comprehensive exam 14-16, situations 9.
13.	Anamnesis 9, listening practice for the comprehensive exam 17-18, situations 10.
14.	Revision, mock comprehensive exam

Course material, recommended text book(s), professional literature and supplementary reading(s)

Teaching materials and audio recordings of authentic medical documentation, edited by the instructors of the Department of Languages for Specific Purposes.

Borda Szandra-Hetesy Bálint: Magyar orvosi szaknyelv IV. Students can download the book in pdf format from the moodle interface.

MEDICAL PSYCHOLOGY

Institute of Behavioral Sciences

Type of the course: obligatory

credit: 4 credits

Presenter of the course: Dr. Tamás Dömötör Szalai

Course leader: Prof. Dr. György Purebl

Course objectives: The course is designed to give a broad overview of the field of medical psychology, including concepts, theory, and research. A distinct aim of the course is to introduce those low intensity psychological interventions, which can be efficiently used in everyday medical practice.

Learning objectives:

- Develop an understanding of the complex interplay between one's physical well-being and a variety of biological, psychological, and social factors.
- Learn the nature of the stress response and its impact in the etiology and course of many health problems.
- Understand the approach of bio-psycho-social model and become familiar with some frequent psychosomatic diseases.
- Be able to identify various psychological disorders and key personality traits related to health / disease.

Course Syllabus:

Lectures:

Week 1.	Introduction to Human Behaviour
Week 2.	Major Schools of Psychology
Week 3.	Stress and illness; behavioral interventions
Week 4.	Conscious states, sleep, dreaming and general anesthesia
Week 5.	Depression and Suicide – The Role of Online Intervention
Week 6.	Human Attachment – Mental Health and Doctor-Patient Relationship
Week 7.	The Diagnosis and Treatment of Eating and Body Image Disorders

Seminars:

Week 1.	Developmental psychology, attachment theories
Week 2.	Personality theories
Week 3.	Human sexuality and sexual disorders, psychology of reproduction, psychology of birth
Week 4.	Depression and mood disorders.
Week 5.	Anxiety and medical illnesses.
Week 6.	Eating disorders.
Week 7.	Psychosomatic disorders – case studies; somatization and dissociative disorders
Week 8.	Personality disorders.
Week 9.	Sleep disorders
Week 10.	Addiction, substance use
Week 11.	Suicide, cry for help, crisis intervention
Week 12.	Psychology of death, grief, and dying
Week 13.	Behaviour change and psychotherapy. Stress management in medical practice.
Week 14.	Mental health of medical doctors. Prevention and management of burn-out. Bálint-groups.

Participation and making up for absences: Students are expected to attend regularly the course and participation list will be recorded at the end of every lecture and every seminar. To participate on at least 75% of the total number of seminars is a prerequisite for getting the signature needed to absolve the course. The maximum number of absences permitted: three absences from the seminars.

Justification of the absence in the lectures and examinations: Absence should be justified for the seminar leading teacher within three working days.

Checks during the semester (reports, written checks): Every student should prepare presentations on the topics designated by the seminar leader teacher. Active participation is expected.

Requirements for the signature at the end of the semester: Active participation on the practices. The teacher has the right for refusing to give signature to the students who didn't work on the desired level on the seminars.

Method of the calculation of marks: Grades will be based on student's performances at the final written exam.

Type of the exam: Written final examination taken in the examination period.

Requirements for the exam: Lecture and seminar slides are the obligatory material for the exam, and are available on our website: <https://semmelweis.hu/magtud/en/education/faculty-of-medicine/medicalpsychology/>

Application for the exam: Through the Neptun system.

Changing the application for the exam: Through the Neptun system.

Justification of the absence from the exam: Absence should be justified for the course leading teacher within three working days.

Course and recommended text books:

Required textbook:

1. Behavior & Medicine, 4th Edition, Danny Wedding, Hogrefe & Huber Publishers, Seattle, 2006.

Recommended text books:

1. Kopp M. – Skrabski Á.: Behavioural Sciences Applied in a Changing Society, Corvina, 1996.
2. Fadem B: Behavioural Science., Lippincott Williams & Wilkins, 5th ed., 2008.
3. Sarafino E.P.: Health Psychology. Biopsychosocial interactions. 6th ed., New York, Wiley, 2008.

Additional readings:

The powerpoint slides and prezi presentations used for the lectures and seminars and also some related papers will be assigned for reading during the course, and they will be made available on the course website.

Introduction to Clinical Medicine

Credit Points: 2

Total number of hours: 30

lectures: 12 (6*2) practices: 18 (6*3) seminars: -

Type of the course (mandatory/elective): mandatory

Academic year: 2022/2023

Name of the Department: **Dr. Péter Torzsa M.D. Ph.D.**

Contact details: H- 1085 Budapest, Stáhly u. 7-9. Phone: +36-1-355-8530

Position: Head of Department

Tutor: **Dr. Adam Becze – becze.adam@med.semmelweis-univ.hu**

Aim of the subject and its place in the curriculum:

- Preventive approach, screening procedures. The importance of disease prevention.
- Holistic patient care, managing complex bio-psycho-social-health problems
- Care of frequent chronic illnesses
- Presenting patients, basic differential diagnostics
- Basic diagnostic tools
- Most frequent diseases in the clinical department and the general practitioner's office. Case reports.
- Referral of patients. The medical consultation.
- Communication with the patient and his/her relatives.
- The role of the family in the treatment of and care for acute and chronic diseases.
- Effective cooperation with patients. Means to improve compliance.
- Team work in medicine.
- Development of professional consciousness.
- Overview of the research activity at the clinical department. Raising interest in participating.

Location of the course (lecture hall, practice room, etc.):

Family practices, clinics

Prerequisite(s) for admission to the subject:

Only for students in the 2nd year, following completion of the Introduction to Patient Care program

Minimum and maximum number of students registering for the course:

Student selection method in case of oversubscription:

Max. 15 students/group

How to register for the course:

Registration for the course in the 'Neptun' system

Detailed topics of the course:**Detailed topic of the subject:**

1st week:	internal medicine, public health, dermatology, urology, pulmonology, neurology lectures
2nd week:	internal medicine, public health, dermatology, urology, pulmonology, neurology lectures
3rd week:	internal medicine, public health, dermatology, urology, pulmonology, neurology lectures
4th week:	internal medicine, public health, dermatology, urology, pulmonology, neurology lectures
5th week:	internal medicine, public health, dermatology, urology, pulmonology, neurology lectures
6th week:	internal medicine, public health, dermatology, urology, pulmonology, neurology lectures
7th week:	internal medicine, surgery, paediatrics, psychiatry, obstetrics and gynaecology, family medicine, orthopaedics-traumatology, cardiology, dermatology, urology, pulmonology, neurology, public health practicals according to the attendance sheet
8th week:	internal medicine, surgery, paediatrics, psychiatry, obstetrics and gynaecology, family medicine, orthopaedics-traumatology, cardiology, dermatology, urology, pulmonology, neurology, public health practicals according to the attendance sheet
9th week:	internal medicine, surgery, paediatrics, psychiatry, obstetrics and gynaecology, family medicine, orthopaedics-traumatology, cardiology, dermatology, urology, pulmonology, neurology, public health practicals according to the attendance sheet
10th week:	internal medicine, surgery, paediatrics, psychiatry, obstetrics and gynaecology, family medicine, orthopaedics-traumatology, cardiology, dermatology, urology, pulmonology, neurology, public health practicals according to the attendance sheet
11th week:	internal medicine, surgery, paediatrics, psychiatry, obstetrics and gynaecology, family medicine, orthopaedics-traumatology, cardiology, dermatology, urology, pulmonology, neurology, public health practicals according to the attendance sheet
12th week:	internal medicine, surgery, paediatrics, psychiatry, obstetrics and gynaecology, family medicine, orthopaedics-traumatology, cardiology, dermatology, urology, pulmonology, neurology, public health practicals according to the attendance sheet
13th week:	Homework: Essay
14th week:	Exam: Essay

Special training activities required: –

Completed attendance sheet

Policy regarding the attendance and making up absences:

It's obligatory for the student to attend 75 percent of the training sessions. Students can join another training group to meet the requirements if they have missed a training session in the original group

Requirement for acknowledging the semester (signature):

It's obligatory for the student to attend at least 75 percent of the training sessions.

Type of the examination:

Essay

Exam requirements:

Case study (essay, typed, 2000 characters without spaces at minimum length, Times New Roman font, font size 12, single spacing) of a specific patient chosen from the practicals' experiences highlighting one or more topics of the Aim of the subject part above seen.

Deadline for handing in the essay is the 14th week

Type and method of grading:

Grading is based on the essay according to the following criteria:

Grade 1: failing to hand in the essay on deadline, the number of characters is under 2000, the case study is not original, but plagiarism

Grade 2: absence of a specific case study of a patient, but the other requirements are met

Grade 3: there is a case study, but too general drafting, without any personal experience

Grade 4: there is a case study with not too significant professional/technical mistake

Grade 5: precise and accurate wording in the medical jargon, personal opinion about the patient's case

How to register for the exam:

Registering for the exam in the 'Neptun' system

Opportunities to retake the exam:

In accordance with the Studies and Exams Code Rules

Literature, i.e. printed, electronic and online notes, textbooks, tutorials (URL for online material):

see on the subject's MOODLE platform

PHYSICAL EDUCATION III.**Department of Physical Education****Subject: Physical Education III.****Type of Subject:** Obligatory

Credit: 0

Name of the Lecturer: Várszegi Kornélia**The objectives of Physical Education:**

One aim of the course is to improve the health status of medical students, maintaining and increasing physical performance, creating the conditions for better physical quality of life.

The syllabus**1st Week: General information**

Health and Safety, Fire and Environmental protection. The mid-year adoption requirements, the construction of the classes and the presentation of the university recreational and sports opportunities for extra – curricular activities. Heart rate measurement exercises. Ruffier test and evaluation of the results.

2nd Week: Athletic

Different athletic exercises like throwing, shot put. Preferably outdoors with the aim of learn how to execute the exercise with a proper form and breathing technique.

3rd Week: Tennis

Introducing and learning advanced technical elements (serve, volley) and game.

4th Week: Agility ladder

To perform different exercises to improve speed, balance and concentration. Preferably outdoors, on grass ground.

5th Week: Relay race and competitive games

To improve explosiveness, skills and experience good team spirit.

6th Week: Football

Practicing the technical elements of football in pairs and game situation.

7th Week: Circuit training

Functional exercises with bodyweight and exercises with basic equipments to improve general coordination skills.

8th Week: Badminton

Introducing the technical and tactical elements of doubles game. Game applying all the previously known rules.

9th Week: Ruffier test

Comparing the results with the previously recorded one to bring the importance of the health of the cardiovascular system to the attention.

10th Week: Meta

Reminders of the basic need to know about META. Learn tactical elements of the game and using them. Aim to improve ball skill development, reaction time, explosiveness and collective gaming experience.

11th Week: Obstacle course

To complete a built up obstacle course using different creeping- climbing, hovering, pulling, skipping, throwing techniques for general skill development.

12th Week: Mobilisation

Dynamic stretching exercises with and without equipment to prevent the health of the joints by maintaining and developing the mobility of it.

13th Week: Skipping rope

Skill developing exercises with skipping rope individually and in pairs, in place and in motion at different levels.

14th Week: Kettlebell

Different kind of strengthening exercises with kettlebell.

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes! (2x90 mins./week sport training (competitive sport, for qualified only): cheerdance, cheerleader, men's football, handball, basketball, volleyball)

Requirements to participate in the sessions and the potential for absences:

Active participation in sport classes.

The method of proof for the workshops and the exam absence:

The absence can not be proved, should make up for the lost lessons.

Requirements for signature at the end of semester (including the number of tasks to be solved learning outcomes and type):

Active participation in ten classes (for trainings 15 times!) approved by the staff.

How to prove absence regarding the exam:

Absence must be retaken!

PHYSICAL EDUCATION IV.

Type of Subject: Obligatory

Credit: 0

Name of the Lecturer: Várszegi Kornélia

The objectives of Physical Education:

One aim of the course is to improve the health status of medical students, maintaining and increasing physical performance, creating the conditions for better physical quality of life.

1st week: General information

Accident, fire and environmental knowledge. Requirement for acceptance of the semester system, the structure of the classes and the presentation of the university recreational sports opportunities for extra-curricular activities.

2nd week: Basketball

Dribbling and shooting skill improving drills. Games: 1 on 1; 2 on 2; shooting contests, king of the court. Scrimmage.

3rd week: Wall-bar exercises

Enhance strength and balance by climbing, declining, hanging, skipping, pulling, pushing etc. exercises.

4th week: Circuit training

A chain of compete drills in a certain time period with and without equipment. The aim is to improve the general level of strength and stamina.

5th week: Floorball

Passing and receiving skill improving drills. Exposing shots on goal (wrist- slap- and snapshots). Scrimmage.

6th week: Drills in pairs

Strength, agility, coordination and battling skill improving exercises with a partner incorporated.

7th week: Volleyball

Introducing the defensive elements of the game (receiving serves, blocks). Exposing unknown rules. Games.

8th week: Game-day

Introducing and practicing different kind of cohesion enhancing games (Tick-Tac-Toe, etc.)

9th week: Ruffier test

Comparing the results with the previously recorded one to bring the importance of the health of the cardiovascular system to the attention.

10th week: Circuit training

Specialized chain of drills for strengthen the shoulder, back, chest, arm and leg muscles, considering the fitness level of the Students.

11th week: Tennis

Introducing variations of ground strokes and grip types (slice, topspin, lobs etc.) Exposing the rules of doubles. Games (all around the world, etc.)

12th week: Badminton

Exposing the rules and the basic tactical elements of the doubles game. Scrimmage.

13th week: Core exercises

Body-weight exercises targeting to strengthen the muscles of the trunk thus develop a strong fascia to protect it from the harmful effects of overdose sitting (studying)

14th week: Medicine-ball exercises

Strength and coordination (complex) skill developing exercises by throwing, rolling, passing, lob, shot-put, etc. with a partner incorporated.

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes! (2x90 mins./week sport training (competitive sport, for qualified only): cheerdance, cheerleader, men's football, handball, basketball, volleyball)

Requirements to participate in the sessions and the potential for absences:

Active participation in sport classes.

The method of proof for the workshops and the exam absence:

The absence can not be proved, should make up for the lost lessons.

Requirements for signature at the end of semester (including the number of tasks to be solved learning outcomes and type):

Active participation in ten classes (for trainings 15 times) approved by the staff.

How to prove absence regarding the exam:

Absence must be retaken!

PRE-CLINICAL MODULE



Faculty of Medicine
3rd year

STUDY PROGRAMME
Third year in the 2024/2025 academic year
5th Semester

Course name	Neptun code	lecture (h/week)	lecture (h/semester)	practice (h/week)	practice (h/semester)	seminar (h/week)	seminar (h/semester)	credit points	prerequisite(s)	examination
OBLIGATORY										
Clinical ECG	AOKKAR680_1A	1		2				3	Medical Biophysics II, Medical Physiology II	examination
Internal Medicine – Propedeutics	AOKBHK1111_1A	0		3				3	Macroscopic Anatomy and Embryology II, Introduction to Patient Care, Medical Genetics and Immunology II	examination
Internal Medicine – Propedeutics	AOKBOK1112_1A	0		3				3	Macroscopic Anatomy and Embryology II, Introduction to Patient Care, Medical Genetics and Immunology II	examination
Medical Microbiology II.	AOKMIK022_2A	1,5		2				3	Medical Microbiology I	comprehensive examination
Medical Statistics, Informatics and Telemedicine	AOKFIZ974_1A	1		1,5				2	Medical Biophysics II	examination
Pathology I	AOKPIB1110_1A	4		4				8	Medical Physiology II, Macroscopic Anatomy and Embryology II, Microscopic Anatomy and Embryology II	examination
Pathology I	AOKPTK1109_1A	4		4				8	Medical Physiology II, Macroscopic Anatomy and Embryology II, Microscopic Anatomy and Embryology II	examination
Pharmacology I	AOKFRM1108_1A	2		3				5	Medical Microbiology I, Molecular Cell Biology II, Medical Physiology II	examination
Physical Education V.	AOKTSI009_5A	0		1				0	Physical Education III	signature
Translational Medicine and Pathophysiology I.	AOKTLM740_1A	1,5		1,5				3	Medical Physiology II, Macroscopic Anatomy and Embryology II, Medical Biochemistry II	examination

Course name	Neptun code	lecture (h/week)	lecture (h/semester)	practice (h/week)	practice (h/semester)	seminar (h/week)	seminar (h/semester)	credit points	prerequisite(s)	examination
OBLIGATORY ELECTIVE										
Assisted Reproduction	AOVNO11012_1A	1		1				2	Medical Physiology II, Molecular Cell Biology II	
Clinical cardiovascular physiology	AOVTLM965_1A	2						2	Medical Physiology II	
Clinical physiology of respiration and respiratory diseases	AOVTLM955_1A	2						2	Medical Physiology II	
Disaster Management	AOVHKT1070_1A		6		8			1		project work
Introduction to the Methodology of Clinical Research I. - Observational studies	AOVTLM967_1A	2		0				2		practical mark
Library Informatics	AOVKPK1027_1A		30					3		
Sport and Lifestyle 5.	AOVTSI1098_5A	0		1				1		practical mark
Ultrasonography in obstetrics and gynecology	AOVNO1554_1A	1		1				1	Medical Physiology II, Microscopic Anatomy and Embryology II, Medical Biochemistry II	

Third year
6th Semester

Course name	Neptun code	lecture (h/week)	lecture (h/semester)	practice (h/week)	practice (h/semester)	seminar (h/week)	seminar (h/semester)	credit points	prerequisite(s)	examination
OBLIGATORY										
Basic Surgical Techniques	AOKKMI020_1A	0,5		1,5				2	Medical Physiology II, Macroscopic Anatomy and Embryology II	examination
Medical Ethics, Bioethics and Medical Law	AOKMAG1113_1A	1		1				2	Medical Psychology, Medical Sociology	examination
Pathology II	AOKPTK1109_2A	4		4				8	Pathology I	comprehensive examination
Pathology II	AOKPIB1110_2A	4		4				8	Pathology I	comprehensive examination
Pharmacology II	AOKFRM1108_2A	2		3				5	Pharmacology I, Medical Microbiology II, Pathology I	comprehensive examination
Physical Education VI.	AOKTSI009_6A	0		1				0	Physical Education IV.	signature
Summer Practice - Internal Medicine	AOKNSG1131_1A	0			168			3	Internal Medicine – Propedeutics	practical examination
Translational Medicine and Pathophysiology II.	AOKTLM740_2A	1,5		1,5				3	Pathology I, Translational Medicine and Pathophysiology I	comprehensive examination
OBLIGATORY ELECTIVE										
Clinical Gastroenterology	AOVBHK788_1A	2						3	Internal Medicine – Propedeutics	
Introduction to the Methodology of Clinical Research II. - Experimental Studies	AOVTLM1132_2A	2		0				2	Introduction to the Methodology of Clinical Research I - Observational Studies	practical examination
Pathophysiological basis of nephrology	AOVTLM1063_1A	2						2	Medical Physiology II, Translational Medicine and Pathophysiology I	
Sport and Lifestyle 6.	AOVTSI1098_6A	0		1				1		practical mark

LIST OF TEXTBOOKS (The list may change!)

- 1 Bickley, L.S.-: Bates' Guide to Physical Examination and History Taking. 12th ed. Wolters Kluwer, 2016.
- 2 Murray, Rosenthal, Kobayashi, Pfaller: Medical Microbiology. 9th ed. Elsevier, 2020
- 3 Robbins: Basic Pathology, 2008. V. Kumar, A. K. Abbas, N. Fausto, R. Mitchell Saunders; 8 edition
- 4 Szende B, Suba Zs.: Introduction to Histopathology. Bp. Medicina, 1999.
- 5 Basic and Clinical Pharmacology (Ed. B. G. Katzung), 15th edition, McGraw-Hill Education, 2021. ISBN 978-1 260 45231 0
- 6 Owen, Punt, Stranford, KUBY Immunology • W. H. Freeman and Company • New York • 2013; International Edition ISBN-13: 978-14641-3784-6; ISBN-10: 1-4641-3784-6

Recommended textbooks:

- 1 Kumar & Clark's Clinical Medicine. Ed. Feather, Randall, Waterhouse. Elsevier, 10th ed. 2020. ISBN 9780702078682
- 2 Harrison's Principles of Internal Medicine. Ed. Jameson, Fauci, Kasper, Hauser, Longo, Loscalzo. 20th ed. McGraw Hill Inc. 2018
- 3 William J. Marshall, Stephen K. Bangert: Clinical Chemistry. 5th ed. Elsevier Health Sciences 2004. ISBN: 0723433283.
- 4 H. Thelml, H. Diem, T. Haferlach: Color Atlas of Hematology 2nd ed. Georg Thieme Verlag 2004. ISBN: 9783136731024
- 5 N. Goldschlager et al.: Principles of Clinical Electrocardiography. 3rd ed. 1989. Appleton and Lange ISBN: 0-8385-7951-5.
- 6 Mahta, Atul B. Hoffbrand, A. Victor: Haematology at a Glance 2nd ed. Blackwell Publishing 2005. ISBN: 1405126663
- 7 Carl A. Burtis: Tietz Textbook of Clinical Chemistry. W.B. Saunders 3rd 1999 ISBN 0721656102
- 8 Carl A. Burtis: Tietz Fundamentals of Clinical Chemistry. WB. Saunders 5th 2001 ISBN 0721686346
- 9 Davis et al.: Clinical Laboratory Science. (Strategies for Practice.) 1988. Lippincott-Raven Cldh Text. ISBN: 0-397-50860-3
- 10 E. Rubin-J.L. Farber: Pathology (J.B. Lippincott 1994). – 3rd edition (1999)
- 11 Nemes Z.: Atlas of Histopathology (TEMPUS edition, Debrecen 1998)
- 12 C.P.L. Wheater, H.G. Burkitt, Stevens J.S. Lowe: Basic Histopathology, a Colour Atlas and Text. (Churchill Livingstone; 4Rev Ed edition, 2002)
- 13 Zalotnai A.: 500 Practice Questions about Pathology (Semmelweis University of Medicine)
- 14 Illyés Gy.: Path Nebulo 2000. Version 1.0 (English-Hungarian)
- 15 Székely E.: Practice on Histopathology I-II. (Semmelweis University of Medicine) - video

PHARMACOLOGY I.**First and Second Semester**

Semmelweis University, Faculty of Medicine
Department of Pharmacology and Pharmacotherapy

Semmelweis University, Faculty of General Medicine – single, long-cycle medical training programme

Name of the host institution (and any contributing institutions):

Name of the subject: Pharmacology I.

in English: Pharmacology I.

in German: Pharmakologie I.

Credit value: 4

Semester: 5th (*as defined in the curriculum*)

Total number of classes per week: 4.5

lectures: 2

practical lessons: 2.5

seminars: -

Type of subject: obligatory

Academic year: 2024/2025 1st semester

Course director (tutor): Dr. Ferdinandy, Péter

Contact details: Department of Pharmacology and Pharmacotherapy, 1089 Budapest, Nagyvárád tér 4. Tel: +36-1-2104416,

e-mail: ferdinandy.peter@med.semmelweis-univ.hu

Position: Head of Department, full professor

Date of habilitation and reference number: June 2 2001., 26/2001 Hab.

Objectives of the course and its place in the medical curriculum:

Pharmacology is a synthesizing subject, building on what has been learned in the past, especially physiology, biochemistry, pathology, and translational medicine, and is essential for the later acquisition of clinical knowledge. The subject includes: general pharmacology, detailed pharmacology, toxicology and basics of prescription writing. General pharmacology (pharmacodynamics, pharmacokinetics) aims to acquire the basic concepts and knowledge needed for pharmacological thinking, while in detailed pharmacology the student learns the main principles of the mechanism of action, therapeutic effects, adverse effects, major interactions, and partly dosing of medicines. The basics of toxicology describe the mechanisms and targets of major intoxications and thus provide a theoretical background for toxicology education. All of these competencies form the grounds to study clinical pharmacology and prepare students for the skill-level application of pharmacotherapeutic knowledge essential to clinical subjects.

Place of instruction (address of lecture hall or seminar room etc.):

Nagyvárád téri Elméleti Tömb, 1089 Budapest, Nagyvárád tér 4.

Competencies acquired through the completion of the course:

Students understand the pharmacological terminology, learn the mechanism of action, therapeutic effects, adverse effects, important interactions of drugs and the basics of dosing. They understand the mechanisms and targets of the most important poisonings, as well as the knowledge of the basic rules of prescription writing.

Prerequisites for course registration and completion:

Medical Microbiology I, Molecular Cell Biology II, Medical Physiology II

OR

Medical Microbiology I Medical Physiology II, (Medical Biochemistry III OR Medical Biochemistry, Molecular and Cell Biology III., OR Molecular Cell Biology II.)

Conditions for concurrent course registration and permission thereof in the case of a multi-semester subject:

Since it is a mandatory subject all the students in the third year of medical education must register.

Student headcount conditions for starting the course (minimum, maximum) and method of student selection:

Through NEPTUN system.

Detailed course description:

(Theoretical and practical instruction must be broken down into lessons (weeks), numbered separately. Please provide the names of lecturers in both types of lessons, indicating guest lecturers. This information is not to be attached separately. CVs of guest lecturers, however, must be attached.)

1st week

- Lecture: Introduction to Pharmacology. (development, pharmacogenomics, basics of toxicology)
- Practice: Pharmacodynamics I (drug receptors, receptor theories, drug-receptor interactions).

2nd week

- Lecture: Pharmacokinetics I.
- Practice: Pharmacodynamics II (quantal dose-response curves, therapeutic indices, tolerance, drug interactions).

3rd week

- Lecture: Pharmacokinetics II. Pharmacology of the cholinergic and adrenergic systems
- Practice: Pharmacology of the cholinergic transmission. Parasympathomimetics and parasympatholytics, centrally acting anticholinergic drugs

4th week

- Lecture: Pharmacology of the skeletal muscles.
- Practice: Pharmacology of the adrenergic transmission. Sympathomimetics and sympatholytics

5th week

- Lecture: Non-steroidal anti-inflammatory drugs (NSAIDs). Minor analgesics.
- Practice: Drugs affecting uric acid metabolism. Drugs for headache syndromes. 1st midterm

6th week

- Lecture: Drugs acting on opioid receptors
- Practice: 1st midterm. The Summary of Product Characteristics

7th week

- Lecture: Local anesthetics
- Practice: Basic principles of prescription writing

8th week

- Lecture: Antipsychotics
- Practice: Sedative-hypnotics, anxiolytics

9th week

- Lecture: Drugs acting on the extrapyramidal motoric system. Nootropic agents
- Practice: Antidepressants, drugs against mania, mood stabilizers

10th week

- Lecture: General anesthetics
- Practice: Anticonvulsants (antiepileptics)

11th week

- Lecture: Antiviral drugs
- Practice: Cell wall synthesis inhibitor antibiotics. 2nd midterm

12th week

- Lecture: Antifungal drugs. Antimycobacterial drugs.
- Practice: Protein synthesis inhibitor antibiotics

13th week

- Lecture: Antihelmintic and antiprotozoal agents. Antiparasitic drugs.
- Practice: Inhibitors of nucleic acid synthesis and antibiotics with other mechanisms of action. Disinfectants, antiseptics.

14th week

- Lecture: Biological Drugs. Orphan Drugs. Advanced Therapy Medicines
- Practice: Nutrients, traditional plant medicines, vitamins, anorectic drugs.

Related subjects due to interdisciplinary fields (both obligatory and elective) and potential overlaps between subjects:

Physiology, biochemistry, molecular biology, pathology, translational medicine, internal medicine, cardiology, pulmonology, neurology, psychiatry, clinical pharmacology

Attendance requirements; conditions under which students can make up for absences and the method of absence justification:

Maximum number of absences is 25 percent of the number of practices in the semester. In the case of absence, the student can attend another class the same week.

Form of assessment in the study period:

(including the number, topics and scheduling of oral and written tests, their share in the overall evaluation, make-up tests and improvement tests)

During the semester, we organise two obligatory midterm tests in weeks 6 and 11. These can be made up in weeks 7 and 12. Improvement attempt of the midterm tests (both) will be possible in week 13.

The course material for the first midterm test (study material from week 1 to 5): General Pharmacology. Pharmacology of cholinergic and adrenergic transmission. Skeletal muscle relaxants.

Second midterm test (study material from week 6 to 10): NSAIDs, Opioids, Neuropsychopharmacology

The midterm tests will count towards the semester semifinal exam results:

1. 5% of the students in the top 5% of the whole year will be awarded an excellent mark (5) and 5% of the students in the second top 5% will be awarded a good mark, provided that they achieve at least 2x75% in the midterm tests. If the number of these students is less than 10% of the whole year, only they will be offered a mark, if more than 10%, the top 10% will be offered a mark.
2. If the student scores better than 60% in both midterm tests, the drug recognition question will be waived and in case of a doubtful grade, the better one will be awarded.

If the student fails both midterm tests (even at the time of a retake), or fails to achieve 33% in either midterm test with a correction, the student will receive a grade penalty on the semifinal exam.

Number and type of assignments for individual work and the deadline for submission:

-

Requirements to obtain the teacher's signature:

The number of absences must not be more than 25 percent of the number of practices in the semester.

Type of assessment (*comprehensive examination, end-term examination, term-grade, term-grade on a three-grade rating scale, no examination*):

oral end-term semifinal examination**Examination requirements:**

(*list of examination topics, subject areas of tests / examinations, lists of mandatory parameters, figures, concepts and calculations, practical skills*)

In the oral semifinal exam, at first 5 active substances selected from the obligatory list of active substances must be identified and their mechanism of action explained. If the student does not recognize at least 3 of the active substances, he/she will not be allowed to continue and will receive a fail mark. After successful completion of one core-concept question and two topics of two lists of topics (one from each), an acceptable level of knowledge of pharmacology must be demonstrated.

Core concept topic list

1. Stages of drug development in brief.
2. Types of clinical trials.
3. History of the Hungarian pharmaceutical industry.
4. Molecular targets of drugs
5. Receptor theory - agonist, partial agonist, antagonist, inverse agonist
6. Efficacy, potency
7. Dose-effect relationships at population level
8. Adverse drug reactions
9. Therapeutic index
10. Tolerance, tachyphylaxis, dependence
11. Absorption of drugs
12. Membrane transport mechanisms.
13. Distribution of drugs
14. Bioavailability
15. Volume of distribution
16. Phases of drug biotransformation
17. Excretion of drugs
18. Linear and non-linear pharmacokinetics
19. Clearance
20. Half-life
21. Saturating and maintenance dose
22. Drug accumulation and cumulation
23. Enzyme inducers
24. Enzyme inhibitors
25. Pharmacodynamic interactions - synergism
26. Pharmacodynamic interactions - antagonism
27. Pharmacokinetic drug interactions - at the level of absorption
28. Pharmacokinetic drug interactions - at the level of distribution
29. Pharmacokinetic drug interactions - at the level of metabolism
30. Pharmacokinetic drug interactions - at the level of elimination
31. Characterisation of biological medicinal products
32. Orphan drugs
33. Advanced therapy medicinal products
34. Nutritional supplements
35. Traditional herbal active substances
36. Medical device
37. Principles of antimicrobial treatment - selective toxicity
38. Principles of antimicrobial treatment - empirical, targeted and prophylactic therapy
39. Principles of antimicrobial treatment - principles of bactericidal, bacteriostatic antibiotic and antibiotic combinations
40. Principles of antimicrobial treatment - time-, concentration- and exposure-dependent antibiotics
41. Narrow and broad spectrum antibiotics
42. Antibiotic selection considerations - pregnancy, childhood
43. Antibiotic selection considerations - infections affecting specific compartments
44. Considerations for antibiotic choice - comorbidities
45. Classification of drugs according to chemical structure and complexity
46. The Summary of Product Characteristics

Topic list "A"

1. Cholinergic and adrenergic transmission and its presynaptic modification.
2. Cholinomimetics
3. Muscarinic receptor blocking drugs
4. Catecholamines
5. Indirect sympathomimetics. Selective α_1 agonists
6. α_2 -agonists and drugs acting on the imidazoline receptors
7. α -receptor antagonists
8. β -receptor antagonists
9. Centrally and peripherally acting skeletal muscle relaxants
10. Local anesthetics
11. Opioids
12. NSAIDs.
13. Drugs used for treatment of gout. Drugs for headache syndromes
14. Inhalational anesthetics
15. Intravenous anesthetics. Perioperative medication
16. Benzodiazepines
17. Non benzodiazepine anxiolytics and non-benzodiazepine hypnotics.
18. Antipsychotics
19. Monoamine reuptake inhibitors.
20. Non-reuptake-inhibitor antidepressants. Agents used for treatment of manic phase of bipolar disorders.
21. Antiepileptics. Adjuvant analgesics.
22. Drugs of neurodegenerative diseases. (Drugs acting in the extrapyramidal motoric system. Nootropic drugs)

Topic list "C"

1. Disinfectants and antiseptics
2. Antimycobacterial drugs
3. Antiprotozoal and antihelminthic drugs.
4. Antifungal agents
5. Agents to treat Herpes simplex (HSV), varicella-zoster (VZV) virus, cytomegalovirus (CMV). Anti-influenza agents Drugs against Corona- and other viruses
6. Antiretroviral agents.
7. Agents against hepatitis viruses
8. Penicillins
9. Cephalosporins
10. Carbapenems. Monobactams. Beta-lactamase inhibitors.
11. Chloramphenicol. Polymyxins. Antifolate drugs
12. Tetracyclines and glycylicyclines
13. Aminoglycosides
14. Quinolones and fluoroquinolones
15. Macrolides. Pleuromutilins
16. Clindamycin. Streptogramins. Oxazolidinones. Fusidans.
17. Glycopeptides. Lipopeptides. Bacitracin. Mupirocin.
18. Metronidazole. Fidaxomicin. Rifaximin. Nitrofurantoin. Phosphomycine.

Method and type of grading:

(Share of theoretical and practical examinations in the overall evaluation. Inclusion of the results of the end-of-term assessment. Possibilities of and conditions for offered grades.)

The midterm tests will count towards the semester semifinal exam results:

1. 10% of the students in the top of the whole year will be awarded an excellent mark (5) and further 10% of the students in the second top 10% will be awarded a good mark, provided that they achieve at least 2x75% in the midterm tests. If the number of these students is less than 20% of the whole year, only they will be offered a mark, if more than 20%, the top 10% will be offered a mark. Only the results of the first attempts count towards the offered semifinal mark, not the improved midterms.
1. If the student scores better than 60% in both midterm tests, the drug recognition question will be waived and in case of a doubtful grade, the better one will be awarded. There is no exemption from the Core Concept topics.
2. If the student fails both midterm tests (even at the time of a retake), or fails to achieve 33% in either midterm test with a correction, the student will receive a grade penalty on the semifinal exam.
3. In the case of a repeated exam after a failure, the negative and, in the case of an improvement exam, both the positive and the negative modifications are cancelled.

In the oral semifinal exam, at first 5 active substances selected from the obligatory list of active substances must be identified and their mechanism of action explained. If the student does not recognize at least 3 of the active substances, he/she will not be allowed to continue and will receive a fail mark. After successful completion of one core-concept question and two topics of two lists of topics (one from each), an acceptable level of knowledge of pharmacology must be demonstrated.

Detailed information on the obligatory and the full lists of active substances. If the candidate:

1. knows all the active substances to be studied in full detail, or knows all the active substances with some minor lacks and can mention names of active substances from the full drug list, – mark 5
2. knows all the active substances to be studied and the information to a varying degree and can mention the names of active substances from the full drug list to a varying degree – 2,3,4
3. knows all the active substances to be learned, but only the name and nothing else – unsatisfactory (failure)
4. does not know any active substance names – unsatisfactory (failure)
5. does not know all the active substances from the mandatory list, but knows the active substances from the full list of active substances in the given topic, then points 1,2 or 3 above are taken into consideration, the mark is awarded according to these points

Type of grade: five-mark scale (1=unsatisfactory, 2=satisfactory, 3=average, 4=good, 5=excellent)

List of course books, textbooks, study aids and literature facilitating the acquisition of knowledge to complete the course and included in the assessment, precisely indicating which requirement each item is related to (e.g., topic by topic) as well as a list of important technical and other applicable study aids:

Basic and Clinical Pharmacology (Ed. B. G. Katzung), 15th edition, McGraw-Hill Education, 2021. ISBN 978-1 260 45231 0

Materials discussed during lectures and seminars: Moodle (<https://itc.semmelweis.hu>)

Pharmacology II.

Semmelweis University, Faculty of General Medicine – single, long-cycle medical training programme

Name of the host institution (and any contributing institutions):

Department of Pharmacology and Pharmacotherapy

Name of the subject: Pharmacology II.

in English: Pharmacology II.

in German: Pharmakologie II.

Credit value: 5

Semester: 6th (*as defined in the curriculum*)

Total number of classes per week: 4.5

lectures: 2

practical lessons: 2.5

seminars: -

Type of subject: obligatory

Academic year: 2024/2025 2nd semester

Course director (tutor): Dr. Ferdinandy, Péter

Contact details: Department of Pharmacology and Pharmacotherapy, 1089 Budapest, Nagyvárad tér 4. Tel: +36-1-2104416, e-mail: ferdinandy.peter@med.semmelweis-univ.hu

Position: Head of Department, full professor

Date of habilitation and reference number: June 2 2001., 26/2001 Hab.

Objectives of the course and its place in the medical curriculum:

Pharmacology is a synthesizing subject, building on what has been learned in the past, especially physiology, biochemistry, pathology, and translational medicine, and is essential for the later acquisition of clinical knowledge. The subject includes: general pharmacology, detailed pharmacology, toxicology and basics of prescription writing. General pharmacology (pharmacodynamics, pharmacokinetics) aims to acquire the basic concepts and knowledge needed for pharmacological thinking, while in detailed pharmacology the student learns the main principles of the mechanism of action, therapeutic effects, adverse effects, major interactions, and partly dosing of medicines. The basics of toxicology describe the mechanisms and targets of major intoxications and thus provide a theoretical background for toxicology education. All of these competencies form the grounds to study clinical pharmacology and prepare students for the skill-level application of pharmacotherapeutic knowledge essential to clinical subjects.

Place of instruction (address of lecture hall or seminar room etc.):

Nagyvárad téri Elméleti Tömb, 1089 Budapest, Nagyvárad tér 4.

Competencies acquired through the completion of the course:

Students understand the pharmacological terminology, learn the mechanism of action, therapeutic effects, adverse effects, important interactions of drugs and the basics of dosing. They understand the mechanisms and targets of the most important poisonings, as well as the knowledge of the basic rules of prescription writing.

Prerequisites for course registration and completion:**Pharmacology I, Medical Microbiology II, Pathology I****Conditions for concurrent course registration and permission thereof in the case of a multi-semester subject:**

The Department of Pharmacology and Pharmacotherapy does not support concurrent course registration.

Student headcount conditions for starting the course (minimum, maximum) and method of student selection:

Through NEPTUN system.

Detailed course description:**1st week**

- Lecture: Anticoagulants, inhibitors of platelet aggregation
- Practice: Fibrinolytics, drugs against bleeding, drugs acting on blood cell production.

2nd week

- Lecture: Drugs influencing cardiac electrophysiology
- Practice: Positive inotropic agents.

3rd week

- Lecture: Diuretics, antidiuretics.
- Practice: Drugs influencing blood pressure (sympatholytics, nitrates, Ca-channel blockers and other vasodilators. Pharmacology of RAAS.)

4th week

- Lecture: Drugs acting on blood glucose control.
- Practice: Drugs influencing the oxygen demand and oxygen supply of the heart. Drugs improving microcirculation.

5th week

- Lecture: Drugs affecting lipid metabolism (1 study hour). Bronchodilators and drugs inhibiting the bronchial inflammatory processes (1 study hour).
- Practice: Expectorants (secretomotorics, secretolytics, mucolytics), antitussive drugs. Practice: Expectorants (secretomotorics, secretolytics, mucolytics), antitussive drugs. Histamine, antihistamines. Drugs acting on smooth muscles

6th week

- Lecture: Corticosteroids and their antagonists. Drugs inhibiting steroid hormone synthesis
- Practice: Pharmacology of pituitary hormones. Hypothalamic hormones, hormonanalogs and antagonists. Pharmacology of thyroid gland (thyroid hormones and antithyroid drugs). 3rd midterm

7th week

- Lecture: Pharmacology of female sexual hormones. Contraceptive medications

- Practice: Androgens, antiandrogens, anabolic steroids, drugs influencing sexual activity.

8th week

- Lecture: Basics of toxicology
- Practice: Drugs affecting bone mineral homeostasis.

9th week

- Lecture: Drugs influencing gastric acid secretion, drugs protecting gastric mucosa
- Practice: Appetizers, drugs promoting digestion, antiemetics, prokinetic agents. Laxatives, drugs against diarrhea. Pharmacology of liver and bile.

10th week

- Lecture: Immunopharmacology (cytotoxic agents, inhibitors of intracellular signaling, cytokine and cytokine receptor inhibitors)
- Practice: Cytotoxic anticancer drugs. .

11th week

- Lecture: Small molecule signal transmission inhibitor anticancer drugs. Anticancer drugs with hormonal mechanisms
- Practice: Toxicology I. 4th midterm

12th week

- Lecture: Anticancer antibodies. Immunostimulant anticancer agents
- Practice: Toxicology II.

13th week

- Lecture: Pharmacodynamic and pharmacokinetic basics of drug interactions
- Practice: Drugs and pregnancy. Toxicology exam

14th week

- Lecture: Pharmacogenomics, personalized medicine, drugs for orphan disease. Special aspects of pharmacology in children and elderly
- Practice: Contrast agents. Consultation

Related subjects due to interdisciplinary fields (both obligatory and elective) and potential overlaps between subjects:

Physiology, biochemistry, molecular biology, pathology, translational medicine, internal medicine, cardiology, pulmonology, neurology, psychiatry, clinical pharmacology

Attendance requirements; conditions under which students can make up for absences and the method of absence justification:

Maximum number of absences is 25 percent of the number of practices in the semester. In the case of absence, the student can attend another class the same week.

Form of assessment in the study period:

(including the number, topics and scheduling of oral and written tests, their share in the overall evaluation, make-up tests and improvement tests)

During the semester, two obligatory midterm tests will be organized in weeks 6 and 11. These can be made up in weeks 7 and 12. Improvement attempt of the midterm tests (both) will be possible in week 13. The correction may only be a verbal demonstration. The first semester midterms cannot be improved in the second semester.

The course material for the third midterm test (study material from week 1 to 5 4 and the half of the 5th week lecture): Pharmacology of the cardiovascular system. Drugs acting on lipid metabolism. Drug acting on blood glucose level.

Fourth midterm test (seminar topics of the 5th week, half of the 5th week lecture and study material from week 6 to 10): Endocrine pharmacology. Pharmacology of the respiratory system. Pharmacology of the gastrointestinal system. Histamine and antihistamines. Drugs acting on smooth muscles. Immunopharmacology.

The midterm tests will count towards the final exam results:

1. If the student scores better than 60% in all four midterm tests during the whole year, the drug recognition question will be waived and in case of a doubtful grade, the better one will be awarded. There is no exemption from the Core Concept topics.
 1. If the student achieves at least 80% score of all four midterm tests one final exam topic will be waived as well as the drug recognition question. The waived topic will be chosen by the examiner.
 2. At the competition at the end of the year, the student who has at least one midterm of 80% and none of his/her demonstrations is worse than 33%, depending on the result of the competition, will be rewarded: between scores 90-100% the students will choose one of the three topics, between 80-89% the students will choose which one he/she will drop, between 70-79% the examiner will choose one topic to be dropped. The drug recognition question will be waived.
 3. If the student fails both midterm tests of the second semester (even at the time of a retake), or fails to achieve 33% in either midterm test with a correction, the student will receive a grade penalty on the final exam.
 4. In the case of a repeated exam after a failure, the negative and, in the case of an improvement exam, both the positive and the negative modifications are cancelled. The first semester midterms, if their results were worse than 30%, will not be counted for the final exam.

Number and type of assignments for individual work and the deadline for submission:

-

Requirements to obtain the teacher's signature:

The number of absences must not be more than 25 percent of the number of practices in the semester.

Type of assessment (*comprehensive examination, end-term examination, term-grade, term-grade on a three-grade rating scale, no examination*):

oral comprehensive examination**Examination requirements:**

(*list of examination topics, subject areas of tests / examinations, lists of mandatory parameters, figures, concepts and calculations, practical skills*)

To apply for the oral examination, the student must pass the toxicology exam before the examination period starts. The grade in the toxicology exam counts towards the final grade. In the oral final exam, at first 5 active substances selected from the obligatory list of active substances must be identified and their mechanism of action explained. If the student does not recognize at least 3 of the active substances, he/she will not be allowed to continue and will receive a fail mark. After successful completion of one core-concept question and three topics of three lists of topics (one from each), an acceptable level of knowledge of pharmacology must be demonstrated.

Toxicology topics

1. Management of the poisoned patient I. antidotes
2. Management of the poisoned patient II. Emergency care. Decontamination. Enhancing of elimination of toxins. supportive treatment.
3. Pharmacology of chelators
4. Acid and base poisonings
5. Mercury poisoning
6. Lead poisoning
7. Arsenic poisoning
8. Cadmium poisoning
9. Poisons inducing methemoglobinemia
10. Aliphatic hydrocarbons and aliphatic halogenated hydrocarbons
11. Aromatic hydrocarbons,
12. Nitrobenzene and aniline poisonings
13. DNP, DNOC poisonings
14. Methanol and glycol poisonings
15. Poisonings caused by aliphatic aldehydes.
16. Carbon monoxide poisoning
17. Poisonings caused by insecticides and herbicides
18. Mushroom poisoning
19. Cyanide poisoning
20. Snake and bee bites
21. Poisonous plants

Core concept topic list

1. Stages of drug development in brief.
2. Types of clinical trials.
3. History of the Hungarian pharmaceutical industry.
4. Molecular targets of drugs
5. Receptor theory - agonist, partial agonist, antagonist, inverse agonist
6. Efficacy, potency
7. Dose-effect relationships at population level
8. Adverse drug reactions
9. Therapeutic index
10. Tolerance, tachyphylaxis, dependence
11. Absorption of drugs
12. Membrane transport mechanisms.
13. Distribution of drugs
14. Bioavailability
15. Volume of distribution
16. Phases of drug biotransformation
17. Excretion of drugs
18. Linear and non-linear pharmacokinetics
19. Clearance
20. Half-life
21. Saturating and maintenance dose
22. Drug accumulation and cumulation
23. Enzyme inducers
24. Enzyme inhibitors
25. Pharmacodynamic interactions - synergism
26. Pharmacodynamic interactions - antagonism
27. Pharmacokinetic drug interactions - at the level of absorption
28. Pharmacokinetic drug interactions - at the level of distribution
29. Pharmacokinetic drug interactions - at the level of metabolism
30. Pharmacokinetic drug interactions - at the level of elimination
31. Special groups - drug interactions: pregnancy
32. Special groups - drug interactions: childhood
33. Special groups - drug interactions: ageing
34. Characterisation of biological medicinal products
35. Orphan drugs
36. Advanced therapy medicinal products
37. Nutritional supplements
38. Traditional herbal active substances
39. Medical device
40. Principles of antimicrobial treatment - selective toxicity
41. Principles of antimicrobial treatment - empirical, targeted and prophylactic therapy
42. Principles of antimicrobial treatment - principles of bactericidal, bacteriostatic antibiotic and antibiotic combinations
43. Principles of antimicrobial treatment - time-, concentration- and exposure-dependent antibiotics
44. Narrow and broad spectrum antibiotics
45. Antibiotic selection considerations - pregnancy, childhood
46. Antibiotic selection considerations - infections affecting specific compartments
47. Considerations for antibiotic choice - comorbidities
48. Antidote - definition and examples
49. Pharmacogenetics, pharmacogenomics - definition, examples
50. Classification of drugs according to chemical structure and complexity
51. Drug-induced adverse reaction: sulfonamide allergy and its characterization
52. Drug-induced adverse reaction: serotonin syndrome
53. Drug-induced adverse reaction: neuroleptic malignant syndrome
54. Drug-induced adverse reaction: Stevens-Johnson sy.
55. Drug-induced adverse reaction: pseudomembranous colitis
56. Drug-induced adverse reaction: cheese reaction
57. Drug-induced adverse reaction: orthostatic hypotension
58. Drug-induced adverse reaction: hemorrhage
59. Drug-induced adverse reaction: thrombosis
60. Drug-induced adverse reaction: bone marrow damage
61. Drug-induced adverse reaction: nephrotoxicity
62. Drug-induced adverse reaction: ototoxicity
63. Drug-induced adverse reaction: hepatotoxicity
64. Drug-induced adverse reaction: QT prolongation

- | | |
|---|---|
| 65. Drug-induced adverse reaction: bradycardia / AV block | 70. Drug-induced adverse reaction: epileptiform seizures MI |
| 66. Drug-induced adverse reaction: constipation, diarrhea, vomiting | 71. Drug-induced adverse reaction: sexual dysfunction |
| 67. Drug-induced adverse reaction: mucosal damage | 72. Drug-induced adverse reaction: dental and oral cavity adverse reactions |
| 68. Drug-induced adverse reaction: weight gain/loss | 73. The Summary of Product Characteristics |
| 69. Drug-induced adverse reaction: sedation | |

Topic list "A"

- | | |
|--|---|
| 1. Cholinergic and adrenergic transmission and its presynaptic modification. | 13. Drugs used for treatment of gout. Drugs for headache syndromes |
| 2. Cholinomimetics | 14. Inhalational anesthetics |
| 3. Muscarinic receptor blocking drugs | 15. Intravenous anesthetics. Perioperative medication |
| 4. Catecholamines | 16. Benzodiazepines |
| 5. Indirect sympathomimetics. Selective α_1 agonists | 17. Non benzodiazepine anxiolytics and non-benzodiazepine hypnotics. |
| 6. α_2 -agonists and drugs acting on the imidazole receptors | 18. Antipsychotics |
| 7. α -receptor antagonists | 19. Monoamine reuptake inhibitors. |
| 8. β -receptor antagonists | 20. Non-reuptake-inhibitor antidepressants. Agents used for treatment of manic phase of bipolar disorders. |
| 9. Centrally and peripherally acting skeletal muscle relaxants | 21. Antiepileptics. Adjuvant analgesics. |
| 10. Local anesthetics | 22. Drugs of neurodegenerative diseases. (Drugs acting in the extrapyramidal motoric system. Nootropic drugs) |
| 11. Opioids | |
| 12. NSAIDs. | |

Topic list "B"

- | | |
|--|---|
| 1. Drugs influencing blood coagulation I: Antiplatelet agents. Fibrinolytic drugs. Drugs inhibiting bleeding | 20. Agents affecting bone mineral homeostasis (calcium, vitamin D, parathyroid hormone, calcitonin, etc.). |
| 2. Drugs influencing blood coagulation II: Anticoagulant drugs | 21. Selective β_2 -stimulants and other bronchodilators. |
| 3. Agents used in anemias | 22. Antiinflammatory agents inhibiting bronchial inflammatory processes. Antitussive agents and expectorants |
| 4. Positiv inotropic drugs | 23. Drugs influencing gastric acid secretion, protective drugs of gastric mucosa |
| 5. Drugs influencing cardiac electrophysiology. | 24. Antiemetic drugs. Prokinetic agents. |
| 6. Drugs acting on the renin-angiotensin-aldosterone-system (RAAS) | 25. Drugs used in constipation (laxatives) and diarrhea. Drugs promoting digestion. Pharmacology of liver and biliary tract |
| 7. Ca^{++} -channel blockers and other vasodilators | 26. Histamine and antihistamines |
| 8. Drugs influencing the oxygen demand and oxygen supply of the heart. Drugs improving microcirculation. | 27. Drugs acting on smooth muscles. Drugs influencing uterus contractions. |
| 9. Drugs affecting lipid metabolism. | 28. Immunopharmacology I. (cytotoxic agents). |
| 10. Potassium excreting (wasting) diuretics | 29. Immunopharmacology II. (Inhibitors of cytokine gene expression, 5-ASA derivatives) |
| 11. Potassium sparing diuretics, ADH antagonists, osmotic diuretics | 30. Immunopharmacology III. (Antibodies and fusion proteins) |
| 12. Glucocorticoids for oral and parenteral use | 31. Drugs used in cancer treatment I (antimetabolites) |
| 13. Mineralocorticoids. Topically applied glucocorticoids. Adrenocortical antagonists, inhibitors of corticosteroid synthesis. | 32. Drugs used in cancer treatment II (cytotoxic agents targeting DNA) |
| 14. Androgens, anabolic steroids, antiandrogens. Agents affecting the sexual activity | 33. Drugs used in cancer treatment III (Topoisomerase inhibitors. Inhibitors of mitotic spindle) |
| 15. Estrogens and antiestrogens | 34. Drugs used in cancer treatment IV. (Hormonal agents) |
| 16. Progestins and antiprogestins. Contraceptives | 35. Drugs used in cancer treatment V. (Small molecule signal transduction inhibitors. Retinoids) |
| 17. Thyroid and antithyroid drugs. Pituitary hormones. Hypothalamic hormones, hormonanalogs and antagonists. | 36. Drugs used in cancer treatment VI. (Large molecule signal transduction inhibitors. Immunostimulant anticancer drugs.) |
| 18. Pancreatic hormones and parenterally applied antidiabetic drugs. | |
| 19. Oral antidiabetics. | |

Topic list "C"

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| 1. Disinfectants and antiseptics | 10. Carbapenems. Monobactams. Beta-lactamase inhibitors. |
| 2. Antimycobacterial drugs | 11. Chloramphenicol. Polymyxins. Antifolate drugs |
| 3. Antiprotozoal and antihelminthic drugs. | 12. Tetracyclines and glycolcyclines |
| 4. Antifungal agents | 13. Aminoglycosides |
| 5. Agents to treat Herpes simplex (HSV), varicella-zoster (VZV) virus, cytomegalovirus (CMV). Anti-influenza agents Drugs against Corona- and other viruses | 14. Quinolones and fluoroquinolones |
| 6. Antiretroviral agents. | 15. Macrolides. Pleuromutilins |
| 7. Agents against hepatitis viruses | 16. Clindamycin. Streptogramins. Oxazolidinones. Fusidans. |
| 8. Penicillins | 17. Glycopeptides. Lipopeptides. Bacitracin. Mupirocin. |
| 9. Cephalosporins | 18. Metronidazole. Fidaxomicine. Rifaximin. Nitrofurantoin. Phosphomycine. |

Method and type of grading:

(Share of theoretical and practical examinations in the overall evaluation. Inclusion of the results of the end-of-term assessment. Possibilities of and conditions for offered grades.)

The midterm tests will count towards the semester final exam results:

- | | |
|---|---|
| 1. If the student scores better than 60% in all four midterm tests during the whole year, the drug recognition question will be waived and in case of a doubtful grade, the better one will be awarded. There is no exemption from the Core Concept topics. | students will choose one of the three topics, between 80-89% the students will choose which one he/she will drop, between 70-79% the examiner will choose one topic to be dropped. The drug recognition question will be waived. |
| 2. If the student achieves at least 80% score of all four midterm tests one final exam topic will be waived as well as the drug recognition question. The waived topic will be chosen by the examiner. | 4. If the student fails both midterm tests of the second semester (even at the time of a retake), or fails to achieve 33% in either midterm test with a correction, the student will receive a grade penalty on the final exam. |
| 3. At the competition at the end of the year, the student who has at least one midterm of 80% and none of his/her demonstrations is worse than 33%, depending on the result of the competition, will be rewarded: between scores 90-100% the | 5. In the case of a repeated exam after a failure, the negative and, in the case of an improvement exam, both the positive and the negative modifications are cancelled. The first semester midterms, if their results were worse than 30%, will not be counted for the final exam. |

In the oral final exam, at first 5 active substances selected from the obligatory list of active substances must be identified the and their mechanism of action explained. If the student does not recognize at least 3 of the active substances, he/she will not be allowed to continue and will receive a fail mark. After successful completion of one core-concept question and three topics of three lists of topics (one from each), an acceptable level of knowledge of pharmacology must be demonstrated.

Detailed information on the obligatory and the full lists of active substances. If the candidate:

- | | |
|--|--|
| 1. knows all the active substances to be studied in full detail, or knows all the active substances with some minor lacks and can mention names of active substances from the full drug list, – mark 5 | 3. knows all the active substances to be learned, but only the name and nothing else – unsatisfactory (failure) |
| 2. knows all the active substances to be studied and the information to a varying degree and can mention the names of active substances from the full drug list to a varying degree - 2,3,4 | 4. does not know any active substance names – unsatisfactory (failure) |
| | 5. does not know all the active substances from the mandatory list, but knows the active substances from the full list of active substances in the given topic, then points 1,2 or 3 above are taken into consideration, the mark is awarded according to these points |

Type of grade: five-mark scale (1=unsatisfactory, 2=satisfactory, 3=average, 4=good, 5=excellent)

List of course books, textbooks, study aids and literature facilitating the acquisition of knowledge to complete the course and included in the assessment, precisely indicating which requirement each item is related to (e.g., topic by topic) as well as a list of important technical and other applicable study aids: Basic and Clinical Pharmacology (Ed. B. G. Katzung), 15th edition, McGraw-Hill Education, 2021. ISBN 978-1 260 45231 0

Materials discussed during lectures and seminars: Moodle (<https://itc.semmelweis.hu>)

Translational Medicine – Pathophysiology I-II.**5th semester****Credit value:** 3**Number of lessons per week:** 42 **lecture:** 21 **practical course:** 21**Academic year:** 2023/2024 Semester 1**Name of the course leader:** Zoltán Benyó MD, PhD, DSc**His/her workplace, phone number:** Institute of Translational Medicine, 06-1-210-0306**Position:** Director, University Professor**Date and registration number of their habilitation:** 2008, 259**Objectives of the subject, its place in the medical curriculum:**

The objective of the course is to have the students understand the complex mechanisms responsible for the development of functional disturbances in common conditions affecting the function of the entire organism through integration of the knowledge imparted by initial courses (most importantly anatomy, biochemistry and physiology), as well as the regulatory processes that are activated in order to fend off these disturbances. Having assimilated the knowledge encompassing organ systems and disciplines and the integrative approach, the students will be ready to understand, in the course of their clinical education, the mechanisms and symptomatology of various diseases and the respective therapeutic possibilities.

Place where the subject is taught (address of the auditorium, seminar room, etc.):

Centre of Theoretical Medicine, 37–47 Tűzoltó street, 1094 Budapest

Theoretical Building, 4 Nagyvárads square, 1089 Budapest

Competencies acquired through the completion of the course:

Based on their basic training in anatomy, biochemistry and physiology, the students will become capable of understanding the manifestation, on the organism level, of the pathological processes underlying the most common diseases, their symptoms, causes and potential therapeutic outcomes. Helped by practice sessions closely linked

with the theoretical material, the students will acquire the skills necessary for following causality relationships in the disturbances of physiological processes and for recognizing the effects of these disturbances on the totality of the function of the organism, and will gain experience in test methods utilized in clinical practice, their theoretical bases, margins for interpretation and actual execution.

Prerequisites for course registration and completion:

Anatomy, final exam Macroanatomy: AOKATN667_2A

Biochemistry, final exam Biochemistry II.

Physiology, final exam Physiology II.

Conditions for concurrent course registration and permission thereof in the case of a multi-semester subject:

None

Number of students required for the course (minimum, maximum) and method of selecting students:

Based on registration in the Neptun system; offered in the autumn semester for the entire class.

Detailed curriculum:**Semester 1****Lectures (75 min. lectures weekly)**

Week 1	Hypertension – Zoltán Benyó
Week 2	Congestive heart failure – László Tornóci
Week 3	Obesity – Éva Ruisanchez
Week 4	Diabetes I: Pathogenesis of Type 1 and 2 diabetes – Domokos Gerő
Week 5	Diabetes II: Pathogenesis of diabetic complication – Domokos Gerő
Week 6	Atherosclerosis and disorders of lipid metabolism – Éva Margittai
Week 7	Disorders of Hemostasis – Zoltán Benyó
Week 8	Endocrine diseases I: Pituitary gland and reproductive system – Zoltán Benyó
Week 9	Endocrine diseases II: Thyroid gland – Tamás Ivanics
Week 10	Endocrine diseases III: Adrenal gland – Tamás Ivanics
Week 11	Menopause – Tímea Tímár
Week 12	Osteoporosis. Calcium and phosphate hoemostasis – Gábor Kökény
Week 13	Systemic autoimmune diseases and joint disorders – Gábor Kökény
Week 14	Disorders developing in the course of immobilization and their treatment. Cachexia. Rehabilitation. – Zoltán Benyó

Practices (150 min. lessons biweekly)

Weeks 1-2	Hypertension, ABPM and Clinical case discussion
Weeks 3-4	Blood pressure measurement, arterial pulse wave, ankle-brachial index
Weeks 5-6	Obesity and Diabetes, and Clinical case discussion
Weeks 7-8	Diabetic neuropathy diagnostic procedures
Weeks 9-10	Diabetic vascular function task
Weeks 11-12	Adrenal gland and Thyroid gland, and Clinical case discussion
Weeks 13-14	Menopause and Osteoporosis, and Clinical case discussion

Related subjects due to interdisciplinary fields (both obligatory and elective) and potential overlaps between subjects:

Pathology, Immunology, Laboratory medicine and General medicine

Number and type of assignments for individual work and the deadline for submission:

None

Attendance requirements; conditions under which students can make up for absences and the method of absence justification:

Participation at practice sessions is obligatory. Maximum of 1 absence from the practice sessions is acceptable. Absence from more than 1 of the practice sessions in a semester means that the student did not fulfil his/her semestrial study obligations. There is no possibility for making up for absence from lectures; absence from practice sessions can be made up for with another group in the same week, if there is room for additional participants. In case of absence students should immediately contact (e-mail) your course tutors who will decide the request.

Form of assessment in the study period:

(including the number, topics and scheduling of oral and written tests, their share in the overall evaluation, make-up tests and improvement tests)

Students might give account of – which there is no obligatory participation - their theoretical and practical curriculum knowledge of the material so far presented in the lectures and the practical lessons on two occasions in the course of the semester, at predetermined dates/times, in the form of written or online test. Based on the combined results of the two competition rounds, we will prepare a grade offer for the colloquium examination.

Requirements for semestrial signature:

The requirement for the end-of-semester signature: absence from more than 1 practice sessions in a semester also means that the student did not fulfil his/her semestrial study obligations, therefore he/she is not permitted to take the exam.

Type of examination:

Semifinal exam

Requirements of the examination:**1st Semester, Exam topics, (theory)**

1. Definition of hypertension and its different forms; hypertension of known causes; complications of hypertension
2. Essential hypertension; principles of hypertension treatment
3. Heart failure, its causes and symptoms
4. Secondary effects of heart failure, therapeutic options
5. Prevalence, causes and definition of obesity
6. Adipose tissue function and dysfunction
7. Systemic consequences of obesity
8. Pathogenesis of Type 1 diabetes mellitus
9. Pathogenesis of Type 2 diabetes mellitus
10. Microvascular complications of diabetes mellitus
11. Macrovascular complications of diabetes mellitus
12. Classification of dyslipidemias; syndromes of primary hyperlipoproteinemia
13. Syndromes associated with secondary hyperlipoproteinemia
14. Atherosclerosis
15. Conditions associated with coagulation system dysfunction
16. Conditions associated with excessive activation of the coagulation system
17. Simultaneous under- and overacting disorders of the coagulation system
18. Pathogenesis of hypothyroidism and the symptoms of hypothyroidism
19. Pathogenesis of syndromes with hyperthyroidism and symptoms of thyrotoxicosis
20. Pathogenesis of acute and chronic adrenocortical insufficiency, pathomechanism underlying the main symptoms; congenital adrenal hyperplasia
21. Pathogenesis of Cushing's syndrome, pathomechanism underlying the symptoms and diagnosis
22. Pathogenesis of primary and secondary hyperaldosteronism; the pathomechanism underlying the symptoms
23. Possible causes of overproduction of growth hormone and prolactin, the pathomechanism of the consequences
24. Male hypogonadism and androgen insensitivity syndrome
25. Disorders of the female hormonal regulation
26. Menopausal transition and menopause
27. Postmenopause
28. Hormonal regulation of calcium and phosphate metabolism in physiological and pathological conditions
29. Hormonal regulation of calcium and phosphate metabolism in physiological and pathological conditions, its effects on the skeletal system
30. Non-osteoporotic bone diseases in adults and extraskeletal effects of vitamin D deficiency
31. General mechanisms in the development of systemic autoimmune diseases
32. Autoimmune joint diseases; rheumatoid arthritis and ankylosing spondylitis
33. Pathomechanism of Systemic lupus erythematosus, systemic sclerosis and Sjögren's syndrome
34. The effect of the immobilization syndrome on somatic functions
35. The effect of immobilization syndrome on autonomic functions

1st Semester, Exam topics, (practice)

Case study presentation of relevant clinical cases to discuss the pathogenesis of typical symptoms, diagnosis and therapeutic approaches in diseases.

Case 1-4. Hypertension

Case 5-8. Obesity – Diabetes

Case 9-12. Endocrine disorder

Case 13-16. Menopause and osteoporosis

Practical tasks, device operation:

1. Methods to measure blood pressure. Practical aspects of correctly performing blood pressure measurement.
2. ABPM and its indications. How is an ABPM test performed? Why is it important to assess diurnal rhythm?
3. Diagnostic criteria of hypertension using different methods of measurement. What are the indications and benefits of home blood pressure monitoring?
4. Investigation methods of vascular aging. The significance of pulse wave velocity and its measurement.
5. Characterization of the physiological arterial pulse wave and its changes with aging.
6. The definition and measurement of the ankle-brachial index. Its significance.

7. Diabetic neuropathy task: the manifestations and symptoms of diabetic neuropathy, their pathomechanism.
8. Examination procedures used for diagnosing neuropathy affecting somatic nerves. Explanation of the physical examination procedures presented in the practical lesson.
9. Diabetic neuropathy Diagnostic procedures used in the investigation of autonomic neuropathic abnormalities. Demonstration of the performance of the Ewing test.
10. Diabetic vascular function task: briefly describe the methods of laser Doppler flow measurement and transcutaneous partial oxygen tension measurement. Describe the blood flow response to heating and its changes in diabetic vascular dysfunction; explain the underlying pathomechanism.
11. Diabetic vascular function task: briefly describe the methods of laser Doppler flow measurement and transcutaneous partial oxygen tension measurement. Explain what post-occlusive reactive hyperaemia is and how it changes with diabetic vascular dysfunction; explain the underlying pathomechanism.

Method and type of evaluation:

Semifinal exam:

The semifinal exam is oral.

Exam exemption may be obtained by achieving exceptional results in the competition, a grade “4” or “5” may be offered as the colloquium/semifinal examination grade.

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

The Figures of the lectures available for download at the website, and short written extracts of the lectures (“handout”)

Gary D. Hammer, Stephen J. McPhee: Pathophysiology of Diseases: An Introduction to Clinical Medicine– A LANGE medical book 7th edition (2014), 8th edition (2018)

6th Semester

Credit value: 3

Number of lessons per week: 42 **lecture:** 21 **practical course:** 21

Academic year: 2023/2024 Semester 2

Name of the course leader: Zoltán Benyó MD, PhD, DSc

His/her workplace, phone number: Institute of Translational Medicine, 06-1-210-0306

Position: Director, University Professor

Date and registration number of their habilitation: 2008, 259

Objectives of the subject, its place in the medical curriculum:

The objective of the course is to have the students understand the complex mechanisms responsible for the development of functional disturbances in common conditions affecting the function of the entire organism, through integration of the knowledge imparted by initial courses (most importantly anatomy, biochemistry and physiology), as well as the regulatory processes that are activated in order to fend off these disturbances. Having assimilated the knowledge encompassing organ systems and disciplines and the integrative approach, the students will be ready to understand, in the course of their clinical education, the mechanisms and symptomatology of various diseases and the respective therapeutic possibilities.

Place where the subject is taught (address of the auditorium, seminar room, etc.):

Centre of Theoretical Medicine, 37–47 Tűzoltó street, 1094 Budapest
Theoretical Building, 4 Nagyvárád square, 1089 Budapest

Successful completion of the subject results in the acquisition of the following competencies:

Based on their basic training in anatomy, biochemistry and physiology, the students will become capable of understanding the manifestation, on the organism level, of the pathological processes underlying the most common diseases, their symptoms, causes and potential therapeutic outcomes. Helped by practice sessions closely linked with the theoretical material, the students will acquire the skills necessary for following causality relationships in the disturbances of physiological processes and for recognizing the effects of these disturbances on the totality of the function of the organism, and will gain experience in test methods utilized in clinical practice, their theoretical bases, margins for interpretation and actual execution.

Prerequisites for course registration and completion:

Pathology I. semifinal

Translation Medicine – Pathophysiology I. semifinal

Conditions for concurrent course registration and permission thereof in the case of a multi-semester subject:

None

Student headcount conditions for starting the course (minimum, maximum) and method of student selection:

Based on registration in the Neptun system; offered in the spring semester for the entire class

Detailed course description:**Semester 2.****Lectures** (75 min. lectures weekly)

Week 1 Pathophysiology of gastrointestinal diseases – Gábor Kőkény

Week 2 Liver tract disorders – Éva Margittai

Week 3 Acute alcohol and biliary poisoning. Acute and chronic pancreatitis – Éva Margittai
Week 4 Acute kidney injury – Péter Hamar

Week 5 Chronic kidney disease – Péter Hamar

Week 6 Acute respiratory failure – György Losonczy

Week 7 Chronic respiratory disorders – György Losonczy

Week 8 Acid-base disorders – Domokos Gerő

Week 9 Na⁺, K⁺ and water balance; pathophysiology of fluid and electrolyte disorders – Éva Margittai

Week 10 Circulatory shock – Zoltán Benyó

Week 11 Septic and anaphylactic shock – Zoltán Benyó

Week 12 Pathophysiology of ageing – Zoltán Ungvári

Week 13 Secondary disorders developing in malignant diseases – Péter Hamar

Week 14 Consultation lecture

Practices (150 min. lessons biweekly)

Weeks 1-2 GI diseases and Nutritional status analysis, Clinical case discussion

Weeks 3-4 Liver diseases and Clinical case discussion

Weeks 5-6 Kidney diseases and Clinical case discussion

Weeks 7-8 Respiratory diseases and Clinical case discussion

Weeks 9-10 Acid-base disorders and Clinical case discussion

Weeks 11-12 Circulatory shock and Clinical case discussion

Weeks 13-14 Vascular cognitive disorders: fNIRS and cognitive tests

Related subjects due to interdisciplinary fields (both obligatory and elective) and potential overlaps between subjects:

Pathology, Immunology, Laboratory medicine and General medicine

Attendance requirements; conditions under which students can make up for absences and the method of absence justification:

Participation at practice sessions is obligatory. Maximum of 1 absence from the practice sessions is acceptable. Absence from more than 1 of the practice sessions in a semester means that the student did not fulfil his/her semestrial study obligations. There is no possibility for making up for absence from lectures; absence from practice sessions can be made up for with another group in the same week, if there is room for additional participants. In case of absence students should immediately contact (e-mail) your course tutors who will decide the request.

Form of assessment in the study period:

(including the number, topics and scheduling of oral and written tests, their share in the overall evaluation, make-up tests and improvement tests)

Students might give account of – which there is no obligatory participation - their theoretical and practical curriculum knowledge of the material so far presented in the lectures and the practical lessons on two occasions in the course of the semester, at predetermined dates/times, in the form of written or online test. Based on the combined results of the two competition rounds, we will prepare a grade offer for the final examination.

Number and type of assignments for individual work and the deadline for submission:

None

Requirements for semestral signature:

The requirement for the end-of-semester signature: absence from more than 1 practice sessions in a semester also means that the student did not fulfil his/her semestral study obligations, therefore he/she is not permitted to take the exam.

Type of examination:

Final exam

Examination requirements:**1st Semester Exam topics – Theory**

1. Definition of hypertension and its different forms; hypertension of known causes; complications of hypertension
2. Essential hypertension; principles of hypertension treatment
3. Heart failure, its causes and symptoms
4. Secondary effects of heart failure, therapeutic options
5. Prevalence, causes and definition of obesity
6. Adipose tissue function and dysfunction
7. Systemic consequences of obesity
8. Pathogenesis of Type 1 diabetes mellitus
9. Pathogenesis of Type 2 diabetes mellitus
10. Microvascular complications of diabetes mellitus
11. Macrovascular complications of diabetes mellitus
12. Classification of dyslipidemias; syndromes of primary hyperlipoproteinemia
13. Syndromes associated with secondary hyperlipoproteinemia
14. Atherosclerosis
15. Conditions associated with coagulation system dysfunction
16. Conditions associated with excessive activation of the coagulation system
17. Simultaneous under- and overacting disorders of the coagulation system
18. Pathogenesis of hypothyroidism and the symptoms of hypothyroidism
19. Pathogenesis of syndromes with hyperthyroidism and symptoms of thyrotoxicosis
20. Pathogenesis of acute and chronic adrenocortical insufficiency, pathomechanism underlying the main symptoms; congenital adrenal hyperplasia
21. Pathogenesis of Cushing's syndrome, pathomechanism underlying the symptoms and diagnosis
22. Pathogenesis of primary and secondary hyperaldosteronism; the pathomechanism underlying the symptoms
23. Possible causes of overproduction of growth hormone and prolactin, the pathomechanism of the consequences
24. Male hypogonadism and androgen insensitivity syndrome
25. Disorders of the female hormonal regulation
26. Menopausal transition and menopause
27. Postmenopause
28. Hormonal regulation of calcium and phosphate metabolism in physiological and pathological conditions
29. Hormonal regulation of calcium and phosphate metabolism in physiological and pathological conditions, its effects on the skeletal system
30. Non-osteoporotic bone diseases in adults and extraskeletal effects of vitamin D deficiency
31. General mechanisms in the development of systemic autoimmune diseases
32. Autoimmune joint diseases; rheumatoid arthritis and ankylosing spondylitis
33. Pathomechanism of Systemic lupus erythematosus, systemic sclerosis and Sjögren's syndrome
34. The effect of the immobilization syndrome on somatic functions
35. The effect of immobilization syndrome on autonomic functions

2nd Semester Exam topics – Theory

1. The pathophysiology of the gastrointestinal system - the diseases of the stomach and the small intestine
2. The pathophysiology of the gastrointestinal system - inflammatory bowel diseases
3. Liver dysfunction I.
4. Liver dysfunction II.
5. The metabolism of alcohol
6. Acute alcohol intoxication
7. Chronic alcoholism
8. The causes and systemic consequences of acute renal failure
9. The causes and definition of chronic renal failure
10. Pathological changes in organs affected by chronic renal failure
11. Pulmonary ventilation disorders and respiratory function tests to detect them; the definition and forms of respiratory failure
12. The symptoms of acute respiratory failure; the effect of consequent hyperventilation on blood gas and acid-base values
13. The effects of prolonged smoking on the large and small airways and on the elastic fibers of the lungs
14. The correlation between FEV1 decline and arterial pO₂ and pCO₂ in chronic respiratory failure (COPD and pulmonary fibrosis)

15. Various types of organ damage caused by chronic global respiratory failure (mainly COPD)
16. Acid-base disorders of metabolic origin: metabolic acidosis and metabolic alkalosis
17. Acid-base disorders of respiratory origin: respiratory acidosis and respiratory alkalosis
18. Sodium (Na⁺) balance disorders
19. Hypo- and hypervolemia (edema)
20. Potassium (K⁺) balance disorders
21. The definition and classification of circulatory shock
22. Forms of hypovolemic shock
23. The different phases of hypovolemic shock
24. The progression of circulatory shock
25. Organ manifestations of circulatory shock
26. Possible causes of cardiogenic shock
27. The definition and mechanism of septic shock and the principles of its treatment
28. The development and consequences of pro- and anti-inflammatory processes, coagulation disorders and endothelial dysfunction in septic shock
29. Molecular and cellular aging
30. Organ-level manifestations of the aging syndrome
31. Secondary disorders caused by tumors I: Disorders of other organs in cancer patients
32. Secondary disorders caused by tumors II: Systemic consequences of cancer
The pathomechanism of systemic inflammation, cachexia and pain

1st Semester Exam topics – Practice

Case study presentation of relevant clinical cases to discuss the pathogenesis of typical symptoms, diagnosis and therapeutic approaches in diseases.

- Case 1-4. Hypertension
- Case 5-8. Obesity – Diabetes
- Case 9-12. Endocrine disorder
- Case 13-16. Menopause and osteoporosis

Practical tasks, device operation:

1. Methods to measure blood pressure. Practical aspects of correctly performing blood pressure measurement.
2. ABPM and its indications. How is an ABPM test performed? Why is it important to assess diurnal rhythm?
3. Diagnostic criteria of hypertension using different methods of measurement. What are the indications and benefits of home blood pressure monitoring?
4. Investigation methods of vascular aging. The significance of pulse wave velocity and its measurement.
5. Characterization of the physiological arterial pulse wave and its changes with aging.
6. The definition and measurement of the ankle-brachial index. Its significance.
7. Diabetic neuropathy task: the manifestations and symptoms of diabetic neuropathy, their pathomechanism.
8. Examination procedures used for diagnosing neuropathy affecting somatic nerves. Explanation of the physical examination procedures presented in the practical lesson.
9. Diabetic neuropathy Diagnostic procedures used in the investigation of autonomic neuropathic abnormalities. Demonstration of the performance of the Ewing test.
10. Diabetic vascular function task: briefly describe the methods of laser Doppler flow measurement and transcutaneous partial oxygen tension measurement. Describe the blood flow response to heating and its changes in diabetic vascular dysfunction; explain the underlying pathomechanism.
11. Diabetic vascular function task: briefly describe the methods of laser Doppler flow measurement and transcutaneous partial oxygen tension measurement. Explain what post-occlusive reactive hyperaemia is and how it changes with diabetic vascular dysfunction; explain the underlying pathomechanism.

2nd Semester Exam topics – Practice

Case study presentation of relevant clinical cases to discuss the pathogenesis of typical symptoms, diagnosis and therapeutic approaches in diseases.

- Case 1-3. Gastrointestinal disease
- Case 4-9. Liver disease
- Case 10-14. Kidney disease
- Case 15-18. Respiratory disease
- Case 19-22. Acid-base disorder
- Case 23-26. Circulatory shock

Practical tasks, device operation:

1. What options can you name to define nutritional status? What are the advantages and disadvantages of the different methods?
2. How does the body composition monitor based on bioimpedance spectroscopy work? What are the most important parameters that are determined?
3. What are the clinical uses of bioelectrical impedance analyzers? What are the main parameters used in different areas?
4. Describe the abnormal findings in urine tests; describe the most common symptoms and their causes. Reference values.
5. Possible causes of abnormal urine color.
6. The mechanism and clinical significance of neurovascular coupling in functional brain imaging. The theoretical background and practical application of the fNIRS method and its significance in the study of frontal cortical function.
7. Types of cognitive tests and their significance in the diagnosis of neurodegenerative disorders. The significance of the recognition of mild cognitive impairment and the theoretical basis of its differential diagnosis.

Method and type of evaluation:

Final exam:

The Final exam is oral.

Exam exemption may be obtained by achieving exceptional results in the competition, a grade "4" or "5" may be offered as the Final examination grade

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

The Figures of the lectures available for download at the website, and short written extracts of the lectures ("handout").

Gary D. Hammer, Stephen J. McPhee: Pathophysiology of Diseases: An Introduction to Clinical Medicine– A LANGE medical book 7th edition (2014), 8th edition (2018)

MEDICAL STATISTICS, INFORMATICS AND TELEMEDICINE**lecture 1 hour/week practice 1.5 hour/week****2 credits****Tutor: Dr Dániel Sándor Veres**

week	lecture topic	practice topic
1	Principles of quantitative medicine.	Introduction. Data types. Introduction to data types.
2	Summary of data: descriptive statistics	Graphical representation of data and interpretation of plots I. Plotting frequencies: visualization of samples with a large number of elements on a histogram, bar plot.
3	Event, probability, distribution.	Graphical representation of data and interpretation of plots II. Box plots, scatter plot, mosaic plot. Outliers. Interpretation of percentile curves. Descriptive values. Determination of descriptive values from a large sample size.
4	Estimations.	Distributions. Using binomial distributions. Using normal distributions.
5	Principles of hypothesis testing in medical practice.	Reference interval. Approximate calculation for normal distribution. Interpretation. Confidence intervals. Simple calculation of the confidence interval of mean. Interpretation.
6	T-tests; chi-square tests. Multiplicity.	Hypothesis tests. Logic of hypothesis tests.
7	Correlation. Simple linear regression.	Hypothesis test and confidence interval calculation on difference between two ratios. Chi-square tests, Fisher exact test. Confidence interval of difference between two ratios.
8	Arguing.	Hypothesis test and confidence interval on difference of means. Student t-tests. Making t-tests. Interpretation of effect size, confidence interval and p-value. Multiplicity. Examples for multiple testing.
9	Confounding, biases. Linear regression as a tool against confounding	Correlation, regression. Interpretation of correlation coefficient. Making simple linear regression, interpretation of the slope.
10	Evaluation of diagnostic tests.	Regression models. Interpreting the results of regression models.
11	Statistical concepts in epidemiology. Prevalence, incidence, risk, odds. ROC curves. Likelihood ratios.	Diagnostic tests I. Diagnostic tests.
12	Communication with a statistician. Sample size. Data tables. Survey tips.	Diagnostic tests II. Odds, OR, RR. Likelihood ratios.
13	Introduction to medical decision theory, Bayesian theory: a priori and a posteriori distributions, learning model.	Preparing data. Organizing data tables.
14	Databases, expert systems, AI supported diagnostics, BigData.	Possibility to write an exam test.

MEDICAL MICROBIOLOGY II.**Institute of Medical Microbiology**Program Director: **Prof. Dr. Dóra Szabó**Tutor: **Dr. Ágoston Ghidán****Second Semester**

Week	Lectures (1,5 hours per week)
1.	Medical Mycology
2.	Medical Parasitology – 1
3.	Medical Parasitology – 2
4.	Medical Parasitology – 3
5.	General Virology
6.	• DNA viruses – 1 Adenoviruses, Herpesviruses
7.	• DNA viruses – 2 Pox-, Parvo- and Papillomaviruses
8.	• RNA viruses – 1 Orthomyxo-, Paramyxo- and Togaviruses
9.	• RNA viruses – 2 Arbo- and Roboviruses
10.	• RNA viruses – 3 Polio-, Rota-, Calici- and Astroviruses
11.	Hepatitis viruses
12.	Retro viruses. AIDS. Viral oncogenesis
13.	• Slow viruses and Prions. Control of viral diseases. Antiviral chemotherapy
14.	• Iatrogenic and Nosocomial infections

Week	Practicals (2 hours per week)
1.	Medical Mycology
2.	Medical Parasitology – 1 Amoebas, Flagellata
3.	Medical Parasitology – 2 Plasmodia, Toxoplasma, Criptosporidium
4.	Medical Parasitology – 3 Helminthes
5.	General Virology
6.	DNA viruses
7.	RNA viruses
8.	Midterm exam II.
9.	Clinical Bacteriological Diagnosis – 1: Skin, wound and eye infections
10.	• Clinical Bacteriological Diagnosis – 2: Respiratory tract infections
11.	• Clinical Bacteriological Diagnosis – 3: Infections of the uro-genital tract. Abdominal and Enteral infections. Sexually transmitted diseases
12.	• Clinical Bacteriological Diagnosis – 4: Bacteraemia, sepsis, endocarditis, meningitis
13.	Summary and review
14.	Practical exam

PATHOLOGY I.

1st Dept. of Pathology and Experimental Cancer Research

 Tutor: *Dr. Gergely RÁCZ*
1st SEMESTER – 2023

	LECTURES	HISTOPATHOLOGY and PREPARATION
Week 1	The place and role of Pathology in the Medicine. Structure of pathology and methods Definition of Death, Signs of Death, Necrosis and Apoptosis.	Practice 1- Introduction Safety rules Digital teaching system Teleconsultation E-school
Week 2	Examples of Necrosis. Myocardial Infarction. Reversible Cell Injury	Practice 2- Necrosis 1. Histology: Anemic infarction, kidney Infarctus haemorrhagicus pulmonis Acute myocardial infarction Reperfusion injury Chronic myocardial infarction Cerebral infarct Preparation: Infarctus anaemicus renis Ruptura cordis, haemopericardium Infarctus recurrens myocardii Gangraena humida antebrachii Infarctus obsoletus myocardii et aneurysma cordis Encephalomalacia alba et encephalomalacia rubra
Week 3	Lipid accumulation, Atherosclerosis, Protein accumulation, Amyloidosis. Cellular adaptations: Hypertrophy, Hyperplasia, Atrophy, Metaplasia	Practice 3- Necrosis 2. Histology: Liponecrosis pancreatis Lymphadenitis tuberculosa Apoptosis Preparation: Liponecrosis pancreatis Caseatio tuberculosa lympholandulae Necrosis in centro tumoris
Week 4	Endogeneous and Exogeneous Pigments, Calcification, Lithiasis Hemorrhage	Practice 4- Accumulation Histology: Steatosis hepatis alcoholica (HE) Atheromatosis arteriae (HE) Infiltratio adiposa myocardii (HE) Amyloidosis renis (Congo Red) IRDS (PAS) Preparation: Steatosis diffusa hepatis Atheromatosis aortae Amyloidosis lienis et renis

	LECTURES	HISTOPATHOLOGY and PREPARATION
Week 5	Thrombosis, Embolism, DIC Stagnation, oedema, shock	Practice 5- Adaptation Histology: Hypertrophia myocardii, CIHD Hyperplasia glandulae suprarenalis Bronchus, squamous metaplasia (HE) Microcalcification, DCIS (HE) Preparation: Cholelithiasis – Gallbladder stones Hypertrophia ventriculi sinistri cordis Hypertrophia ventriculi dextri cordis
Week 6	Acute Inflammation Chronic Inflammation and Tissue Repair: Regeneration, Healing, and Fibrosis	Practice 6 - Circulation 1. Histology: Oedema pulmonis (HE) Induratio brunea pulmonis (Prussian blue) Hepar moschatum adiposum (HE) Thrombosis arteriae femoralis (HE) Preparation: Thrombosis venae Thrombosis arteriae Thrombus muralis laminata in aneurysma aortae Thromboembolia trunci brachiocephalici
Week 7	New technologies in molecular diagnostic - Numerical and Structural abnormalities of the Chromosomes. Mutations and Clinical manifestations. Pediatric Diseases	Practice 7 - Circulation 2. Histology: DIC (fibrin staining) Embolia lipomatosa (Oil-red) Preparation: Erosiones mucosae ventriculi Haemorrhagia subarachnoidealis Apoplexia glandulae suprarenalis
Week 8	Mechanisms of Immune-Mediated Injury Immune deficiency Diseases. Rejection of Transplants	Practice 8 - Acute inflammation Histology: Pericarditis fibrinosa Bronchopneumonia Appendicitis acuta ulcerophlegmonosa Pneumonia lobaris Preparation: Pericarditis fibrinosopurulenta Pneumonia lobaris
Week 9	All Saints Day Autoimmune Disease	Practice 9 - Chronic Inflammation Histology: Myocarditis rheumatica (HE) Tuberculosis pulmonis (HE) Tuberculosis pulmonis (ZN) Granuloma corporis alienis (HE) Granulation tissue (HE) Sarcoidosis (HE) Preparation: Tuberculosis pulmonis
Week 10	Pathological consequences of infectious diseases, sepsis, AIDS Characteristics of Benign and Malignant Neoplasms	Practice 10 - Immunology Histology: Polypus nasi (HE) Asthma bronchiale (PAS) Acute rejection (HE) Lupus nephritis (PAS) Scleroderma (HE)

	LECTURES	HISTOPATHOLOGY and PREPARATION
Week 11	Carcinogenesis, Etiology of Neoplasia Prevention, Diagnosis and Treatment of Cancer	Practice 11 - Oncology 1. Histology: Squamous cell metaplasia, cervix HPV infection_condyloma_LSIL HSIL_CIN3 Invasive carcinoma, cervix Papilloma laryngis (HE) Carcinoma basocellulare (HE) Carcinoma planocellulare cutis (HE) Polypus adenomatosus coli (HE) Adenocarcinoma coli (HE) Preparation: Papilloma laryngis Polypus intestini crassi Haemangioma hepatis
Week 12	Ability to Invade and Metastasize Preneoplastic Disorders	Practice 12 - Oncology 2. Histology: Leiomyoma Leiomyosarcoma Osteosarcoma Wilms tumor Neuroblastoma (HE) Teratoma adultum (HE) Metastasis carcinomatosa lymphnodi (HE) Metastasis carcinomatosa hepatis Preparation: Cysta dermoides Lymphangiosis carcinomatosa pulmonis Melanoma malignum cutis Metastasis carcinomatosa cerebri, melanoma Metastasis carcinomatosa vertebrarum Metastasis lymphoglandularum melanomatis Osteosarcoma manus
Week 13	Effects of Tobacco. Injury by Drugs and Drugs of Abuse. Effect of alcohol. Obesity Anomalies of cardiac development, IHD	Practice 13 - Cardiology 1. Histology: Arteriosclerosis Atherosclerotic plaque_calcified Atherosclerotic plaque_atheromatous Acute myocardial infarction Chronic myocardial infarction Preparation: Fallot tetralogy Defectus septi atrii (ASD) Defectus septi ventriculi (VSD) Cardiomyopathia dilatativa (DCM) Cardiomyopathia hypertrophica (HOCM)
Week 14	Diseases of endocardium, myocardium, pericardium Vascular pathology	Practice 14 - Cardiology 2. Histology: Infective endocarditis Viral myocarditis (HE) Arteritis temporalis (HE) Kaposi sarcoma (HE) Preparation: Vitium aortae Dissectio coronariae Thrombosis globuli in atrio sinistri cordis

2nd Semester - 2023

Week 1	<ul style="list-style-type: none"> • Methods of hematology diagnostics. Classification of Anemia • Diseases of the Myeloid system 	Practice 1 - Hematology 1. Histology <ul style="list-style-type: none"> • Megaloblastic erythroid hyperplasia (MGG) • AML- pb (MGG) • AML- pb (MPO) • CML accelerated phase (MGG) • Myelofibrosis (HE) • Myelofibrosis (reticulin)
Week 2	<ul style="list-style-type: none"> • Diseases of the Lymphoid system • Clinicopathology 	Practice 2- Hematology 2. Histology: <ul style="list-style-type: none"> • Follicularis hyperplasia (HE) • Follicularis lymphoma grade 1 (HE) • Follicularis lymphoma (BCL-2) • CLL - pb (MGG) • Diffuse large B-cell lymphoma (HE, CD20) • Myeloma multiplex, bm (MGG) • Hodgkin-lymphoma NS (HE) • Non-Hodgkin lymphoma (extranodal) • CLL-1 • CLL-2 Preparation: <ul style="list-style-type: none"> • Hodgkin lymphoma- Cervical lymph nodes • Myeloma multiplex, - Ribs • Nodularis lymphoid spleen infiltration - (Porphyll spleen)
Week 3	<ul style="list-style-type: none"> • Lesions of the upper respiratory tract. Pulmonary infections • Obstructive and Restrictive pulmonary diseases. • Lung tumors. Pleural lesions. 	Practice 3 - Pulmonology Histology: <ul style="list-style-type: none"> • Aspergillosis (HE, Grocott) • Pneumocystis pneumonia (HE, Grocott) • Cysticus fibrosis • Adenocarcinoma pulmonis • Carcinoma microcellulare pulmonis • Mesothelioma Preparation: <ul style="list-style-type: none"> • Emphysema pulmonis et emphysema bullosum pulmonum • Haemorrhagic pneumonia caused by H1N1 influenza • Neoplasma malignum peripheriale pulmonis
Week 4	<ul style="list-style-type: none"> • Pathology of the oral cavity, salivary gland, oesophagus, stomach and small intestine 	Practice 4 - Gastrointestinal pathology 1. Histology: <ul style="list-style-type: none"> • GIST (HE, CD117) • Gastritis (HE, Giemsa) • Ulcus pepticum ventriculi • Adenocarcinoma ventriculi (diffuse type) Preparation: <ul style="list-style-type: none"> • Adenocarcinoma ventriculi et metastasis carcinomatosa hepatis • GIST • Ulcus duodeni • Ulcus ventriculi • Varicositas oesophagii

Week 5	<ul style="list-style-type: none"> • Pathology of the large intestine and the peritoneum • Pathology of the pancreas. Diabetes mellitus 	<p>Practice 4 - Gastrointestinal pathology 2.</p> <p>Histology:</p> <ul style="list-style-type: none"> • Parotis pleomorph adenoma • Celiac disease • Ulcerative colitis - biopsy • Ulcerative colitis - specimen • Crohn colitis <p>Preparation:</p> <ul style="list-style-type: none"> • Colitis ulcerosa • Diverticulosis et polyposis sigmae • Diverticulum perforatum sigmae
Week 6	<ul style="list-style-type: none"> • Jaundice and cholestasis Alcohol- drug-induced, metabolic and inherited liver diseases. • Infectious and inflammatory disorders. Hepatic failure. Liver cirrhosis. Tumors of liver. • Disorders of the gallbladder and biliary tract 	<p>Practice 6 - Hepatology, pancreas</p> <p>Histology:</p> <ul style="list-style-type: none"> • Pancreatitis chronica • Carcinoma pancreatis • Cholecystitis chronica • Hepatitis chronica - HCV • HBV-hepatitis • Cirrhosis hepatis (HE, Picro) • Carcinoma hepatocellulare <p>Preparation:</p> <ul style="list-style-type: none"> • Adenocarcinoma pancreatis capitis et metastasis carcinomatosa hepatis • Hepar polycysticum • Pancreatitis acuta
Week 7	<ul style="list-style-type: none"> • Malformations. Clinical manifestations of renal disease. Glomerular diseases • Diseases affecting tubules and interstitium. Diseases involving blood vessels 	<p>Practice 7- Nephrology</p> <p>Histology:</p> <ul style="list-style-type: none"> • RPGN • Nephropathia diabetica (PAS) • End-stage-kidney (HE, picrosirius) • Carcinoma renis (HE) • Carcinoma transitiocellulare <p>Preparation:</p> <ul style="list-style-type: none"> • Carcinoma renis • Cysta simplex renis • Pyelonephritis chronica • Ren soleiformis - trisomia 18 • Urocystitis acuta haemorrhagica
Week 8	<ul style="list-style-type: none"> • Urinary outflow obstruction. Renal tumors. Pathology of the urinary bladder • Pathology of the male genital tract 	<p>Practice 8 - Male genital organs and gravidity</p> <p>Histology:</p> <ul style="list-style-type: none"> • Seminoma • Embryonal carcinoma • Teratoma adultum (HE) • Nodular hyperplasia, prostate • Adenocarcinoma prostatae • Extrauterine gravidity <p>Preparation:</p> <ul style="list-style-type: none"> • Gravidity extrauterina • Mola hydatidosa • Penis carcinoma • Real knot in umbilicus

Week 9	<ul style="list-style-type: none"> • Pathology of the female genital tract 	<p>Practice 9 - Female genital organs</p> <p>Histology:</p> <ul style="list-style-type: none"> • Carcinoma planocellulare cervicis uteri • Teratoma maturum cysticum/cysta dermoides ovarii • Serosus carcinoma, High grade (cystadenocarcinoma ovarii) • Hyperplasia simplex • Endometrioid endometrium carcinoma • Ovarian follicular cyst <p>Preparation:</p> <ul style="list-style-type: none"> • Carcinoma endometrii • Cystadenocarcinoma ovarii • Endometriosis ovarii
Week 10	<ul style="list-style-type: none"> • Pathology of the breast and pregnancy • Hypophysis, thyroid gland 	<p>Practice 10 - Breast</p> <p>Histology:</p> <ul style="list-style-type: none"> • Fibrocystic disease • Invasive carcinoma, NST • Invasive carcinoma, lobular • Ductal carcinoma in situ (DCIS) • Fibroepithelial tumor <p>Preparation:</p> <ul style="list-style-type: none"> • Malignant breast tumor
Spring break		
Week 11	<ul style="list-style-type: none"> • Parathyroid gland, adrenals, MEN 	<p>Practice 11- Endocrinology and dermatology</p> <p>Histology:</p> <ul style="list-style-type: none"> • Multinodulare goiter • Hashimoto-thyroiditis • Carcinoma papillare thyroideae • Pheochromocytoma • Naevus intradermalis cutis • Melanoma malignum cutis • Carcinoma basocellulare <p>Preparation:</p> <ul style="list-style-type: none"> • Kaposi sarcoma • Keloid • Macroglossia propter adenoma hypophysealis
Week 12	<ul style="list-style-type: none"> • Pathology of musculoskeletal system • Malformations, cerebrovascular diseases, edema, herniation, and hydrocephalus • CNS tumors, infections 	<p>Practice 12 - Bone and soft tissue</p> <p>Histology:</p> <ul style="list-style-type: none"> • Osteochondroma, bone • Osteosarcoma, bone • Fasciitis nodularis, subcutaneous tissue • Desmoid fibromatosis, mesenterium • Desmoid fibromatosis, mesenterium (beta catenin) • Rhabdomyosarcoma, brain • Liposarcoma-retroperitoneum • Synovial sarcoma-subcutaneous tissue <p>Preparation:</p> <ul style="list-style-type: none"> • Chondroma • Neurofibroma • Osteosarcoma

Week 13	<ul style="list-style-type: none"> • Diseases of myelin • Neurodegenerative disorders • Non-neoplastic diseases of the skin 	Practice 13 - Neurology Histology: <ul style="list-style-type: none"> • Glioblastoma • Medulloblastoma • Meningeoma • Parkinson's disease • Schwannoma Preparation: <ul style="list-style-type: none"> • Anencephaly • Haemorrhagia pontis (Duret hemorrhage) • Hydrocephalus externus • Hydrocephalus internus • Meningeoma • Metastasis multiplex cerebri (melanoma malignum) • Butterfly tumor
Week 14	<ul style="list-style-type: none"> • Neoplastic skin diseases • Pathology competition discussion, student staff meeting, take home message 	Practice 14 - Consultation

List of textbooks:

Kumar, Abbas, Aster Robbins and Cotran: Robbins Basic Pathology (Elsevier, 10th Edition, 2017), ISBN: 978-0-323-35317-5

Andras Matolcsy (eited by) Basic Pathology – A Socratic Approach (Medicina, 2nd edition, 2016), ISBN: 978-963-226-567 6

WEBPAGE:

General informations and downloads: <https://semmelweis.hu/patologia1/>

Online available slide center (digital slides): <http://193.6.208.216/SlideCenter/Login>

Ms. Maria Cserneki shall be approached with technical problems regarding server availability:

e-mail: cserneky.maria@semmelweis-univ.hu

SlideViewer free download:

<https://www.3dhitech.com/research/software-downloads/>

General information

Lectures

The topic of the lectures includes both general and systemic pathology. Each lecture lasts 1hour 10 minutes and is illustrated with board layouts, ppt, macroscopic and microscopic photographs, radiologic images, interesting autopsy cases illustrating the presented material.

Attending the lectures is obligatory, since the semifinal and final exams are partly based on them. The Department may record the absences and those students who skip more than 15 % of the lectures may not be registered for examination.

Practices

There are 14 two hours (1.5 hours) practices in both semesters, which are divided into autopsy and histopathology. Not more than 2 autopsy practices and not more than 2 histopathology practices can be missed in each semester. Catch up is possible only for autopsy hall practices, students can join other groups and their presence should be registered and signed by the tutor of the autopsy hall practice attended. In case the absences exceed the allowed limit the student will not be accepted for examination.

The histopathology practices provide basic histopathology skills. The topic of the histopathology practices matches that of the lectures. Brief theoretical background for the presented slides will be discussed in the frame of the practice. The pathological lesions will be presented in form of digital slides and will be demonstrated by the tutor with the help of a computerized multidiscussion/teleconsultation system. The digitalized slides will be individually studied and analyzed by the students as well. The digital slides are also available for the students through the internet any time (<https://www.3dhistech.com/research/software-downloads/>)

The preserved prepared specimens connected the actual material will be demonstrated during the histopathology practices.

During autopsy practices the students will learn the basic skills of autopsy and how to recognize what's pathological and will gain skills to demonstrate and describe these lesions. The emphasis is on the clinicopathologic aspects of the discussed cases. The clinical staff or the therapist usually will be called at the end of every autopsy practices in order to realise a common consultation, discussion and summary with the end of take home messages.

The medical and patient information provided during autopsies, lectures and demonstrations is confidential. The requirement to maintain professional secrecy and preserve confidentiality also applies for medical students.

It is strictly forbidden to make any kind of record (photography, video, sound-record) of the material provided during the tuition and demonstrations in the facilities and building of the Department, especially during lectures and practices (excluding the autopsy practices, where students are allowed to make pictures certain gross alteration of the demonstrated organs). The material presented during the tuition is the intellectual property of the Department and their presentation is directly controlled by the Department. Therefore, it is not intended for the public and must not be published or arbitrarily recorded, alternatively taken away without the permission of the Department. Violation of the rules mentioned above implies disciplinary action. Exception can be made only based on the previous and written permission provided by the Head of the Department. The Department reserves the rights to completely control the communication of the information about the Department.

Midterm exams: There are no midterm exams nor in the first and not in the second semester as well.

Pathology competition

The only pathology competition will be held just before the last week of the **2nd semester**. Clinicopathology based macroscopic photographs will be projected, and in the former, based on documentation, the participants should recognize and describe an autopsy case and answer the case connected questions.

Students use code word. The first 3 place winner will be awarded. More information will be announced on the lecture held by the Head of the Department.

Consultation

Upon request there is a possibility for a consultation with always the tutor. The students are welcome to autopsy practices of other groups for retake or extra occasion as long as it does not disturb the ongoing practice. There is no planar consultation during any semester.

Examinations

SEMIFINAL:

1. Prerequisites:

Absences: not more than 2 autopsy practices and not more than 2 histology practices (histology practice and autopsy hall practice counts separately) can be missed in each semester. Attending the lectures is obligatory. If one does not fulfill the above mentioned prerequisites the Department of Pathology and Experimental Cancer Research has the right for not acknowledging the semester.

The semifinal exam consists of practical and theoretical parts.

All exam starts with practical exam followed by theoretical part.

2. Practical exam:

1 first semester histopathology slide and 1 first semester specimen demonstration.

2 marks will be given.

3. Theoretical part is an oral exam:

Sei-final exam questions: 2 topics (A and B)

1 topic: (*general pathology*) Sign with the letter "A"

1 topic: (*oncology and cardiology*). Sign with the letter "B"

The list of these theoretical questions is on the website of the Department.

2 additional marks will be given.

Evaluation: Failure of the practice is not obligatory failure of the exam.

Summary by the exam committee 1 final, result mark will be given in the index: practice marks (2) + oral marks (2). It should be kept in mind that the final mark is not merely the mathematical average of the given grades of different parts of the exam! Serious mistakes or "clear spots" in your knowledge may significantly affect the final mark or even result in a failed exam.

Suspension: If you have any problem during the practical exam, ask the supervisor. In case of communicating, unacceptable behaviour, cheating (usage of mobile tools, books, notes, etc.,) your exam is immediately suspended and the exam will not be evaluated and counts as a failed exam. Written report of the incident will be prepared and signed by the teachers.

The exam begins at 9.00 a.m. at the Department of Pathology and Experimental Cancer Research, meeting at the Digital Histology practice room, ground floor. The students to be examined will be identified by picture ID cards by the supervisor before starting the exam. Therefore, students should present a picture ID, otherwise they are not allowed to take examination!

Exam dates: You will be notified about the dates offered by the Department before the exam period and they will be finalized at the Staff/Student meeting. Then these fixed days will figure in NEPTUN.

Usually Tuesdays and Thursday are the regular exam dates. Usually Tuesdays and Thursday are the regular exam dates and app. 25-30 EM students are accepted each exam day.

Important! Taking examinations before the exam period is not permitted! (University Policy). In exceptional cases (such as near-delivery, etc.), you must have a written permission from the Dean's Office.

Registration: The internet based sign up system (NEPTUN) regarding pathology has been established for 3rd year students as well. The sign up procedure is controlled and regulated by the software and the institute cannot interfere with the system. The officially signed up students will be scheduled for examination.

Rescheduling the exam date: The list of examinees is completed 1 hour before the examination date. The NEPTUN system automatically closes the sign up list by expiration of the deadline. Example: if the exam is on Tuesday, you may remove your name before Monday 12:00 pm. After that changes are not permitted. If you do not show up on the given exam date, you should justify it within 3 days at the head of the Institute or at the tutor responsible for the English program. Otherwise, "not appeared" note is written in your index, and the exam is not allowed without having a retake ticket! The skipped exam is deducted from the number of possible retake exams.

Retake exam: In case of failure or for those who are unsatisfied with the result of the first exam a retake exam should be taken to improve the mark. For that a retake ticket is required from the secretariat. If one retakes an exam to improve the previous mark it is not granted that mark of the retake exam cannot be the same or worse than the previous mark.

Every parts of the exam must be retaken - the practical exam as well.

One must also register on the NEPTUN system and indicate that this is the first, second, etc. retake exam. Without retake ticket and NEPTUN registration one is not allowed to take an examination.

Any further details regarding the exam and exam dates will be discussed on a Students-Professor sitting held in the 7-8 gradual week, first semester. The date of the meeting is to be announced on the lecture.

FINAL EXAM

Prerequisites:

Absences: not more than 2 autopsy practices and not more than 2 histology practices (histology practice and autopsy hall practice counts separately) can be missed in each semester. Attending the lectures is obligatory. If one does not fulfill the above mentioned prerequisites the Department of Pathology and Experimental Cancer Research has the right for not acknowledging the semester. Further requirement is to pass the semifinal exam before.

The final exam consists of practical and theoretical parts.

All exam starts with practical exam followed by theoretical part.

Practical exam: 2 histopathology slides of any semester and 1 specimen demonstration of any semester and 1 organ demonstration in the autopsy room. During this part of the exam dissected organs or organ complexes are to be described. The student should be able to orientate the organ (or organ complex) properly, to describe it fully and evaluate the pathological alterations and establish diagnoses.

3 marks will be given as the result of the practical exam.

Theoretical part is an oral exam:

Final exam questions: 3 topics (A, B, C)

1 topic: (general pathology) Sign with the letter "A"

1 topic: (oncology and cardiology). Sign with the letter "B"

1 topic: (systemic pathology). Sign with the letter "C"

The list of these theoretical questions is on the website of the Department.

The exam board may ask the 10 autopsy case's summary collected during the two semesters. The autopsy cases are discussed previously to the students by the tutor.

4 additional marks will be given.

Evaluation: Failure of the practice is not obligatory failure of the final exam.

Summary by the exam committee 1 final, result mark will be given in the index: practice exam marks (3) + oral exam marks (4). It should be kept in mind that the final mark is not merely the mathematical average of the given grades of different parts of the exam! Serious mistakes or “clear spots” in your knowledge may significantly affect the final mark or even result in a failed exam.

Suspension: If you have any problem during the practical exam, ask the supervisor. In case of communicating, unacceptable behaviour, cheating (usage of mobile tools, books, notes, etc..) your exam is immediately suspended and the exam will not be evaluated and counts as a failed exam. Written report of the incident will be prepared and signed by the teachers.

The exam for EM begins at 9.00 a.m. at the Department of Pathology and Experimental Cancer Research, meeting at the Digital Histology practice room, ground floor. The students to be examined will be identified by picture ID cards by the supervisor before starting the exam. Therefore, students should present a picture ID, otherwise they are not allowed to take examination!

Exam dates: You will be notified about the dates offered by the Department before the exam period and they will be finalized at the Staff/Student meeting. Then these fixed days will figure in NEPTUN. Usually Tuesdays and Thursday are the regular exam dates and app. 25-30 EM students are accepted each exam day.

Important! Taking examinations before the exam period is not permitted! (University Policy). In exceptional cases (such as near-delivery, etc.), you must have a written permission from the Dean's Office.

Registration: The internet based sign up system (NEPTUN) regarding pathology has been established for 3rd year students as well. The sign up procedure is controlled and regulated by the software and the institute cannot interfere with the system. The officially signed up students will be scheduled for examination.

Rescheduling the exam date: The list of examinees is completed 1 hour before the examination date. The NEPTUN system automatically closes the sign up list by expiration of the deadline. Example: if the exam is on Tuesday, you may remove your name before Monday 12:00 pm. After that changes are not permitted. If you do not show up on the given exam date, you should justify it within 3 days at the head of the Institute or at the tutor responsible for the English program. Otherwise, “not appeared” note is written in your index, and the exam is not allowed without having a retake ticket! The skipped exam is deducted from the number of possible retake exams.

Retake exam: In case of failure or for those who are unsatisfied with the result of the first exam a retake exam should be taken to improve the mark. For that a retake ticket is required from the secretariat. If one retakes an exam to improve the previous mark it is not granted that mark of the retake exam cannot be the same or worse than the previous mark.

Every parts of the exam must be retaken - the practical exam as well.

One must also register on the NEPTUN system and indicate that this is the first, second, etc. retake exam. Without retake ticket and NEPTUN registration one is not allowed to take an examination.

Any further details regarding the exam and exam dates will be discussed on a Students-Professor sitting held in the 7-8 gradual week of the second semester. The date of the meeting is to be announced on the lecture.

Schedule

Lectures

	1st semester		2nd semester	
	Monday	10:00 – 11:10	10:00 – 11:10	
	Wednesday	8:00 – 9:10	8:00 – 9:10	

Practices

	1st semester		2nd semester	
Group 10,11,12	Monday	11:30 – 13:00	Monday	11:30 – 13:00
	Thursday	11:30 – 13:00	Thursday	11:30 – 13:00
Group 14,15,16	Wednesday	12:00 – 13:30	Wednesday	12:00 – 13:30
	Friday	12:00 – 13:30	Friday	12:00 – 13:30
Group 17,19,20	Wednesday	14:00 – 15:30	Wednesday	14:00 – 15:30
	Friday	14:15 – 15:45	Friday	14:15 – 15:45

* preliminary data

Contact list of Tutors

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PATHOLOGY II.**Second Semester****Lectures** (3 hours per week)

29. Liver and biliary system
 30. Liver and biliary system
 31. Liver and biliary system
32. Kidney
 33. Kidney
34. Urinary tract
35. Male genital system
36. Gynecologic pathology
 37. Gynecologic pathology
38. Neonatology
 39. Breast
40. Blood and lymphoid organs
 41. Blood and lymphoid organs
42. Blood and lymphoid organs
 43. Blood and lymphoid organs
44. Endocrinology

Histopathology practices

- Alcoholic hepatitis H&E(70)
 Chronic hepatitis H&E (71)
 Liver cirrhosis H&E(72)
 Hepatocellular carcinoma H&E (73)
 Cavernous haemangioma of liver H&E (35)
 Chronic cholecystitis H&E(74)
 Chronic pancreatitis H&E(75)
 Acute hemorrhagic necrotising pancreatitis H&E(76)
 Pancreatic pseudocyst (slide demonstration)
 Adenocarcinoma of pancreas H&E (77)
 Islet cell tumor of pancreas (slide demonstration)
 Diabetic nodular glomerulosclerosis
 (Kimmelstiel-Wilson) H&E (78)
 Glomerulonephritis H&E (79)
 End stage kidney H&E (80)
 Acute rejection in transplanted kidney H&E (22)
 Acute pyelonephritis H&E (81)
 Chronic pyelonephritis H&E (82)
 Renal cell carcinoma H&E (83)
 Normal adrenal cortex (slide demonstration)
 Wilm's tumor H&E(84)
 Transitional cell carcinoma H&E (28)
 Nodular hyperplasia of the prostate H&E(85)
 Adenocarcinoma of prostate H&E(87)
 Seminoma H&E (88)
 Embryonal carcinoma (slide demonstration)
 Teratoma H&E(89)
 Placenta retention H&E (90)
 Extrauterine gravidity H&E (91)
 Arias-Stella phenomenon (slide demonstration)
 Hydatiform mole H&E (92)
 Choriocarcinoma H&E (93)
 Endometrial hyperplasia H&E (94)
 Endometriosis (slide demonstration)
 Endometrium carcinoma H&E (95)
 Chronic cervicitis H&E (123)
 HPV infection in cervix H&E (124)
 In situ hybridisation (slide demonstration)
 Condyloma acuminatum (slide demonstration)
 Follicular cyst of the ovary H&E (125)
 Mucinous cystadenoma of the ovary H&E(29)
 Mucinous cystadenocarcinoma (slide demonstration)
 Borderline serous papillary cystadenoma of the ovary H&E (126)
 Serous papillary cystadenocarcinoma of the ovary (slide demo)
 Granulosa cell tumor (slide demonstration)
 Fibrocystic disease of the breast H&E(101)

Lectures (3 hours per week)

- 45. Endocrinology
- 46. Skin
- 47. Skin
- 48. Head and neck
- 49. Bones and joints
- 50. Bones and joints
- 51. Bones and joints
- 52. Eye
- 53. Skeletal muscle
- 54. Nervous system
- 55. Nervous system
- 56. Nervous system
- 57. Clinicopathologic conference

Histopathology practices

- Peri- and intracanalicular fibroadenoma of the breast H&E (33)
- Phylloid tumor (slide demonstration)
- Intraductal carcinoma H&E (102)
- Invasive ductal carcinoma H&E(103)
- Invasive lobular carcinoma H&E (104)
- FNAB of the breast (cytol. smear demonstration)
- Normal bone marrow H&E (127)
- Leukemic bone marrow H&E(128)
- Leukemic infiltration of parenchymal organs (slide demonstration)
- Multiple myeloma H&E (106)
- Amyloidosis Congo (21)
- Non Hodgkin lymphoma (low grade) H&E (107)
- Non Hodgkin lymphoma (high grade) H&E (108)
- Follicular lymphoma (slide demonstration)
- Tonsillar lymphoma (slide demonstration)
- MALT lymphoma (slide demonstration)
- Hodgkin lymphoma H&E (109)
- Hodgkin lymphoma histologic types (slide demonstration)
- Colloid goiter H&E(110)
- Graves disease H&E (111)
- Follicular adenoma of the thyroid gland H&E(112)
- Follicular carcinoma (slide demonstration)
- Papillary carcinoma of the thyroid gland H&E (113)
- Medullary carcinoma (slide demonstration)
- Adrenal cortical adenoma H&E(105)
- Parathyroid adenoma (slide demonstration)
- Osteosarcoma H&E (114)
- Rhabdomyosarcoma H&E (115)
- Rheumatoid arthritis H&E (116)
- Autoimmun diseases (slide demonstration)
- Basocellular carcinoma H&E (27)
- Verruca vulgaris H&E (100)
- Naevus pigmentosus H&E (39)
- Malignant melanoma H&E (40)
- Metastatic melanoma (slide demonstration)
- Bowen's disease (slide demonstration)
- Capillary haemangioma of the skin H&E (34)
- Purulent meningitis H&E(117)
- Encephalitis H&E (118)
- Meningeoma H&E (119)
- Glioblastoma multiforme H&E(120)
- Schwannoma H&E (121)
- Neuroblastoma H&E (122)
- Ganglioneuroblastoma (slide demonstration)
- Paraganglioma (slide demonstration)
- Review

Semifinal Exam: Autopsy demonstration on the last autopsy practice will be graded 1 to 5. This grade, if not 1, will be added to the scores of written tests. Written test is composed of 100 Qs (true-false, simple choice, problem solving, combination, multiple choice, relations, medical term, assay, scores are 0-65:1; 66-73:2; 74-83:3; 84-89:4; 90-105:5). Further details available in the semifinal exam protocol provided one month before examination period.

PATHOLOGY I - II.**Department of Pathology, Forensic and Insurance Medicine**Head of Department: *Prof. Dr. András Kiss***Index**

Lectures

List of textbooks

Histopathology practices - slides for the histopathology exam and slide demonstrations

General information - Lectures, practices, competition

Examinations: Examination

Examinations - Final

Schedule

Schedule for the academic year

1st SEMESTER

	LECTURES	HISTOPATHOLOGY
Week 1	Introduction Intracellular storage. Cell injury Reversible cell injury (hydropic swelling, atrophy, hypertrophy, hyperplasia, metaplasia, dysplasia). Irreversible cell injury (necrosis, apoptosis, ischemic cell injury, external damaging agents, calcification, hyalinization, aging).	Practice 1- Introduction Safety rules Digital teaching system Teleconsultation E-school
Week 2	Hemodynamic disorders I. Basics of hemodynamics. Hemorrhage, active and passive hyperemia. Disorders of fluid homeostasis and electrolytes. Edema. Hemodynamic disorders II. Thrombosis, embolism. Infarction. Shock.	Practice 2- Cell injury, adaptation, storage disorders Coagulative necrosis, Liquefactive necrosis Apoptosis Hypertrophy Hyperplasia Fatty degeneration Amyloidosis Infiltratio adiposa myocardii Bronchus - squamous metaplasia
Week 3	Inflammation I. Definition. Symptoms. Vascular permeability. Inflammatory mediators and their origin. Cellular recruitment. Acute inflammation. Systemic manifestations of inflammation. Inflammation of avascular tissues. Wound healing, regeneration and repair. Classification of cells and tissues according to their regenerative capability. Extracellular matrix. Inflammation II. Chronic inflammation. Fibrosis, scar formation. Granulomatous inflammation: (tuberculosis, syphilis. etc.)	Practice 3- Hemodynamic disorders I. Acute congestion - pulmonary edema Chronic pulmonary congestion Hemosiderin in alveolar macrophages ("heart failure cells") Chronic congestion in the liver ("nutmeg liver") Shock, DIC

	LECTURES	HISTOPATHOLOGY
Week 4	Cardiovascular pathology I. Structure of vessels. Atherosclerosis. Aneurysms. Hypertensive vascular disease. Inflammatory disorders of blood vessels. Microvascular disease. Diseases of the veins and lymphatic vessels. Vascular tumors. Cardiovascular pathology II. Endocarditis, myocarditis, pericarditis. Rheumatic heart disease. Ischemic heart disease.	Practice 4- Hemodynamic disorders II. Thrombus Fat embolism Anemic infarction – kidney Hemorrhagic infarction - lung
Week 5	Cardiovascular pathology III. Congenital heart diseases. Cardiomyopathies. Heart failure. Systemic diseases involving the heart. Cardiac tumors. Neoplasia I. Neoplasia - definition. Characteristics of benign and malignant tumors. Histological classification of tumors. Grading.	Practice 5- Inflammation, cell repair Acute appendicitis Fibrinous pericarditis Granulation tissue Foreign body granuloma Rheumatic myocarditis
Week 6	Neoplasia II. Causes of neoplasia. Epidemiology. Chemical, physical and biological carcinogenesis. Prevention. Screening. Neoplasia III. Molecular mechanisms of tumor development: protooncogenes, oncogenes, tumor suppressor genes, growth factors.	Practice 6- Midterm I (cell injury, hemodynamics, inflammation) Cardiovascular diseases Arteriosclerosis Atherosclerosis Acute myocardial infarction Myocardial infarction - healing Endocarditis Viral myocarditis Temporal arteritis Kaposi-sarcoma
Week 7	Neoplasia IV. Tumor growth, tumor progression, metastasis. Familiar cancer Neoplasia V. Prognostic factors in tumor pathology. Staging and grading of tumors. TNM. Handling of surgical biopsy material	Practice 7- Neoplasia I Squamous metaplasia Condyloma (LSIL) CIN 3 (HSIL) Invasive carcinoma
Week 8	Childhood tumors	Practice 8- Neoplasia II. (Benign and malignant tumors) Squamous papilloma Squamous cell carcinoma Adenoma Adenocarcinoma Lymph node metastasis Liver metastasis
Week 9	Methods of pathology I. Grossing, HE and special staining techniques, immunohistochemistry. FNAB, core biopsy.	Practice 9- Neoplasia III. (Soft tissue and childhood tumors) Leiomyoma Leiomyosarcoma Osteosarcoma Wilms tumor Neuroblastoma Mature teratoma Fascitis nodularis Desmoid fibromatosis Rhabdomyosarcoma Liposarcoma

	LECTURES	HISTOPATHOLOGY
Week 10	<p>Genetic and developmental disorders. Gene pathology I. Single-gene abnormalities. Autosomal dominant and recessive inheritance, sex-linked disorders. Lysosomal storage disease.</p> <p>Genetic and developmental disorders. Gene pathology II. Chromosomal abnormalities. Morphogenic disorders, malformations, multifactorial inheritance. Prenatal diagnosis. Familiar diseases and symptoms.</p>	<p>Practice 10- Biopsy techniques, protein- and DNA-based diagnostics Cytology smear Core needle biopsy Biopsy by endoscopy Frozen section Special stains Immunohistochemistry FISH Polypus nasi Asthma bronchiale Acut rejection Lupus nephritis Scleroderma</p>
Week 11	<p>Methods of pathology II. Diagnostic parameters, requirements, which guide the clinical protocols. Molecular diagnostics of tumors. Targeted therapy</p> <p>Immunopathology Constituents of the immune system. Hypersensitive reactions. Allergy. Transplantation. Immunodeficiency. AIDS.</p>	<p>Practice 11- Hematopathology I. Reactive lymphadenopathy Hodgkin's Lymphoma Nodal non-Hodgkin's lymphoma Extranodal non-Hodgkin's lymphoma Multiple myeloma</p>
Week 12	<p>Autoimmune diseases Etiology. Monosystemic diseases (e.g. chr. atrophic gastritis, myasthenia gravis, Graves disease, Hashimoto thyroiditis, Addison disease., Insulin-dependent diabetes mellitus, multiple sclerosis) and Oligo- polysystemic diseases (e.g. SLE, Sjögren sy, RA, scleroderma, dermatomyositis) Hematopathology I. Hemopoetic system. Normal function (bone marrow, lymph nodes, spleen). Morphology and immunologic evaluation. Disorders of platelets and coagulation. Anemias, polycytemia. Neutrophilia. Proliferative disorders of mast cells. Monocytosis. Sinus histiocytosis. Benign disorders of lymphoid cells.</p>	<p>Practice 12- Practical exam (1 organ, 1 histology slides, 3 questions from the definition list)</p>
Week 13	<p>Hematopathology II. Acute myeloproliferative syndromes (acute leukaemias). Chronic myeloproliferative syndromes (CML, myelofibrosis, thrombocytemia). Acute and chronic lymphocytic leukemias. Disorders of the spleen.</p> <p>Hematopathology III. Lymphomas (Hodgkin, non-Hodgkin). Metastatic tumors in bone marrow and lymph nodes.</p>	<p>Practice 13- Hematopathology II. Megaloblastos vérképzés AML CML Myelofibrosis CLL</p>
Week 14	<p>Infectious diseases Viral diseases (tick-borne viruses, polio, smallpox, herpes, CMV, EBV, rubella, varicella, mumps, influenza), Rickettsiae, Spirochetes. Bacteria (tularaemia, pertussis, legionella, brucellosis, listeriosis, clostridial infections (tetanus, botulism), Streptococci) Actinomycosis. Mycobacteria (tbc, leprosy). Protozoa (malaria, toxoplasmosis, amebiasis) Environmental and nutritional pathology Smoking, alcoholism, drugs. Iatrogenic injuries. Environmental chemical and physical factors. Obesity, protein malnutrition, vitamins</p>	<p>Practice 14 - Consultation</p>

2nd Semester

	LECTURES	HISTOPATHOLOGY
Week 1	Head and neck Neoplastic and non-neoplastic lesions of the lips, oral cavity, tongue, teeth, salivary glands, sinuses, pharynx, larynx, ear. Respiratory system I. Diseases of conducting airways and lung parenchyma. Diffuse alveolar damage. Chronic obstructive pulmonary disease (COPD). Restrictive lung diseases.	Practice 1- Pulmonary pathology I. - non-neoplastic diseases IRDS Bronchopneumonia Lobar pneumonia Tuberculosis Boeck sarcoidosis Cystic fibrosis Pneumocystis pneumonia
Week 2	Respiratory system II. Development of lung cancer. Neoplasia (primary cancer of the lung, metastasis, benign tumors). Etiology, genetic abnormalities. Diseases of the pleura. Gastrointestinal tract I. Esophagus (anatomy and developmental disorders, inflammation, trauma, tumors). Pathology of the stomach (part 1).	Practice 2- Pulmonary pathology II- neoplastic Small cell carcinoma Squamous cell carcinoma Adenocarcinoma Mesothelioma
Week 3	Gastrointestinal tract II. Pathology of the stomach (part 2) and small bowel. Appendix. Gastrointestinal tract III. Pathology of the Colon (congenital disorders, infections, diverticular disease, inflammation, Crohn's disease, ulcerative colitis, vascular diseases, neoplasms, other disorders). Peritoneum.	Practice 3- Gastrointestinal pathology I. Peptic ulcer - stomach Gastritis chronica (H. pylori) Carcinoma sigillocellulare GIST Pleomorphic adenoma – parotid gland
Week 4	Pathology of the liver I. Anatomy and function of the liver.. Bilirubin-metabolism and jaundice. Hepatic failure. Hepatorenal syndrome. Viral hepatitis. Chronic hepatitis. Cirrhosis. Portal hypertension. Non-viral hepatitis. Pathology of the liver II. Alcoholic liver disease, toxic liver injury. Hemochromatosis. Vascular disorders.	Practice 4- Gastrointestinal pathology II. Celiac disease Ulcerative colitis Crohn's disease
Week 5	Pathology of the liver III. Neoplasms. Gallbladder and bile ducts (congenital anomalies, cholecystitis, cholelithiasis, cholangitis, neoplasms) Pathology of the exocrine pancreas Developmental abnormalities, inflammation, tumors of the exocrine pancreas.	Practice 5- Liver pathology Alcoholic hepatitis Viral hepatitis Cirrhosis Hepatocellular carcinoma Chronic cholecystitis
Week 6	Endocrinology I. Pathology of the endocrine pancreas: Diabetes mellitus. The hypothalamus-hypophysis system. Pathology of the pituitary gland. The thyroid gland: hypo- and hyperfunction, inflammations, tumors. Endocrinology II. Pathology of the parathyroid gland. Hypo- and hyperfunction and other diseases of the adrenal cortex. Tumors of the adrenal gland. Pineal gland. Ectopic hormone production	Practice 6- Pathology of the pancreas Acute pancreatitis Chronic pancreatitis Adenocarcinoma of the pancreas Neuroendocrine tumor
Week 7	Renal pathology I. Anatomy. Definitions. Clinical syndromes. Cystic renal diseases. Destructive and non-destructive tubulointerstitial diseases. Kidney biopsy. End stage kidney. Renal pathology II. Glomerulonephritis.	Practice 7- Endocrine pathology Goiter Autoimmune thyroiditis (Hashimoto) Thyroid gland-follicular adenoma Thyroid gland-papillary carcinoma Pheochromocytoma

	LECTURES	HISTOPATHOLOGY
Week 8	Renal pathology III. Tumors of the kidney. Kidney transplantation.	Practice 8- Renal- and uropathology Kidney biopsy – diabetic nephropathy End-stage kidney disease Renal cell carcinoma Transitional cell carcinoma
Week 9	Uropathology Congenital abnormalities of the urinary tract. Urinary bladder (malformations, inflammation, tumors). Urethra. Penis and scrotum. Male genital tract Diseases of the epididymis, testes, prostate.	Practice 9- Uropathology- prostate, testis Prostatic hyperplasia Prostatic adenocarcinoma Testis- seminoma Testis -embryonal carcinoma
Week 10	Gynecologic pathology I. Pathology of the vulva and vagina. Non-neoplastic diseases of the cervix. Precancerous lesions of the cervix. HPV. Screening. Conisation. Cervix carcinoma. Bethesda system. Gynecologic pathology II. Pathology of the uterus. Uterine bleeding disorders. Endometrial hyperplasia, endometriosis. Tumors of the endometrium, myometrium and serosa. Pathology of the fallopian tube and the ovaries.	Practice 10- Midterm III. (lung, GI, liver, endocrine, kidney, urology and male genital system) Gynecologic pathology Ectopic pregnancy Endometriosis Endometrial hyperplasia (simple) Endometrial carcinoma Follicular cyst- ovary Mucinous cystadenoma-ovary Serous cystadenoma-ovary High grade serous carcinoma-ovary Choriocarcinoma
Week 11	Breast pathology I. Symptoms and diagnosis of breast diseases. Malformations. Benign symptomatic lesions (inflammations, fibrocystic disease, epithelial dysplasia and its significance, benign tumors).	Practice 11- Breast Pathology Fibrocystic disease Fibroepithelial tumors Ductal carcinoma in situ (DCIS) Invasive carcinoma (NST, lobular)
Week 12	Breast pathology II. Malignant tumors - epidemiology, risk factors. Histologic classification of breast cancer. Prognostic factors in breast cancer. Non-epithelial malignancies of the breast. Screening: non-palpable breast lesions. The male breast.	Practice 12- CNS histopathology Purulent meningitis Meningeoma Glioma Brain metastasis Parkinson-disease
Week 13	Neonatology Pregnancy-related pathology. Premature birth and its complications. Intrauterine infections and their sequelae. Twin pregnancy. Diseases of the perinatal period. Sudden infant death Central nervous system I. Trauma, vascular and circulatory disorders. CSF dynamics. Encephalomyelitis, meningitis. Congenital malformations. Demyelinating diseases. Neurodegenerative diseases. Pathology of the eye and ear. Metabolic diseases.	Practice 13- Skin pathology Seborrheas-keratosis Basal cell carcinoma Melanocytic naevus Malignant melanoma
Week 14	Central nervous system II. Neoplasms (neuroectodermal, embryonic, ectopic tissue, metastasis). Peripheral nervous system (neuropathies, inflammations, trauma, tumors). Skin pathology Basics of skin pathology. Primary lesions. Dermatitides. Infectious conditions of the skin. Skin manifestations of systemic diseases. Tumors of the surface epithelium and skin appendages. Pigmented nevi and malignant melanoma	Practice 14- Interesting autopsy case presentation Consultation

General information

Study materials are available via Moodle system.

List of textbooks

Kumar, Abbas, Aster Robbins and Cotran: Robbins Basic Pathology (Elsevier, 10th Edition, 2017), ISBN: 978-0-323-35317-5
 Szende B., Suba Zs Introduction to Histopathology (Medicina, 1999)

WEBPAGE

General informations and downloads: <http://semmelweis.hu/patologia2/en/>
 Online available slide center (digital slides): <https://slidecenter.semmelweis.hu>
 User name and password for Java based version: student_jav
 User name and password for SlideViewer based usage: student_pv

The visit of the internet based SlideCenter and Practice Test on tuition and exam dates is allowed after 4 p.m. only!

Mr. Gábor Drozda and Mr. Endre Kontsek shall be approached with technical problems regarding server availability:

e-mail: for Mr. Gábor Drozda: drozda.gabor@semmelweis.hu
 for Mr. Endre Kontsek: kontsek.endre@semmelweis.hu

SlideViewer free download:

<https://www.3dhistech.com/research/digital-microscopes-viewers/slideviewer/>

Lectures

The topic of the lectures include both general and systemic pathology. Each lecture lasts 1 hour 15 minutes and is illustrated with macroscopic and microscopic photographs, radiologic images, illustrating the presented material. Occasionally interesting autopsy cases will be demonstrated during the lectures.

Practices

There are 14 two + two hour practices in both semesters, which are divided into autopsy and histopathology. Not more than 3 autopsy practices and not more than 3 histopathology practices can be missed in each semester. Catch up is possible only for autopsy hall practices, students can join other groups and their presence should be registered and signed by the tutor of the autopsy hall practice attended. In case the absences exceed the allowed limit the student will not be accepted for examination.

The **histopathology practices** provide basic histopathology skills. The topic of the histopathology practices matches that of the lectures. Brief theoretical background for the presented slides will be discussed in the frame of the practice. The pathological lesions will be presented in form of digital slides and will be demonstrated by the tutor with the help of a computerized multidiscussion/teleconsultation system. The digitalized slides will be individually studied and analyzed by the students as well. The digital slides are also available for the students through the internet every day from 4 p.m. till 8 a.m. the next day.

During **autopsy practices** the students will learn the basic skills of autopsy and how to recognize what's pathological and will gain skills to demonstrate and describe these lesions. The emphasis is on the clinicopathologic aspects of the discussed cases. If there is no autopsy available, organ demonstration will take place on plastinated organs. Alternatively, visit of the laboratories (Laboratory of Histopathology, Laboratory of Immunohistochemistry and Laboratory of Molecular Pathology) of the Department will be on the program.

The medical and patient information provided during autopsies, lectures and demonstrations is confidential. The requirement to maintain professional secrecy and preserve confidentiality also applies for medical students.

It is strictly forbidden to make any kind of record (photography, video, sound-record) of the material provided during the tuition and demonstrations in the facilities and building of the Department, especially during lectures and practices (including autopsy and histology practices). The material presented during the tuition is the intellectual property of the Department and their presentation is directly controlled

by the Department. Therefore, it is not intended for the public and must not be published or arbitrarily recorded, alternatively taken away without the permission of the Department. Violation of the rules mentioned above implies disciplinary action. Exception can be made only based on the previous and written permission provided by the Head of the Department. The Department reserves the rights to completely control the communication of the information about the Department.

Midterm exams: There are one midterm exam in the first and second semester, respectively. Similarly to the written part of semifinal and final exams, midterms are performed in the e-school system. In addition, on week 12 of the first semester practical exam is held.

The participation of the midterm exams is obligatory. If a student does not attend one of the midterms, annual signature will be withdrawn. Additional (non-scheduled) events for the midterm may be provided only for certificated medical reasons.

Pathology competition

Pathology competition has two rounds in the 2nd semester, it is expected to take place in weeks 11 and 13. Macroscopic photographs will be projected in the first round and diagnoses should be given. The students with the best results (up to 8-10 people, depending on the number of participants) will enter the second round. The second round has two parts: theoretical and histopathology parts. In the former, based on documentation, the participants should recognize and describe an autopsy case (virtual autopsy). During the histopathology part, participants should recognize and describe a neoplastic and a non-neoplastic slide. Students use pseudonyms in both rounds. Those students who enter the second round are exempt from test writing, those who recognize both of the histopathology slides in the second round are exempt from histopathology. Students who are finally ranked position 1-3 exempt autopsy in the final exam.

Consultation

Upon request there is a possibility for a consultation with the tutor. The students are welcome to autopsy practices of other groups for retake or extra occasion as long as it does not disturb the ongoing practice. **There is no consultation during the exam period.**

EXAMINATIONS

SEMIFINAL:

1. Prerequisites:

Absences: not more than 3 autopsy practices and not more than 3 histology practices (histology practice and autopsy hall practice counts separately) can be missed in each semester. If one does not fulfill the above mentioned prerequisites the Department of Pathology, Forensic and Insurance Medicine has the right for not acknowledging the semester.

Midterm exams: Participation of the midterm exams during each semester is obligatory.

2. Practical exam will be held during the week 12 practice. One should be able to recognize the organ (complex), orientate it properly, precisely describe the pathological lesions and establish a macroscopical diagnosis. In addition, examinee should be able to recognize and describe one histology slide, and answer three questions from the definition list (see our webpage). Successful completion of the organ demonstration as part of the practical exam is a prerequisite for passing the exam. Students who receive a 'fail' grade will be required to repeat the organ demonstration at a prearranged time before the semester examination.

3. The semifinal exam is a written test!

The material for the examinations is based on the book, the lectures and practices as well. The questions are prepared based on the official pathological textbook, but the factual data of the lectures are also constituents of the written test.

The test consists of **60 questions** in the e-school system. The students have 60 minutes for writing the test. The test is given in one session, there will be no break during the examination. Your sitting order is determined by the actual supervisor. The written test will be held in the **Histopathology practice room** using the teleconsultation computerized system. Every student to be examined on a certain exam day will receive the same set of questions, however, in different order within one question and regarding the numbering of the questions as well. The actual set of questions will be randomly selected from a pool by the computer. Upon submission of the test for evaluation, the computer will evaluate it. The result is immediately available and will be recorded. **Since there is no possibility of human error in the correction the result of the written test is not subject of personal consultation.**

The test questions include simple choice (one correct answer out of 5), multiple choice (2 answers are correct), "true-false" analysis and definitions should be given. Every correct answer of a multiple choice question will be awarded with one point, false statements of the multiple choice questions will result in one point deduction in order to avoid randomly crossing every possible answer of the multiple choice questions. Altogether, the deductions can not conclude a negative score, the worst score for one question is 0. Before submitting the test for evaluation the answers might be changed. Copying the questions are not permitted. The results are posted at the same day, generally early afternoon.

Evaluation: The passing level of the written test is 60% (without extra points, see below), below 60% the exam is immediately failed. If the level of 60% is achieved, the points received on the midterm and practical exam will be added to percentage received on the written test.

Extra points: In the mid-term exam of the 1st semester, students who achieve 60% will receive 1 point, students who achieve 75% will receive 2 points and students who achieve 90% will receive 3 points, which will be added as a percentage to the semester exam. For the practical exam, students will receive a fail (0 points), pass (1 point), or pass (2 points) grade for all three sections, which will be added as percentage to the semester test exam score. The maximum number of extra points available is 9.

60-69,99%: = 2

70-79,99%: = 3

80-89,99%: = 4

90-100%: = 5

Suspension: If you have any problem during the test, ask the supervisor. In case of communicating, unacceptable behaviour, cheating (usage of mobile tools, books, notes, etc.,) your exam is immediately suspended and the exam will not be evaluated and counts as a failed exam. Written report of the incident will be prepared and signed by the teachers.

4.The exam for EM begins at 8.30 a.m. sharp at the **Department of Pathology, Forensic and Insurance Medicine** meeting at the **Histology practice room**. The students to be examined will be identified by picture ID cards by the supervisor before starting the exam. Therefore, students should present a picture ID, otherwise they are not allowed to take examination!

5. Exam dates: You will be notified about the dates offered by the Department before the exam period and they will be finalized at the Staff/Student meeting. Then these fixed days will figure in NEPTUN. Important! Taking examinations before the exam period is not permitted! (University Policy). In exceptional cases (such as near-delivery, etc.), you must have a written permission from the Dean's Office.

6. Registration: The internet based sign up system (NEPTUN) regarding pathology has been established for 3rd year students as well. The sign up procedure is controlled and regulated by the software and the institute can not interfere with the system. The officially signed up students will be scheduled for examination.

7. Retake exam: In case of failure or for those who are unsatisfied with the result of the first exam a retake exam should be taken to improve the mark. For that a retake ticket is required from the secretariate. If one retakes an exam to improve the previous mark it is not granted that mark of the retake exam can not be the same or worse than the previous mark.

The retake exam - the first retake exam as well - may be oral by request!!!

One must also register on the NEPTUN system and indicate that this is the first, second, etc. retake exam. Without retake ticket and NEPTUN registration one is not allowed to take an examination.

FINAL EXAM

The material for the examinations is based on the book, the lectures and practices as well!

The examination will take place at the Department of Pathology, Forensic and Insurance Medicine, starting with the written test in the Histology Practice Room.

The final exam starts at 8.30 a.m. sharp!!!

MEETING POINT: In the Histology Practice Room at the Department.

The students to be examined will be identified by picture ID cards by the supervisor before starting the exam. Therefore, students should present a picture ID, otherwise they are not allowed to take examination!

The final exam consists of two practical and two theoretical parts. The practical parts are **histopathology** in the histology practice room and **organ demonstration** in the autopsy hall. The theoretical parts are: **written test (60 questions – 60 minutes)** and **oral exam about theoretical topics** – concerning not only the organ or organ complex to be demonstrated, but the complete material discussed in the official pathology books as well as the material presented in the lectures. **The written test is obligatory part of the exam! The passing limit is 60%.** The test is given in one session, there will be no break during the examination. Your sitting order is determined by the actual supervisor.

Parts of the final exam:

I. Written test: The test questions include simple choice (one right answer out of 5), and multiple choice (2 correct answers are correct), “true-false” analysis. Every correct answers of multiple choice questions will be awarded with one point, false statements of the multiple choice questions will result in one point deduction on order to avoid randomly crossing every possible answers of the multiple choice questions. Every answer should be marked in the computer. Before submitting answers for evaluation the answers might be changed.

Extra points: In the mid-term exam of the 2nd semester, students who achieve 60% will receive 1 point, students who achieve 75% will receive 2 points and students who achieve 90% will receive 3 points, which will be added as a percentage to the result of the written test. The maximum number of extra points available is 3.

Evaluation: Each correct answer is worth of 1 point. The written test is passed if the result reaches 60% without any extra points added.

60-69,99%: = 2

70-79,99%: = 3

80-89,99%: = 4

90-100%: = 5

II. Histology part: After test writing, examinees are required to take the histology part of the final. Two slides from the pool are given to the student and the examinee should describe the organ (if there is one present on the slide) and the histological findings. Finally, a correct diagnosis should be given. The histology part can not be examined by the tutor of the student.

III. Organ demonstration: After the test and histology, organ demonstration follows. During this part of the exam dissected organs or organ complexes are to be described. The student should be able to orientate the organ (or organ complex) properly, to describe it fully and evaluate the pathological alterations and establish diagnoses.

IV. Oral exam: 3 theoretical questions of the oral examination are from a list of theoretical questions (one from group A, B and C). The list of these theoretical questions is on the website of the department.

If the written exam or the histological part of the final exam is failed, the examination may be continued, but the final mark must be less than 5. If both the written test and the histological exam are failed, the examination is discontinued with an final mark of 1. If either the organ demonstration or the theoretical questions are failed, the final mark for the final exam is mark 1.

The final mark will be decided by the exam board of the institute based on the marks received on the practical and theoretical parts of the final exam. It should be kept in mind that the final mark is not merely the mathematical average of the given grades of different parts of the exam! Additional factors, for example your midterm results, your general performance during the academic year (evaluated by your tutor), the competition results, etc. are also taken into consideration. Serious mistakes or “clear spots” in your knowledge may significantly affect the final mark or even result in a failed exam.

Retake exam: In case of failure or for those who are unsatisfied with the result of the first exam a retake exam should be taken to improve the mark. If the student retakes the exam to improve the previous mark, the mark of the retake exam may be the same or worse than the previous mark. The student must also register on the NEPTUN system and indicate that this is the first, second, etc. retake exam. Without retake ticket and NEPTUN registration the student is not allowed to take an examination.

By retake examination in case of failure, the written test or/and the histology exam or/and the organ demonstration should not be repeated in case it has reached at least grade 3 by the previous examination.

In case of a retake exam that serves as improving the grade, the complete examination should be repeated, except if the written test/histology/autopsy part was grade 5.

Announcement of the results is at the same day.

Suspension: If you have any problem during the test, ask the supervisor. In case of communicating, unacceptable behaviour, cheating (usage of mobile phone, books, notes, etc.,) your exam is immediately suspended and the exam will not be evaluated and counts as failed exam. Written report of the incident will be prepared and signed by the teachers.

Responsible tutor: Dr. Éva KOCSMÁR (kocsmar.eva@semmelweis.hu)

Tutors:

Dr. András KISS
 Dr. András BUDAI
 Dr. István KENESSEY
 Dr. Tibor VÁRKONYI
 Dr. Eszter SZATMÁRI
 Dr. Lilla MADARAS
 Dr. Judit HALÁSZ
 Dr. Zsófia KRAMER
 Dr. Zorán MÁLI
 Dr. Attila KOVÁCS
 Dr. Alíz GÓGL
 Dr. Gábor LOTZ
 Dr. Glória RADVÁNSZKI
 Dr. Deján DOBI
 Dr. József TÍMÁR

CLINICAL ECG**Semmelweis University, Faculty of Medicine****Name of the managing institute (and any contributing institutes):**

Heart and Vascular Center
Institute of Translational Medicine

Credit value: 3

Weeks 1–7: Total number of lessons/week: 4 lecture: 2 practical course: 2 seminar: 0

Weeks 8–14: Total number of lessons/week: 2 lecture: 0 practical course: 2 seminar: 0

Subject type: obligatory course

Academic year: 2021/2022

Name of the course leader: Zoltán Benyó MD, PhD, DSc (weeks 1-7)

His/her workplace, phone number: Institute of Translational Medicine, 210-0306

Position: director, professor

Date and registration number of their habilitation: 2008, 259

Name of the course leader: Dávid Becker MD, PhD, (weeks 8-14)

His/her workplace, phone number: Heart and Vascular Center, +36-1-458-10

Position: deputy director

Date and registration number of their habilitation: 2020, 02

Objectives of the subject, its place in the medical curriculum:

The aim of the subject is to prepare students for the courses in cardiology and internal medicine.

The student should be able to recognize the conditions requiring immediate cardiac intervention and the most important arrhythmias.

Place where the subject is taught (address of the auditorium, seminar room, etc.):

Nagyvárad square Building, 1089 Bp. Nagyvárad tér 4. (weeks 1–7: lectures and practicals)

Heart and Vascular Center, 1122 Budapest, Városmajor u. 68. (weeks 8–14: practicals)

Successful completion of the subject results in the acquisition of the following competencies:

The student will be able to independently record an ECG and give a professionally correct description of a 12-lead ECG at rest. He/she will be able to estimate basic parameters, identify abnormalities and list clinical conditions that may cause the abnormalities described. Of particular importance is the ability to recognize ST-elevation myocardial infarction, atrial fibrillation and arrhythmias requiring acute intervention.

Course prerequisites:

biophysics, physiology

Detailed curriculum:
Weeks 1–7, lectures (2-45 min):

Week	Translational Medicine (45 min)	Cardiovascular Center (45 min)
1	The concept and classification of arrhythmias. Mechanisms of origin of tachyarrhythmias.	Examination of a patient with supraventricular tachycardia. Differential diagnosis of narrow QRS tachycardias.
2	Classification of conduction disorders, mechanisms of bradyarrhythmias	The practical significance of impulse formation and conduction disorders
3	Repolarization disorders. ECG signs of different forms of ischaemic heart disease.	The role of ECG in the investigation of chest pain pathologies and its role in risk stratification.
4	Ventricular arrhythmias	Differential diagnosis of wide QRS tachycardias. Detection of ventricular tachycardias, ECG criteria.
5	Basics of pacemaker systems	ECG of a patient with pacemaker
6	Cases with multiple abnormalities	Description of complex ECGs, ECG differential diagnostics.
7	Cases to learn from	Revision

Weeks 1-7, practicals:

1. ECG lead systems, nomenclature. Analysis of normal ECG tracings. Estimation of frequency and heart axis. The ladder diagram.
2. Recognition of nodotopic and heterotopic pacemaker disturbances, supraventricular and ventricular tachycardias on ECG tracings.
3. Recognition of SA, AV and intraventricular conduction disturbances. Aberrant conduction.
4. Angina and NSTEMI. Localization and staging of ST-elevation infarcts.
5. Recognition of electrolyte abnormalities, atrial and ventricular strain and hypertrophy.
6. Recognition and practice of multiple abnormalities.
7. **Mid term exam**

Weeks 8-14, practicals:

During the practicals, theoretical knowledge is correlated with clinical practice at the bedside of the wards of the Heart and Vascular Center, and ECG curves of patients are analyzed.

From week 14 – end of the exam period: Examination (written)

Other subjects concerning the border issues of the given subject (both obligatory and optional courses!). Possible overlaps of themes: biophysics, physiology, cardiology

Special study work required to successfully complete the course: none

Requirements for participation in classes and the possibility to make up for absences:

Students can miss two practices, above that they have to make up. It is not possible to make up lectures, but you can make up the practicals in another group in the same week.

Methods to assess knowledge acquisition during term time:

An oral mid term of the material from the basic course (first 6 weeks) in week 7 (analysis of ECG tracings. Attendance is obligatory.

Requirements for signature:

Successful (at least satisfactory) oral demonstration (as the subject is taught by two different departments).

Type of examination:

Written MCQ test

Requirements of the examination:

Recognition of attendance

Method and type of evaluation:

Grading is based on performance in the written test.

How to register for the examination:

through the Neptun system

Possibilities for exam retake:

In accordance with the study and examination regulations

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

Thaler, Malcolm S.: Az egyetlen EKG-könyv, amire szükséged lehet, Medicina Kiadó, 2019

Malcolm S. Thaler: The Only EKG Book You'll Ever Need, Wolters Kluwer, 2019

Trappe, Hans-Joachim, Schuster Hans-Peter: EKG-Kurs für Isabel, Thieme, 2013

Simon András–Tornóci László: EKG érthetően (munkafüzet), Semmelweis Kiadó, 2015

Simon András–Tornóci László: Understanding ECG (workbook), Semmelweis Kiadó, 2016

INTERNAL MEDICINE - PROPEDEUTICS

First (Groups 10-18) or Second (Groups 1-9) Semester

Department of Internal Medicine and Oncology
Department of Internal Medicine and Hematology

Course directors: *prof. István Takács* and *prof. Tamás Masszi*

Course coordinators: *dr Péter Studinger* and *dr Katalin Keltai*

Exam type: oral exam

Credit: 4

Objective of the course: Primary objective of the course is to have the student to acquire the basic skills of examination of a medical patient. Lectures will present the fundamental components of a complete medical patient interview and methods of physical examination. Bedside practices will allow students to gain experience in using these methods. Special emphasis will be placed on the of proper physician behavior with patients.

Lectures:

1. Patient interview, comprehensive health history.
2. Techniques of physical examination: inspection, palpation, percussion, auscultation.
3. Measurement and evaluation of body temperature. Evaluation of body weight, height, composition. Urinalysis, measurement of urine output.
4. Physical diagnosis of the common pleural and pulmonary syndromes. I.
5. Physical diagnosis of the common pleural and pulmonary syndromes. II.
6. Heart sounds and murmurs, diagnosis of valvular diseases.
7. Evaluation of blood pressure, pulse, and vascular system.
8. Physical examination of the abdomen and hernias.
9. Signs, symptoms and differential diagnosis of "acute abdomen".
10. General diagnostics of the kidney and the urinary tract.
11. Evaluation of the musculoskeletal system.
12. Examination of the breasts. Patient with malignant neoplasm, ECOG classification.
13. Examination of the lymph nodes. Physical and laboratory evaluation of the hematologic diseases.
14. Signs and symptoms of diseases of the endocrine system.

Practices:

1. Introduction to medicine. Patient interview and health history
2. Approach to symptoms, patient documentation (patient chart, flowsheet, follow up)
3. Methods of physical examination: inspection, palpation
4. Methods of physical examination: percussion, auscultation
5. Practicing physical examination of the thorax and lung I.
6. Practicing physical examination of the thorax and lung II.
7. Practicing physical examination of the heart I.
8. Practicing physical examination of the heart, ECG evaluation.
9. Practicing blood pressure and pulse measurement, evaluation of the vascular system
10. Practicing physical examination of the abdomen I.
11. Practicing physical examination of the abdomen II.
12. Practicing evaluation of changes in body temperature and examination of the urogenital system. Bedside blood glucose measurement.
13. Practicing physical examination of the musculoskeletal system, breasts and lymph nodes.
14. Summary and review

BASIC SURGICAL TECHNIQUES

Department of Surgical Research and Techniques

Theoretical Block at Nagyvárad Square, Operating Lab ,
1089 Budapest, Nagyvárad sqr 4.

Lecturer: **Professor Dr. György Wéber** Dr. Andrea Ferencz

Tutor: **Dr. Györgyi Szabó**

Credit: 2

Second Semester

Prerequisites: Microscopic Anatomy and Histology II., Medical Physiology II.

The aim of the subject is to practice the basic surgical techniques, to present hygienic approach, which attainments are indispensable for clinical doctors working in manual field of medicine. This subject provides basics about special behavior in the operating theatre, preparation of the patient and surgical team before operation, surgical tools and instruments, wound management, laparoscopic instruments and techniques.

Recommended for students interesting in manual fields of medicine.

Practices are held on every second week (7x135 minutes).

1. Basic suturing techniques on the skill models (simple interrupted suture). Basic surgical instruments and their usage.
2. Getting acquainted with the operating room, rules and behavior in the operating room, scrubbing-in and preparation of the surgical field. Knotting techniques.
3. Basic suturing techniques on ex-vivo animal model (interrupted sutures).
4. Basic suturing techniques on ex-vivo animal model (continuous sutures).
5. Demonstration of the laparoscopic tower and instruments.
6. Practicing eye-brain-hand coordination and fine hand movements using a laparoscopic pelvitrainer.
7. Practical exam

Attendance is obligatory on every practice. Because of limited capacity of operating lab, absence cannot be repeated by joining another group. Only one missed practice can be repeated .

Absence Absence from practices is not to exceed 25%. One practice can be retaken in another group after registration on our website.

Requirement: Exam (5 degree evaluation).

Textbook: A. Ferencz, Gy. Wéber, J. Sándor: Basic surgical techniques

PROBLEM BASED MEDICAL PHYSIOLOGY

Course Director: Prof. Dr. László Hunyady M.D., Ph.D., D.Sc.,
Head of the Department of Physiology

Lecturers: *Professor László Hunyady* M.D., Ph.D., D.Sc.
Professor Péter Enyedi M.D., Ph.D., D.Sc.
Péter Várnai M.D., Ph.D., associate professor
Miklós Geiszt M.D., Ph.D., associate professor
Gábor Czirják M.D., Ph.D., assistant professor

Credits: 4

Programme:

The primary purpose of this course is the synthesis of the theoretical and practical knowledge of the students. The thematic of the course includes various clinical and non-clinical practical problems (e.g. acclimatisation). The students will receive questions related to a specific problem and they have usually one week to find the proper answer in available electronic and printed information sources. Problem solving is based on the discussion of the students with directions from the instructors. This course requires the active participation of the students. The role of the instructor is to determine the thematics of the course and to provide guidance to the discussions.

Thematics:

1. Physiologic principles of circulatory problems I.
2. Physiologic principles of circulatory problems II.
3. Physiologic principles of circulatory problems III.
4. Physiologic principles of respiratory problems I.
5. Physiologic principles of respiratory problems II.
6. Physiology of acclimatisation.
7. Dysfunctions of kidneys I.
8. Dysfunctions of kidneys II.
9. Immune cells and blood coagulation.
10. Physiologic principles of the regulation of food intake.
11. Dysfunctions of neuroendocrine system I.
12. Dysfunctions of neuroendocrine system II.
13. Dysfunctions of central nervous system I.
14. Dysfunctions of central nervous system II.

Requirement and attendance

Requirement: Medical Physiology (AOKIKELT2A)

In case of an over-application selection will be made on the base of the exam achievement.

Condition of the sign: participation at min. 75% of the lessons. Replacement of an absence is not possible.

Absence: Certification of the absence from the lessons is not required. Absence from the exam should be certificated in three weekdays (medical certificate).

Semester requirement: Recitation: every week, oral or written. Details will be given on the first lesson.

End-semester evaluation: Condition of the sign: participation at min. 75% of the lessons. A practical mark will be given.

Mark: Weekly results plus the oral exam grade.

Exam sign up: On the last week, personal.

Written subject-matter of instruction: the discussable themes were selected by the lecturers of the Department of Physiology, and are given to the students every week. The necessary subject-matter of instruction will be published on the home page of the Department of Physiology. Use of data bases in the Central Library of the University (e.g. PubMed) is required.

BIOETHICS—MEDICAL ETHICS**Department:****Institute of Behavioral Sciences****Department of Bioethics**

NET Building, 19th, 20th floor

1089. Budapest, Nagyváradi tér 4.

Tel: 210-2953

Secretary: Csilla Motyovszki , e-mail: motyovszki.csilla@med.semmelweis-univ.hu

Tel: 210-2930/56114, NET Building, 20th floor, Room-2015

(28 hours)

2023/2024 year II. semester**Course objectives:**

- a.) **To enable students to recognize ethical issues when encountered in everyday clinical practice and research**
- b.) **To provide students with a conceptual-logical system, which helps them to address ethical questions and to resolve ethical dilemmas in an efficient way**
- c.) **To introduce students to a body of knowledge, which helps them to understand, respect and protect the rights of patients' research subjects and fellow health care professionals**
- d.) **To help the would be health care professional to understand the responsibility of the individual, of the health care system and of the society as a whole in maintaining health**

Lectures:**1. week. Lecture (18 February, 2021)**

Principles of Medical Ethics (Jozsef Kovacs)

2. week. (Lecture)

Informed Consent I. (Jozsef Kovacs)

3. week. (Lecture)

Informed Consent II. (Jozsef Kovacs)

4. week. (Lecture)

Competence and Capacity to Make Health Care Decisions (Orsolya Peter)

5. week. Lecture

Ethical Questions of Human Research (Jozsef Kovacs)

6. week Lecture

Reproductive Issues (Orsolya Peter)

7. week. Lecture

Organ and Tissue Transplantation (Jozsef Kovacs)

8. week. Lecture

Information Disclosure to Terminally Ill Patients. Telling the Truth to Patients (Orsolya Peter)

9. week Lecture

Confidentiality and Medical Records. Reportable Illnesses, HIV-Related Issues, Sexually Transmitted Diseases (STDs) (Orsolya Peter)

10. week. Lecture

End of Life Issues (Jozsef Kovacs)

11. week Lecture

Doctor-Patient, Doctor-Doctor Relationship (Jozsef Kovacs)

12. week Lecture

Doctor and Society (Jozsef Kovacs)

13. week Lecture

Malpractice (Orsolya Péter)

14. week Lecture

The Rights of Patients (Orsolya Péter)

Course Faculty:

1. Jozsef Kovacs, MD, PhD, (Head of the Department of Bioethics), 210-2930/56115; e-mail: kovacs.jozsef@med.semmelweis-univ.hu (Room 2003)
2. Ágnes Dósa, MD, JD, PhD e-mail: dosaagi@gmail.com (Tel: +36-30-9-912-462)
3. Imre Szebik, MD, PhD e-mail: szebik.imre@med.semmelweis-univ.hu (Room 1914) (Tel: +36-20-824-3195)
4. Jenő Lőrincz, MD, JD e-mail: lorincz.jeno@med.semmelweis-univ.hu (Room 2007) (Tel: +36-30-749-4768)
5. Ágnes Zana, PhD e-mail: zana.agnes@med.semmelweis-univ.hu (Room 2008) (Tel: +36-30-53-01-647)
6. Orsolya Péter, JD, PhD, peter.orsolya@med.semmelweis-univ.hu; peterorsolya@gmail.com (Room 2012) (Tel: +36-30-906-5787)

Course attendance statistics can be found on NEPTUN in the following way:

Taken courses -- options -- Course details -- Attendance statistics.

List of questions

- | | |
|--|---|
| <ol style="list-style-type: none"> 1. The principles of medical ethics 2. Competence and the capacity to make decisions 3. Paternalism in medical practice 4. Informed consent 5. Information disclosure for terminally ill patients 6. Withholding and withdrawal of medical treatment 7. Advance Directives 8. Do not resuscitate (DNR) orders 9. Withholding Fluids and Nutrition in terminally ill patients 10. Physician assisted suicide 11. Active and Passive Euthanasia 12. Terminal sedation and the law of double effect 13. Futile medical care 14. Determination of death and brain death 15. Ethical problems of live organ donation 16. Organ donation from brain-dead donors: the system of donor cards. | <ol style="list-style-type: none"> 17. Organ donation from brain-dead donors: presumed consent 18. Reproductive issues (abortion, contraception, sterilization, donation of sperm and eggs) 19. HIV related issues (confidentiality, partner notification, HIV-positive health-care workers, refusal to treat HIV-positive patients) and sexually transmitted diseases (STDs) 20. Malpractice 21. Doctor-patient relationship (beginning and ending the relationship, gifts from patients, doctor/patient sexual contact) 22. Doctor and society (child abuse, elder abuse, impaired drivers, physician participation in executions, torture, spousal abuse, gunshot wounds, gifts and industry funding) 23. Doctor-doctor relationship (reporting impaired physicians, physician disagreements) 24. Confidentiality and medical records 25. Ethical Questions of Human Research 26. The Rights of Patients |
|--|---|

Textbook:

Conrad Fischer—Caterina Oneto (2016): Medical Ethics for the Boards. (Third edition) New York: McGraw-Hill Education.

ISBN: 978-1-259-64121-3

MHID 1-25-964121-X

The textbook can be ordered in the following bookshop: Medicina könyvesbolt, Budapest, IX. Üllői út 91/a (tel: 06-1-215-3786)

Lectures: The power point slides of the lectures can be found at the Moodle site of the course and at:

<http://semmelweis.hu/magtud/en/education/faculty-of-medicine>

Password is given on the lectures

A thorough knowledge of the textbook is the absolute minimum for passing the exam, although in itself it may not be enough to pass it. Because the power point slides contain only the outline of each lecture, participation on the lectures is indispensable for a full understanding of the subject.

MEDICAL ASPECTS OF DISASTER PREPAREDNESS AND RESPONSE

Directorate for Safety Technology
Department for Disaster Management and Education

Supervisor: *Mátyás Simon*

Lecturer: *Csaba Csendes*

Credit value: 0

Second Semester**Purpose of the lecture:**

The goal of the subject is to provide basic knowledge of the definition, mission, reasons and circumstances of establishment of civil protection/disaster management, on its place and role in the country's defense/protection system; to provide information on the types of disasters and their features. Based on experience gained in real incidents, to provide information on the peculiarities of disaster management and the tasks of medical authorities in this context.

The syllabus:

(M1) Concept, mission, tasks and establishment of civil protection and disaster management in Hungary. Types and features of disasters, the disaster vulnerability of Hungary, the organizational system of the protection against disasters, command and control of protection, the role of medical authorities.

(M2) The early warning system and signals of disaster management. The elimination of the consequences of disasters, the staff work applied during protection. Features and activities of Hungarian disaster management organizations and authorities, international possibilities of disaster management and the lessons learnt, demonstrated by examples.

Requirements and the potential for absences to participate in the sessions:

The subject consists of 4 modules. Module 1 does not have any prerequisites; module 2 anticipates the fulfillment of module 1.

Students must register to attend the course announced as required. Those who are unable to fulfill module 1 or 2 (do not attend), may participate in a supplementary lesson in the 1st semester of the following year.

The method of certificate for the workshops and the exam absences:

Certificate of absence: medical, official – court of justice, local government, Students' Union, etc.

The mid-term controls' (reports, midterm) number, topic and date, replacements and repairs:

Method of making up for the absence justified by certificate: participation in a supplementary lesson.

Requirements for the signature:

Students must participate in the lesson announced to acquire signature, or in case of absence justified by certificate, in a supplementary lesson. Only registered students may participate in a supplementary lesson announced.

The method of grading: signature

Type of examination: none

Requirements: none, students must fulfill the obligation to attend the lessons.

Application for exam: none

Changing procedure for exam application: none

Absence from the examination: none

Notes, textbooks, study aids and literature list: László Major PhD – Ronald Barham PhD – Dr. György Orgován PhD: Medical Aspects of Disaster Preparedness & Response – Semmelweis Kiadó 2017. ISBN 978-963-331-420-3

PHYSICAL EDUCATION V-VI.

Department of Physical Education

Subject: Physical Education V.

Type of Subject: Obligatory

Credit: 0

Name of the Lecturer: Várszegi Kornélia

The objectives of Physical Education:

The short-term goal of the course is to maintain and improve the students' current state of health, to create the physical conditions for a better quality of life by learning and practicing (new) branches of sports that can be practiced after graduation as well. The long-term goal is to improve the quality of life and life prospects of future physicians, and to provide students with credible preventive attitudes and lifestyle advice - so that they can represent those in their later practice, through their own health-promoting behavior.

The syllabus (preferably a week and numbered):

Within the framework of obligatory regular physical activity, the requirements of the subject can be fulfilled as free of charge and self-financed student as well. The former is available during classes and courses organized by the Semmelweis University's Centre for Physical Education and Sports (TSK), and the latter is available at SE-TSK accredited partner locations.

Free of charge:

60 minute classes held at the same time on a weekly basis, on the premises of the TSK facilities and other locations.

1107 Bp, Zággrábi utca 14.

1x60 min./week sessions:

- Aerobics, BlessYou Gym, boulder, functional circuit training, golf, beginner Yoga, male football, salsa, step aerobics, badminton, beginner ultimate frisbee, advanced ultimate frisbee, zumba
- 1 x 90 mins./week sessions: women's football, ice hockey, beginner tennis, beginner tennis 2,
- 4 x 3 hrs. and 1x 2 hrs. session packages: Golf, Hiking 1, Hiking 2.
- 2x90 mins./week sport training (competitive sport, for qualified only): cheerleader, men's and women football, handball, basketball, volleyball, waterpolo

Fee-based:

at the sports venues specified on www.semmelweis.hu/sportkozpont, which will also be advertised on the Neptun system. The list of these locations may vary per school year.

Attendance requirements; conditions under which students can make up for absences and the method of absence justification:

The number of active participations for physical education classes is 10 (once a week), regardless of the number of school breaks, which is to be completed during the hours assigned to the group. Two hours can be recovered in the first week of the exam period, on two separate days. Lessons missed do not need to be certified; however, catching up is mandatory. The days of study breaks do not qualify as automatic attendance. Practice leaders follow an online presence registration at the beginning and end of the lessons, which can be individually tracked on semmelweis.hu/sportkozpont homepage.

Except for the Sport Hiking courses, where you have to attend 4 times due to blocking. 3 of these are on your own course and 1 can be made up by arrangement with the instructor!

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes!

Department of Physical Education

Subject: Physical Education VI.

Type of Subject: Obligatory

Credit: 0

Name of the Lecturer: Várszegi Kornélia

The objectives of Physical Education:

The short-term goal of the course is to maintain and improve the students' current state of health, to create the physical conditions for a better quality of life by learning and practicing (new) branches of sports that can be practiced after graduation as well. The long-term goal is to improve the quality of life and life prospects of future physicians, and to provide students with credible preventive attitudes and lifestyle advice - so that they can represent those in their later practice, through their own health-promoting behavior.

The syllabus (preferably a week and numbered):

Within the framework of obligatory regular physical activity, the requirements of the subject can be fulfilled as free of charge and self-financed student as well. The former is available during classes and courses organized by the Semmelweis University's Centre for Physical Education and Sports (TSK), and the latter is available at SE-TSK accredited partner locations.

Free of charge:

60 minute classes held at the same time on a weekly basis, on the premises of the TSK facilities and other locations.

1107 Bp, Zágrábi utca 14.

1x60 min./week sessions:

- Aerobics, BlessYou Gym, boulder, functional circuit training, golf, beginner Yoga, male football, salsa, step aerobics, badminton, beginner ultimate frisbee, advanced ultimate frisbee, zumba
- 1 x 90 mins./week sessions: women's football, ice hockey, beginner tennis, beginner tennis 2,
- 4 x 3 hrs. and 1x 2 hrs. session packages: Golf, Hiking 1, Hiking 2.
- 2x90 mins./week sport training (competitive sport, for qualified only): cheerleader, men's and women football, handball, basketball, volleyball, waterpolo

Fee-based:

at the sports venues specified on www.semmelweis.hu/sportkozpont, which will also be advertised on the Neptun system. The list of these locations may vary per school year.

Attendance requirements; conditions under which students can make up for absences and the method of absence justification:

The number of active participations for physical education classes is 10 (once a week), regardless of the number of school breaks, which is to be completed during the hours assigned to the group. Two hours can be recovered in the first week of the exam period, on two separate days. Lessons missed do not need to be certified; however, catching up is mandatory. The days of study breaks do not qualify as automatic attendance. Practice leaders follow an online presence registration at the beginning and end of the lessons, which can be individually tracked on semmelweis.hu/sportkozpont homepage.

Except for the Sport Hiking courses, where you have to attend 4 times due to blocking. 3 of these are on your own course and 1 can be made up by arrangement with the instructor!

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes!

SUMMER (INTERNAL MEDICINE) PRACTICE

Managing (and contributing) institutes:

Department of Internal Medicine and Hematology

Department of Internal Medicine and Oncology

In English: Internal medicine summer practical

Total hours: practice: 40 hours/week for 4 weeks

Type of course: obligatory

Responsible for course: Prof. Dr. Tamás Masszi, Prof. Dr. István Takács

Aim of the course, its position in the medical curriculum:

The main aim of the internal medicine summer practical following the 6th semester is, apart from practicing taking medical history and performing physical examination, detailed introduction to and participation in practical clinical work, as well as utilisation of obtained pre-clinical knowledge. Acquiring the basics of the integrative approach of internal medicine, practicing differential diagnostics.

Location of course (address of lecture-hall, seminar room, etc.):

Department of Internal Medicine and Hematology

Department of Internal Medicine and Oncology

External training sites (see list of accepted practical locations)

Acquired competences after successfully completing the course:

Practical and internal medical utilisation of knowledge obtained during theoretical courses and propedeutics within the internal medicine famulus practical. The goal is that the student is able to receive the patient, start examination, set up diagnostic and, as far as possible, treatment plan, as well as to perform routine treatment, under supervision. Furthermore, the aim is to acquire professional and human communication skills with medical staff, patients and their relatives.

Prerequisite(s) for admission to the course:

Attendance requirements of propedeutics and signature in propedeutics. Successful exam in propedeutics is not a criterium for attending summer practical.

Student enrolment requirements (minimum, maximum), method of student selection:

Based on registration in the Neptun system maximum 25 students per shift per Department.

Detailed syllabus:

Students participate in practice 8 hours daily, 5 days a week for 4 weeks **General syllabus:**

Introduction to the internal medical ward and the hospital.

Examination of patient, treatment of assigned patients at an assistant physician level under supervision, according to only partial pharmacological knowledge.

Medical history:

- taking medical history of patient, documenting the organised collected information with medical terms.
- interpretation of medical history in patient's documentation (abbreviations, recognition of connection of events)
- considering an expected home treatment based on medical history

Medication

- connecting the name of the patient's medications with the active ingredients
- identifying indication of drugs (in medical history)
- setting up a medical treatment plan for the condition indicated upon admission

Physical examination

- practicing head-to-toe examination and its professional description
- practicing targeted examination (e.g. patient with dyspnoea, anaemia, hepatic cirrhosis)
- recognising connection between acquired results of physical examination and medical history

Practicing the most important medical interventions

- Measuring pulse, blood pressure, temperature, weight, blood glucose
- Administration methods of medication
- Blood sample collection, injection administration, insulin administration, utilisation of pen (perhaps insulin pump)
- Prepare and administer infusions with supervision, introduction to transfusion
- Utilisation of diagnostic devices (ECG, Doppler, ultrasound, monitor, blood gas)

Introduction to patient's documentation (patient's chart, medical record, glucose chart, fluid chart, critical patient sheet), individual documentation. Professional demonstration of patient case known and followed by student on clinical rounds.

Acquiring skills of communication with patient and relatives, especially of informing patient and confidentiality. Become familiar with informed consents required for interventions, their introduction to patient, obtaining consent.

As far as possible, participation in consultations, in imaging diagnostics, in examination with devices, in clinical pathological consultations, especially in case of patient's known by student.

Participation in professional consultations of the institute.

Schedule

8:00-8:15	AM short meeting about events of night shift, daily tasks
8:15-9:30	AM medical rounds at ward - making rounds in the ward with the ward physician
9:30-10:00	AM clinical case consultation
10:00-10:20	AM coffee break
10:20-11:00	AM participation in ward tasks, participation in scheduled examinations, admission of new patients
11:00 AM-12:00	PM medical rounds with senior physician of ward
12:00-12:30	PM midday medical consultation
12:30-01:00	PM lunch break
01:00-01:30	PM assessment of and consultation on laboratory findings
01:30-02:00	PM consultation on daily tasks, reviewing and correction of documentation, reviewing activities log book, discussion of home study

Cross-border issues of the given course related to other courses (obligatory and elective). Possible overlaps in curriculum: general hospital bedside practice, practical basics of clinical courses

Activities

The student prepares an activity log book during the practical. Each student follows the patient turnover of a hospital bed. Student prepares medical record for the patient assigned to the bed and documents daily events. Student may analyse and explain patient's medication, details of therapy (e.g. choice of antibiotics, adjusting medication of cardiac insufficiency, etc.). Student may document main points of examinations, interventions, consultations they participated in during the day. The log book may be electronic or hand-written.

Requirements for participation in classes and opportunities to make up for absences:

According to the Studies and Exams Code, the criteria for obtaining signature is at least 75% participation in the practical.

Examination of acquired knowledge during term:

cannot be interpreted

Type of exam: report**Exam requirements:**

Presentation of activity log book, exam on the subjects listed in the general syllabus within the context of a bedside consultation.

Method and type of class marks:

The completion of the practical is confirmed by a signature. Confirmation is given based on the activity shown during the practical and the complex patient examination at the end of the practice.

How to apply for the exam:

Application happens automatically when applying for the practical.

Opportunity to repeat the exam:

Not applicable.

The list of printed, electronic and online notes, textbooks, study aids and literature to be used for to learn the curriculum (in case of online sources, html address): Bickley, L.S.-: Bates' Guide to Physical Examination and History Taking. 12th ed. Wolters Kluwer, 2016.

Practical examination

1. taking medical history of a given patient, documenting the organised collected information with medical terms, complete physical examination of patient and its professional presentation (may be performed previously during the days before the exam, student is expected to present the documentation in the test)
2. theoretical and practical consultation on one item of the exam items.

Exam items

1. targeted examination of patient with dyspnoea
2. targeted examination of patient with anaemia
3. targeted examination of patient with renal insufficiency
4. targeted examination of patient arriving with chest pain
5. targeted examination of patient with fever
6. measurement of pulse, bedside diagnostics of vascular stenosis
7. blood pressure measurement technique, ABPM, assessing values of blood pressure measured at home
8. describing transfusion process (indication, choosing blood supply, bedside tasks)
9. blood glucose measurement (technique), assessing glucose chart, therapy recommendations
10. practical instructions on insulin treatment, describing utilisation of pen
11. primary/hospital treatment of hypoglycaemic patient
12. primary treatment of patient with ketoacidosis
13. diagnosis and treatment of pleural effusion
14. diagnosis and treatment of ascites
15. arterial blood gas analysis (technique, assessment)
16. recognising septic patient/patient in critical condition (ABCDE), report on condition (SBAR)
17. examination procedure of patient with icterus
18. utilisation of bedside ultrasound device
19. administration methods of medication, preparation of infusion
20. placement technique of urinary catheter

CLINICAL MODULE



Faculty of Medicine
4th year

STUDY PROGRAMME
Fourth Year in the 2024/2025 academic year
4th and 5th Years (7th-10th semesters)

Teaching is done in “clean” blocks: Theory + Practice + Exam. (Practices are taught by “shadowing”)

The time span of each block depends on the credit value of the subjects: 1 to 5 weeks

Pharmacology and Pharmacotherapy is taught on a weekly regular basis for 2 × 14 weeks in the 7th and 8th semesters

For example: based on a subject of 2 credits:

- 2 credits × 14 lessons = 28 lessons (1 semester consists of 14 weeks. The number of credits are equal with the lessons in a week)
- Education is provided as 8 lessons in a day: 4 days × 8 lessons = 32 lessons
- the training and the exam must be completed in 2 weeks
- approx. 40 students will be trained by providing 4 days of training and 2 days of exams within 10 working days.

7-8th Semester

Course name	lecture (h/week)	lecture (h/semester)	practice (h/week)	practice (h/semester)	seminar (h/week)	seminar (h/semester)	credit points	prerequisite(s)	examination	examination
OBLIGATORY										
Cardiology, Heart Surgery, Angiology, Vascular Surgery	AOKKAR1114_1A	2		5				7	Pharmacology II, Clinical ECG, Internal Medicine – Propedeutics	examination
Clinical Pharmacology	AOKFRM1117_1A	0		3				3	Pharmacology II	examination
Dermatology	AOKBOR043_1A	1,5		2,5				4	Pharmacology II, Medical Microbiology II, Pathology II	examination
Emergency Medicine and Oxyology	AOKSGO891_1A	1		1,5				2	Internal Medicine – Propedeutics, Pharmacology I, Translational Medicine and Pathophysiology II	examination
Family Medicine	AOKCSA957_1A	0			12		8	2	Internal Medicine – Propedeutics, Pharmacology I, Laboratory Medicine	practical mark
Internal Medicine I. (Metabolism, Endocrinology, Gastroenterology, Nephrology)	AOKBOK784_1A	2		5				7	Internal Medicine – Propedeutics, Pharmacology II, Pathology II	examination
Laboratory Medicine	AOKLMI709_1A	1,5		1				3	Pharmacology II, Pathology II, Translational Medicine and Pathophysiology II	examination

Course name	lecture (h/week)	lecture (h/semester)	practice (h/week)	practice (h/semester)	seminar (h/week)	seminar (h/semester)	credit points	prerequisite(s)	examination	examination
Medical Imaging	AOKOKA750_1A	1		2				3	Medical Biophysics II, Translational Medicine and Pathophysiology II, Pathology II	examination
Ophthalmology	AOKSZE1143_1A		24		32			4	Internal Medicine – Propedeutics	examination
Oral Surgery and Dentistry	AOKSZB976_1A	0			20		8	2	Pathology II, Basic Surgical Techniques	examination
Otorhinolaryngology	AOKFUL1116_1A	1		1				2	Basic Surgical Techniques, Pathology II	examination
Physical Education VII.	AOKTSI009_7A	0		1				0	Physical Education V.	signature
Physical Education VIII.	AOKTSI009_8A	0		1				0	Physical Education VI	signature
Pulmonology - Thoracic Surgery	AOKPUL751_1A	1,5		2,5				4	Internal Medicine – Propedeutics, Pharmacology II, Basic Surgical Techniques	examination
Summer Practice – Surgery	AOKNSG1134_1A	0			168			3	Surgery I-II	practical examination
Surgery I-II.	AOKSB1704_1A	3		3				6	Basic Surgical Techniques, Pathology II	examination
Traumatology and Orthopedics	AOKTRA1115_1A	1		4				5	Basic Surgical Techniques, Pathology II	examination
OBLIGATORY ELECTIVE / 7TH SEMESTER										
Anesthesiology and Intensive Therapy	AOVANE104_1A	2						2	Intensive Therapy and Anaesthesiology	
Healthcare management	AOVEMK444_1A	2						2		
Medicinal, Epidemiological, and Social Aspects of Drug Abuse	AOVFRM252_1A	2						2	Pharmacology II	
Neonatology	AOVGY1120_1A	2						2	Pediatrics	

LIST OF TEXTBOOKS (The list may change!)

1. Feather – Randall – Waterhouse: Kumar and Clark's Clinical Medicine. (Elsevier, 10th Ed., 2020), ISBN: 9780702078682
2. Adler: ABC of AIDS. 1993. 3rd ed. ISBN 727907611. BMJ
3. Adler: ABC of Sexually Transmitted Diseases. 3rd ed. 1995. ISBN 72790261X. BMJ
4. Becker,W.- Naumann,H.- Pfaltz R.: Ear, Nose and Throat Diseases. Thieme. Stuttgart, New-York, 1994. ISBN 0-86577-536-2 or 3-13-671202-3
5. Répássy,G.: Otolaryngology. Eger, Radó Ny. 2000.
6. Churchill's pocketbook of cardiology. Grubb, NR-Newby,D.E. Edinburgh 2006.
7. Adams,J.C-Hamblen,D.L.:Outline of Orthopaedics. 12th ed. Churchill Livingstone, Edinburgh, 1995. ISBN 0443 05149 6
8. Horst Cotta: Orthopaedics. Georg Thieme Verl. New York, 1980. ISBN 3-13590001-0
9. Szendrői Miklós (szer.): Orthopaedics. Semmelweis Kiadó, 2008. ISBN 978 963 9656 93 2
10. Bourne, Brewis: Lecture Notes on Respiratory Disease. Blackwell. 5th ed. 1998. ISBN 0-632-04968-5
11. Sabiston Essentials of Surgery. Saunders. 1994. ISBN 0-7216-3492-3.
12. Szabó Gy.ed: Oral and Maxillofacial Surgery. Semmelweis Kiadó, Budapest, 2001.
13. Szende B.-Suba Zs.: Introduction to Histopathology. Medicina, Budapest, 1999.
14. Koerner KR: Manual of Minor Oral Surgery for the General Dentist, Blackwell Munksgaard, 2008
15. Peitzman B.A,Rhodes M, Schwab C.W, Yealy M.Y, Fabian C.T: The Trauma Manual: Trauma and Acute Care Surgery, Third edition, Publisher: Wolters Kluwer / Lippincott Williams & Wilkins
16. Basic and Clinical Pharmacology (Ed. B. G. Katzung), 15th edition, McGraw-Hill Education, 2021. ISBN 978-1 260 45231 0
17. Conrad Fischer—Caterina Oneto (2016): Medical Ethics for the Boards. (Third edition) New York: McGraw-Hill Education. ISBN: 978-1-259-64121-3 ;MHID 1-25-964121-X

Recommended textbooks:

1. Jameson – Fauci – Kasper – Hauser – Longo –Losalzo: Harrison's Principles of Internal Medicine. (McGraw-Hill Education, 21st Ed., 2022). ISBN: 9781264268504
2. Lynn S. Bickley: Bates' Guide to Physical Examination and History Taking. (Wolters Kluwer, 12th Ed., 2016.) ISBN: 9781469893419
3. Davis-Christopher: Textbook of Surgery / Synopsys for students (Sabiston)
4. Clive R. G. Quick, Joanna B. Reed et all.: Essential SURGERY(5th Edit.) Churchill Livingston
5. Duckworth,T.: Orthopaedics and Fractures. 3rd ed. Blackwell Science, 1995.
6. Semmelweis Egyetem e-learning rendszere Ortopédia fejezet – Semmelweis University e-learning system: Orthopaedics
7. Szécsény-Berentey: Sebészet. Bp. Medicina.
8. Gaál: Sebészet. Bp. Medicina.
9. Littmann: Sebészeti műtéttan. Bp. Medicina.
10. Dermatology Made Easy 1st Edition by Amanda Oakley OR Dermatology Essentials 2nd Edition by Jean L. Bolognia MD
11. Online sources: UpToDate.com / Dermatology and DermNet.nz
12. Peterson: Principles of Oral and Maxillofacial Surgery. Decker, 2004.
13. Robinson PD: Tooth Extraction. A Practical Guide, Oxford, Boston, 2000
14. Ward Booth P, Eppley B, Schmelzeisen R: Maxillofacial Trauma and Esthetic Facial Reconstruction, 2nd Edition, Elsevier, 2011
15. Forrai J.-Ballér P.: Chrestomathy on the History of Medicine. SOTE, Bp. 1992.
16. W. Becker, H.H. Naumann, C.R. Pfaltz: Ear, Nose and Throat Diseases Georg-Thieme Verlag, Stuttgart 1994. ISBN: 3-13-671202-1
17. Rakel,R.E: Essentials of Family Practice. W.B.Saunders Co. 1998.
18. Taylor,R.B.: Fundamentals of Family Medicine. Springer, 1996.

INTERNAL MEDICINE I. – Metabolism, Endocrinology, Nephrology, Gastroenterology

Department of Internal Medicine and Oncology, 1083 Budapest, Korányi S. u 2/a

Course director: *prof. István Takács*

Course coordinator: *dr. Péter Studinger*

5 weeks

Lectures: 28 hours

Practices: 70 hours

Credit: 7

Objectives of the course:

The primary objective of the course in internal medicine for fourth-year students, who have been acquired the basic skills of physical examination, is the symptom-based and patient-oriented education of various segments of internal medicine. Internal medicine I comprises **endocrinology, metabolic disorders, nephrology and gastroenterology**. Students become familiar with the diagnostics and the treatment of the most common disorders of these disciplines.

Detailed syllabus:

During a 5-week block practice, students spend 13 days in the department, through 4 weeks.

Within the daily schedule, there are lectures for the entire block of students (45-50 students), and case discussion practices in rotation and bedside practices for small groups of students. Students are assigned into groups (15-16 students / group) for the case discussions that are held in rotation. Bedside practices are also held in small groups (7-8 students/group).

On the first day of the 5th week, students take a 60-min written exam, which is comprised of 12-15 open-ended questions. On the following days (Tuesday-Friday), students continue with a bedside, patient-oriented oral exam. Oral exam is comprised of physical examination of a patient, interpretation of physical findings and discussion of diagnostic and therapeutic approach to the patient's endocrine / metabolic / renal / gastroenterological medical condition. There is not any topic list for the written or the oral part of the exam. A sample written test is provided to students on Moodle to help preparation.

Score-to grade conversion is as follows: 90-100: excellent (5), 80-89: good (4), 70-79: average (3), 60-69: pass (2), <60 or <25 on the written test: fail (1).

Schedule:

	Monday	Tuesday	Wednesday	Friday
8:15-9:45	Case discussion 1	Case discussion 3	Case discussion 5	Case discussion 7
10:00-12:15	Bedside practice	Bedside practice	Bedside practice	Bedside practice
13:15-14:00	Lecture 1	Lecture 3	Lecture 5	Lecture 7
14:15-15:00	Lecture 2	Lecture 4	Lecture 6	Lecture 8
15:15-16:00	Case discussion 2	Case discussion 4	Case discussion 6	

Endocrinology and metabolic diseases

Lectures:

1. Introduction to endocrinology: Diseases of the hypothalamus.
2. Thyroid disorders – symptoms, diagnosis and treatment.
3. Thyroid nodules and cancer.
4. Secondary endocrine hypertension (primary aldosteronism, pheochromocytoma).
5. Glucocorticoid deficiency and overproduction: Addison's disease and Cushing's syndrome, iatrogenic Cushing's syndrome.
6. **Diseases of the pituitary.**
7. Disorders of the gonads.
8. Disorders of calcium metabolism.
9. Causes and diagnosis of blood glucose disorders.
10. Glucose control in diseases of carbohydrate metabolism.
11. Managing diabetic patients and their complications.
12. Obesity, management and treatment of patients with lipid metabolism disorders.

Case discussions:

1. Diagnosis, treatment and follow-up of patients with pituitary adenoma and hypopituitarism. (90')
2. What to do in case of altered TSH, examination of thyroid disorders. (90')
3. Examination of cortisol overproduction and deficiency, follow-up and management of patients with Cushing's syndrome and adrenocortical insufficiency (90')
4. Diagnosis and treatment of osteoporosis. (90')
5. Managing diabetes mellitus – diet and treatment. (90')
6. Purine, iron, copper and other rare metabolism disturbances. (90')
7. Thyroid nodules, examination of thyroid cancer, radioiodine treatment. (45')
8. Options of neuroendocrine tumour treatment, endocrine paraneoplastic syndromes. (45')
9. Examination and treatment of hyper- and hypocalcaemia (45')
10. Thyroid ultrasound (45')
11. Managing and follow-up of diabetic patients, complications. (45')
12. Obese patient, metabolic syndrome, when to treat elevated cholesterol. (45')

Nephrology

Lectures:

1. Glomerular diseases.
2. Tubulointerstitial and cystic kidney diseases.
3. Electrolyte disorders.
4. Renal transplantation.
5. Differential diagnostics of renal diseases.

Case discussions:

1. A young female patient with acute kidney injury and liver dysfunction. (90')
2. Approach to a patient with glomerulonephritis. (90')
3. Dialysis treatment. (90')
4. Management of a patient with chronic kidney disease. (45')
5. Vascular disorders of the kidneys, kidney stones and urinary tract infection. (45')
6. Hematuria and proteinuria during pregnancy. (45')

Gastroenterology

Lectures:

1. Disorders of the oesophagus and the stomach.
2. Disorders of the small bowel, malabsorption and maldigestion.
3. Inflammatory bowel diseases.
4. Diseases of the large bowel. Functional GI disorders.
5. Gastrointestinal bleeding.
6. Management of a patient with acute liver failure.
7. Disorders of the pancreas.

Case discussions:

1. Management of a patient with a pancreatic disease. (90')
2. Approach to a patient with acute abdominal pain. (90')
3. Approach to a patient with an abnormal liver function test. (90')
4. Differential diagnosis and management of obstructive jaundice. (45')
5. Approach to a patient with swallowing difficulty. (45')
6. Celiac disease. Differential diagnosis of diarrhoea (45')

CARDIOLOGY – Heart Surgery, Angiology, Vascular Surgery**Heart Center Department of Cardiology**

Tutor: **Dr. György Bárczi**
Dr. Papp Roland

Lectures (2 hours per week)

1. Anatomy and physiology of the heart
2. Cardiomyopathies
3. Acute coronary syndrome
4. Treatment of Chronic Heart Failure
5. Symptoms, diagnosis and conservative treatment of vascular diseases
6. The diagnosis and treatment of Stable Coronary Artery Disease
7. Chest pain differential diagnosis. Life threatening diseases
8. Ventricular arrhythmias. Sudden cardiac death
9. Resynchronisation therapy, mechanical circulatory support, heart transplantation
10. Surgical treatment of arterial diseases
11. Heart surgery in XXI. Century. Revascularization, valve surgery, circulatory support
12. Valvular heart diseases.
13. Pacemaker, ICD indications
14. Primer and secunder prevention
15. Paediatric cardiology
16. Hypertension
17. Supraventricular arrhythmias, atrial fibrillation
18. Antithrombotic, anticoagulant treatment
19. Interventional radiology in the treatment of cardiovascular patients.
20. Infective Endocarditis

Practices (ward rounds, 4,5 hours per week)**Bedside practice:**

1. Patient examination
2. ECG; ECG signs of life-threatening cardiac diseases.
3. Basics of echocardiography; Examination of the heart cavities, heart valves, heart muscle, systolic and diastolic function.
4. Heart failure; Symptoms of left- and right-sided heart failure; Differentiation between systolic and diastolic heart failure; Diagnosis of heart failure; Conservative and interventional treatment of heart failure
5. Cardiac valve dysfunction; Clinical signs of valvular heart disease; Auscultation; Systolic and diastolic murmurs; Valvular heart disease diagnosis and treatment; Transcatheter aortic valve implantation; Heart valve repair and replacement surgery; Anticoagulant therapy.
6. Coronary care unit: intra-aortic balloon pump and cardiogenic shock; Symptoms of acute heart failure and cardiogenic shock, Conservative and interventional treatment; Killip classification.
7. Management of ischemic heart disease in outpatient care; Symptoms and diagnosis of acute coronary syndrome; Signs of STEMI and NSTEMI ECG; Differential diagnosis of major chest disorders with chest pain; GRACE score; Clinical forms of ischemic heart disease; Medication of acute myocardial infarction.
8. Management of arrhythmias in outpatient care; Atrial fibrillation; CHA2DS2-VASc score; Supraventricular arrhythmias and malignant ventricular arrhythmias; Bradyarrhythmias. Practical lessons:
9. Invasive cardiology; Indications and implementation of percutaneous coronary intervention; Types of stents; Transcatheter aortic valve implantation.
10. Non-invasive cardiac imaging: cardiac echo, MRI and CT scans; Indications and procedure of these tests; Vulnerable plaque.
11. Electrophysiology; Indications for pacemaker implantation; Types of pacemakers; Indications for electrophysiological examination; Arrhythmia ablation procedures.
12. Vascular surgery in the operating room
13. Cardiac Surgery in the operating room
14. Intervention laboratory practice
15. Practical examination

Type of examination:

Practical exam and colloquium: test and theoretical exam.

Exam topics:

- 1.
1. Diastolic heart murmurs. Heart sounds.
2. Systolic heart murmurs. Heart sounds.
3. Risk factors, primary and secondary prevention.
4. Dilated cardiomyopathy.
5. Hypertrophic cardiomyopathy.
6. Acute heart failure, cardiogenic shock - etiology, symptoms, diagnostics.
7. Treatment of acute heart failure.
8. Chronic heart failure - etiology, symptoms, diagnostics.
9. Treatment of chronic heart failure.
10. Infective Endocarditis.
11. Pericarditis, pericardial effusion.
12. Aortic valve stenosis. Diagnosis of aortic valve insufficiency.
13. Mitral valve stenosis. Diagnosis of mitral valve insufficiency.
14. Atrial and ventricular septal defects, congenital heart disease.
15. Hypertension I. Etiology, diagnosis.
16. Hypertension II. Treatment. Hypertensive Heart Disease.
17. Anticoagulant treatment and indications.
18. Anti-platelet treatment and indications.
19. Manifestations and evaluation of Ischemic Heart Disease.
20. Angina pectoris.
21. Non ST segment elevation Acute Coronary Syndrome I. Etiology, manifestations, diagnosis.
22. Non ST segment elevation Acute Coronary Syndrome II. Treatment.
23. ST segment elevation Acute Coronary Syndrome I. Etiology, pathomechanism, diagnosis.
24. ST segment elevation Acute Coronary Syndrome II. Treatment.
25. Heart catheterization. Hemodynamic evaluation. The heart cycle.
26. Percutaneous coronary revascularization. (PCI)
27. Differential diagnosis of chest pain syndromes.
28. Pulmonary embolism.
29. Bradyarrhythmias.
30. Supraventricular arrhythmias.
31. Atrial Fibrillation.
32. Electrical and pharmacological cardioversion.
33. Ventricular arrhythmias.
34. Ablation treatment of arrhythmias.
35. Pacemaker indications and pacemaker types.
36. ICD and CRT indications, types.
37. Non-coronary structural interventions in cardiology (TAVI, Mitraclip, Left atrial appendage closure, etc.)
- 2.
1. Treatment of aortic valve stenosis, aortic valve insufficiency.
2. Treatment of mitral valve stenosis, mitral valve insufficiency.
3. Diagnosis and treatment of aortic dissection
4. Coronary revascularization: CABG
5. Treatment of end-stage heart failure with mechanical circulatory support.
6. Complications of myocardial infarction and their treatment
7. Epidemiology and risk factor, screening, prevention and conservative treatment of arterial diseases – vasculitis
8. Clinical presentation and physical and imaging examination of arterial diseases. Diabetic foot
9. Symptoms and physical and visual diagnostic examination of peripheral arterial disease of the lower extremities - diabetic foot
10. Symptoms and physical and visual diagnosis of chronic venous insufficiency, treatment options
11. Symptoms, diagnosis, treatment options, early and late complications of deep vein thrombosis
12. Angiography and intervention - basic endovascular techniques. Basic vascular surgery techniques, vascular grafts
13. Diseases, symptoms, diagnosis and treatment options of supraaortic branches and upper extremity arteries
14. Aortic and peripheral aneurysms
15. Acute aortic syndromes.
16. Vascular imaging diagnostics (UH, CT, MRI) - Vascular malformations
17. Renal and visceral occlusive and aneurysmal diseases - artificial arteriovenous fistulas, haemodialysis access.
18. Endovascular interventions in venous diseases
19. Theory and practical implementation of extracorporeal circulation. Theory and practical implementation of the application of the heart-lung motor.
20. Acute cardiac surgery.
21. Surgical aspects of infectious endocarditis.

Recommended printed, electronic and online notes, textbooks, guides and literature (html address in case of online material) can be used to learn the course material:

Oxford Handbook of Cardiology. The ESC Textbook of Cardiovascular Medicine (2 ed.) <https://www.semmelweiskiad.hu/termek/1551/vascular-medicine>

Students are strongly recommended to visit regularly our website where updated information are available: <http://vszek.semmelweis.hu/education-cardiology>

SURGERY I-II.**Department of Surgery, Transplantation and Gastroenterology**Tutors: **Dr. Vass Tamás**

The subject is taught in as part of the block system. During a 4-week block, students 11 days. Have to be present on 11 days at the clinic for the theoretical and practical sessions. The final exams take place during the last week. As several different topics are covered during the block, the students are taught on a weekly basis in a rotating system, so that fewer students deal with one subspecialty at the same time. These students are further divided into smaller groups for bedside practice.

Schedule:**Lectures** (14 hours per week)

- Definitions, indications and types of surgery, surgical techniques, perioperative treatment
- Emergency surgery
- Surgical Site Infection
- Hernias
- HPB surgery (liver-biliary tract)
- HPB surgery (pancreas I-II)
- Endocrine surgery
- Breast surgery
- IBD, Diverticulitis
- Proctology
- Minimal Invasive Surgery
- Malignant diseases of the small- and large intestine
- Surgery of the Upper GI
- Transplantation

After all the lectures we have a case report/case discussion about a real case at the department. (11×)

Practice (14 hours per week)

All in wards (bedside practice) and the operation theatre:

- Investigate of surgical patients
- Method of physical examinations.
- Evaluation of the findings.
- Visiting the operation theatre.
- Visiting the intensive care unit
- Wound treatment, dressings
- Participation in the work of the surgical ambulance
- Surgical administration
- Postoperative treatment, medication
- Endoscopy

Form of EXAM:**Oral exam**

TRAUMATOLOGY

Department of Traumatology

Type of subject: Obligatory

credit points: 3

Head of Department: Prof. Dr. Hangody László

Number of lessons per week: 44* **lecture:** 24* **practical course:** 74*

The ratio between lectures and practices may also vary, depending on the institute's subspeciality.

On the department's website, which is constantly updated, students can access all the information, documents to download, use and submit in relation to the practice.

<https://semmelweis.hu/traumatologia/foreign-students/medicine-english-language-programme/>

Objectives of the subject, its place in the medical curriculum:

Traumatology as a specialty deals with the treatment of injured patients, independent of the injured organ, patient's age or previous diseases. In developed countries, the 4-5th leading cause of death is injury, while in the actively working population, the rate of death is even higher. Morbidity in children and in the elderly is also high. Traumatology treatment for the most part deals with extremity surgery in correlation to orthopedics, however cranial, thoracic, abdominal, spinal and pelvic injuries as well as the treatment of polytraumatized patients also belong to the field of trauma care.

Place where the subject is taught (address of the auditorium, seminar room, etc.):

Uzsoki Hospital, Department of Orthopedics-Traumatology, Conference room (ground floor)

1145 Budapest, Uzsoki street 29-41.

Dr. Manninger Jenő Traumatology Center, Conference room (8th floor)

1081 Budapest, Fiumei street 17.

Successful completion of the subject results in the acquisition of the following competencies:

During practices, students will have the opportunity to learn the following: physical examination of injured patients, bandaging, suturing, casting techniques, and the uses of orthoses and splints. Students will have the opportunity to enter the operating theater, scrubbing, and become acquainted with special instruments used in Traumatology. Consultation of typical and the more frequent trauma cases, radiologic diagnostics, as well as videos in the operative theater are also part of the curriculum. During on duty shifts, students will have an opportunity to examine and participate in the trauma care of patients under supervision.

Course prerequisites:

Pathology II., Basic Surgical Techniques

Detailed course description:

(Theoretical and practical instruction must be broken down into lessons (weeks), numbered separately. Please provide the names of lecturers in both types of lessons, indicating guest lecturers. This information is not to be attached separately. CVs of guest lecturers, however, must be attached.)

Lectures

Traumatology lectures are available on Semmelweis University's E-learning portal (moodle)

1. General Traumatology. Soft tissue injuries. Thermal injuries. Wound management.
2. Fracture management. Bone healing
3. Immediate care and major accidents. (Multiple injuries, shock, major disasters)
4. Thoracic and abdominal trauma
5. Neurotrauma. Spinal, cranial and facial trauma.
6. Pelvic injuries. Femoral fractures (proximal femur and shaft)
7. Fractures of the tibia and fibula. Injuries of the ankle, talus, calcaneus and the foot
8. Knee Injuries. Cartilage repair, ligament surgeries
9. Injuries of the upper extremity
10. Hand injuries
11. Pediatric trauma
12. Management of open fractures. Septic and non-septic complications in Traumatology.
13. Endoprosthetic replacement possibilities in Traumatology. Peri-prosthetic fractures and complications

	Day 1 – Monday	Day 2 – Tuesday	Day 3 – Wednesday	Day 4 – Thursday	Day 5 – Friday	
08:30 – 09:15	Introduction to the Traumatology department	Cast splinting/Wound dressing	Free Day	Femoral fractures	Injuries of hands (wrists) forearms	
09:15 – 09:30	Break	Break		Break	Break	
09:30 – 10:15	Assignment homework	Trauma implants		Knee fractures	Injuries if the upper extremity	
		Trauma radiographs demonstration				
10:15 – 10:30	Break	Break		Break	Break	
10:30 – 11:45	Polytrauma/scenario	Septic ward		Fractures of the tibia ankle and the foot	Postoperative infections, septic complications	
	Chest/abdomen/pelvic trauma	Trauma implants				
11:45 – 12:30	Lunch break	Lunch break		Lunch break	Lunch break	
12:30 – 16:00 with 30 minutes break	ER	Arthroscopy, cartilage and ligament injuries of the knee		Operating theater 1-3	Operating theater 5-6	
	Operating theater 5-6			Ward/OPD	ER	
	Ward/OPD		ER	Operating theater 1-3		
	Day 6 – Monday	Day 7 – Tuesday	Day 8 – Wednesday	Day 9 – Thursday	Day 10 – Friday	
08:30 – 09:15	Neurotraum	Mini presentation	Free Day	Exam/free day	Exam/free day	
09:15 – 09:30	Break	Break				
09:30 – 10:15	Pediatric trauma	Mini presentation				
10:15 – 10:30	Break	Break				
10:30 – 11:45	Physical Th	Mini presentation/ Consultation				
	Bonee healing/Wound healing					
11:45 – 12:30	Lunch break	Lunch break				
12:30 – 16:00 with 30 minutes break	Ward/OPD	Exam/free day				
	ER					
	Operating theater 1-3					
	Operating theater 5-6					

Attendance requirements; conditions under which students can make up for absences and the method of absence justification:

Minimum attendance requirements: 4.5 days

Maximum allowed absences: 1 day/block

Make up of absences:

- Make up of absences can be done in a later block, but only within the semester. Students need to make up the same day they were absent in the original block (e.g. if the student was absent on a Friday of the first week, then make up of the absence is required on a Friday of the first week in a later block). The student can only take the semi-final exam after make up of the absence - at the earliest in that block that he/she made up in. Scheduling of make-up of absence and making an appointment for the postponed examination needs to be confirmed by e-mail through the Traumatology Department.
- If the absence were to occur in the last block of the first semester, then make-up of the absence can be done in the second semester, but the student needs to reapply for the course as “only exam” in the second semester. The earliest at which a student can take the exam is at the end of the block in which the student made-up the absence. Scheduling of absence make-up and appointment for the postponed examination needs to be confirmed by e-mail through the Traumatology Department.
- If the absence were to occur in the last block of the second semester, then make-up of the absence can be done in the first semester of the following year. In this case, the student needs to reapply for the course as “only exam” in the following year. The earliest at which a student can take the exam is at the end of the block in which the student made-up the absence. Scheduling of absence make-up and appointment for the postponed examination needs to be confirmed by e-mail through the Traumatology Department.
- In case of illness, maximum of 3 days of absence confirmed by medical certificates (outpatient visits, discharge papers) signed by doctors are accepted (except on the last day of the Traumatology block, where the student is required to present a mini topic – see below). Students absent for more than 3 days of the block will need to make up the entire block. (See above)

Form of assessment in the study period:

(including the number, topics and scheduling of oral and written tests, their share in the overall evaluation, make-up tests and improvement tests)

Within the short course of the Traumatology block, there will be no formal assessment of students. The interactive practices and seminars allow for evaluation of students’ knowledge of the subject.

Number and type of assignments for individual work and the deadline for submission:

At the beginning of the Traumatology block, students will receive a mini presentation trauma topic, which they will prepare for and present on the last day of the block (Tuesday morning of the second week) in front of their classmates and tutor. The presentation of the topic in front of their classmates and tutor is mandatory and required in order to obtain the teacher’s signature; the written completion of the topic is not enough.

Requirements to obtain the teacher’s signature:

Minimum attendance of the block seminars and practices according to the Traumatology Department as well as the presentation of the mini topic. Both are required as mentioned above.

Type of assessment (*comprehensive examination, end-term examination, term-grade, term-grade on a three-grade rating scale, coursework project, no examination*)

Semifinal exam, written MCQ electronic exam (single answer and multiple choice test), on Semmelweis University’s E-learning portal (Moodle) at the Traumatology department. 5 scale grading (1-5).

Examination requirements:

(*list of examination topics, subject areas of tests / examinations, lists of mandatory parameters, figures, concepts and calculations, practical skills and the optional topics for exam-equivalent coursework projects, their criteria of completion and assessment*)

The knowledge of the given textbook, uploaded lecture material in Moodle and practice material.

Method and type of grading:

(Share of theoretical and practical examinations in the overall evaluation. Inclusion of the results of the end-of-term assessment. Possibilities of and conditions for offered grades.)

Written MCQ electronic exam. 5 scale grading (1-5).

List of course books, textbooks, study aids and literature facilitating the acquisition of knowledge to complete the course and included in the assessment, precisely indicating which requirement each item is related to (e.g., topic by topic) as well as a list of important technical and other applicable study aids:

Name of Textbook:

The Trauma Manual: TRAUMA AND ACUTE CARE SURGERY Third edition Editors: Andrew B. Peitzman Michael Rhodes C. William Schwab Donald M. Yealy Timothy C. Fabian

Publisher: Wolters Kluwer / Lippincott Williams & Wilkins

Internet

The lecture material can be downloaded from Semmelweis University's E-learning portal <https://itc.semmelweis.hu/moodle/>

Dr. Tamás Gál, M.D.

Assistant Lecturer

Course Coordinator for English language students

Semmelweis University, Department of Traumatology

Prof. Dr. László Hangody, M.D., Ph.D., D.Sc.

Member of the Hungarian Academy of Sciences

Head of Department

Semmelweis University, Department of Traumatology

OTORHINOLARYNGOLOGYTutor: **Dr. Beáta Bencsik**

Lecture (14 hours/block)	Practice (28 hours/block)
Ear I.	Clinical ENT examinations. (2 hours)
Ear II.	Shadowing (4 hours)
Audiology	Ear diseases (2 hours)
Benign neck tumors	Audiology (2 hours)
Otoneurology	Otoneurology (2 hours)
Rhinology I.	Rhinology (2 hours)
Rhinology II.	Pharynx diseases (2 hours)
Pharynx infections	Shadowing (5 hours)
Phoniatry	larynx diseases, phoniatry (2 hours)
Oncology I.	Oncology (2 hours)
Oncology II.	Consultation/medical emerging (2 hours)
Oncology III.	
Sleep apnoe	
ENT emergency	

ORAL SURGERY AND DENTISTRY

Course Leader: *Prof., Dr. Zsolt Németh med. habil. PhD*

Department of Oro-Maxillofacial Surgery and Stomatology

Dental Training Centre of the Faculty of Dentistry

Department of Community Dentistry

Credit value: 2

Number of lessons per week: 28 hours **lecture:** 0 **practical course:** 20 hours **seminar:** 8 hours

Subject type: obligatory course

Objectives of the subject, its place in the medical curriculum:

The main aim of the „Oral surgery and Dentistry” course for 4th year medical students is to introduce the most specific symptoms, recognition and treatment of the most common dental, oral and maxillofacial diseases. In addition, the knowledge of various specialisations of dentistry is important to medical students because later, as specialized medical doctors - regardless of their specialization – they will find numerous correlations and these skills will prove to be essential in case of many borderline diseases and to face diagnostic difficulties. During the course students learn about the method of oral examination and stomato-oncological screening. The practice focuses on the oral and dental contexts of disciplines of medicine. It is extremely important for future medical doctors to be aware of the symptoms of systemic diseases in the oral cavity and know which dental and oral diseases may lead to systemic diseases.

Successful completion of the subject results in the acquisition of the following competencies:

As practicing physicians, they will be in the possession of modern theoretical and practical skills and will be able to perform medical practice on their own and build correct human relationships with their patients and family members as well as other health professionals. It is important that they receive a comprehensive picture of the concept of oral health. As practicing physicians, they will be able to examine the oral cavity and the head and neck region, and interpret the lesions and altered functions, initiate the diagnostic and therapeutic process. In accordance with the preventive approach that is characteristic for today's medicine, they will be able to prevent and detect teeth (oral) diseases with systemic effect in their early stage.

Course prerequisites:

Pathology II.

Basic surgical techniques

Number of students required for the course (minimum, maximum) and method of selecting students:

Based on registration through the Neptun system.

How to apply for the course:

through the Neptun system

Detailed curriculum:

(Theoretical and practical lessons shall be given separately by numbering the lessons (by weeks). Please provide the names of the teachers of the lectures and practical lessons and indicate guest lecturers. Do not use attachments! Always attach a CV for guest lecturers!)

The course is educated in block system; the duration of the course is 1 week.

The English language practices will take place according to the schedule of the blocked education in 2022/2023 academic year.

The courses take place in the building of Department of Oro-Maxillofacial Surgery and Stomatology and in the Dental Training Centre of the Faculty of Dentistry during the educational period (according to the schedule of academic year in Faculty of Dentistry). The courses take

place in the building of Department of Oro-Maxillofacial Surgery and Stomatology and in the Department of Community Dentistry of the Semmelweis University, Faculty of Dentistry during the exam period (according to the schedule of academic year in Faculty of Dentistry). The students receive information about the location and the date of the practices at the beginning of the semester in Neptun system.

The schedule of the one-week block:

one - week block					
	Monday	Tuesday	Wednesday	Thursday	Friday
from 8:00 am to 1:00 pm	education	education	education	day off (obligatory)	seminar
from 1:00 pm to 2:00 pm	lunch break	lunch break	lunch break		lunch break
from 2:00 pm to 3:00 pm	education	education	education		exam

About 18-25 students attends to the clinics weekly. The students are divided into subgroups (minimum 5 students per little group) based on the registration and group assignment in Neptun system. The subgroups take part on practice on Monday, Tuesday and Wednesday. The practices and seminar are held in educational period (according to the schedule of academic year in Faculty of Dentistry) in the Department of Oro-Maxillofacial Surgery and Stomatology and at the Clinics of Dental Training Centre of the Faculty of Dentistry, in the exam period (according to the schedule of academic year in Faculty of Dentistry) in the Department of Oro-Maxillofacial Surgery and the Department of Community Dentistry

The schedule of the subgroups in the educational period (according to the schedule of academic year in Faculty of Dentistry):

1. Department of Oro-Maxillofacial Surgery and Stomatology
2. Department of Restorative Dentistry and Endodontics
3. Department of Prosthodontics
4. Department of Pediatric Dentistry and Orthodontics
5. Department of Periodontology
6. Department of Oral Diagnostics

The schedule of the subgroups in the exam period (according to the schedule of the academic year in the Faculty of Dentistry):

1. Department of Oro-Maxillofacial Surgery and Stomatology
2. Department of Community Dentistry
3. Department of Community Dentistry
4. Department of Community Dentistry
5. Department of Community Dentistry
6. Department of Community Dentistry

The Departments and Clinics are involved in education:

Department of Oro-Maxillofacial Surgery and Stomatology (Faculty of Dentistry, educational period and exam period)
 Department of Restorative Dentistry and Endodontics (Faculty of Dentistry, educational period)
 Department of Prosthodontics (Faculty of Dentistry, educational period)
 Department of Periodontology (Faculty of Dentistry, educational period)
 Department of Pediatric Dentistry and Orthodontics (Faculty of Dentistry, educational period)
 Department of Oral Diagnostics (Faculty of Dentistry, educational period)
 Department of Community Dentistry (Faculty of Dentistry, exam period)

The teachers/instructors of Clinics and Departments are involved in education:**Department of Oro-Maxillofacial Surgery and Stomatology:**

Zsolt Németh Dr., Sándor Bogdán, Dr., Mihály Vaszi Dr., Tamás Huszár Dr., Iván Decker Dr., Péter Barabás Dr., Gergely Csókay Dr., Zsófia Somogyi Dr., Tamás Würsching Dr., Gábor Pintér Dr., Szófia Szentpéteri Dr., Péter Lillik Dr., Ákos Dora Dr., Lőrincz Zatik, Dr. Anita Gyórfi Dr.,

Department of Restorative Dentistry and Endodontics:

Boglárka Szántai Dr., Dalma Pellei Dr., Andrea Demeter Dr.,

Department of Prosthodontics

Máté Jász Dr. Emőke Takács Dr., Dóra Fehér Dr. Anna Németh Dr., Mercedes Linninger Dr.

Department of Periodontology

Afrodité Kőrösi Dr., Bernát Keglevich Dr., László Márk Czumbel Dr.

Department of Pediatric Dentistry and Orthodontics

Violetta Szabó Dr., Réka Skláncz Dr., Réka Macsali Dr., Dr., Anna Répási – Moldován Dr., Adrienn Auth Dr., István Simon Dr., Réka Bálint Dr., Gergely Balaton Dr., Noémi Rózsa Dr., Miklós Kaán Dr., Gergely Kaán Dr., Dorottya Bányai Dr., Lili Heckenast Dr., Bálint Nemes Dr., Levente Szegedi Dr., Stefánia Radó Dr.

Department of Oral Diagnostics

Szabolcs Gyulai-Gaál Dr., László Simonffy Dr.,

Department of Community Dentistry

Gergely Oláh Dr., Márk Répási Dr., Levente Palásti Dr.

Topics of each sub-practices:

Maxillofacial and dentoalveolar surgery:

Benign neoplasms of the orofacial region. Praecancerous lesions, prevention of oral cancer, screening methods. Malignant oral tumors and its treatments. Developmental anomalies (craniofacial malformations, cleft lip and palate, dysgnathia). Reconstructive surgery. Traumatology. Inflammatory diseases and therapeutic options. Tooth extraction, dentoalveolar and preprosthetic surgery. Basics of dental implantology. Oral rehabilitation for patients with special needs.

Restorative Dentistry and Endodontics:

Medical and dental history recording. Correlations between medical conditions and dental, periodontal status. High risk patients. Examination, evaluation of clinical findings and making diagnosis. Aspects of creating treatment plan. Prevention options of oral diseases. Age-related changes in oral condition and its results. Diagnosis and treatment methods of caries. Importance of pulpal and periodontal diseases. Types of conservative dentistry procedures. Focal (dental) infection. Use of antibiotics in the field of conservative dentistry. Importance of regular dental examination considering medical status.

Prosthodontics:

Indications and contraindications of prosthodontics treatments. Making prosthodontic treatment plan: when and which type, fixed or removable and implant retained prosthetic appliances etc. Demonstration of the most frequently used fixed and removable prosthetic appliances emphasizing which types must be removed from the oral cavity of an unconscious patient. The significance of the control and care of patients after prosthetic treatment. Examination of the temporomandibular joint, its dysfunction (TMD), diagnosis and conservative treatment options. The clinical team of treating TMD patients. Detection and treatment of early and late outcome of complete edentulousness.

Periodontology:

Survey of the patient's oral hygiene and setting professional oral hygiene. Examination of the oral mucosa and diagnosis. Opportunity to assist in subgingival debridement (in non-surgical pocket treatment) and surgical periodontic procedures.

Pediatric Dentistry and Orthodontics:

Dental examination in childhood, medical and dental history, dental screening. Opportunity to assist in paedodontic procedures e.g. sealant application, primary and permanent tooth filling, primary tooth extraction, alternative solutions to treatment of childhood caries. Characteristics of primary, mixed and permanent dentition. Difficulties and emergencies in paedodontics. Scanning and eliminating focal infections. Oral manifestations of childhood infections. Use of anaesthetics and drugs in childhood. The connection between paedodontics-orthodontics and other dentistry specialties. Opportunity to assist in activation of removable and fixed orthodontic appliances. The most frequently used orthodontic appliances.

New methods of orthodontics, digitalized procedures and esthetic appliances. The importance of age in orthodontic treatment.

Oral diagnostics:

Patient with dental symptoms, recording dental and medical history, making diagnosis. Considering correlations between medical conditions and dental problems. Examination of head and neck, stomato-oncological screening. Steps of the intraoral examination, making description of the clinical findings. Lesions of oral mucosa. Oral manifestation of systematic autoimmune diseases. Oral manifestation of infections. Symptoms of medicine side effects. Additional modalities in oral mucosa examination. Dentoalveolar and maxillofacial imaging techniques. Manifestations of medical conditions on dental X-ray. Imaging modalities in traumatic injuries. Imaging techniques in screening.

More specialties contain similar course topics:

Emergency cases and its treatments, the importance of prevention and its connection of medical specialties. Dental and dentoalveolar outpatient department connection to maxillofacial and otolaryngology departments work. Gerostomatology. Dental infectology.

The students (with the help of their tutor) are involved mainly in patient examination, elaborate and discussion of diagnostic-therapeutic plans. Related to the anamnesis and patient examination the students will discuss the general medical and interdisciplinary aspects of the given symptoms. In case of every examined patient the symptoms, conditions, diagnostic and treatment options in dental co-disciplines will be discussed. An important element of the oral surgery and dentistry education is that the tutor demonstrates the possible relationship of the symptom or condition to general medical practice.

The study materials of practices and other teaching aids related to the course are available to students on E-learning/Moodle interface.

Other subjects concerning the border issues of the given subject (both obligatory and optional courses!).**Possible overlaps of themes:**

Cleft lip and cleft palate – Pediatric surgery, Otorhinolaryngology
 Sinus illnesses – Otorhinolaryngology
 Allergy – Dermatology
 Mucosa – skin diseases – Dermatology, Internal Medicine, Immunology
 Focal diseases – Internal medicine, Dermatology, Rheumatology
 Hemorrhagic patients' care – Hematology
 Dysgnathia – Pediatric Dentistry and Orthodontics
 Head and neck medical imaging – Radiology
 Interventions in general anesthesia – Anesthesiology
 Transfusion – 2 week transfusion course
 Sepsis – Intensive Therapy, Infectology, Microbiology
 Oncologic patients' care – Oncology, Oncoradiology
 Dental, oral surgical care in elder patients – Gerontology
 Injuries of teeth, maxillofacial bone and soft tissue – Traumatology
 Injuries of head, midface and lower jaw fractures – Traumatology, Neurosurgery
 Facial pain – Neurology
 Orbital diseases due to infections and traumatologic causes – Traumatology, Ophthalmology
 Examination of tissue from orafacial area - Pathology

Special study work required to successfully complete the course:

(E.g. field exercises, medical case analysis, test preparation, etc.)

None

Requirements for participation in classes and the possibility to make up for absences:

At least 90% participation is obligatory of the practices, according to the Study and Examination Regulations. Participation in the sessions is confirmed by the signature of both the student and the instructor on the attendance sheet.

It is possible to make up the practices with the same language groups or during other practice's educational breaks or during on-call/duty hours on weekends, according to prior arrangement. The absence from the practice is possible to confirming with a medical certificate or other valid document from the absence.

Methods to assess knowledge acquisition during term time:

(E.g. homework, reports, mid-term test, end-term test, etc., the possibility of replacement and improvement of test results)

During the short moduls of the education, there will be no mid-term test. All through the interactive practices and consultations, it is enabled to assess the students' knowledge.

Requirements for signature:

At least 90% participation

Type of examination:

Written test exam on E-learning interface.

Requirements of the examination:

(In case of a theoretical examination, please provide the topic list; in case of a practical exam, specify the topics and the method of the exam)

Students will take an online seminar on Friday between 8.00 and 13.00 for summarizing what they have learned during the week. The students take a written exam on the E-learning platform between 14.00 and 15.00 in the afternoon. It is possible to repeat/replace the exam by previous arrangement, following the rules of Study and Examination Regulations.

The questions of the written exam are made from the seminar materials. The study materials of practices are available for student on E-learning interface. The tests are opened on the E-learning Platform on the exam's afternoon. During the exam, students must answer 50 test questions (simple choice, choose one correct answer from 4 options) in 60 minutes.

Method and type of evaluation:

(Method of calculating the final mark based on the theoretical and practical examination. How the mid-term test results are taken into account in the final mark.)

The grade is determined based on the results of the test, in accordance with the following point limits:
45-50 points Excellent, 40-44 points Good, 35-39 points, Average, 30-34 points Fair, 0-29 points Unsatisfactory

How to register for the examination?

On Neptun system

Possibilities for exam retake:

By previous arrangement, following the rules of Study and Examination Regulations

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

The study materials are available for students on E-learning interface: <https://itc.semmelweis.hu/moodle/>. Students can find more study materials, additional resources, notes, textbooks and literature links on the website of clinics and departments participated in education.

Recommended literature:

1. Michael Miloro, G. E. Ghali, Peter E. Larsen, Peter Waite, Peterson's Principles of Oral and Maxillofacial Surgery Springer, 2022
2. James R. Hupp, Myron R. Tucker, Ellis, Edward, III, DDS, MS, Contemporary Oral and Maxillofacial Surgery, Elsevier Books, 2018
3. Peter A. Brennan (Author), Henning Prof Dr Schliephake (Author), G.E. Dr. Ghali DDS MD FACS (Author), Maxillofacial Surgery, 3rd Edition, Churchill Livingstone 2017

DERMATOLOGY

Department of Dermatology-Venerology and Dermatocology

Head of the Department: *Péter Holló, M.D., Ph.D., Professor of Dermatology*

Tutor: *Kende Lőrincz M.D., Ph.D., Assistant Professor of Dermatology*

Credits: 4

Lectures: 2 hours (90min) /week; practices: 8 hours (8x45min or 4x90min) /day

At the first day's lesson medical students should participate a comprehensive introductory lecture. Afterwards the focus is on the practical education of Dermatology. We hold small group special sessions – e.g. problem-based seminars and in- /outpatient patient contact practices each day during the block.

Objectives of the course:

Learning the morphology, structure, physiology, and general pathology of the skin. Basics of the skin immune system, dermato-allergology and -immunology.

Symptoms, diagnostics, and management of the following conditions: Bacterial, viral, and fungal infections of the skin. Sexually transmitted diseases infections (STI's). Autoimmune connective tissue diseases, bullous skin disorders and vascular diseases. Inflammatory dermatoses as eczemas, atopic dermatitis, psoriasis, hidradenitis suppurativa etc. Dermato-oncology and dermato-surgery. Skin symptoms of internal diseases. Basic principles of topical, systemic treatments and adverse drug reactions.

Purpose of the training:

- a. **The main goal is the transfer of knowledge for use in general medical practice regarding aetiopathogenesis, diagnostics and treatment of skin diseases.**
- b. **Problem-oriented assessment of skin symptoms and their placement in the context of general medicine.**

Half of the fourth-year students take the subject in the first semester, the other half in the second semester in form of block rotations. The curriculum contains the following topics discussed as problem-based seminars: anatomy and functions of the skin, dermatoinfectology, oncodermatology, dermatoscopy, atopic dermatitis, urticaria and eczema, drug eruptions, bullous diseases, allergic skin diseases, autoimmune skin disorders, psoriasis, sexually transmitted infections, pathology of the skin.

During practices students examine patients, master the description and evaluation of symptoms, dermatological treatment options.

Important notes: All preclinical modules are required. Registration in the Neptun system is imperative at the beginning of the semester.

Attendance of the lectures and practices is obligatory. Absence from 25% of the seminars or practices is accepted.

Each student should attend the seminars and practices according to the block schedule, and his presence is confirmed by the signature of the lecturer.

In case of absence attendance at the practice of another teacher's lesson is accepted, but the deputy teacher's signature is required

Semester requirement: Optional: at the end of block a competition for clinical examination (a written quiz with projected clinical cases) is announced. The best three students/block are dispensed from taking the practical part of the examination. Sign up in the Neptun system is imperative.

Evaluation: Practical part (clinical examination and discussion of one patient) and theoretical part with randomly selected three main topics compose the semi-final examination.

Sign up and modifying exam: Via Neptun.

Absence from the exam: Only an official medical certificate is accepted within 3 working days.

PULMONOLOGY AND THORACIC SURGERY

Department of Pulmonology

Tömő str. 25-29., Budapest, Hungary 1083
<http://semmelweis.hu/pulmonologia/english/>

Course director: **Prof. Dr. Veronika Muller**
 Course tutor: **Dr. Gabor Horvath**

Credits: 4

Hours: 56 hours/3-week course

Lectures (18 hours)

- Lung cancer
- Chronic obstructive pulmonary disease
- Pneumonia. Tuberculosis
- Respiratory insufficiency. Non-invasive mechanical ventilation
- Bronchial asthma
- Pulmonary rehabilitation. Smoking cessation
- Lung transplantation. Cystic fibrosis
- Pulmonary embolism
- Sleep related breathing disorders
- Chest surgery: lung cancer, pneumothorax, pleural effusion, lung transplantation

Practices (29 hours)

Practical demonstrations/laboratory visits:

- Lung function measurement laboratory techniques
- Pulmonary diagnostics
- Non-invasive ventilation methods
- Oxygen therapy methods
- Inhalation therapy methods
- Pulmonary hypertension

Interactive demonstrations/skill development:

- Bronchology/skill laboratory examinations
- Non-invasive ventilation patient care
- Allergology tests
- Sleep laboratory tools/methods
- Pulmonary rehabilitation procedures
- Chest drainage

General/specific patient examinations:

- Pulmonary dept.
- Pulmonary-oncology dept.
- Transplantation dept.
- Chest surgery dept.

Attendance: lectures and practices are obligatory. Absence hours less than 25% of total are accepted.

Exam type: oral

Exam sign up: Neptun system

Textbooks:

Bourke SJ, Burns GP: Lecture Note: Respiratory Medicine. 9th ed. 2015. ISBN 978-1-118-65232-9

Palange P, Rohde G: ERS Handbook of Respiratory Medicine. 3rd Edition. 2019. ISBN 978-1-84984-079-8

For updated information please contact the department.

Department of Thoracic surgery

Ráth György str.7-9., Budapest, Hungary 1122
<https://semmelweis.hu/mellkassebeszet/education/>

Course director: **Dr. Rényi-Vámos Ferenc**

Lectures (3 hours)

- Surgical aspects of lung cancer
- Emergency chest pathologies:
 - pneumothorax, pleural effusion
 - lung transplantation

Practices (6 hours)

Interactive practice topics

- Evaluation, diagnostics and treatment of a lung cancer case
- Evaluation, diagnostics and treatment of a metastatic lung cancer case
- Evaluation, diagnostics and treatment of a pleural effusion case
- Evaluation, diagnostics and treatment of a pneumothorax case
- Live stream from the operating room
- Pleural drainage

General/specific patient examinations:

- Transplant outpatient clinic/department.
- Thoracic surgery outpatient clinic/department

Attendance: lectures and practices are obligatory. Absence hours less than 25% of total are accepted.

Exam type: oral

Exam sign up: Neptun system

Textbook:

Bourke SJ, Burns GP: Lecture Note: Respiratory Medicine. 9th ed. 2015. ISBN 978-1-118-65232-9

ONCOLOGY AND RECONSTRUCTIVE ONCOPLASTIC SURGERY

Department of Oncology and Department of Clinical Oncology

Credits: 3

Total number of hours: 40 lecture: 14 practice: 26 seminar: 0

Course type: obligatory

Academic year: 2020/21 1st semester

Name of the person in charge of the subject: Prof. Dr. Polgár Csaba

The aim and place of the teaching of the subject in the curriculum of medical education: To get acquainted with the epidemiology, etiology, biological properties, prevention (primary and secondary prevention), diagnostics and multidisciplinary therapy of cancer diseases, to acquire the complex oncological approach. To get acquainted with the modern treatment of the most common solid tumours (surgical, radiation, chemo-, hormone, immunological and biological therapy) and their results. Understanding the possibilities of oncological reconstructive and oncoplastic surgeries. Early and late side effects of oncology treatments, their possible prevention and treatment. Palliative treatment, analgesia, somatic and mental rehabilitation of oncology patients. Oncological emergencies and their treatment. Defining the role of the practitioner in the prevention, early detection of tumours and in the care and care of cancer patients.

Place of teaching the subject (address of lecture hall, seminar room, etc.):

Semmelweis University Department of Oncology, National Institute of Oncology, Budapest, 1122 Ráth György u. 7-9. Semmelweis University Department of Internal Medicine and Oncology, Oncology Department

Successful completion of the subject results in the acquisition of competencies: Acquisition of general oncological knowledge in 4th year medical students, based on preliminary studies, knowledge of the main etiological factors, epidemiology, early detection, diagnosis and 3 main therapeutic modalities of tumours (tumour surgery, radiotherapy, drug treatments) and the main solid tumour type treatment and rehabilitation, including mastering the basics of oncoplastic surgical solutions.

Prerequisite (s) required for the admission or acquisition of the subject: Pharmacology II., Pathology II., Basic Surgical Techniques

Student headcount conditions for starting the course (minimum, maximum), method of selecting students: Based on registration in the NEPTUN system, it is 1/8 of the class

How to apply for the course: In the NEPTUN system

Detailed topics of the subject:

Classroom lectures (14 hours):

Block Day 1:

1. Etiology, epidemiology and biology of tumours, methods of prevention and screening. Principles of complex oncotherapy (45 minutes) (Cs. Polgár, J. Lövey, Z. Takácsi-Nagy)
2. Imaging diagnostics of tumours (45 minutes) (D. Tárnoki, Á-Tárnoki M. Gódney)
3. Histological and molecular pathological diagnosis of tumours (Szőke J./Tóth E.)
4. Principles of tumour surgery, surgical reconstruction, oncoplastic options, and oncological rehabilitation options (Á. Sávolt, T. Mersich)
5. Basics of radiotherapy and radiochemotherapy of tumours (Cs. Polgár, J. Lövey, Z. Takácsi-Nagy)
6. Basics of oncological drug treatments (chemo-, hormone, biological and immunotherapy) (Dank M., Rubovszky G.)

Block Day 2:

7. Oncotherapy of head and neck tumours (Takácsi Nagy Z.)
8. Oncotherapy of gastrointestinal tumours (Lövey J.)

Block Day 3:

9. Oncotherapy of gynecological tumours (Polgár Cs., Vízkeleti J.)
10. Complex treatment of breast tumours (Cs. Polgár, N. Mészáros)

Block Day 4:

11. Complex treatment of lung tumours (Lövey J.)
12. Oncotherapy of urological tumours (Ágoston P., Jorgo K.)

Block Day 5:

13. Treatment of central nervous system / bone and soft tissue tumours (Lövey J./Ágoston P.)
14. Oncological emergencies / Oncological rehabilitation and follow-up (G. Rubovszky, Dank M.)

Block practices (26 hours):**Block Day 1:**

Tumour Diagnosis I: Cytological, Histological, Molecular Pathology Practice (2x45 minutes)

Block Day 2:

Tumour Diagnosis II: Imaging Diagnostic Practice 1. (4x45 minutes; 1 hour mammography / UH, 1 hour CT, 1 hour MRI, 1 hour PET-CT)

Tumour Radiation I: Treatment Planning Practice (2x45 minutes)

Block Day 3:

Tumour surgery (surgical practice) (4x45 minutes)

Oncoteam practice (2x45 minutes)

Block Day 4:

Systemic treatment of tumours I: Chemotherapy, hormone therapy (2x45 minutes)

Systemic treatment of tumours II: Targeted biological and immunotherapy (2x45 minutes)

Systemic treatment of tumours III: Supportation, treatment of side effects (2x45 minutes)

Block Day 5:

Radiation Treatment of Tumours II: Practice of External Radiation Treatment (2x45 minutes)

Tumour radiotherapy III: Brachytherapy practice (2x45 minutes)

Consultation (2x45 minutes)

Other subjects concerning the border issues of the given subject (both obligatory and optional subjects!).**Possible overlaps of themes:**

Urology: diagnosis and surgical treatment of urological tumours

Clinical genetics: hereditary tumours

Special study work required for successful completion of the course:

There is no such

Requirements for participation in classes and the possibility to make up for absences:

According to the study and exam regulations, 75% of the classes are obligatory

How to check the acquired knowledge during the diligence period:

During the short period of education available to us, there is no intermediate, formal examination. However, the interactive nature of the practices and consultations allow teachers to test the students' knowledge and how they use the information available to them.

At least 75% participation in classes. Checking each session by keeping a catalogue.

Type of exam:

Oral exam based on a pre-issued line of items.

Exam requirements:

General oncology and radiotherapy line items

1. Etiology of cancer
2. Epidemiology of cancer
3. Screening and early detection of tumours
4. Imaging methods and their role in the treatment of tumours
5. Imaging diagnostics of major tumour groups
6. Histological diagnosis of tumours
7. Molecular pathological diagnosis of tumours
8. Methods of treatment of tumours - surgery
9. Methods of treatment of tumours - radiation therapy
10. Methods of treating tumours - medication
11. Physical, chemical and biological bases of radiation therapy
12. Basic concepts of dosimetry
13. Computer treatment planning, significant volumes in radiation therapy
14. Structure and operating principle of teletherapeutic devices
15. Structure and operating principle of brachytherapy devices
16. Brachytherapy applicators
17. Brachytherapy planning system, imaging devices
18. Interstitial brachytherapy
19. Image Guided Radiation
20. Intensity Modulated Radiation Therapy
21. Stereotaxic Radiotherapy and Radiosurgery
22. Basics of chemotherapy
23. Side effects of chemotherapy
24. Basics of simultaneous radio-chemotherapy
25. Basics of targeted, biological therapy
26. Side effects of targeted, biological therapy
27. Basics of immunotherapy
28. Side effects of immunotherapy
29. Basic elements of oncopharmacology
30. Clinical pharmacology studies in cancer
31. Evaluation of objective clinical response and general condition

Detailed line of oncology and radiotherapy items

1. Epidemiology, etiology, histology, staging, symptoms and pre-treatment examination of head and neck tumours.
2. Radiation therapy, surgical and pharmacological treatment of head and neck tumours.
3. Epidemiology, etiology, histology, staging, symptoms and pre-treatment examination of oesophageal tumours.
4. Radiation therapy, surgery and systemic treatment of oesophageal tumours.
5. Epidemiology, etiology, histology, staging, symptoms and pre-treatment examination of gastric tumours.
6. Radiation therapy, surgical and pharmacological treatment of gastric tumours.
7. Epidemiology, etiology, histology, staging, symptoms and pre-treatment examination of colorectal tumours.
8. Surgical and pharmacological treatment of colorectal tumours.
9. Epidemiology, etiology, histology, staging, symptoms and pre-treatment examination of rectal tumours.
10. Radiation therapy, surgery and systemic treatment for rectal tumours.
11. Epidemiology, etiology, histology, staging, symptoms and pre-treatment examination of pancreatic tumours.
12. Radiation therapy, surgical and pharmacological treatment of pancreatic tumours.
13. Epidemiology, etiology, histology, staging, symptoms and pre-treatment examination of liver tumours.
14. Radiation therapy, surgery and systemic treatment for liver tumours.
15. Epidemiology, etiology, histology, staging, symptoms and pre-treatment examination of cervical tumours.
16. Radiation therapy, surgery and systemic treatment for cervical tumours.
17. Epidemiology, etiology, histology, staging, symptoms and pre-treatment examination of uterine tumours.
18. Radiation therapy, surgery and systemic treatment for uterine tumours.
19. Epidemiology, etiology, histology, staging, symptoms and pre-treatment examination of vulvar, vaginal and ovarian tumours.

20. Radiation therapy, surgery and systemic treatments for tumours of the vulva, vagina and ovaries.
21. Epidemiology, etiology, histology, staging, symptoms and pre-treatment examination of penis, testis and kidney tumours.
22. Radiation therapy, surgery and systemic treatment for penile, testicular and kidney tumours.
23. Epidemiology, etiology, histology, staging, symptoms and pre-treatment examination of prostate and bladder tumours.
24. Radiation therapy for prostate and bladder tumours.
25. Surgical and pharmacological treatment of prostate and bladder tumours.
26. Epidemiology, etiology, histology, staging, symptoms and pre-treatment examination of lung tumours.
27. Radiation therapy of lung tumours.
28. Surgical and pharmacological treatment of lung tumours.
29. Epidemiology, etiology, histology, staging, symptoms and pre-treatment examination of breast tumours.
30. Radiation therapy of breast tumours.
31. Surgical and pharmacological treatment of breast tumours.
32. Epidemiology, etiology, histology, staging, symptoms and pre-treatment examination of central nervous system tumours.
33. Radiation therapy of central nervous system tumours.
34. Surgical and pharmacological treatment of central nervous system tumours.
35. Epidemiology, etiology, histology, staging, symptoms and pre-treatment examination of bone tumours.
36. Radiation therapy, surgical and pharmacological treatment of bone tumours.
37. Epidemiology, etiology, histology, staging, symptoms and pre-treatment examination of soft tissue tumours.
38. Radiation therapy, surgery and medication for soft tissue tumours.
39. Oncological emergencies.
40. Radiation treatment of distant metastases and oncological rehabilitation.
41. Principles of the possibilities of reconstructive plastic surgery.
42. Oncoplastic surgery for head and neck tumours.
43. Oncoplastic surgery for breast tumours.

Method and type of rating:

oral exam (100%)

Marks: Excellent above 90%, good 80-89%, satisfactory 70-79%, pass 60-69%, fail 60%

How to apply for the exam:

Students apply for the exam exclusively with the help of the NEPTUN unified study system according to the regulations described in the TVSZ (Study and Examination Regulations-SER).

Options for retaking the exam:

According to the Study and Examination Regulations (SER)

Printed, electronic and online notes, textbooks, aids and literature (html title in case of online material) can be used to acquire the study material:

Curriculum: University Note on Oncology and Radiation Therapy (Ed.: Csaba Polgár):

- in Hungarian, English and German in the form of an electronic note
- in Hungarian in print (Semmelweis Publishing House, Budapest, 2018)

Recommended reading:

Basics of oncology (Ed.: Miklós Kásler), university textbook (2nd edition Medicina Könyvkiadó Zrt., Budapest, 2018)

For updated information please contact the department.

ORTHOPEDICS

Tutor: *Dr. Gergely Holnapy*

Lectures

- Subject of Orthopedic Education. Organization.
- Orthopedic care in Hungary. Possibilities of prophylaxis.
- Inflammatory diseases in orthopaedics.
- Anatomy and biomechanics of the spine. Mai posture.
- Scheuermann's disease. Vertebra plana, Calve.
- Scoliosis. Theories concerning the etiology of various kinds of scoliosis. Pathological, clinical and radiological symptoms and appearance. Symptomatology and therapy of the functional scoliosis. Symptoms and therapy of scoliosis with recognized etiology (congenital, paralytic, rachitic).
- Degenerative diseases of the spine. Etiology of low back pain, clinical symptoms, therapy. Low back of disc origin. Significance of the intervertebral discs under normal and pathological conditions. Symptomatology of the ischias syndrome and its therapy.
- Spondylolysis and spondylolisthesis. Lumbalization and Sacralization.
- Deformities and diseases of the neck and the upper extremity.
- Congenital torticollis, Klippel-Feil deformity. Cervical rib. Sprengel deformity.
- Obstetricalisparalysis. Recurrent dislocation of the shoulder. Cervicobrachial syndrome.
- Periarthritis of the shoulder. Dupuytren contracture. Kienböck disease. Tennis elbow.
- Madelung deformity. Sudeck dystrophy of the upper extremity.
- Osteoarthritis of the hip. Etiology, pathology, clinical and radiological symptoms.
- Methods of conservative and operative Treatment.
- Diseases of the child's hip. Legg-Perthes-Calve disease. Slipped capital femoral epiphysis. Acute and chronic arthritis of the hip.
- Congenital dislocation of the hip. Anatomy and development of the hip joint. Concept of dysplasia. Subluxation and luxation. Pathology. Early and late clinical and X-ray signs. Early and late conservative therapy. Various methods of operative treatment. Palliative operation.
- Diseases of the knee. Recurrent dislocation of the patella.
- Osteochondritis of the tibial tubercle (Osgood-Schlatter disease). Osteochondrosis of the tibia. Varus, valgus and hyperextension deformity. Osteoarthritis. Chondromalacia of the patella. Meniscus lesions.
- Diseases of the foot. Congenital clubfoot. Tarsal synostosis. Hallux valgus. Aseptic necrosis of the bones of the foot. Osteoarthritis of the joints of the foot. Flatfoot.
- Neuromuscular diseases. Classification and treatment. Infantile cerebral palsy. Disturbances of the development of the vertebral body and neural arch. Muscular defects. Progressive muscular dystrophy and other diseases of the muscles.
- Primary tumors of bones and their classification. Benign bone tumors. Osteoid osteoma. Semimalignant and malignant tumors (giant cell tumor, chondroma, osteosarcoma, chondrosarcoma, multiple myeloma, Ewing sarcoma). Main pathologic features.
- Bone disorders. Osteoporosis, osteomalacia, osteogenesis imperfecta, Paget disease.
- Developmental anomalies. Congenital anomalies of the extremities.

Consultation

Practices

- Instruction of correct behaviour in the Hospital and during practicals. Introduction to the Hospital. Therapeutic aims of Orthopedics. Methods of the clinical practicals.
- Methodology of learning Orthopedics.
- Diagnostic and therapeutic methods of Orthopedics. Anamnesis. Inspection, palpation, examination of motions.
- Basics of radiological examination of the musculoskeletal system. Normal Roentgen anatomy of the bones and joints. Form and function. Methods of examination of limb shortening and alterations of the forms. Contracture. Limping.
- Fixation, relief of weight bearing, plaster splints, plaster bandages. Examination of patients. Examination of the diseases and deformities of the spine, malposture (Calves deformity, spondylarthrosis).

- Preparation of plaster splints, bandages. Examination of patients with lumbago, ischias syndrome, spondylolysis, spondylolisthesis. Demonstration of Roentgenograms.
- Examination of scoliotic patients. Preparation of plaster and other corsets.
- Examination of patients. Tuberculous spondylitis. Demonstration of Roentgenograms.
- Preparation of plaster beds.
- Examination of patients with congenital dislocation of the hip. Early and late symptoms of this disease. Demonstration of Roentgenograms.
- Examination of patients with congenital dislocation of the hip. Demonstration of the means and methods of therapy and their application.
- Examination of patients with juvenile osteochondritis of the hip. Epiphyseolysis.
- Infantile coxa vara. Demonstration of Roentgenograms and methods of treatment.
- Preparation of hip spica.
- Examination of patients with osteoarthritis of the hip. Examination of contractures of the hip. Demonstration of Roentgenograms.
- Examination of patients with recurrent dislocation of the patella, Osteoarthritis, tuberculous arthritis of the knee. Puncture of the knee joint. Methods of fixation of this joint, preparation of plaster bandage.
- Examination of patients with diseases and deformations of the neck, upper extremity. Torticollis, cervicobrachial syndrome, peri-arthritis of the shoulder, tuberculosis of the shoulder joint. Demonstration of Roentgenograms. Application of the methods of hand and arm fixation.
- Examination of patients with congenital clubfoot and flatfoot. Therapy. Application of the methods of foot and lower leg fixation.
- Demonstration of the methods of gymnastics and physiotherapy.
- The maximum number of absences in a semester is 3. More than 3 absences invalidate the semester.
- Exam: Practical exam at the time of last practice.
- Semester Closing exam registration has to be done through the NEPTUN system for the days set by the department up to the limits.
- Students have to fill -during semester- the trial test on Semmelweis University's e-learning system. Modifying of exam dates through the NEPTUN system, as it allows.
- Semester Closing exam is a written test. The material for examination is based on the lectures.
- Test results of exam are available within one day.

For updated information please contact the department.

MEDICAL IMAGING

Medical Imaging Centre

Head of Department: Pál MAUROVICH-HORVAT MD, PhD, MPH, DSc

Chief of Undergraduate Education: Zsuzsanna LÉNÁRD MD PhD

2 week-long course

Lectures: 14 hours per course

Practices: 28 hours per course

Credits: 3

Objectives of the course and its place in the medical curriculum:

The aim of the course is to: 1) introduce the role of medical imaging and interventional radiology in clinical practice, diagnostics and treatment of diseases; 2) teach the technical basis and clinical applications of the the different radiological modalities, 3) the delineation of the advantages and disadvantages of each modalities; 4) introduce the radiological appearance of most important and clinically relevant pathologies; 5) learn the professional terminology of imaging procedures; 6) discuss the preliminary preparation and scheduling of diagnostic imaging for the patients; 7) introduce the radiological algorithms of the most frequent clinical symptoms and pathological conditions; 8) demonstrate the role of imaging examination in the patient care process and the importance of consultations between clinician and radiologist.

Lectures

- Introduction of imaging modalities
- Basics of ultrasonography
- Basics of X-Ray
- Basics of CT
- Basics of MRI
- Basics of nuclear medicine
- Emergency imaging (abdominal, neuro and thoracic)
- Breast imaging
- Basics of interventional radiology
- Artificial Intelligence in medical imaging

Practices

- Demonstration of imaging methods
- PACS-based image analysis
- Clinical radiology by interactive case reviews
- Thyroid, vascular and abdominal ultrasound skill practice
- Must-see-images

Textbooks

Herring W. Learning Radiology: Recognizing the Basics. 5th Edition, Elsevier, 2023. ISBN 978-0323878173.

LABORATORY MEDICINE

Department of Laboratory Medicine

Address: H-1089 Budapest, Nagyvárad sq 4. Floor XIV

Phone +36-1-210-0278 ext: 56318

Acting Directors

General: **Prof. Barna VÁSÁRHELYI MD., PhD., DSc.** (vasarhelyi.barna@med.semmelweis-univ.hu)

Background

The Department of Laboratory Medicine was founded in 2010 with missions in the following areas:

Education. The main goal is the introduction of basic principles of Laboratory Medicine to graduate medical students. The Department also provides post-graduate education for health-care specialists including physicians and clinical biochemists.

Diagnostics. The Department coordinates laboratory tests across the University, ensuring the accuracy and reliability of the results. It also provides invaluable professional support, aiding in clinical decision-making and enhancing patient care.

Research. The Department actively participates in research studies involving laboratory tests, manages research projects, and has its own PhD program.

Education

The Laboratory Medicine curriculum is based on the knowledge acquired during the studies of Translational Medicine and Pathophysiology in the third year. The main goal is to present different approaches and diagnostic algorithms necessary for efficient test ordering and the evaluation of lab test results. As part of their education, students receive information about the procedures involved in generating laboratory test results (from test ordering to laboratory reports) and the laboratory tests necessary to establish a diagnosis, which are crucial aspects for medical doctors when evaluating a laboratory report. Additionally, novel techniques used in the general laboratory, along with their drawbacks and benefits, are also covered in the curriculum.

Real diagnostic problems are discussed using practical examples during internal medicine training.

Classroom lectures and practices “Laboratory Medicine” for 4th year medical students

Participation in the tuition is obligatory.

The digital slides are available for the students via our website (www.labmed.usn.hu).

Participation in lectures is highly recommended since the exam is partly based on them.

The topics of the lectures include the elements of general and practical clinical laboratory.

The areas to be covered by the planned lectures:

- 1. Introduction to Laboratory Medicine** (Specimen collection and processing. Preanalytical variables. To identify the major factors interfering with laboratory tests. Establishment and use of reference values/intervals.)
- 2. Concepts in Laboratory Medicine** (Interpretation of laboratory test results: sensitivity and specificity of a laboratory test, predictive values. Quality control, quality assurance in clinical laboratories.)
- 3. Laboratory investigations of hematology diseases.** (To understand the basic principles of modern hematology analyzers in clinical laboratories.)
- 4. Laboratory investigations of hemostatic disorders.** (Identify the appropriate laboratory tests for evaluation of the bleeding patient and the thrombotic patient.)
- 5. Laboratory investigations of inflammation and tissue damage.** (To understand how cell injury and inflammation can be tracked through plasma markers.)
- 6. Immunological investigations in laboratory medicine.** (Learn the diagnostic tests required to the assessment of autoimmune disorders.)
- 7. Laboratory enzyme diagnostics**
- 8. Endocrine investigations in laboratory medicine** (Understand the laboratory tests used in the diagnosis of the more commonly encountered endocrine disorders.)
- 9. Molecular genetics investigation in laboratory medicine**
- 10. Therapeutic drug monitoring** (To learn when therapeutic drug monitoring is required and how it is performed for commonly monitored drugs. To identify the common drugs of abuse and learn how they are detected.)
- 11. Laboratory investigations of tumor markers**
- 12. Laboratory investigations of cerebrospinal fluid and ascites, pleural fluid**
- 13. To learn the laboratory tests used near patients (Point of care testing)**
- 14. To learn the rationale for the selection of laboratory tests in pediatrics, including neonatal screening programs.**

The topics of the exercises include some clinical case studies, harmonized with the Internal medicine studies, dealing with the following diagnostic problems:

1. "Sick or not?" screening tests.
2. Hypertensive patient.
3. Obese patient.
4. Diabetic patients.
5. Endocrine patients
6. Patient with fever.
7. Patient with joint complaint
8. Alcoholic patient.
9. Patients with kidney disorders.
10. Liquid, ion homeostasis disorder

We also provide consultation and laboratory visit during the semester.

Number and type of assignments for individual work and the deadline for submission:

3 case studies per student for the first session of the block.

Exams:

There will be a test exam, an online multiple-choice question (MCQ) test, and an oral exam for the practical subjects. The final mark consists of two parts: 1. the theoretical MCQ test and 2. the practical mark. The average of these two parts determines the grade for the colloquium. In cases of uncertainty, the tutor will determine the final grade based on your knowledge. We compile blended-learning materials for all theoretical and practical topics, which students can study in their spare time and answer the related test questions within the Moodle system. The system keeps track of their results, and if they perform above 82%, we offer them the exam mark [82-89.9% - 4 (good), 92-100% - 5 (excellent)]. Students participating in the course must complete online theoretical and practical preparation using the e-learning materials, the completion of which is confirmed by the successful completion of the tests in the curriculum.

The practical mark will be calculated as the average of the marks obtained for the presentations, the answers to the questions and tests for the cases, and the multiple-choice question (MCQ) test based on the material covered in the exercises. If any practical section receives an unsatisfactory mark, the practical will not be accepted. The marks for the practical work and colloquium will be available on Moodle no later than 8 p.m. on Saturday evening. If the grade offered is unsatisfactory, you have the option to correct it with your tutor orally.

Taking examination before the exam period is not allowed.

The sign up procedure is controlled and regulated by the NEPTUN software and the Department cannot interfere with system. The officially signed up student will be scheduled for examination. The list of examinees is completed 2 days before the date of exam; then NEPTUN system automatically closes the sign up list.

Diagnostic profile of the Department

The Central Laboratory at Semmelweis University forms the basis of the Department. It performs more than 400 different tests in the field of clinical chemistry, hematology, hemostasis, serology, endocrinology, therapeutic drug level monitoring and clinical microbiology with an annual number over 3 million. The laboratory is classified as FJ-3 meaning that it provides a 24 hour service for 7 days a week. Laboratory reports are provided through GLIMS lab informatics system integrated to eMedSolution.

Research at the Department

Laboratory tests are performed in the majority of clinical studies and drug research. In order to use the results more efficiently the colleague who is directly involved in performing the lab tests also participates in study design and evaluation. Therefore, clinical laboratories at the University are active partners of researchers and medical doctors. The major research profile of the Institute is to characterize specific patterns of biomarkers predictive for specific disorders. Characteristic examples are the determination of immune phenotype and analysis of kinetic alteration of intracellular analytes with flow cytometry, measurement of cytokine levels with biochips, genomic analyses (genotyping and gene expression arrays). These instruments and the professional knowledge are also available for research purposes. Medical students are welcome to do research in any of the fields listed above.

Useful and update information about the Institute and the subject of Laboratory Medicine can be found at home page: Semmelweis.hu/laboratorium

For updated information please contact the department.

EMERGENCY MEDICINE and OXYOLOGY

Dept. of Anesthesiology and Intensive Therapy

Division of Emergency Medicine and Oxyology

Tutor: *Peter Vass MD, (Tel: +36 1 459-1500/62037, 62038, E-mail: seemgrad@gmail.com)*

Obligatory subject: Emergency Medicine and Oxyology (EMO)– program and topics

2 credits

Lectures	Remarks
Pictures and sounds from the 20th century – birth of a new philosophy of patient care. How do we err? Importance of communication in acute medicine	Historical perspectives, approach and emphasis. SBAR principles. Patient pathways.
Pain syndromes. As long as it hurts you know that you are alive.	Headache, chest and abdominal pain, backpain. The basics of pain management.
Environmental accidents.	Electrocution, drowning, near-drowning, heat exhaustion, heat stroke, hypothermia. What to do on the scene and in the ED.
Group of symptoms in emergency	Dyspnoe, vertigo, syncope, nausea and vomiting, diarrhoea, weakness. Allergic reactions.
Prehospital emergency services as integral parts of emergency care.	First aid, primary emergency systems, levels of rescue, connection of ambulance with hospital care.
Perfuse it or lose it.	Things you've missed from pathophys but will surprise you in acute situations.
Emergency cardiac care. From the sliding door to the PCI.	Syncope, heart failure, ACS.
Acute neurological deficit. Time is brain.	Stroke, altered mental states, convulsions.
Paediatric emergencies. The same but downsized?	The most frequent emergency situations in kids. Special view of paediatric emergency care.
The severely injured patient. The future: Die Hard 6.	Trauma, burns, compartment syndromes. Integration, teamwork, damage control.
Massive bleeding. The dynamic approach of coagulopathies.	How to deal with bleeding patients?
Toxicology. Alle Ding sind Gift-any stuff is a poison. Two steps above earth.	Toxidromes. Aspecific and specific care. Substances of abuse.
Fever, infections, sepsis. „Blood poisoning“ in the 20th century.	Severe heat imbalance, the emergency aspects of sepsis.

Types of practices in Emergency Medicine - Oxyology:

OMV-OV-NOT-Obligatory: (2x45 min) The basic rules of treatment of a critical ill patient during simulation. Basic airway skills during simulation. Oxygen therapy workshop. IV access or alternative ways in critical ill patient during simulation. **OMV-M-RF-1-NOT-Obligatory (2x45 Min):** Monitoring, basics of red flag treatment and team skills. Diagnostic and therapeutic approach of critical ill patient with basic technical and non-technical skills. Basic monitoring techniques in treatment of emergency patient during simulation. Presentation and practice during simulations of non-technical skills to make teamwork better. Team member non-technical skills presentation and practice during simulations.

OMV-M-RF-2-NOT-Obligatory (2x45 Min): Monitoring, basics of red flag treatment and team skills. Diagnostic and therapeutic approach of critical ill patient with basic technical and non-technical skills. Basic monitoring techniques in treatment of emergency patient during simulation. Presentation and practice during simulations of non-technical skills to make teamwork better. Team member non-technical skills presentation and practice during simulations.

PBL-SBAR-Obligatory: Problem Based Learning SBAR communication practice (2x45 min) Acquaintance and practice of SBAR-communication.

cation method in emergency situations. Communication with patient and relatives in critical situations and during end of life care procedure. Communication practice between dispatch and HCP on the scene.

PBL-Triage-Obligatory: Problem Based Learning – Priorisation practice (2x45 min) Basic technics to solve different problems, with prioritisation techniques and the usefulness of different early warning scores. How to organize and prioritize to maintain Patient safety.

4-hour ER rotation obligatory (4x45 Min): 4-hour rotation at an Emergency Unit Practices. Structure and operation of the Emergency Room/Unit, examination, triage and management of the patients, debriefing of the cases. Examination of emergency patient. Decision making in practice. Make a plan for patient route. Planning and management of diagnostic for emergency patient. PoCT. Planning of treatment of emergency patient. Communication with help of SBAR. Basics of PoCT. Pearls of BGA.

4-hour ER rotation NOT-obligatory: 4-hour rotation at an Emergency Unit Practices (4x45 Min) Structure and operation of the Emergency Room/Unit, examination, triage and management of the patients, debriefing of the cases. Examination of emergency patient. Decision making in practice. Make a plan for patient route. Planning and management of diagnostic for emergency patient. PoCT. Planning of treatment of emergency patient. Communication with help of SBAR.

Clinical Pharmacology

Tutor: *Dr. Pál Riba*

Department of Pharmacology and Pharmacotherapy

Course Director: *Dr. Ferdinandy Péter*

Thematic:

In a block system of 5 days, divided into two weeks, 7 hours of practice per day:

All relevant topics are developed with the involvement of clinical experts. The clinical cases prepared in this way (3-5 cases per topic) are presented and processed in an interactive way on a problem-oriented basis. Related to the above is a description of current therapeutic recommendations.

Day 1:

- Infectious Diseases Treatment Strategy.
- Treatment strategy for respiratory and gastrointestinal diseases

Day 2:

- Endocrine Disease Treatment Strategy
- Treatment strategy for cardiovascular diseases and metabolic syndrome

Day 3:

- Clinical trials and drug registration
- Basics of Drug Development
- Pharmacovigilance, recognition of adverse drug reactions in clinical practice.
- Clinical Addictology

Day 4:

- Strategy for the treatment of psychiatric and neurological diseases
- Treatment strategy of autoimmune diseases
- Clinical Toxicology, Emergency Medicine

Day 5:

- Pharmaceutical Formulations and Prescriptions
- Individualized pharmacotherapy, special patient populations
- Pain Relief

Maximum number of absences is 25 percent of the number of practices in the semester. In the case of absence the student can attend another block class later during the semester.

Certifying absence from the lesson:

Medical certificate is accepted

Exam type:

Written multiple choice test, evaluation with the five-mark scale (excellent=5, good=4, intermediate=3, pass=2, failure=1)

Exam sign up:

Registration has to be done through the NEPTUN system for the days set by the department.

Modifying:

Through the NEPTUN system, as it allows. Students are allowed to take the exam on an exam day of another block.

Certifying absence from the exam:

Medical certificate is accepted.

Literature:

- 1 Basic and Clinical Pharmacology (Ed. B. G. Katzung), 15th edition, McGraw-Hill Education, 2021. ISBN 978-1 260 45231 0
- 2 Materials discussed during practices: <http://semmelweis.hu/pharmacology>, Moodle (<https://itc.semmelweis.hu>)

FAMILY MEDICINE

Department of Family Medicine

H- 1085 Budapest, Stáhly u. 7-9. Phone: +36-1-355-8530

Head of the Department: Dr. Péter Torzsa M.D. Ph.D.

Credits: 2

Total number of hours: 20 lectures: 8 practices:16

Type of the course (mandatory/elective): mandatory

Academic year: 2023/2024

Code of the course: AOKCSA695_1A

Aim of the subject and its place in the curriculum:

Health care is based on the family practice system. It's important for future doctors to get to know the gatekeeping function of family practices. It's also important to show them on a one-to-one tutoring basis that family practice is an integrating profession. While getting involved in the work of the family practice medical students are introduced to the preventive approach, the ways of how to solve holistic, complex, bio-psycho-social and somatic problems and the differential diagnostics of frequent diseases. The aim is to teach them how to use and apply the basic means of diagnostic and therapeutic procedures and tools, to give them an insight into the most frequent laws and courses of action they may meet, to develop the medical students' communication skills in practice and to practise how to work with short interventions.

Location of the course (lecture hall, practice room, etc.):

Accredited tutorial practices

The lecture hall of the Department of Family Medicine

Competencies gained upon the successful completion of the subject:

- Preventive approach, screening
- Holistic patient care
- Managing complex bio-psycho-social-health problems
- Frequent chronic illness care
- Differential diagnostics
- How to use basic diagnostic tools on their own and how to assess test results
- Basic health-care-connected legal knowledge

Prerequisite(s) for admission to the subject:

Internal medicine propaedeutics, Pharmacology I, Laboratory medicine

Minimum and maximum number of students registering for the course:

Student selection method in case of oversubscription:

Turn based system.

How to register for the course:

To register for the course in the 'Neptun' system

Detailed thematic of the course:

Lectures

- Lectures take place on the first day of the course in an eight-hour period in the following categories:

- Screening procedures
- Mood- and sleep disorders
- Diabetes screening and care
- Gastrointestinal disease care
- Emergency care in the practice
- Cardiovascular prevention, hypertonic patient care
- Supplementary medicine

Practices

- The subject is taught in blocks. Medical students have five lessons in the family practice on one-to-one tutoring basis on the second and the fourth day plus a three-lesson long case discussion with a practical and differential diagnostic approach.
- During the training session in the family practice medical students will get to know and acquire
 - the possible forms of prevention
 - chronic illness care
 - acute illness care
 - the managing of complex bio-psycho-social problems
 - how to use the available diagnostic and therapeutic devices and tools

The subject of the case discussion includes the most frequent problems in basic care and provides an opportunity to discuss the diagnostic, differential diagnostic and therapeutic ways and possibilities in the following topics in an interactive way:

Screening procedures

- Complex cardiovascular/metabolic diseases
- Frequent, serious communicable diseases
- Patients with musculoskeletal diseases that have a strong negative impact on their life
- Patients with psycho-social problems

Potential overlap(s) with other subjects:

Internal medicine

Policy regarding the attendance and making up absences:

It's obligatory for the student to attend 75 percent of the training sessions.

Means of assessing the students' progress during the semester:

During training the tutor checks whether the students have acquired the practical and theoretical content of the training. There is no formal assessment.

Requirement for acknowledging the semester (signature): It's obligatory for the student to attend at least 75 percent of the training sessions.

Type of the examination:

Assessment of how actively the student has participated in the training by the tutor.

Compiling a 3-4,000 character case study based on what students have learnt through the training period in one of the topics given in advance.

Type and method of grading:

Assessment and grading of the course: with a 1 to 5 term mark:

It's based on the student's activity through the training assessed by the tutor (40 percent) and the grade of the required case study (60 percent).

Assessment of the case study is based on the following:

Grade 1: failing to hand in the essay on the deadline, the number of characters is under 3,000, the case study is not original, but plagiarism

Grade 2: absence of a required part of the case study, unsophisticated wording, serious professional failure

Exam requirements:

Compiling a case study about a specific patient based on the following topics:

Patient picked through screening

A complex cardiovascular/metabolic disease

Frequent serious communicable disease

Patient with a musculoskeletal disease that has a strong negative impact on their life.

A case study displaying psycho-social problems

Parts of the presentation of the case:

1. Anamnesis
2. Current complaints
3. An examination plan
4. Examinations
5. Diagnosis
6. Therapy
7. Care
8. Processing and assessing the case based on professional literature
9. Bibliography

Grade 3: 2-3 professional or formal mistakes

Grade 4: one not too significant professional mistake

Grade 5: precise and accurate wording in the medical jargon, logical conclusions

How to register for the exam:

Registering for the exam in the 'Neptun' system

Opportunities to retake the exam:

In accordance with the Studies and Exams Code.

PHYSICAL EDUCATION VII-VIII.**Practice: 1 hour per week****Credit value: 0****Number of lessons per week: 1****Practical course: 14****Subject type: obligatory course****Name of the course leader: Várszegi Kornélia****Objectives of the subject, its place in the medical curriculum:**

The short-term goal of the course is to maintain and improve the students' current state of health, to create the physical conditions for a better quality of life by learning and practicing (new) branches of sports that can be practiced after graduation as well. The long-term goal is to improve the quality of life and life prospects of future physicians, and to provide students with credible preventive attitudes and lifestyle advice - so that they can represent those in their later practice, through their own health-promoting behavior.

Place where the subject is taught (address of the auditorium, seminar room, etc.):

Gymnasium, Artificial football court, Artificial tennis court

University's Centre for Physical Education and Sports 1107 Budapest Zágrábi utca 14.

Successful completion of the subject results in the acquisition of the following competencies:

Upon completion of the course the student will be able to carry out regular physical activity.

After completing the „beginner swimming” course, one will acquire water-confident swimming skills.

Detailed curriculum:

(Theoretical and practical lessons shall be given separately by numbering the lessons (by weeks). Please provide the names of the teachers of the lectures and practical lessons and indicate guest lecturers. Do not use attachments!

Always attach a CV for guest lecturers!

Within the framework of obligatory regular physical activity, the requirements of the subject can be fulfilled as free of charge and self-financed student as well. The former is available during classes and courses organized by the Semmelweis University's Centre for Physical Education and Sports (TSK), and the latter is available at SE-TSK accredited partner locations.

Free of charge:

60 minute classes held at the same time on a weekly basis, on the premises of the TSK facilities and other locations.

1107 Bp, Zágrábi utca 14.

1x60 min./week sessions:

Aerobics, BlessYou Gym, boulder, functional circuit training, golf, beginner Yoga, advanced Yoga, male football, salsa, step aerobics, badminton, beginner ultimate frisbee, advanced ultimate frisbee, zumba

1 x 90 mins./week sessions:

women's football, ice hockey, beginner tennis, beginner tennis 2,

4 x 3 hrs. and 1x 2 hrs. session packages:

Hiking 1, Hiking 2.

2x90 mins./week sport training (competitive sport, for qualified only):

cheerdance, cheerleader, men's football, handball, basketball, volleyball

Fee-based:

at the sports venues specified on www.semmelweis.hu/sportkozpont, which will also be advertised on the Neptun system. The list of these locations may vary per school year.

P.E. Teachers:

Doharné Buczkó Anikó
 Farkas Dominika
 Kalmus Dániel
 Lehel Zsolt
 Sótornyiné Hrehuss Nóra
 Várszegi Kornélia
 Weisz Miklós

Requirements for participation in classes and the possibility to make up for absences:

The number of active participations for physical education classes is 10, regardless of the number of school breaks, which is to be completed during the hours assigned to the group. Two hours can be recovered in the first week of the exam period, on two separate days, after registration in the Neptun system. Lessons missed do not need to be certified; however, catching up is mandatory. The days of study breaks do not qualify as automatic attendance. Practice leaders follow an online presence registration at the beginning and end of the lessons, which can be individually tracked on semmelweis.hu/sportkozpont homepage.

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes!

Methods to assess knowledge acquisition during term time:

(E.g. homework, reports, mid-term test, end-term test, etc., the possibility of replacement and improvement of test results)

There is no mandatory control during the term.

Requirements for signature:

Active participation in practice classes 10 times under the conditions described above.

May be exempted from attending classes the student who

1. whose diagnosis and the opinion of the sports doctor do not allow to exercise, and submits a certificate
2. does sports regularly and submits a certificate of association and federation

until the last study day in the 4th week of the semester. On the basis of the submitted application and its annexes, the TVB decides on the exemption of both the Hungarian and foreign students.

SUMMER (SURGERY) PRACTICE

Credit point: 2

Total hours: practical: 160

Type of course: obligatory

Responsible for course: Dr. Szijártó Attila

Workplace, contact details: 1st Department of Surgery, phone: +36-1-333-5343

Position: university professor, director

Date and number of habilitation: 2015.06

Aim of the course, its position in the medical curriculum:

The main aim of the fourth semester surgery practical is introduction to the general symptomology, diagnostics, and specifics of therapeutic decisions of surgical conditions. In addition to the basics of surgery, students learn about surgical conditions of the organ systems, their diagnosis and surgical treatment. Our primary task is to teach an approach of cooperation with accompanying specialities, we guide students through the process of outpatient specialist treatment through surgery to postoperative care.

Acquired competences after successfully completing the course:

Education of surgery starts in the 4th year, and it embraces the whole curriculum until the 4th year comprehensive surgery exam, providing the framework of clinical training. During this time our main goal is to blend the knowledge provided by theoretical courses and accompanying clinical specialities with the surgical approach and decision making.

Prerequisite(s) for admission to the course:

- According to the Study and Examination Policy.
- Student enrolment requirements (minimum, maximum), method of student selection:
- Based on registration in the Neptun system.

How to apply for course:

In Neptun system

Detailed syllabus:

The surgery summer practical, based on "block" syllabus education for the 4th year, provides practical knowledge involving students in daily patient care.

Recommended practical activities:

- Examination of acute surgical patient
- Examination of elective surgical patient
- Wound care
- Participation in the work of the surgical outpatient clinic
- Surgery assistance
- Surgery administration
- Postoperative care, medication

Cross-border issues of the given course related to other courses (obligatory and elective). Possible overlaps in curriculum:

- internal medicine – gastroenterology, endocrinology
- oncology
- anaesthesiology and intensive therapy
- radiology

Special study work required to complete the course:

none

Requirements for participation in classes and opportunities to make up for absences:

There is an attendance register for the practical.

According to Chapter 3, Section 17 § 7 of the Organisational and Operational Rules of the Semmelweis University, attendance at min. 75-75% of lectures and practices is obligatory

Further general information on attendance at lectures and practical can be found in the Studies and Exams Code (Section 17 § 7; 8) of the Semmelweis University.

Examination of acquired knowledge during term:

There is no intermediate exam during the short practical time. The interactive features of the practical and consultations provide an opportunity to continuously assess students' knowledge.

The criteria for end-of-term signatures:

Attendance at min. 75% of classes.

Type of exam:

Practical exam based on previously defined syllabus

Exam requirements:**Practical exam items:**

Knowledge of the below exam items will be tested based on information acquired from literature and practical:

1. What is vital indication?
2. How can free abdominal air be detected by means of percussion?
3. What are the most common complications of thyroid surgery?
4. What is a fundoplication?
5. What can cause dysphagia?
6. With what tissue can the oesophagus be replaced?
7. Draw the Billroth's gastric resections.
8. List the blood supplying vessels of the stomach.
9. Draw/describe the Calot's triangle.
10. What are the 3 main signs of cholangitis, what is the name of the triad?
11. What are the surgical indications of a benign liver tumour?
12. What are the blood supplying vessels of the liver?
13. What imaging diagnostic(s) is necessary to diagnose a liver tumour?
14. What are the pillars of the diagnosis of acute pancreatitis?
15. Name the typical symptoms of chronic pancreatitis.
16. Which laboratory parameter indicates obstructive jaundice?
17. What is the Courvoisier sign? What is the Murphy sign?
18. With which surgical process can a caecal tumour be removed?
19. Why is "short" bowel resection the aim in case of a Morbus Crohn?
20. When is a rectum extirpation performed?
21. What is an indirect inguinal hernia?
22. Which is the most common benign breast tumour?
23. What is a sentinel lymph node?
24. What is a Hartmann surgery?
25. What is an R0 resection?
26. Name 3 precancerous signs in surgery.
27. What is a neoadjuvant therapy?
28. What is pseudomembranous colitis?

29. When is nasojejunal feeding applied?
30. Where is the McBurney's point?
31. What are the indirect signs of acute appendicitis?
32. List the conditions of wound healing.
33. Define the phases of wound healing in chronological order.
34. How can nosocomial infections be prevented?
35. What is the difference between an abscess and a phlegmon?
36. List the inflammatory conditions (min. 3) of the skin and cutaneous annexes.
37. What is a relative indication?
38. What is the difference between a curable and a resectable case/tumour?
39. How is a bite wound and a gunshot wound to be treated?
40. What is the LES?
41. What is diastasis recti?
42. What are (surgical) complications of peptic ulcers?
43. What is the surgical relevance of a Meckel's diverticulum?
44. What are surgical indications in inflammatory bowel diseases?
45. Which perianal diseases are emergency surgical conditions?
46. What vaccination is necessary in case of a planned splenectomy?
47. What causes haematemesis?
48. What causes haematochezia?
49. What are the 3 groups of ileuses based on aetiology?
50. Which is more critical, urgent: ileus of the small or large intestine?

Method and type of class marks:

Practical test of one exam item

How to apply for the exam:

In Neptun system

Opportunity to repeat the exam:

As described in the Study and Examination Policy

The list of printed, electronic and online notes, textbooks, study aids and literature to be used to learn the curriculum (in case of online sources, html address):

Sebészeti Horváth, Örs Péter - Oláh, Attila (editors)

Sebészeti (10th edition) Gaál, Csaba (editor)

Sebészeti műtéttan Boros, Mihály (editor)

Littmann Sebészeti műtéttan Horváth, Örs Péter - Kiss, János

OPTIONAL SUBJECTS

Detailed programs see in the 5th year Study Program of Medicine!

CLINICAL MODULE



Faculty of Medicine
5th year

STUDY PROGRAMME
Fifth Year in the 2024/2025 academic year
4th and 5th Years (7th-10th semesters)

Teaching is done in “clean” blocks: Theory + Practice + Exam. (Practices are taught by “shadowing”)
 The time span of each block depends on the credit value of the subjects: 1 to 5 weeks

For example: based on a subject of 2 credits:

- 2 credits × 14 lessons = 28 lessons (1 semester consists of 14 weeks. The number of credits are equal with the lessons in a week)
- Education is provided as 8 lessons in a day: 4 days × 8 lessons = 32 lessons
- the training and the exam must be completed in 2 weeks
- approx. 40 students will be trained by providing 4 days of training and 2 days of exams within 10 working days.

9th and 10th semester

Course name	lecture (h/week)	lecture (h/semester)	practice (h/week)	practice (h/semester)	seminar (h/week)	seminar (h/semester)	credit points	prerequisite(s)	examination	examination
OBLIGATORY										
Clinical Genetics	AOKGRI966_1A			0	20	0	8	2	Pharmacology II, Genetics and Genomics, Pathology II	examination
Forensic Medicine	AOKPIB1002_1A			0	10	0	18	2	Pathology II, Genetics and Genomics, Pharmacology II	examination
Intensive Therapy and Anaesthesiology	AOKANE759_1A	1,5	0	2,5	0			4	Cardiology, Heart Surgery, Angiology, Vascular Surgery, Clinical Pharmacology, Emergency Medicine and Oxyology	examination
Internal Medicine II. (Hematology, Infectology, Immunology, Rheumatology)	AOKBHK783_2A	2	0	5,5	0			7	Internal Medicine I (Metabolism, Endocrinology, Gastroenterology, Nephrology), Laboratory Medicine, Medical Imaging	examination
Medical Rehabilitation	AOKREH765_1A			2	0			2	Cardiology, Heart Surgery, Angiology, Vascular Surgery, Orthopedics	examination
Neurology and Neurosurgery	AOKNEU963_1A	0	24	0	48	0	24	6	Internal Medicine I (Metabolism, Endocrinology, Gastroenterology, Nephrology), Medical Imaging	examination
Obstetrics and Gynaecology	AOKNO1755_1A	2	0	4	0			6	Pharmacology II, Medical Imaging, Surgery I-II	examination
Ophthalmology	AOKSZE977_1A	0	24	0	32			4	Internal Medicine I (Metabolism, Endocrinology, Gastroenterology, Nephrology), Cardiology, Heart Surgery, Angiology, Vascular Surgery, Surgery I-II	examination

Course name	lecture (h/week)	lecture (h/semester)	practice (h/week)	practice (h/semester)	seminar (h/week)	seminar (h/semester)	credit points	prerequisite(s)	examination	examination
Pediatrics	AOKGY1960_1A			6	0	2	0	8	Internal Medicine I (Metabolism, Endocrinology, Gastroenterology, Nephrology), Laboratory Medicine, Medical Imaging	examination
Pediatrics	AOKGY2961_1A			6	0	2	0	8	Internal Medicine I (Metabolism, Endocrinology, Gastroenterology, Nephrology), Laboratory Medicine, Medical Imaging	examination
Physical Education IX.	AOKTSI009_9A	0		1				0		signature
Physical Education X.	AOKTSI009_10A	0		1				0		signature
Psychiatry and Psychotherapy	AOKPSI762_1A	2	0	4	0			6	Pharmacology II	examination
Public Health	AOKNEI766_1A	3	0	4	0			7	Cardiology, Heart Surgery, Angiology, Vascular Surgery, Oncology and Plastic Surgery, Medical Statistics, Informatics and Telemedicine	examination
Sports Medicine	AOKSPR763_1A			2	0			2	Internal Medicine I (Metabolism, Endocrinology, Gastroenterology, Nephrology), Cardiology, Heart Surgery, Angiology, Vascular Surgery	examination
Urology	AOKURO060_1A	1	0	2	0			3	Pharmacology II, Surgery	examination
OBLIGATORY ELECTIVE / 9TH SEMESTER										
Neurosurgery	AOVIDS962_1A					2		2	Medical Imaging/Radiology	
Vascular Medicine	AOVAGL476_1A	2						2	Internal Medicine – Propedeutics	
Vascular neurology and neurointervention	AOVNIT1069_1A	2		1				3	Macroscopic Anatomy and Embryology II, Emergency Medicine and Oxyology	

LIST OF TEXTBOOKS (The list may change!)

- 1 Nelson Essentials Pediatrics 9th Edition
- 2 Lecture Notes of Forensic Medicine Ed. by Péter Sótonyi, Éva Keller, Semmelweis Publisher, 2008.
- 3 Knight's Forensic Pathology. 3rd ed. 2004. Arnold.
- 4 Lang, G.K.:Ophthalmology. A Pocket Textbook Atlas. Thieme Flexibook. Stuttgart, 2000. ISBN 3-13-126161-7
- 5 Hacker N.F-Moore J.G-Gambone J.C.:Essentials of Obstetrics and Gynecology. 4th ed. W.B. Saunders Co. ISBN 0-721601790 Paperback
- 6 Smith's General Urology. E.A.Tanagho, J.W.McAninch (ed.) Appleton & Lange. 15th ed. McGraw-Hill Professional Publ. 2000. ISBN 0-83-858607-4
- 7 P. Nyirády, I. Romics (ed.): Textbook of Urology, Semmelweis Publisher, Budapest, 2009.
- 8 Arányi Zs., Kamondi A., Kovács T., Szirmai I.: Investigation of neurological patients.
- 9 Adams and Victor's Principles of Neurology, Eleventh Edition, McGraw-Hill ISBN 978-0-07-184261-7
- 10 Lindsay,Bone,Callender:Neurology and Neurosurgery Illustrated. Churchill Livingstone
- 11 Marini J.J.-Wheeler A.P.: Critical Care Medicine – The Essentials. Williams and Wilkins. Baltimore, 2nd ed. 1997. ISBN 0-683-05555-0
- 12 The New Public Health: An Introduction for the 21st Century. By:T.Tulchinsky, E.A. Varavikova. 2000. ISBN 03350-5 Note: The list of the textbooks in Public Health, please find after its syllabus!
- 13 Textbook of Medicine 10th Ed. (Weatherall, Ledingham, Warrel, 2017).
Harrison's Principles of Internal Medicine 20th Ed. (McGraw-Hill, 2018).
- 14 Bates' Guide to Physical Examination and History Taking. 12th Ed.(Wolters Kluwer, 2016).

Recommended textbooks:

- 1 T.E.OH: Intensive Care Manual.
- 2 Basic Ophthalmology for Medical Students and Primary Care Residents. Ed.by: C.A.Bradford. 1999. 7th ed.
- 3 Oxford Handbook of Paediatrics
- 4 Silver, Kempe Bryn and Fulginiti's Handbook of Pediatrics. Appleton and Lange. ISSN 0440-192
- 5 Mecleod's: Clinical Examination. J.Munro. CRW Edards Churchill Livingstone Ed.
- 6 Papp Z.: Obstetric Genetics. Bp. Akadémiai K. 1990. ISBN 963-05-5689-8
- 7 Papp Z.: Atlas of Fetal Diagnosis. Elsevier, London, 1992. ISBN 0-444-98675-8
- 8 Knight B.: Simpson's Forensic Medicine. E.Arnold Co. London. 1991.
- 9 Marsden, Fowler: Clinical Neurology. Raven Press
- 10 Duus: Topical Diagnosis in Neurology. Thieme Medical Publishers
- 11 Gilroy: Basic Neurology. Pergamon Press
- 12 Weiner- Lewitt: Neurology of House Officer. Williams and Wilkins
- 13 Bannister: Brain an Bannister's Clinical Neurology. Oxford University Press
- 14 Mumenthaler: Neurology. Georg Thieme Verlag.
- 15 Manual of Emergency Medicine. 5th ed. Jon L.Jenkins, G.R.Braen. 2004. Lippincott Williams and Wilkins. Prod.Nr. 479531-1019

INTERNAL MEDICINE – Hematology, Infectology, Immunology, Rheumatology**Dept of Internal Medicine and Hematology**

Tutor: **Katalin Keltai, MD**

Lecture: 2 hours per week

Practice: 5,5 hours per week

Credit: 7.5

The primary objective of the course in internal medicine for fifth-year students is the symptom-based and patient-oriented education of haematology, immunology, rheumatology, and infectology. Students become familiar with the diagnostics and treatment of the most common disorders of the above disciplines.

Besides the above mentioned, integrative medicine, the holistic approach to medicine is also taught. This means the presentation of the coordinated patient care between internal medicine subspecialties and other related professionals and the illustration of the complexity of real life cases. Differential diagnosis also requires utilization of knowledge acquired from different specialties in the diagnostic phase of a case. With this complex program we emphasize the practical importance of internal medical approach and pursuit and teach its application in the real world.

Internal Medicine II. is taught in a block system. During the 5-week block, students spend 14 days (8 hours/day) in the Department. Theoretical and practical (bedside) classes are taught. Students are assigned into groups for bedside practices, case discussions and consultations that are held in rotation resulting in fewer students learning about a given topic at a time.

According to the topics below, classes are taught also dependent on the available patients.

Hematology**Topic list of the lectures:**

1. Cellular therapies
2. Blood count evaluation
3. White blood cell abnormalities
4. B signs, lymphadenopathies
5. Acute myeloid leukemias
6. Myelodysplastic syndromes
7. Thrombocytopenias and thrombocytopathy. Haemophilias. Increased coagulation (thrombophylia). Coagulopathies.

Topic list of the practices:

8. Neutropenic fever
9. Palliative and curative treatment of acute leukaemia
10. NHL low-grade / NHL high-grade
11. Patient with anaemia. Transfusion.
12. Bone marrow sampling. Presentation of sampling
13. Complex cases at bedside

Topic list of the consultations:

14. Ph negative myeloproliferative diseases
15. Myeloma
16. Anaemia – case based discussion
17. CML
18. Hemophilia/DIC
19. AIHA/ITP
20. Hodgkin

Infectology

Topic list of the lectures:

1. Emergencies in infectology
2. HIV/AIDS, tropical diseases in Hungary
3. Invasive mycosis
4. Primary immunodeficiencies
5. Vaccination
6. Multiresistant pathogens, infection control and antimicrobial stewardship

Topic list of the consultations:

1. Introduction to infectology
2. FUO
3. Sepsis
4. Infective endocarditis
5. Antibiotics, microbiological sampling, assessment of the culture results

Topic list of the practices:

1. Urinary tract infections
2. Airway tract infections
3. Skin and soft tissue infections
4. Infectological situations in practice (sepsis, meningitis, Lyme, pharyngitis)

Immunology

Topic list of the lectures:

6. Autoimmunity
7. Vasculitides of the great vessels
8. HANO
9. Autoimmune myopathies
10. Sjögren's syndrome – progressive systemic sclerosis

Topic list of the consultations:

1. Allergic diseases

Topic list of the practices:

1. SLE
2. Therapy of autoimmune diseases. Side effects of steroid therapy
3. Small vessel (ANCA-associated) vasculitis
4. Primary and secondary immunodeficiency
5. Rheumatoid arthritis
6. Spondylarthropathies
7. Gout, arthrosis
8. Complex immune cases

Each course is concluded by a practical skill oriented oral exam. During the exam the students are required to answer questions based on the knowledge acquired during practical sessions and by reading the obligatory chapters of the theoretical curriculum, by elaborating on 3 themes of the titles below.:

Hematology

1. Investigation of an anemic patient
2. Iron-deficiency anemia
3. Macrocytic anemia
4. Anaemia associated to chronic diseases
5. Hemolytic anemia
6. Aplastic anemia
7. Checking of the coagulation system
8. Evaluation of thrombosis
9. Acquired thrombophylia
10. Antiphospholipid syndrome
11. Hereditary hemophylia (Hemophylia A and B)
12. Von Willebrand disease
13. Anticoagulant therapy (indications, implementations)
14. DIC
15. Investigation of a thrombocytopenic patient
16. Thrombocytosis
17. TTP/HUS
18. ITP
19. Symptomatology of the lymphoproliferative diseases
20. Evaluation of lymphadenopathy
21. Non-Hodgkin lymphomas
22. Follicular lymphoma
23. Diffuse large B-cell lymphoma
24. Chronic lymphocytic leukemia/ Small lymphocytic lymphoma
25. Myeloma multiplex
26. Hodgkin-lymphoma
27. Symptomatology of myeloproliferative diseases
28. Acute myeloid leukemia
29. Acute lymphoid leukemia
30. Ph-negative myeloproliferative neoplasia (PV, ET, MF)
31. Chronic myeloid leukemia
32. Myelodysplasia syndroma 3
33. Autologous stem cell transplantation
34. Allogenic stem cell transplantation

Infectology

1. Basic principles of infectology and antimicrobial therapy (infectious disease anamnesic history and physical examination, targeted, empirical and prophylactic therapy, importance of source control, blood stream infections)
2. Common antibiotics, groups of antibiotics and their clinical use (penicillins, cephalosporins, carbapenems, glycopeptids, metronidazol; bacteriostatic and bactericid antibiotics, expected susceptibility – natural resistance; important factors: host, pharmacokinetics, mechanism of action) penicillinek, cephalosporinok, Semmelweis University Dept of Internal Medicine and Hematology Topic list for Internal Medicine II. (5th year) 2020/21 2
3. Common antibiotics, groups of antibiotics and their clinical use (lincosamids, macrolids, rifampin, tetracyclins, fosfomycin, nitrofurantoin, fluoroquinolones: bacteriostatic and bactericid antibiotics, expected susceptibility – natural resistance; important factors: host, pharmacokinetics, mechanism of action)
4. FUO – fever of unknown origin
5. Upper respiratory tract infections (sore throat, pharyngitis, otitis media, sinusitis, acute bronchitis)
6. Mononucleosis syndrome
7. Community acquired pneumonia
8. Nosocomial pneumonia
9. UTI (asymptomatic bacteriuria, cystitis, prostatitis)
10. UTI (pyelonephritis, catheter associated UTI)
11. Sepsis, septic shock
12. Intraabdominal infections (cholangitis/cholecystitis, abdominal abscess [liver, spleen, psoas], diverticulitis, peritonitis)
13. Endocarditis.
14. Lyme
15. Acute bacterial meningitis, brain abscess, neurotop viral infections
16. Erysipelas, cellulitis, fasciitis necrotisans, toxic shock syndrome, infectious arthritis, osteomyelitis
17. Neutropenic fever, systemic mycosis, infections of the immun-suppressed patient
18. Infective diarrhoea (bacterial, viral, Cl.diff.), food poisoning
19. HIV. AIDS and AIDS related diseases
20. Vaccines for adults and their importance. The flue.
21. Antimicrobial resistance, resistant microorganisms and their clinical importance; antimicrobial stewardship.

Immunology/rheumatology

1. SLE clinical picture
2. SLE diagnostics and treatment
3. Rheumatoid arthritis clinical picture
4. Rheumatoid arthritis diagnostics and treatment
5. Seronegative spondylarthritises
6. Gout
7. Vasculitises of the small arteries
8. Vasculitises of the middle and great arteries
9. Polyarteritis nodosa
10. Sjögren's syndrome
11. Autoimmune myopathies
12. Progressive systemic sclerosis
13. Primary and secondary immunodeficiencies
14. Allergy
15. Differential diagnosis of arthritis

OBSTETRICS AND GYNECOLOGY

Dept. of Obstetrics and Gynecology

Tutor: *Dr. Gyula Richárd Nagy*

Lectures and Practices in blocks

- Introduction. General information. The menstrual cycle. Conception. Normal pregnancy.
- Normal labor and delivery. Obstetrical examinations.
- Changes in maternal anatomy and physiology during pregnancy.
- Prenatal care. Symptoms and signs of pregnancy.
- Spontaneous abortion. Ectopic pregnancy. Basic knowledge of ultrasonography.
- Maternal diseases complicating pregnancy. Gestational diabetes.
- Abnormalities of pregnancy.
- Abnormalities of labor and delivery.
- Monitoring of the fetus.
- Hypertensive disorders in pregnancy.
- Premature delivery. Intrauterine growth retardation (IUGR).
- Neonatology.
- Twin pregnancy. Operative delivery.
- Normal and abnormal puerperium.
- Major issues in current obstetrics.
- Gynecological endocrinology. Menstrual disorders.
- Inflammatory diseases in obstetrics and gynecology.
- Sterility, infertility. Assisted reproduction.
- Cervical cancer.
- Tumors of the ovary.
- Tumors of the vulva, vagina and corpus uteri.
- Principles of cancer therapy.
- Endometriosis. Polycystic ovary syndrome (PCOS).
- Genetic Counseling.
- Prenatal genetic diagnosis.
- Fetal anomalies. Dysmorphology.
- Perimenopausa.
- Genital prolapse. Urogynecology.
- Vital statistics. Medical legal problems in obstetrics and gynecology.
- Occasionally the topics are interchangeable.

PEDIATRICS

Pediatric Center, Bókay street Department

Tutor: *Dr. Dóra Krikovszky*

Pediatric Center, Tűzoltó street Department

Tutor: *Dr. Klára Horváth*

Credits: 8

Total duration: 112 hours, lectures: 28 hours, practices: 84 hours

Prerequisites: Internal Medicine I., Laboratory Medicine, Medical Imaging

Aims: To introduce students to the most common diseases of the pediatric population.

Curriculum:

The 5th year Pediatric course is organized in the framework of the new block structure. Students spend 3.5 weeks in our department, 1.5 weeks are reserved for home study and the oral exam.

SEMINARS IN PEDIATRICS FOR 5th GRADE MEDICAL STUDENTS

Location:

Pediatric Center, Bókay street Department, Budapest VIII, Bókay J. u. 54. 1. floor

Pediatric Center, Tűzoltó street Department, Budapest IX, Tűzoltó u. 7-9.

- | | |
|---|---|
| 1. Introduction to Pediatrics, Growth and development | 8. Nephrology |
| 2. Development, screening, immunisation | 9. Neurology |
| 3. Pediatric emergencies | 10. Endocrinology |
| 4. Pulmonology | 11. Surgery |
| 5. Neonatology // Cardiology | 12. Dermatology // Immunology |
| 6. Infectious diseases | 13. Psychiatry |
| 7. Gastroenterology, hepatology | 14. Genetics // Inborn errors of metabolism |

Practices

Pediatric Center, Bókay street Department, Budapest VIII, Bókay J. u. 54. I. floor

Pediatric Center, Túzoltó street Department, Budapest IX, Túzoltó u. 7-9.

Practices at: Pediatric Center, Bókay street Department:

- Physical examination of children
- Communication with families
- Cardiology
- Diabetology
- Emergency
- Gastroenterology
- Hepatology
- Hematology (at 2nd Department)
- Infancy
- Neonatal Intensive Care Unit
- Neonatal surgery
- Nephrology
- Neurology
- Pulmonology
- SKILL (Pediatric Basic Life Support)
- Surgery

Practices at: Pediatric Center Túzoltó street Department

- Physical examination of children
- Pediatric Basic Life Support
- Foreign body airway obstruction
- Rheumatology
- Neurology
- Hematology
- Endocrinology
- Cardiology
- Communication with families
- Gastroenterology
- Oncology
- Surgery
- NICU (at **the Pediatric Center, Bókay street Department** and at the Obstetrics and Gynecology Departments)

Requirements (Pediatric Center, Bókay street Department):

Attendance: according to Semmelweis University regulations, students may not miss more than 10% of their scheduled sessions (including practices, seminars). Students will be provided an opportunity to make up missed sessions at the end of the semester.

Students should bring their own gown and stethoscopes to the practices.

Examination (Pediatric Center, Bókay street Department):

Practical exam will be scheduled at the end of the pediatric blocks. Practical exams are not graded. Grades will be given based on the result of the oral exam.

Requirements (Pediatric Center, Túzoltó street Department):

Students should bring their own stethoscopes to the practices. Attendance: students have to attend 75% of the practices and 75% of the consultations and seminars.

Examination (Pediatric Center, Túzoltó street Department): The final grade consists of the average grade of the practical and the oral exams (50-50%), students should pass both parts with a minimum grade of 2. The practical exam is organized to the last day of the block. If the final average is between two grades, we round the final grade towards the mark of the oral exam.

Type of exam: Bedside practical exam and oral exam.

5th year semifinal topic list

1. Definitions in perinatology, gestational and mortality data, birth related concepts
2. Aspects of newborn care, Apgar scoring system
3. Physiologic growth, anthropometric features, normal development from newborn to school age
4. Nutrition and feeding of a healthy infant and child, nutrition and feeding of premature babies, energy needs. Physiologic growth of a healthy infant
5. Newborn and genetic screening, prevention
6. Chromosomal abnormalities
7. Neonatal respiratory adaptation disorders and lung disease
8. Neonatal infections
9. Neonatal jaundice
10. Complications of prematurity (BPD, ROP, NEC, IVH)
11. Sudden infant death syndrome (SIDS), infant mortality, demographic data
12. Neonatal and infant CPR (cardiopulmonary resuscitation)
13. Meconium ileus, intestinal atresia, pyloric stenosis, diaphragmatic hernia
14. Ileus, intussusception, volvulus, incarcerated hernia, appendicitis.
15. Obstipation. Hirschsprung disease.
16. Testicular and ovarian torsion. Cryptorchism.
17. Coagulopathies
18. Anaemia: signs and symptoms and evaluation
19. Leukaemia.
20. Prevention of infectious diseases. Vaccination
21. Signs of sepsis. Management of sepsis in the first few hours
22. Herpes virus infections
23. Measles, rubella, scarlet fever
24. Systemic autoimmune disease
25. Allergic disease in infancy and childhood. Definition of atopy
26. Diseases affecting the ear
27. Rhinitis, adenoiditis, tonsillitis, bronchitis.
28. Pneumonia. Age related most common pathogens
29. Cystic fibrosis.
30. Obstructive bronchitis, asthma bronchiale, acute subglottic laryngitis
31. Alarming signs of CNS diseases. Necessary examinations. Lumbar puncture
32. Inflammatory disease of the nervous system
33. Facial nerve palsy
34. Seizures in childhood. Febrile seizure
35. Diabetes mellitus. Treatment of diabetic ketoacidosis
36. Congenital adrenal hyperplasia
37. Disease of the thyroid gland
38. Endocrine disorders of calcium and phosphate metabolism. Rickets.
39. Growth disorders (short stature, tall stature)
40. Disorders of pubertal growth and sexual maturation
41. Henoch-Schönlein purpura
42. Kawasaki syndrome, MISC.
43. Urinary tract infection. (localization, course of the disease, treatment, complications)
44. Congenital disorders of the kidney and urinary tract
45. Glomerular kidney disease
46. Nephrosis syndrome
47. Cyanotic congenital heart disease
48. Acyanotic congenital heart disease
49. Malabsorption. Celiac disease
50. Cholestatic liver disease in childhood
51. Hepatitis in childhood
52. Most common infectious enteritis
53. Inflammatory bowel disease: ulcerative colitis, Crohn's disease
54. Alarming signs of abdominal diseases
55. Enuresis. Polyuria and polydipsia
56. Oedema
57. Acid-base homeostasis, treatment of acid-base balance disorders
58. Fever, management of fever, antipyretics

Note concerning the 6th year's rotations: Only legibly, completely and accurately filled out, institutionally sealed, original acceptance letters are recognized!

PSYCHIATRY, PSYCHOTHERAPY

Semmelweis University, Faculty of General Medicine

Name(s) of the Institute(s) teaching the subject: Department of Psychiatry and Psychotherapy

Name of the subject: Psychiatry, Psychotherapy

Credits: 7 (two semesters)

Total number of hours: 140 (two semesters) lectures: 42 practices: 98 seminars: none

Type of the course (mandatory/elective): Mandatory (obligatory)

Academic year: 2023-2024

Course director (tutor): Prof. János Réthelyi MD, PhD

Contact details: Department of Psychiatry and Psychotherapy 1083 Budapest Balassa u. 6.

Tel.: 061 210 0336

Position: Head of the department

Date of habilitation and reference number: 24 June 2015, registration number: 05/2015.

Aim of the subject and its place in the curriculum:

The aims of the subject of Psychiatry I-II. is to acquire in-depth knowledge about the diagnostics, symptoms and treatment of psychiatric disorders at the level of a general medical practice. It is expected from students to be able to identify the basic elements of psychopathology and the conditions requiring emergency psychiatric interventions. Furthermore, students' communication skills are developed in order to be able to examine patients and explore psychiatric conditions independently.

Psychiatry I-II. is taught in the semesters of 9-10 within the curriculum.

Location of the course (lecture hall, practice room, etc.):

The location of Psychiatry lectures and practice session are within the premises of the Department of Psychiatry and Psychotherapy (i.e. Lecture hall and rooms for education)

Competencies gained upon the successful completion of the subject:

- Recording the patient's history (general, somatic, psychiatric, pharmacological and family history)
- Complex psychiatric examination (assessing the consciousness, perception, orientation, thought, intellect; emotional and memory functions; mood, and psychomotor functions of the patient; assessment of attitude towards examiner, motivation system and personality functions)
- Suicide risk assessment
- Family consultation to uncover the patient's problems
- Exploration of patients after suicide attempts or in crisis situations.
- Interpretation of the Mini Mental State Examination results
- Indication of psychiatric inpatient treatment
- First steps of emergency psychiatry care
- Identification of different intoxications
- Recognition of somatic disorders underlying psychiatric symptoms
- Management of immediately dangerous behaviours
- Psychoeducation (regarding the disorder, therapy, prodromal signs, patient care)
- Differential diagnosis of psychiatric disorders; making a diagnosis

Prerequisite(s) for admission to the subject:

For Psychiatry, Psychotherapy: Pharmacology and Pharmacotherapy II., Neurology I.

Minimum and maximum number of students registering for the course: We instruct the entire fifth year, therefore, there is no limit on number of subscribing students in the Neptun System.

Student selection method in case of oversubscription:

How to register for the course:

Registration for the course is possible in the Neptun system within the rotations of the block practice system.

Potential overlap(s) with other subjects:

Behavioural sciences, Medical communication, Medical anthropology, Medical sociology, Psychotherapy in medical practice, Pharmacology and pharmacotherapy, Neurology

Special training activities required³: None.

Policy regarding the attendance and making up absences:

Similar to other subjects, the course is considered to be completed if the absences do not exceed 20% of practice sessions each semester. Practice teachers record absences on an attendance sheet at each practice occasion together with the following data: the ID number of the group, topic of the practice sessions, the demonstrated diagnosis. It is not possible to certify absences. Therefore, making up missing practice time is obligatory either by coming to practice sessions with a different group or performing extra tasks such as writing a case report that is examined and signed by one of our practice teachers. In the case of mass absences because of exceptional cases (i.e. grave disease) the permission of the head of the department is necessary.

Means of assessing the students' progress during the semester⁴: There are not any mid-semester tests or oral reports in Psychiatry but on the last day of the first week of the practice (Thursday) there are three specific questions to be answered in writing during the block practice session.

Requirement for acknowledging the semester (signature):

The semester is acknowledged if the student has actively participated at the practice sessions which cover the theory and practice of examining a patient and case discussions attached to demonstrations. The sheet entitled *The Register of Psychiatric Conditions* must be downloaded from our website in the fifth year and submitted with the required signatures certifying the observed psychiatric disorders. This sheet of paper must be submitted at the final exam of Psychiatry in the sixth year.

Type of the examination:

At the end of the first semester there is a semi-final exam, while a practice mark must be acquired at the end of the second semester. The semi-final exam is a written exam containing 50 multiple choice questions. Some of them are related to case vignettes within the body of the test paper.

Exam requirements⁵:

The material should be acquired by regular patient examinations during the practice sessions, by studying the e-learning material available also on our website and by studying from the designated text books. Preparation for the semi-final exam includes presence at the lectures, text books and the drafts and PowerPoint presentations of lectures made available for students on the website of the Department of Psychiatry and Psychotherapy.

Type and method of grading⁶:

In the first semester, the semi-final exam can be passed by answering a written test of 50 items. An oral semi-final exam is only allowed by permission from the head of the department in the case of subsequently failing two written exams in Psychiatry. In the second semester, a practice mark can be gained by considering the following factors: the students' performance exhibited within the semester during the practice sessions, the quality of their written case report submitted to their own practice teacher and the oral performance related to the topics of practice sessions.

How to register for the exam:

Exam registrations can be made in the Neptun system within the time limits permitted by the Rule Book of Study and Exams of Semmelweis University.

Opportunities to retake the exam:

Retake of the semi-final exam are permitted within the boundaries set by the Book of Study and Exams of Semmelweis University. There are two occasions of passing attempts in the form of a written exam. The third attempt to correct the failed exams can be oral.

Literature, i.e. printed, electronic and online notes, textbooks, tutorials (URL for online material):

Text books and lecture materials available on the website should be consulted while preparing for examination:

Textbook: Rebecca McKnight, Jonathan Price, John Geddes. Psychiatry 5th edition. Oxford University Press, 2019. Oxford, United Kingdom.

Detailed thematic of the course²:
Lectures

Title of the lecture	Lecturer	Mode
1st week MONDAY		
Introductory lecture: What we teach in psychiatry, curriculum, objectives, exams. The history of psychiatry. Psychiatric epidemiology.	Professor János Réthelyi	in person
Lecture: Psychopathology. Mental status examination. Transcultural psychiatry. Gene-environment interactions in psychiatry.	Professor János Réthelyi	in person
1st week TUESDAY		
Lecture: Classification of mental disorders.	György Szekeres	in person
Lecture: Anxiety disorders: diagnosis and treatment. Eating disorders: diagnosis and treatment. Sexual disorders.	Szilárd Hamvas	in person
1st week WEDNESDAY		
Lecture: Schizophrenia and other psychotic disorders	Professor János Réthelyi/Professor István Bitter	in person
Lecture: Affective disorders: diagnosis and treatment	Professor Zoltán Rihmer	in person
1st week FRIDAY		
Lecture: Neurocognitive disorders: diagnosis and treatment. Geriatric Psychiatry	Zoltán Hidasi / Máté Fullajtár	in person
Lecture: Emergency psychiatry. Legal and ethical issues in psychiatry . Suicide	Brigitta Baran / Ferenc Ádám Szabó	in person
2d week MONDAY		
Lecture: Introduction to psychotherapy. Definition, indications, effects, main trends, basic competencies of psychotherapy	Professor Zsolt Unoka	in person
Lecture: Stages of motivational interview and behaviour change: addictions, eating disorders, lifestyle changes required due to chronic diseases, management of compliance problems. Sleep disorders: diagnosis and treatment	Professor György Purebl	in person
Lecture: The cognitive model: anxiety disorders, depression, somatization, sleep disorders, psychotherapeutic approach to sexual disorders	Professor Dóra Perczel-Forintos	recorded
Lecture: Suicide prevention, crisis intervention, aggressive, psychotic, psychotherapeutic approach for patients with personality disorders	Bálint Hajduska-Dér	recorded
2d week TUESDAY (second part of the rotation)		
Lecture: Neuropsychology, Clinical Psychology (Theoretical Introduction)	Éva Jekkel / Xénia Gonda	in person
2d week WEDNESDAY		
Lecture: Pharmacotherapy in psychiatry	Professor István Bitter / Gábor Csukly	in person
Transcultural psychiatry	Gyöngyi Szilágyi	in person
Consultation lecture of the online learning material		
Lecture: Posttraumatic stress disorder. Somatoform disorders, Somatization and Conversion disorders, Hypochondriasis	Professor János Réthelyi	recorded
Lecture: EEG and event related potentials in psychiatry	Pál Czobor	recorded

FORENSIC MEDICINE

Semmelweis University, Faculty of Medicine

Name of the managing institute (and any contributing institutes):

Department of Pathology, Forensic-, and Insurance Medicine

Name of the subject: Forensic Medicine

Credit value: 2

Total number of lessons: 28 **lecture:** 0 **practical course:** 10 **seminar:** 18

Subject type: obligatory course

Academic year: 2024/2025

Name of the course leader: Dr. Kiss András

His/her workplace, phone number: Department of Pathology, Forensic and Insurance Medicine, phone: 061-215-6921

Position: director

Date and registration number of their habilitation: 30th May 2007, reg. number: 248

Objectives of the subject, its place in the medical curriculum:

Forensic medicine is a science forming a bridge between medicine and law, aiming to communicate medical findings in order to aid jurisdiction. In our course we go beyond morphology and diagnoses, and try to reveal the underlying causes of the current state of a body, through providing a foundation for the understanding of changes, injuries and disease states at the molecular, cellular, tissue, organ, and organism levels.

The purpose of the subject is to achieve the qualities of a medical doctor, within the framework of forensic medicine, and for the students to become (a) independent, (b) critically thinking, (c) able to make decisions, and (d) take further necessary actions, (e) recognize emergency situations and (f) respects the boundaries of their competency.

During this course our goal is to pass over the knowledge substantial in everyday clinical practice, making the main objective of this subject to help acquire the following practical skills:

- I. Attain the skillset of on-scene inspection of cadavers, and familiarize with the procedure of processing cases of the deceased.
- II. Examining injuries, and injury-patterns in the clinical practice, with the ability to individually evaluate, and professionally document them.

Place where the subject is taught (address of the auditorium, seminar room, etc.):

Hegedűs Gyula Room, Autopsy Room

All premises above are located under our main address, at 93. Üllői street 1091 Budapest.

Successful completion of the subject results in the acquisition of the following competencies:

Successfully completing the subject will result in the attainment of the following practical skills and knowledge:

Sufficient data about basic disease reactions and organ specific reactions so that you can:

- Interpret signs and symptoms appearing in a patient's history and create a differential diagnosis.

Sufficient knowledge of forensic pathology and histopathology at large so that you can:

- Interpret findings at autopsy
- Interpret reports of forensic pathology
- Intelligently review forensic pathology slides and images with a consulting forensic pathologist

Awareness of the role of autopsy in medicine.

Course prerequisites:

Pathology, Genetics, Pharmacology

Number of students required for the course (minimum, maximum) and method of selecting students:

The announcement of the courses is based upon the orders of the Dean's Office of General Medicine.

Maximum headcount of the course: 28

Minimum headcount of the course: 10

How to apply for the course:

Applying for the course takes place via the NEPTUN system, regarding the instructions of the Study and Exam Committee (TVSZ) and the Dean's Office of General Medicine.

Detailed curriculum:

The course is organized in the block-based education system, throughout 40 weeks, in blocks of 2 weeks. Practical classes are preceded by short theoretical preparation sessions, followed by a gradual introduction to the clinically oriented practices, emphasizing the importance of examination of cadavers for every student. During the sessions we organize the students into small groups, challenging them to examine and process cases, while the theoretical preparation classes are held in bigger groups. Regular oral and written contribution of the students (case reports, and independent documentation) is substantial during the course. All sessions are required to contain feedback elements. At the end of the course an oral exam is conducted on the second week (see details below).

Detailed schedule**Week A**Monday (A/I)

- Introduction to Forensic medicine. Violent death and post mortem changes (2 periods – Dr. Almádi Zsófia)
- Types and patterns of injuries (2 periods – Dr. Törő Klára)
- Electrical fatalities, burns and scalds (1 periods – Dr. Németi Balázs)
- DNA analysis (1 periods – Dr. Németi Balázs, Dr. Lászik András)
- Sudden death (number of classes: 1 period – Dr. Bokor János)
- Head trauma (1 period – Dr. Misnyovszki Péter, Dr. Almádi Zsófia)

Tuesday (A/II)

- Autopsy room practice (2 periods – Dr. Marcsa Boglárka, Dr. Almádi Zsófia, Dr. Varga Balázs)
- Examination on the scene of death (1 period – Dr. Marcsa Boglárka)
- General toxicology (1 period – Szabó-Kócs Tamara, Dr. Vannai Mariann)
- Documentation of injuries (2 periods – Dr. Almádi Zsófia)
- The role of histopathology in forensic medicine (1 period – Dr. Hegedüs Panna, Dr. Danics Krisztina)
- Asphyxia and drowning (1 period – Dr. Hegedüs Panna, Dr. Törő Klára)

Wednesday (A/III)

- Autopsy room practice (2 periods – Dr. Bokor János, Dr. Németi Balázs, Dr. Misnyovszki Péter)
- Medico-legal aspects of traffic accidents (1 period – Dr. Misnyovszki Péter, Dr. Almádi Zsófia)
- Firearm injuries (1 period – Dr. Misnyovszki Péter, Dr. Almádi Zsófia)
- Identification (2 periods – Dr. Magyar Lóránt)
- External examination practice (2 periods – Dr. Magyar Lóránt, Dr. Marcsa Boglárka, Dr. Németi Balázs, Dr. Misnyovszki Péter, Dr. Hegedüs Panna)

Friday (A/IV)

- Autopsy room practice (2 periods – Dr. Magyar Lóránt, Dr. Csellár Lilla, Dr. Danics Krisztina)
- Consultation (Dr. Németi Balázs)
- Summary (Dr. Almádi Zsófia)

The names of tutors listed above is given for information purposes only, the actual roster of tutors may change in accordance with the rules for substituting tutors on classes.

Week BWednesday

- Oral exam

Friday

- Oral exam

Other subjects concerning the border issues of the given subject (both obligatory and optional courses!). Possible overlaps of themes:

Neurology – head injuries

Traumatology – injuries of bones and soft tissues

General practice – examination of cadavers

Radiology – radiological results as proof

Gynecology – sexual offences

Internal medicine – toxicology

Special study work required to successfully complete the course:

Successfully completing the subject does not require additional instructional occupation.

Requirements for participation in classes and the possibility to make up for absences:

Students are required to be present on 75% of all classes, and thus allowed to miss 7x45 minutes of education, provided that they attend at least one autopsy room practice during their rotation. The names of students listed on the attendance sheet or make up sheet of practices, signed by the appointed instructor of the class classifies as a proof of their verified presence on the session.

Making up for absences can be done by joining other, subsequent groups in which case missed classes must be made up for in accordance with their original topics. Attending another group has to be arranged with the resident educational advisor of the department in advance!

The make-up classes have to be registered and presented to the secretary of the department by 2 days before the exam at latest. Presenting a written certificate of the makeup classes is the responsibility of the students attending the course! If the number of missed classes exceeds 7, and the make-up classes have not been verified, the subject cannot be completed.

The rules above may vary in accordance with rules and regulations due to the pandemic situation.

Methods to assess knowledge acquisition during term time:

No mid-term examination takes place, and homework is not given. Assigned groups all take their exams on the B week of their periods, on the given specific days provided above.

Requirements for signature:

Attendance will be monitored on each class of the course individually and registered on the attendance sheet at the beginning or end of classes. Taking attendance is the responsibility of the tutor.

Students with the required amount of attendances (see segment *Requirements for participation in classes and the possibility to make up for absences* for more information) will be given signature by the end of the first week of their rotation.

Type of examination:

The subject concludes with an **oral exam**. Students are required to pick two randomly chosen topics from the list below and talk about them after a brief preparation time.

The preparation time only applies if the exam is held in person.

Requirements of the examination:**List of topics**

- | | |
|---|---|
| 1. Definition of death. Post mortem changes. | 19. Sexual assault: examination requirements, evidential samples and documentation. |
| 2. The early post-mortem interval. | 20. Transportation under influence. Drink and drive problems. Widmark's formula. |
| 3. The late post-mortem interval. Estimation of post-mortem interval. | 21. Road traffic injuries. |
| 4. Estimating the time of death. | 22. Railway injuries, aircraft fatalities. |
| 5. Determining the cause of death. Medico-legal investigation of death. | 23. Classification of asphyxia. Signs of asphyxia. |
| 6. The autopsy. | 24. Types of mechanical asphyxial mechanism. |
| 7. Methods of identification. Identification of decomposed or skeletonized remains. | 25. Immersion deaths: evidence of immersion. Post-mortem artefact and immersion. |
| 8. Sudden death of cardiovascular disorders. | 26. Pathological diagnosis of drowning. The role of alcohol in drowning. |
| 9. Sudden death of respiratory and gastrointestinal disorders. | 27. Injury caused by heat. Cold injury, hypothermia. |
| 10. Sudden infant death. | 28. Electrical injury. |
| 11. Child abuse. Safeguarding children. | 29. Principles of toxicology. |
| 12. Terminology of injuries. Types of injuries. | 30. Commonly misused drugs and drug related death. |
| 13. Self-inflicted injury. | 31. Carbon-monoxide poisoning. Arsenic, cyanide, lead and methanol poisoning. |
| 14. Injury patterns. Documentation of injuries and marks of injury. | 32. Scene examination and evidence recovery. Examination on the scene |
| 15. Head and neck injuries. | 33. Forensic DNA analysis. |
| 16. Spinal, chest and abdominal injuries. | |
| 17. Gunshot injuries. | |
| 18. Differentiation of accident, suicide or murder in gunshot injuries. | |

Method and type of evaluation:

Students are being evaluated based on their presentation of their assigned topic, and on their answers to the follow-up questions.

The students will then be graded on a scale of 1-5, with a 1 resulting in a fail.

How to register for the examination:

Via the NEPTUN system, according to the general rules of the Study and Exam Regulations (TVSZ).

Possibilities for exam retake:

Via the NEPTUN system, according to the general rules of the Study and Exam Regulations (TVSZ).

Successful exams may be repeated up to 1 time.

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

- Lecture notes of forensic medicine. Semmelweis Publisher. 2008.
- Simpson's Forensic Medicine. 13th edition. Hodder Arnold Publishing. 2011.
- www.forensicmed.co.uk edited by: Richard Jones

UROLOGY

Tutor: **Dr. András Horváth**

UROLOGY

Head of Department: **Prof. Dr. Péter Nyirády**

Tutor: **Dr. András Horváth**

Aim of education: Our aim is to teach our students for a basic knowledge in urology (the most important differential diagnostic steps, urological physical examination, imaging techniques, different treatment options) and also to educate them to perform the most important, minor urological procedures (like urethral and suprapubic catheterization).

Syllabus:

- Embryology of the urological tract
- History of urology, Symptoms, Diagnostic Measures
- Urolithiasis. Diagnosis and Treatment
- Incontinency, Neurogenic Bladder
- Benign Prostatic Hyperplasia
- Prostate Cancer
- Renal Tumours
- Tumours of the Urinary Bladder
- Injuries to the GU Tract
- Testicular and Penile Tumours
- Male Infertility
- Endoscopic Urology (Endourology)
- Emergency in Urology
- Paediatric Urology
- Nonspecific Infections of the GU Tract

Attendance

Lectures: 14 lectures during 2 weeks course

Practice: 2 weeks course in rotation system at the Department of Urology.

During practices all parts of urology are covered and as many as possible physical examinations and procedures are shown.

Absence from practice: 20% absence is accepted, in case of more absence it has to be compensated by joining another group's practices.

Exam: oral exam, topics are available at our website.

The mark depends on the practice score given by the tutor of the student and also on the oral exam result.

Absence from the exam: Only an official medical certificate is accepted.

Exam sign up: Through the Neptun system.

For updated information please contact the department.

INTENSIVE THERAPY AND ANESTHESIOLOGY (ITO)

Tutor: *Dr András Kállai*
Dr Dóra Konczig

Lectures:

1. Introduction

Basics of intensive therapy and anesthesiology. Diseases requiring intensive therapy. Patient safety. Psychological methods (hypnosis, suggestive communication) in anesthesiology and intensive therapy

2. Acid-base balance. Fluid - electrolyte homeostasis. Metabolic disorders in diabetes mellitus

3. Disorders of salt - water homeostasis. Disorders of electrolyte homeostasis, hypokalaemia and hyperkalaemia. Enteral and parenteral nutrition

4. Basics of respiratory failure. Obstructive pulmonary diseases. ARDS: definition, classification, diagnosis and therapy

5. Principles of ventilatory support. Postoperative respiratory failure. Weaning

6. Shock states: pathophysiology, classification, diagnosis and therapy

7. SIRS, sepsis and septic shock

8. Volume therapy: crystalloids and colloids. Haemostasis management. Massive haemorrhage protocols

9. Cardiopulmonary resuscitation (CPR, BLS, ALS), the periarrest period and the Post Cardiac Arrest Syndrome (PCAS). Chain of survival. In-hospital BLS and ABCDE-approach. Managing ALS (defibrillation, 4H-4T, iv./io., drugs) and PCAS. Importance of non-technical skills (task management, team work, situation awareness, decision making, communication). Organizing CPR. CPR on CPR-Bas and CPR-Sim practices

10. Pulmonary embolism. Stroke. Disseminated intravascular coagulation (DIC)

11. Polytrauma: Emergency and Intensive care management

12. Preoperative risk stratification, preconditioning, premedication. Cardiopulmonary protection. Perioperative approach of heart and lung transplantation

13. General anaesthesia using intravenous and/or volatile anaesthetics. Airway management. Analgesics. Muscle relaxants. Antidotes

14. Regional (spinal and epidural) anaesthesia: anatomy, techniques, indications, practice and complications. Local anaesthetics. Pain management

Lecture attendance:

Recommended. Attendance will not be taken.

Practices:

ICU bed side practices:

1. Introduction, ABCDE-approach (BEV)
2. Respiratory intensive care practice 1 (Resplnt 1)
3. Respiratory intensive care practice 2 (Resplnt 1)
4. Shock practice 1 (Shock 1)
5. Shock practice 1 (Shock 1)
6. Gastrointestinal bleeding and metabolic disorders (GIVMET)
7. Anesthesiology practice (ANE)
8. Anesthesiology and intensive care of trauma patients (TraumIA)

Simulation practices:

9. CPR-Basic
10. ABC-skills
11. ALS-Sim1 (CPR Simulation 1)
12. ALS-Sim2 (CPR Simulation 2)
13. HiFi-Sim (High Fidelity Simulation)

Problem based learning practices:

14. Perioperative care
15. Pain management
16. Homeostasis
17. Case report
18. Consultation

Attendance criteria and absences:

In order to complete Intensive Therapy and Anesthesiology you need to be present **on 13 out of the first 17 practices**. Also you need to pass a practical exam in In-Hospital Basic Life Support (CPR)) and ABC-skills.

Bed-side practices will be held at the Intensive Care Unit of the new building “Központi Betegellátó Épület” (Klinikák metro station, Bp. 1082 Üllői út 78., building section “B”, 4th Floor). Trauma practices will be at the Trauma-ICU (1081. Budapest, Fiumei út 17., 7th floor). Simulation practices will take place at Simulation Center (Bp. IX. Ernő u. 7.). The PBL practices will be held via Zoom. Practice schedule will be uploaded in Moodle.

Keep in mind that before the HiFi-sim and CPR-sim practices you need to pass a 5-minute “pre-practice test” in order to attend.

For bed-side practices we kindly ask you to have a stethoscope on you. For changing clothes please use the wardrobe located under the escalator at the entrance of the 2nd Dept. of Gyne/Obs. (In the case of Trauma practices our colleagues on the 7th floor will give you coats for the practice.)

In case of a missed practice you have two options. You can find another group (on a different week) in Moodle with the same theme as the practice you have missed and join them (please note that the group limit is 7 students). Or at the end of the semester you can join the extra practices we will hold, but please note that the capacity of these practices will be limited to 7 person just like the ones during the semester.

Grading:

1. Written (multiple choice test)
2. Retaking of the written exam is also possible. Repeating of the examination can be taken in the form of oral exam.

Type of exam: written (multiple choice test)

Make-up exam: written or oral

Exam requirements:

The knowledge of the given textbook, lecture and practice material.

If there is anything we can help you with feel free to contact us via int.ane.edu@gmail.com.

OPHTHALMOLOGY

Dept. of Ophthalmology

Tutor: *Dr. Dorottya Szabó*

24 theoretical lessons, 32 practical lessons in 3-week blocks

Educational materials: pre-recorded, available in the Moodle

E: 60 minute blocks of lectures; 70x 10-20 minutes lectures
 ES: case presentation seminars 12x; 5 minute case presentations (total of 80-100 cases);
 Pre-recorded lectures (in Kaltura) can be viewed in the Media Gallery.

The students should attend 26 practical lessons at our Department

Contact consultation (CC); 8x45 minutes
 PP: patient presentation, 12x45 minutes (9x60 min)
 Seminars, 6x45 minutes

In 1 block: 18-24 students, 6 teachers

DAY 1: basic knowledge, preparation of patient examination
 students divided into 3 groups, i.e. 6-8 students / lecturers; 3 working hours / instructor
DAY 2-7: patient examination
 students are divided into 6 groups, i.e. max. 2-4 students / lecturers; 9 working hours / instructor
 Colloquium from **DAY 8** (test exam)

For students:

- at least 75% attendance in practical sessions: the instructor signs each contact consultation or patient examination class in the student's attendance document. According to new regulations of the University, the missed practical sessions need to be retaken. There is an opportunity for delayed completion in case of absence, at the time of on-call shifts, by appointment with the block leaders.
- **successful partial tests**
 - o **partial test:** opens on Day 1 in the morning, can be tried several times, longer writing time. Target: to reach min. 90% satisfactory result
 - o **Exam I.:** Lectures 1-7. and contact consultations 1-6. must be completed till Day 2, 9am
- **practical exam:** on Day 7.
- **Colloquium (test):** from Day 8

Lectures 1-24

1. Functional anatomy, in vivo examination of the tissue of the eye I: instruments for anterior segment
2. Functional anatomy, in vivo examination of the tissue of the eye II: instruments for posterior segment
3. Binocular vision. Strabismus-amblyopia.
4. Misalignment of the eye movements, diplopia.
5. Diseases of the orbit. Differential diagnosis of exophthalmus
6. Malpositions of the eyelids. Ocular oncology I: tumors of the eyelid, plastic surgery
7. Ocular oncology II: anterior surface of the eye, adnexa, anterior segment
8. Ocular oncology III: posterior segment
9. The red eye I: diseases of the anterior surface (infective disorders of conjunctiva, cornea, sclera, dry eye).
10. The red eye II: Uveitis
11. Refractive surgery.
12. Cataract
13. Glaucoma I.
14. Glaucoma II.
15. Sudden visual loss I: papilla edema
16. Sudden visual loss II: retinal circulation problems
17. Sudden visual loss III: retinal detachment, diseases of the vitreous (endophthalmitis)
18. Main causes of blindness in posterior segment I: diabetes mellitus
19. Main causes of blindness in posterior segment II: senile macular degeneration
20. Main causes of blindness in childhood: ROP and problems of formerly adults
21. Pediatric ophthalmology: Leukocoria
22. The most common genetic disorders of the posterior segment
23. Ocular traumatology, iatrogenic injury
24. Interdisciplinary issues: possibilities of a general doctor for screening, prevention of blindness

Contact consultations

1. The place of ophthalmology in medicine. History of the Department. Anatomy of the eyeball. Dissection of the eye.
2. General ophthalmic physical examination, exploration of conjunctival sac, eversion of the eyelids, estimation of the intraocular pressure with palpation, applanation tonometry. Anterior segment: focal light (pupil lamp) and slitlamp; examination of eye movements, pupil reactions.
3. Red reflex, indirect ophthalmoscopy using an eye model, methods of fundus Examination; eye drops, bandage; Hertel exophthalmometer; colour vision (Ishihara, Farnworth), contrast sensitivity; critical fusion frequency (CFF).
4. Vision tests: visual acuity (automatic refractometry, eye charts, ophthalmic trial lens set), visual field (confrontational, Goldman, automatic), electrophysiology testing.
5. Fluorescein staining of the cornea, diagnostic tools of the anterior segment (demonstration), lasers.
6. OCT, invasive angiographies, ophthalmic ultrasound: demonstration of diagnostic tools.
7. Consultation
8. Practical exam

Checklist for practical lessons:**Vision, refraction:**

- automatic refractometry, keratometry
- eye charts
- handheld eye-chart (Csapody)
- ophthalmic trial lens set

Physical examination of the anterior segment:

- slit lamp
- Hertel exophthalmometer
- fluorescein dye
- Schirmer paper
- eversion of the upper eyelid
- bindings

Glaucoma:

- Goldmann applanation tonometry; non-contact tonometry
- automatic perimetry

- papilla OCT
- manual eye pressure checking

Functional examinations:

- perimetry
- critical fusion frequency (CFF)
- Color vision (Ishihara, Farnworth)

Posterior segment:

- direct ophthalmoscope
- Volk lens
- macula OCT, angiography
- ultrasound
- laser

Eye movements:

- cover test
- guided eye movements

Basic skills in Ophthalmology**In practice:**

1. Assessment of near and distance visual acuity in adults and in children
2. Confrontal visual field testing
3. Color vision test
4. Examination of eye movements in the six cardinal directions
5. Checking ocular alignment, screening for amblyopia
6. Examination of the pupil: pupil size, reactions
7. Examination of the eyelids, lacrimal apparatus, conjunctiva, cornea, anterior chamber, iris, and the pupil with pupil lamp
8. Fluorescein staining of the cornea
9. Estimating intraocular pressure with palpation
10. Examination of the upper tarsal conjunctiva by eyelid eversion
11. Red reflex examination
12. Examination of the papilla, posterior segment, retinal vessels by direct ophthalmoscopy

In theory:**Diagnostics:**

1. Differential diagnosis of red eye (conjunctivitis, keratitis, scleritis, anterior uveitis, acute glaucomatous attack).
2. Papilla oedema
3. Hemianopic visual field loss
4. Acute cranial nerve III, IV and VI palsy
5. Leukocoria
6. Orbital cellulitis
7. Retinal tear, suspected retinal detachment
8. Suspected postoperative endophthalmitis
9. Sudden visual impairment
10. Mechanical eye injuries, symptoms of blow out fracture

Therapy:

Conjunctivitis (viral, bacterial, allergic)

Hordeolum

Emergency care: chemical burns, injuries, conjunctival foreign body removal

Management of acute angle closure glaucoma

Conditions requiring ophthalmology specialist care:

When should a patient be referred urgently to an ophthalmologist?

Ophthalmic screening in adulthood and in childhood

Interpretation of an ophthalmic medical record

For updated information please contact the department.

NEUROLOGY – NEUROSURGERY**General information**Tutor: **Dr. Róbert Debreczeni**

Tel.: 210-0330, Fax: 210-1368

Office hours at the Department of Neurology: Monday 13,00-14,00 Friday 10,00-12,00**Responsible Secretary:** Andrea Kovács (Andi)**Official textbooks for 5th year:**

- | | |
|---|--|
| 1. Arányi Zs., Kamondi A., Kovács T., Szirmai I.: Investigation of neurological patients. | 2. Lindsay, Bone, Callender: Neurology and Neurosurgery Illustrated. Churchill Livingstone |
|---|--|

Other suggested books:

- | | |
|--|---|
| 1. Marsden, Fowler: Clinical Neurology. Raven Press | 5. Bannister: Brain and Bannister's Clinical Neurology. Oxford University Press |
| 2. Duus: Topical Diagnosis in Neurology. Thieme Medical Publishers | 6. Mumenthaler: Neurology. Georg Thieme Verlag. |
| 3. Gilroy: Basic Neurology. Pergamon Press | 7. Adams and Victor's Principles of Neurology, Eleventh Edition, McGraw-Hill ISBN 978-0-07-184261-7 |
| 4. Weiner-Lewitt: Neurology of House Officer. Williams and Wilkins | |

Hours per week: The two-semester curriculum for fifth-year neurology education is given in 4-week block training. For the first three weeks of the block, there is one day off a week to prepare. There are 32 practical lessons in the first week, 26 practical and 6 theoretical lessons in the second week, 24 practical lessons and 8 theoretical lessons in the third week. In the fourth week of the block, you will have to take both practical and theoretical exams. The detailed schedule will be given to students on the first day of the block.

Form of tuition: lecture, bedside practice**Lecture title**

- Basic principles of neurological diagnosis. The anamnesis. The connection between symptoms, localization and causes of neurological diseases.
- Patient examination I. Cranial Nerves (part 1).
- Patient examination III. Motor system (part 1)
- Patient examination IV. Motor system (part 2)
- Patient examination II. Cranial Nerves (part 2)
- Patient examination V. The sensory system
- The spinal cord. The peripheral nervous system.
- The brainstem. The thalamus
- The cerebellum
- Altered states of consciousness
- Organization of speech, language
- The temporal and the parietal lobe
- Control of behaviour. Memory and related structures
- Neuroradiology (CT, MRI, angiography)
- Classification and treatment of cerebrovascular disorders
- Tumors of the central nervous system
- Dementias
- Movement disorders
- Diagnosis and treatment of epilepsy
- Neurological Emergencies
- Neurosurgical aspects of Neurology
- Neuromuscular disorders. Myopathies. Neuropathies
- Motoneuron diseases.
- Multiple sclerosis
- Neurological consequences of craniocervical traumas
- Alcohol related nervous system disorders
- Headaches and neuralgias
- Inflammatory neurological disorders. AIDS.

Block Practice

- Signs of meningeal irritation.
- Examination of the I. and II. Cranial nerve. The visual fields.
- Examination of the III., IV., VI. Cranial nerves. The eye movements. Gaze disorders.
- The V cranial nerve. The facial nerve palsy. The nystagmus. Dizziness and vertigo. The vestibular system.
- Motor functions of cranial nerves. Bulbar, pseudobulbar and suprabulbar paresis.
- Assessment of the paresis. Examination of muscle tone and trophy.
- The mono- and polysynaptic reflexes. The pyramidal signs. The upper and lower motoneuron lesion.
- Examination of the sensory system. Examination of the spine and spinal cord. The vegetative functions.
- The coordination. The cerebellar functions (neo-, paleo-, and archicerebellum).
- The reticular activating system. Examination of speech and higher cerebral functions
- Examination of patients suffering from Cerebrovascular Disorders
- Movement Disorders, Hyperkinesias
- Hypnoid and non-hypnoid unconsciousness. Epilepsy
- Multiple Sclerosis, Neuropathies
- Dementias and cognitive functions

Neurology Examination Question List for 5th year Students**I. Neuroanatomical, physiological and biochemical basis of neurology**

- | | |
|---|---|
| 1. The visual system | 11. Sensory systems |
| 2. Innervation of extraocular muscles. The oculomotor nuclei. | 12. Gross anatomy of the hemispheres |
| 3. Gaze control. Gaze disturbances | 13. Basal ganglia and the thalamus |
| 4. Pupillary reflex arcs. Disturbances of pupillary reflexes. | 14. The limbic system |
| 5. Trigeminal nerve | 15. The cerebellum |
| 6. Facial nerve | 16. Blood supply of the hemispheres. Cerebral metabolism |
| 7. The vestibular system | 17. Blood supply of the brainstem, cerebellum and the spinal cord |
| 8. Hearing | 18. The cerebrospinal fluid |
| 9. Glossopharyngeal, vagus, accessory and hypoglossal nerves | |
| 10. Organization of motor control | |

II. Basic Neurology

- | | |
|---|--|
| 1. Classification of reflexes (stretch, superficial, abnormal and primitive reflexes) | 14. Symptoms of parietal lobe damage |
| 2. Characteristics of upper and lower motoneuron lesion | 15. Symptoms of occipital lobe damage |
| 3. Paresis syndromes according to the site of lesion | 16. Thalamic syndromes |
| 4. Symptoms of spinal cord damage | 17. Clinical examination and types of aphasia |
| 5. Medulla oblongata (bulbar) syndromes caused by circulatory disorders | 18. Structural basis and types of unconsciousness |
| 6. Pontine syndromes caused by circulatory disorders | 19. Physical examination of the unconscious patient |
| 7. Mesencephalic syndromes caused by circulatory disorders | 20. Increased intracranial pressure, brain herniations, hydrocephalus |
| 8. Muscle tone control | 21. Hyperkinesia |
| 9. Nystagmus | 22. Gait disturbances |
| 10. Vertigo and dizziness; peripheral and central vestibular syndromes | 23. Bladder and bowel dysfunction |
| 11. Symptoms of cerebellar lesions | 24. Symptoms of intervertebral disc herniation |
| 12. Symptoms of frontal lobe damage | 25. Lesions of the peripheral nerves of the upper extremity. Tunnel syndromes on the upper limb. |
| 13. Symptoms of temporal and occipital lobe damage | 26. Lesions of the peripheral nerves of the lower extremity. |

III. Neurological Disorders

1. Classification of ischaemic cerebrovascular disorders
2. Intracranial bleedings, subarachnoideal hemorrhage
3. Symptomatology of Parkinson's disease
4. Classification of headaches. Trigeminal neuralgia
5. Focal epilepsies
6. Generalized epilepsies
7. Meningitis. Examination of the CSF in inflammatory neurological diseases
8. Encephalitis
9. Diagnosis of polyneuropathies
10. Emergency in neurology
11. Traumatic CNS diseases
12. Diagnosis of dementia
13. Multiple sclerosis: signs and diagnosis
14. Intracranial tumors
15. Spinal tumors
16. Disorders of the nervous system due to alcoholism
17. Myasthenia gravis
18. Guillain-Barre syndrome
19. Encephalopathies
20. The motor neuron diseases
21. Muscular dystrophies

SPORTS MEDICINE

Lecture: Sportsphysiology, Sports surgery, Sports Nutrition

Practice: ECG, Spiroergometry, Echocardiography, MRT, Patient examination, Sport surgery- operating room, ambulance, rehabilitation, physiotherapy

Credit: 2

Examination:

The aim of sports medicine education is to provide a wide range of up-to-date, usable basic knowledge of sports medicine and to account for the future generation of doctors within the framework of general medical education. Students interested in sports medicine should be provided with advanced training.

Detailed topics:

1. Physiological bases and energy sources of muscle function.
2. Motion control, motion learning. Warming up, dead center, fatigue, muscle fever.
3. Energy turnover, daily energy balance. Sports nutrition. Legal performance enhancers, procedures. Doping.
4. The composition of the blood, its role in sports. Sports adaptation processes of circulation and respiration. Sporty.
5. Strength, speed, endurance. Age characteristics in acute and chronic sports adaptation. Checking the condition. Exercise physiology studies in improving sports performance.
6. Medical history, physical examination, urine examination: sports medicine specialties. Guidelines for Sports Medicine Fitness and Periodic Examination. Indications for refusal / revocation of a sports medical license.
7. The role of physical activity in the primary and secondary prevention and treatment of internal medicine diseases. Obesity, hypertension, diabetes and sports.
8. Electrocardiography in sports medicine screening. Arrhythmias and their treatment in athletes.
9. Imaging procedures in sports-related cardiac remodeling.
10. The importance of sports cardiology screening. Sudden cardiac death in athletes.
11. The concept, division, etiology, prevention and diagnosis of sports injuries. General principles for the treatment of acute and overload sports injuries. One head, one neck, one chest and one have sports injuries.
12. Typical sports injuries and injuries of the upper limb.
13. Typical sports injuries and injuries of the lower limb.
14. Rehabilitation, movement therapy, scientific methods in the conservative treatment of sports injuries. The aim of sports medicine education is to provide a wide range of up-to-date, usable basic knowledge of sports medicine and to account for the future generation of doctors within the framework of general medical education. Students interested in sports medicine should be provided with advanced training.

CLINICAL GENETICS

Institute: Institute of Genomic Medicine and Rare Disorders

Location:

Semmelweis University Central Patient-Care Unit (Korányi Tömb, Központi Betegellátó Épület) 1082 Budapest Üllői Str. 78/B Building „A” (Radiology Wing) 4th floor

Course lecturer: *Prof. Dr. Mária Judit Molnár*

Course tutor: *Dr. Viktor Molnár*

Exam type: multiple choice test

Participation: min. 75% is obligatory

Aim of the subject and its place in the curriculum:

The Clinical Genetics course introduces medical students to the clinical significance of human genetic variations, covering the principles of diagnosis and treatment of rare diseases, mainly through the presentation of cases, clinical situations and demonstrating correct communication. In addition to diagnosis of monogenic diseases and chromosomal abnormalities, genetic tests are now used to predict susceptibility to certain diseases or the efficacy and side effects of certain therapeutic options (pharmacogenomics) or delineate disease prognosis. The role of the physician in the management of hereditary diseases and the practice of good decision making will also be addressed. The discipline is one of the most rapidly developing field and it is presumably going to be an important component of the future medicine.

Competencies gained upon the successful completion of the subject:

- Students meet the typical clinical scenarios requiring genetic-genomic knowledge for diagnostic, predictive, preventive and pharmacogenomic questions, as well as they are introduced into most common diagnostic, therapeutic decision-making, management and ethical dilemmas of the field.
- Students gain insight into practice how to elicit, document, and act on relevant family history pertinent to the patient’s clinical status, how to choose the right genetic or genomic testing to guide patient management and how to use genomic information to make treatment decisions.
- Through problems represented by several real and synthetic/standardized clinical cases and through getting involved into the patient flow of in- and outpatient units, they will learn
- how to gather information from appropriate information resources,
- how to employ artificial intelligence-based decision-making systems for phenotype pattern recognition a problem-based manner.
- how to communicate with the patients and families with hereditary diseases by playing the role of a counselee (genetic counselling), and
- how to work together as a team if they are encountered with real-world diagnostic challenges.

Overview of the blocked course with thematic learning modules (2×45 minutes each):

Seminars:

- Clinical genetics in medicine
- The significance and diagnostic potential of congenital genetic disorders
- Genetic disorders of public health significance
- Personalised medicine
- Small group work:
- Case presentation part 1
- Case presentation part 2
- Bedside practice: inpatient department
- Bedside practice: neurogenetic clinic
- Team competition (decision-making simulation)

Workshops:

- Web-based search methods in clinical genetics
- Developing genetic diagnostic skills
- Management of patients with a rare disease
- Genetic counselling
- Ethical problems, pre-exam consultation

REHABILITATION

Institute: Department of Rehabilitation Medicine

Location: Rehabilitation Clinic, 1121 Budapest, Szanatórium utca 19. Tel: +36 1 391 19 03.

Course director: *Dr Zoltán Dénes*

Tutors: *Dr Orsolya Masát, Dr Mihály Fórián Szabó*

Coordinator: *Gabriella Tápay*

practical training: 32 hours

Aim of the subject and its place in the curriculum:

Special medical knowledge required for recognizing and managing disabilities is summarized in the field of Rehabilitation Medicine. According to WHO about 10 % of the world's population lives with some form of disability. All medical students need to gain a basic knowledge of Rehabilitation Medicine for completion of the graduate program and to practice later as a physician. For this purpose, two theoretical lectures (one in Neurology and one in Traumatology) and one practical seminar in Orthopedics are held during the graduate years on the topic. According to the new curriculum, fifth year students will participate in a one-week clinical rotation in Rehabilitation Medicine.

Detailed thematic of the course:

The course will be one week long and consist of lectures on basics followed by clinical practice. Students will participate in daily clinical activities, such as bedside visits and multidisciplinary team meeting. Moreover, they will perform patient assessment, physical examination and write medical reports under supervision. Getting familiar with basic rehabilitation methods is part of the course: physiotherapy, physical and other treatment modalities, occupational therapy, psychotherapy, speech therapy, neuropsychology, sport therapy, hydro therapy. Students will also gain experience in ambulatory care.

Detailed schedule:

1. **Rehabilitation Medicine (RM): core competencies, the field of RM, definition, philosophy, objectives and methods, concept of ICF, quality of life.**
2. **Clinical and functional assessment in RM.**
3. **Interventions in RM: medical treatments, physical and other treatment modalities, therapeutic exercises, orthoses and prostheses.**
4. **Musculoskeletal and orthopedic rehabilitation: upper limb dysfunctions (including hand- and nerve injuries), lower limb dysfunctions (including nerve injuries and amputation).**
5. **Neurorehabilitation: stroke, brain injury, spinal cord injury.**
6. **Rehabilitation in other disabling conditions: geriatric-, pediatric-, cardiovascular- and pulmonary rehabilitation and rehabilitation in malignancy.**

Recommended literature: https://archive.uems-prm.eu/resources/Physical_Rehabilitation_Medicine_for_medical_students.pdf

PUBLIC HEALTH

Institute: Department of Public Health

Location: NET building, 1089 Budapest, Nagyvárád tér 4., 13th floor.

NET 13th floor, room 1307

Phone: 061 210-2930, extension 56313

E-mail: horvath.ferenc@med.semmelweis-univ.hu

Course lecturer: *Dr. Zoltán Ungvári*

Course tutor: *Dr. Horváth Ferenc*

Location of the course (lecture hall, practice room, etc.):

Semmelweis University, NET building

1089 Budapest, Nagyvárád tér 4.

How to register for the course: via Neptun system

Detailed thematic of the course

- Health promotion programs – basics, situation mapping, identification of needs, action plan
- Mental health / Prevention. Illegal drugs use and their prevention
- Handicapped population / public health programs for the vulnerable groups
- Aging population / gerohygiene. The elderly as a vulnerable group. Social situation of the elderly. Role play with ability tools
- Epidemiology: basic statistics, morbidity measurements. Types of epidemiologic studies. Clinical decision making.
- Interventional studies, screening. Epidemiology test.
- Epidemiology of communicable diseases. Epidemiologic measures in outbreak investigation
- Infection control / epidemiology of communicable diseases
- Critical reading, evaluation of scientific articles (STROBE / PRISMA / CONSORT statement)
- Evaluation of nutritional status. Lifestyle advice for nutrition, brief intervention. Food safety.
- Alcohol use, public health significance. Brief intervention for alcohol use. Role play studying
- Environmental medicine. Air / soil / water hygiene. Climate change. Chemical safety.
- Occupational medicine, work risk assessment
- Smoking. Brief intervention for smoking cessation. Role play studying.
- Physical activity, possible therapies. Brief intervention for sports, role play studying
- Structure of healthcare, healthcare financing.
- Quality assurance in healthcare

Policy regarding the attendance and making up absences:

Participation on the contact hours is mandatory. Catch up classes are possible based on discussion with the tutor of the course.

Requirement for acknowledging the semester (signature): participation on practicals and lectures and finishing the e-learning material

Type of the examination:

Combined exam, which consists of oral and written (test) performance evaluation. The exam is successful if both performance assessments reach at least a satisfactory level. The final grade is the average of the two exams. You must register for the test in the Neptun system.

PHYSICAL EDUCATION IX-X.**Department of Physical Education****Subject: Physical Education IX.****Type of Subject:** Obligatory

Credit: 0

Name of the Lecturer: Várszegi Kornélia**Department of Physical Education****Subject: Physical Education X.****Type of Subject:** Obligatory**Code of Subject:** AOKTSI009_10A

Credit: 0

Name of the Lecturer: Várszegi Kornélia**The objectives of Physical Education:**

The short-term goal of the course is to maintain and improve the students' current state of health, to create the physical conditions for a better quality of life by learning and practicing (new) branches of sports that can be practiced after graduation as well. The long-term goal is to improve the quality of life and life prospects of future physicians, and to provide students with credible preventive attitudes and lifestyle advice - so that they can represent those in their later practice, through their own health-promoting behavior.

The syllabus (preferably a week and numbered):

You can register for the "independent sports activity" course as part of the Physical Education course in the Neptune system.

Every week, a questionnaire is sent to the students through the Neptune system:

- The questionnaire can be filled in from Monday to Sunday in a semester (no entries can be made in advance or afterwards).
- Students must assure themselves that they have completed the questionnaire truthfully.
- It is a minimum requirement for the signature that a training of 1 × 60 minutes per week is completed (to be 10 times responses) and this is recorded in the questionnaire.

Other way, Free of charge:

2x90 mins./week sport training (competitive sport, for qualified only): cheerleader, female's football, men's football, handball, basketball, volleyball, waterpolo

Requirements for signature at the end of semester (including the number of tasks to be solved learning outcomes and type):

The student who completes the independent sport activity course is also supposed to attend 10 classes and record their participation in the weekly sent UniPoll questionnaire.. Practice leaders follow an online presence registration at the beginning and end of the lessons, which can be individually tracked on semmelweis.hu/sportkozpont homepage.

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes!

How to prove absence regarding the exam:

Absence must be retaken!

OPTIONAL COURSES

The courses listed can be taken in or after the semester indicated in the first column, also taking the prerequisite(s) into consideration. If there is no specification, the course can be taken at any stage of the studies.

Semester	Course name	Neptun code	practice (h/week)	practice (h/semester)	seminar (h/week)	seminar (h/semester)	credit points	prerequisite(s)	examination	prerequisite(s)	examination
-	Advanced laparoscopic techniques	AOSKMI807_1A		1		13			1	Basic Surgical Techniques, Intermediate knotting and suturing techniques	
-	Advanced suturing techniques	AOSKMI808_1A		3		11			1	Basic Surgical Techniques, Intermediate knotting and suturing techniques	
2	Anatomic dissection in the practice	AOSANT809_1A			2				2	Macroscopic Anatomy and Embryology II	
-	Art of Learning	AOSMAG1036_1A		16		12			2		
3	Artificial Intelligence in Diagnostics and Surgery Planning	AOSTRA882_1A					1		1	Internal Medicine II (Hematology, Infectology, Immunology, Rheumatology), Obstetrics and Gynaecology, Pediatrics	
-	Artificial Intelligence in Healthcare: social, ethical and legal aspects	AOSMAG1072_1A			2				2		project work
-	Bridge	AOSANT908_1A			2				2		
5	Cardiopulmonary clinical physiology and rehabilitation - Practical aspects	AOSPUL989_1A		14		14			2	Medical Physiology II, Molecular Cell Biology II, Medical Microbiology I	
6	Cardiorespiratoric and neurophysiological measuring methods (II. Laboratory practices)	AOSTLM770_2A			2				2	Cardiorespiratoric and neurophysical measuring techniques, Medical Physiology II	
5	Cardiorespiratoric and neurophysical measuring techniques	AOSTLM770_1A	2						2	Medical Physiology II	
5	Clinical Embryology	AOSNO1830_1A	1,5		0,5				2	Molecular Cell Biology II, Medical Physiology II	
7	Clinical Hungarian	AOSLEK340_1A			4				2	Medical Hungarian IV.	
5	Clinical practice		0		1				2+		practical examination
5	Clinical practice, Advanced Level		0		1				1+		practical mark
11-12	Complementary elective internship practice	AOSANG852_SA				200			5		practical mark
5	Course on human lactation and breastfeeding - theory, support and promotion	AOSNNT884_1A	2						2	Medical Physiology II	
-	Disruptive Technologies in Medicine	AOSGRI374_1A	2						1		

Semester	Course name	Neptun code	practice (h/week)	practice (h/semester)	seminar (h/week)	seminar (h/semester)	credit points	prerequisite(s)	examination	prerequisite(s)	examination
5	Genetics in Pediatrics	AOSGY1876_1A	1						1	Genetics and Genomics	
9	Genetics of endocrine diseases	AOSED869_1A	2						2		
4	Highlights on Mental Health and Mental Treatment (Culture in Medicine II.)	AOSMAG507_2A	2						2		
–	History of the medical professionalism	AOSNEI562_1A	2						2		
–	Human Intelligence	AOSMAG983_1A	2						2		
–	Intercultural Healthcare Integrated Course	AOSMAG877_1A					2		2		
–	Intermediate knotting and suturing techniques	AOSKMI814_1A		3		11			1	Basic Surgical Techniques	
–	Introduction to French for Medical Purposes I.	AOSNYE943_1A					2		2		
–	Introduction to French for Medical Purposes II.	AOSNYE943_2A					2		2		
–	Introduction to German for Medical Purposes I.	AOSNYE944_1A					2		2		
–	Introduction to German for Medical Purposes II.	AOSNYE944_2A					2		2		
–	Introduction to Italian for Medical Purposes I.	AOSNYE945_1A					2		2		
–	Introduction to Italian for Medical Purposes II.	AOSNYE945_2A					2		2		
–	Introduction to pharmacological research	AOSFRM1037_1A	2						2	Medical Biophysics II, Immunology	practical mark
3	Introduction to principles of students' scientific research	AOSSB1802_1A	1						2	Medical Chemistry, Medical Biophysics I, Macroscopic Anatomy and Embryology I	
–	Introduction to Russian for Medical Purposes I.	AOSNYE946_1A					2		2		
–	Introduction to Russian for Medical Purposes II.	AOSNYE946_2A					2		2		
–	Introduction to Spanish for Medical Purposes I.	AOSNYE947_1A					2		2		
–	Introduction to Spanish for Medical Purposes II.	AOSNYE947_2A					2		2		
6	Introduction to the clinical biostatistics	AOSFIZ872_1A		21		28			3	Medical Statistics, Informatics and Telemedicine	
2	Introduction to yoga	AOSANT986_1A	2						2	Macroscopic Anatomy and Embryology I	

Semester	Course name	Neptun code	practice (h/week)	practice (h/semester)	seminar (h/week)	seminar (h/semester)	credit points	prerequisite(s)	examination	prerequisite(s)	examination
–	Jewish Medical Ethics I.	AOSMAG139_1A	2						2		
2	Jewish Medical Ethics II.	AOSMAG139_2A	2						2	Jewish Medical Ethics I	
5	Medic Orchestra	SEFPKZOMZ_1	0		2				1		signature
2	Medical Humanities	AOSMAG818_1A					2		2		
2	Medical-biophysical aspect of radiological accidents	AOSFIZ1050_1A	2						2	Medical Biophysics I	
5	Mentoring programme	AOSMAG1041e1m		2		26			2	Medical Physiology II, Molecular Cell Biology II, Medical Psychology	
2	Methods in Molecular Biology	AOSMBT798_1A	1						1	Medical Chemistry	
2	Molecular Medicine Research	AOSMBT799_1A	1						1	Medical Biochemistry I	
–	Networks	AOSMBT796_1A	2						2		
5	Obstetrics genetics, prenatal diagnostics	AOSNO11052_1A	2		2				2	Medical Physiology II	
7	Occupational medicine	AOSNEI875_1A			0,5		1,5		2		
–	Practise Course for Instrumental Improvisation	AOSMAG1031_2A	1		1				2		
2	Present and Future prospects in Medicine: Data-Driven Health and AI in Health Care	SEEMKJGAEMI		14		14			2		practical examination
5	Semmelweis University Choir	SEPAKHTISEK_01	0		2				1		signature
4	Sleep and Chronobiology	AOSMAG868_1A	2						2	Microscopic Anatomy and Embryology II, Medical Physiology II, Medical Psychology	
–	Systems Neuroscience I. Systems Biology: Neuronal genomics and proteomics	AOSANT560_1A		25		3			2	Genetics and Genomics, Molecular Cell Biology II	practical mark
–	Systems Neuroscience II. Computational models in systems neuroscience	AOSANT560_2A		25		3			2	Medical Physiology II, Macroscopic Anatomy and Embryology II, Microscopic Anatomy and Embryology II	practical mark
–	Systems Neuroscience III. Neurodynamics: from single neurons to motifs	AOSANT560_3A		25		3			2	Medical Biophysics II, Medical Statistics, Informatics and Telemedicine, Medical Physiology II	practical mark
–	Systems Neuroscience IV. Neocortex: from structure to function	AOSANT560_4A		25		3			2	Medical Biophysics II, Medical Statistics, Informatics and Telemedicine	practical mark
–	Systems Neuroscience V. Learning and Navigation	AOSANT560_5A		25		3			2	Medical Biophysics II, Medical Statistics, Informatics and Telemedicine, Medical Physiology II	practical mark

Semester	Course name	Neptun code	practice (h/week)	practice (h/semester)	seminar (h/week)	seminar (h/semester)	credit points	prerequisite(s)	examination	prerequisite(s)	examination
-	Systems Neuroscience VI. Neural rhythms: normal and pathological. Brain imaging: from normal to pathological	AOSANT560_6A		25		3			2	Medical Biophysics II, Medical Statistics, Informatics and Telemedicine, Medical Physiology II	practical mark
-	Systems Neuroscience VII. Statistics of the brain	AOSANT560_7A		25		3			2	Medical Biophysics II, Medical Statistics, Informatics and Telemedicine, Medical Physiology II	practical mark
5	Teaching assistance (Demonstrator)								1	Macroscopic Anatomy and Embryology II	practical mark
-	The Scalpel and the Paragraph: Special Issues of Medical Practice in Light of the Law	AOSMAG1051_1A					2		2		
5	Traditional Chinese Medicine	AOSMMS174_1A	2						2	Macroscopic Anatomy II	
5	Work within the Union of Research Students (TDK)		1		0				1+		practical mark on a three-grade rating scale

ANATOMIC DISSECTION IN THE PRACTICE – optional coursee

Department of Anatomy, Histology and Embryology

Credit: 2

1×90 min practical course

Course prerequisites: Macroscopic Anatomy and Embryology II.

Held in both semesters.

Objectives of the subject, its place in the medical curriculum:

The technique of anatomical dissection dates back many centuries. Dissecting of fixed specimens gives students the opportunity to acquire practical knowledge that is essential, especially for those who are planning to choose manual field. Fine dissection of small structures requires extra time and appropriate infrastructural conditions. Our practical course creates this unique opportunity under the guidance of expert instructors. The specimens will get into the high quality demonstration specimen pool to be used in the education.

Successful completion of the subject results in the acquisition of the following competencies:

By completing the course, students will master the technique of fine anatomical dissection. Working with fine quality instrumental tools gives the opportunity to get to know better anatomical layers and structures in more details. This type of work gives a good base of knowledge what can be developed further in manual fields.

Detailed curriculum:

Practices:

1. **Introduction. Handout of specimens. Removal of the skin.**
2. **Dissection of cutaneous nerves and superficial veins I. (demonstration and practice)**
3. **Dissection of cutaneous nerves and superficial veins II. (demonstration and practice)**
4. **Dissection of muscles I. (demonstration and practice)**
5. **Dissection of muscles II. (demonstration and practice)**
6. **Dissection of arteries and nerves I. (demonstration and practice)**
7. **Dissection of arteries and nerves II. (demonstration and practice)**
8. **Dissection of the viscera I. (demonstration and practice)**
9. **Dissection of the viscera II. (demonstration and practice)**
10. **Working with bone I. (demonstration and practice)**
11. **Working with bone II. (demonstration and practice)**
12. **Dissection of the brain I. (demonstration and practice)**
13. **Dissection of the brain II. (demonstration and practice)**
14. **Exam and demonstration of the dissected specimens.**

Teachers (depending on the number of the registered students):

Dr. Alán Alpár professor – professional tutor

Dr. Tamás Ruttkay senior lecturer – lecturer, practice leader

Dr. Bálint Fábrián assistant lecturer – practice leader

Special study work required to successfully complete the course:

Anatomical dissection on the practices. There is no midterm-check.

Requirements for participation in classes and the possibility to make up for absences:

Participation in the practices is verified by signing an attendance sheet. Absence up to 25% of the classes is allowed within a semester. Due to the nature of the course, it is not possible to make up for absences.

Methods to assess knowledge acquisition during term time:

There is no mid-term check. Requirements for signature: Attendance at least 75% of the classes.

Type of examination:

The semester ends with a practical exam, during which the student presents and hands over the specimen dissected by him/her to the practice leader.

Requirements of the examination:

During the last practice of the semester, the student summarizes the topic of the dissected specimen and displays it. The practice leader evaluates the semester preparatory work based on the criteria detailed below.

Method and type of evaluation:

The finished specimen is evaluated according to the following criteria: 1. The degree of preparation of the topic recorded at the beginning of the course. 2. Quality of the prepared anatomical structures. 3. Presentation of the specimen in a practical exam (theoretical, regional anatomical presentation).

The student's knowledge will be evaluated using a scale of 1 to 5 mark.

Possibilities for exam retake:

It is not possible to replace an unfinished specimen. In case of justified absence from the practical exam, the presentation of the dissected specimen and the formation of the grade will take place at an additional time.

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

T. Tömböl: Regional Anatomy. Medicina, Budapest, 2008.

BASIC CELL BIOLOGY – Department of Genetics, Cell- and Immunobiology**OBLIGATORY Optional courseE FOR MEDICINE I. II. III. YEARS**

Course Director: **Dr. Valéria László Ph.D.**

Prerequisite subject: Anatomy, Cell, Histology and Embryology I.

Credit: 3

Lectures (2 hours per week)

First semester

1. Intracellular transport mechanisms
2. Endoplasmic reticulum. Vesicular transport
3. Secretion and Golgi
4. Endocytosis. Endosomal – lysosomal system
5. Nuclear envelope and nuclear lamina. Nuclear pores and gated transport
6. Functions and malfunctions of some nuclear components
7. rRNA synthesis. Telomerase
8. Endosymbiotic cell organelles. Mitochondrion
9. Peroxisome
10. Cytoskeleton. Microtubules
11. Microfilaments and intermediate filaments
12. Cell – cell and cell – ECM adhesion and junction
13. Regulation of cell cycle I
14. Cell aging and death

Important notes: No possibility to make up of absences.
 There are no mid-term exams.
 Attendance of 75% of lectures is necessary for the end-term signature.
 Requirement: practice grade based on the result of the written or oral exam.
 (depending on the number of students).

Core text:

Alberts et al. Essential Cell Biology (4th edition) Garland Science, ISBN-13: 978-0815344544; ISBN-10: 0815344546

Lecture presentations are available on the homepage: <http://gsi.semmelweis.hu> (The user name and password is on course datasheet of the Neptun)

CLINICAL CARDIOVASCULAR PHYSIOLOGY

Institute of Translational Medicine

Credit value: 2

Number of lessons per week: lecture: 2 seminar: 2

Subject type: optional course

Academic year: 2021/2022

Name of the course leader: Dr. Zoltán Benyó

Position: professor, head of department

Objectives of the subject, its place in the medical curriculum:

To refresh and extend – in selected topics – the basic knowledge related to normal and pathological functions of the human circulatory system.

To integrate the latest scientific results related to different organization levels – from molecular mechanisms to system physiology – of the cardiovascular system.

To discuss and demonstrate measurement principles and techniques, as well as physiological and pathophysiological mechanisms related to the application of state of the art non-invasive cardiovascular diagnostic procedures in the clinical practice.

Researchers as well as skilled clinical practitioners have also been included among the lecturers to provide a translational point of view and help the transition of the students' theoretical knowledge to modern clinical cardiovascular medicine.

Place where the subject is taught (address of the auditorium, seminar room, etc.):

Semmelweis University, Centre of Theoretical Medicine

Successful completion of the subject results in the acquisition of the following competencies:

After completion of the subject, students will deepen their knowledge of the physiology and pathophysiology of the cardiovascular system, better understand the pathological processes that occur during the most common cardiovascular diseases and the potential therapeutic options. Completion of the course thus helps and establishes the acquisition of cardiovascular pharmacology, cardiology-angiology and cardiovascular surgery with sufficient detail.

Course prerequisites:

Completion of Physiology II.

Number of students required for the course (minimum, maximum) and method of selecting students:

Min: 5 students

Max: 80 students (in case of more applicants, the first 80)

How to apply for the course:

In the Neptune system.

Detailed curriculum:

- Hemodynamic background of normal and pathological cardiovascular functions; “hemodynamic exercise” and prevention of diseases (Dr. Anna Monori-Kiss)
- Modern methods for measuring and monitoring arterial blood pressure (Dr. Ákos Jobbágy), Cardiovascular effects of hypersensitivity reactions (CARPA) (Dr. László Dézsi)
- Biomechanical properties of cerebral aneurisms, their computer modeling (Dr. István Nyáry, Dr. Róbert Nagy)
- Physiological mechanisms supporting venous return of blood; orthostatic tolerance, Pathophysiology of chronic venous insufficiency (Dr. Anna Monori-Kiss)
- Investigation of blood pressure regulation by use of transgenic technologies (Dr. Zoltán Benyó)
- Cardiovascular implications of the healthy and the diseased kidney (Dr. Péter Hamar)
- Age related changes in the vascular system, role of sexual hormones. Interventional radiological procedures on arteries and veins (Dr. György Nádasy, Dr. Viktor Bérczi)
- Ultrasonic investigation of the human heart: theoretical background; 2D-, M-, Doppler-mode, color Doppler imaging, echocardiography; diagnostics of valve insufficiency and coronary diseases. Duplex ultrasonic investigation of large vessel function: measurement of vessel wall elasticity, Doppler-indexes (Dr. Domonkos Cseh, Dr. Adrienn Sárközi)
- Coronary circulation. Physiological background of the treatment of myocardial ischemia (Dr. Tamás Ivanics, Dr. Gergely Szabó)
- The cardiovascular risk and the protection of menopausal women. Alterations of the cardiovascular system in pregnancy and polycystic ovary syndrome (Dr. Gabriella Masszi, Dr. Szabolcs Várbíró)
- Role of endothelial mechanisms in clinical symptoms (Dr. Zsolt Pécsvárady)
- Visit to the MRI Cardiovascular Diagnostic Unit of the Semmelweis University Heart Center (Dr. Attila Tóth)
- Vascular cognitive impairment (Dr. Zoltán Ungvári)
- Written examination

(Guest lecturers are underlined)

Other subjects concerning the border issues of the given subject (both obligatory and optional courses!). Possible overlaps of themes:

- Cardiology
- Medical Imaging
- Obstetrics and Gynecology
- Vascular Medicine
- Pathophysiology

Requirements for participation in classes and the possibility to make up for absences:

It is obligatory to attend the seminars. Students are not allowed to miss more than 3 seminars (6 lessons), otherwise the semester cannot be accepted.

Methods to assess knowledge acquisition during term time:

Theoretical knowledge will be assessed by a written test on the 14th week.

Requirements for signature:

Regular attendance (max. 3 missed seminars) of classes and successful written exam. No more than three absences from seminars are allowed; otherwise the course will not be credited.

Type of examination:

The semester performance is assessed by the result of the written test (10-15 questions based on the material of the seminars) on the 14th week.

Requirements of the examination:

The question pool for the written test is available for the registered students. The question pool contains 2 short essay-type questions and 5-10 multiple choice questions per seminar.

Method and type of evaluation:

The grade is based on the result of the test written on the 14th week. The written test will be evaluated as follows:

- 90-100% – honor (5)
- 80 – 89 % – good (4)
- 70 – 79 % – fair (3)
- 51 – 69% – pass (2)
- < 51% – fail (1)

How to register for the examination:

There is no exam in the exam period.

The exam is organized on the last seminar of the semester.

Possibilities for exam retake:

For students who cannot attend the exam for reasonable excuses, we provide extra occasions to make up for the practical exam.

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

Guyton and Hall Textbook of Medical Physiology 13th edition (Elsevier, 2015)

Emil Monos: Hemodynamics, biomechanics of the blood circulation, Second edition, Semmelweis Kiadó, 2011.

Emil Monos: Physiology of the venous system, Second edition, Semmelweis Kiadó, 2010

Material of the lectures and supplementing literature provided by the lecturers.

CLINICAL PHYSIOLOGY OF RESPIRATION AND RESPIRATORY DISEASES

Optional course for medical students in the 3rd, 4th and 5th years.

The aims of the course are to strengthen knowledge on basic physiological principles related to respiration, summarize the most important aspects of cardiorespiratory adaptation in sport activities and also its changes in respiratory diseases and to provide integrated information about the physiological and pathophysiological background of the most important respiratory disorders in light of results from cutting edge research.

Program:

1. COVID-19 from the frontline
2. COVID-19 outcome stats
3. Personalized medicine in lung cancer
4. Asthma
5. Bronchiectasis, COPD.
6. Obstructive sleep apnoea
7. Hypoventilation syndromes
8. Translational research, biomarkers, drug development, machine learning
9. Cystic fibrosis-case presentation
10. Pneumonia
11. Invasive ventilation and intensive care, ECMO, particular aspects of COVID-19
12. Chest imaging I - Screening
13. Chest imaging II- Lung Fibrosis-COVID score, Ultrasound
14. Exam

Acknowledgement of the course: regular attendance (maximum 3 absences) is required; signature in the Neptun, and 2 credit points will be provided after a successful written exam.

CARDIORESPIRATORIC AND NEUROPHYSIOLOGICAL MEASURING METHODS

Institute of Translational Medicine

Subject type: optional

Credit value: 2

Name of the course leaders:

Prof. Dr. Zoltán Benyó, Department Head,

Dr. Habil. László Dézsi, Research Associate Professor, Course Director, Semmelweis University

(Invited Lecturers: Dr. Iván Fűzes, Dipl. Electrical Engineer, Master Teacher, Semmelweis University

Prof. Dr. Ákos Jobbágy, Professor Emeritus in Electrical Engineering, Budapest University of Technology and Economics,

Dr. György L. Nádasy, Associate Professor, Semmelweis University)

Academic year: 2021/2022/1st semester

Objectives of the subject, its place in the medical curriculum:

The purpose of the course: To review the theory and practice of modern measuring methods in experimental and clinical medicine, and providing practical knowledge to medical and pharmacy students on cardiorespiratory and neurophysiological measurements. The course based on and further extends the material of the course of Medical physiology. Throughout the lectures, we put an emphasis on potential methodological errors of measurements and examinations, discussing how to avoid them.

Successful completion of the subject results in the acquisition of the following competencies:

The course offers practical knowledge to medical and pharmacy students on cardiovascular, respiratory and neurophysiological measurements based on, but further extending the course material of Medical physiology. Involving engineers into teaching, students receive real technological knowledge on a basic level. Throughout the lectures we put an emphasis on potential methodological errors of measurements and examinations, discussing how to avoid them, and so we utilize a critical approach.

Detailed curriculum:

Theoretical and practical lessons shall be given separately by numbering the lessons (by weeks).

1. Introduction. Biomedical engineering. Design and safety requirements of biomedical equipment
2. General metrology. Basics of measurement and control theory
3. Computerized data acquisition and analysis. Telemetry systems
4. Sampling of continuous signals. Digitizing analogue signals
5. Home monitoring of cardiovascular health status. Determination of blood glucose and tissue glucose concentrations
6. Experimental study of pulmonary function. Measurements of blood gases and the acid-base balance
7. Investigating the electrical activity of the heart. Design of ECG amplifiers
8. Direct and indirect methods to determine cardiac output and peripheral blood flow
9. Neurophysiological measurements (action potentials, brain stem evoked potentials). Objective studies in audiology
10. Adaptive processes in the cardiovascular system. Investigative methods in experimental angiology
11. Measuring blood pressure in the lab and clinics (invasive and noninvasive methods)
12. Complement-related immunological and cardiopulmonary responses (CARPA)
13. Studying brain function by functional imaging systems. The linear CT method
14. Experimental methods to study pain and nociception

Requirements for participation in classes and the possibility to make up for absences:

Regular attendance is required, which will be registered. In case of absence make up of material is possible based on lecture sketches.

Methods of verification of absence from classes or the exam:

Absence can be verified by medical notice only.

Methods to assess knowledge acquisition during term time:

(E.g. homework, reports, mid-term test, end-term test, etc., the possibility of replacement and improvement of test results)
From the course material, no midterms are written.

Requirements for signature:

Signature will be awarded upon regular attendance of the lectures.

Method and type of evaluation:

(Method of calculating the final mark based on the theoretical and practical examination. How the mid-term test results are taken into account in the final mark.)

Marks are based upon the result of the written exam. Students will be graded on a 5-grade-scale:

0-49 % - 1, 50-64 % - 2, 65-79% - 3, 80-89% - 4, 90-100% - 5.

Type of examination:

Written exam + 2 re-takes

How to register for the examination:

Personal registration by the Course Director.

How to modify the registration for the examination:

Personal notice by the Course Director.

Possibilities for exam retake:

Upon obstacles (medical notice, or parallel exam) or failure of the exam, two re-takes are possible.

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

1. A.C. Guyton: Textbook of Medical Physiology W.B. Saunders Company, 2006
2. Fonyó Attila: Principles of Medical Physiology, Medicina Kiadó, 2002
in Hungarian https://regi.tankonyvtar.hu/hu/tartalom/tamop425/2011_0001_524_Elettan/index.html
3. Lecture sketches of course tutors <https://drive.google.com/drive/folders/0B51j4aPM88ChLU9mR0xobkpOcjg>
3. Bronzino, D. Joseph The Biomedical Engineering Handbook, 3rd Ed, CRC Taylor & Francis, 2006
https://brainmaster.com/software/pubs/brain/The_Biomedical_Engineering_Handbook_.pdf

INTRODUCTION TO THE METHODOLOGY OF CLINICAL RESEARCH I.

Observational studies

Number of lessons per week: 2 **lecture – practical course:** 2x45 min for 3 weeks **seminar:** 2x45 min for 11 weeks

Subject type: optional course

Academic year: 2021/2022

Name of the course leader: *Dr. Zoltán Benyó*

Institute of Translational Medicine, (+36-1) 210-0306

Position: professor, head of department

Goals of the course:

Nowadays most physicians will inevitably be involved in clinical research during their careers. Many of them will participate actively in clinical research programs, while others will get in contact with clinical studies via the literature or by interpreting new clinical guidelines. Therefore, at the time of graduation physicians of the 21st century must possess skills which enable them to join research programs and critically interpret scientific evidence. The ultimate goal of the course is to prepare future doctors for these challenges by offering a curriculum which helps to acquire these skills during the academic years of their gradual studies.

The course aims to give a comprehensive insight into the methodology of clinical research. The broad spectrum of methodological approaches will be presented in 2 separate courses built on each other. The course „**Introduction to the Methodology of Clinical Research I.**” will focus on observational studies. Accordingly, the course will:

describe the types of observational studies and the pros and cons of their application

give a deep insight to clinical epidemiology

and to the ethical and legal concepts related to the planning and conduct of these studies;

describe basic concepts of biomarker and genomic research

introduce the background of the application of screening tests.

Beyond these, the course will introduce the students (without showing mathematical formulae) the statistical approaches which are closely related to the analyses of observational studies:

Within the frame of seminars, we will discuss basic biostatistical terms and principles,

and the steps of basic regression model building.

Moreover, the practicums of the course will provide opportunity to apply the knowledge acquired on seminars to real-life situations. On these labs we aim to perform 2 types of practical tasks in small student groups:

Performing simple statistical analyses on simulated patient datasets using a comprehensive statistical software package under the guidance of the tutor.

Problem-based discussion of pre-released publications, critical interpretation of the published research.

Place where the subject is taught (address of the auditorium, seminar room, etc.):

Seminar: Semmelweis University, EOK, Tűzoltó street 37-47. Hári Pál auditorium

Practicum: Semmelweis University, EOK, Tűzoltó street 37-47. Department of Biophysics and Radiation Biology

Successful completion of the subject results in the acquisition of the following competencies:

After successful completion of the subject the students:

- will be able to join research projects based on observational studies (**even as an undergraduate student!**),
- will be able to critically comprehend scientific literature related to observational studies,
- will understand the basic aspects of study design and analysis related to observational studies
- will understand the limitations and factors influencing the validity of observational studies,
- will understand the ethical and legal aspects of observational studies,
- will have basic knowledge about the statistical methodology used to properly plan and analyse observational studies

Number of students required for the course (minimum, maximum) and method of selecting students:

Minimum number students: 5

Maximum number students: 60 (the first 60 applicants can attend the course)

How to apply for the course:

Application occurs via the Neptun system

Detailed curriculum:

(Theoretical and practical lessons shall be given separately by numbering the lessons (by weeks). Please provide the names of the teachers of the seminars and practical lessons and indicate guest lecturers. Do not use attachments! Always attach a CV for guest lecturers!)

1st week: Types of observational studies (Dr. Monori-Kiss Anna, Institute of Translational Medicine)

- Comparison of observational and experimental studies; types of observational studies, pros and cons of their application (case reports, ecological studies, cross-sectional studies, cohort studies, case-control studies)

2nd week: Introduction to biostatistics I. (Dr. Veres Dániel, Department of Biophysics and Radiation Biology)

- Types of variables, description of variables (mean, median, percentile, IQR); types of distribution, population vs. sample, sampling procedures, estimating the population mean, confidence intervals

3rd week: Introduction to biostatistics II. (Dr. Veres Dániel, Department of Biophysics and Radiation Biology)

- Power, sample size; hypothesis testing; parametric vs. non-parametric probes; revision of known biostatistical tests (t-test, ANOVA, their non-parametric counterparts; Chi square test)

4th week: Workshop seminar to introduce the biostatistical analysis software package (STATA) (Dr. Veres Dániel, Department of Biophysics and Radiation Biology)

- Interactive presentation of the most important commands and menu points

5th week: Introduction to epidemiology (Dr. Miklós Zsuzsanna, Institute of Translational Medicine)

- The aim of clinical epidemiology; outcome measures (ratio, odds, incidence, prevalence, incidence-ratio); parameters describing the association between outcome measures and intervention/exposition/risk factors (RR, OR, RR, RD); threats to validity and strategies to handle them (confounding, bias, chance etc.)

6th week: PRACTICUM I. (Dr. Miklós Zsuzsanna, Institute of Translational Medicine)

- Clinical epidemiology. Finding an epidemiology related research question based on a simulated patient dataset and answering the question by performing statistical analysis using STATA statistical software package.

7th week: Ethical and legal aspects of observational studies. (Dr. Szentmártoni Gyöngyvér, Department of Internal Medicine and Oncology)**8th week: Applied regression I.** (Dr. Ferenci Tamás, biostatistician, invited lecturer)

- Basic concepts, linear regression

9th week: Applied regression II. (Dr. Ferenci Tamás, biostatistician, invited lecturer)

- Multivariate linear regression, steps of model building

10th week: Applied regression III. (Dr. András Ittész, biostatistician, invited lecturer)

- Logistic regression

11th week: PRACTICUM II. (Dr. Monori-Kiss Anna, Institute of Translational Medicine; Dr. Veres Dániel, Department of Biophysics and Radiation Biology)

- Steps of multivariate regression model building. The students will build regression models on a simulated patient dataset using STATA statistical analysis software package. They experience how the inclusion of different variables/confounders can affect results and data interpretation.

12th week: PRACTICUM III. (Dr. Szentmártoni Gyöngyvér, Department of Internal Medicine and Oncology)

- Critical interpretation and discussion of a pre-released publication (original article)

13th week: Biomarker research, genomics. (Dr. Tóthfaluasi László, Department of Pharmacodynamics) Screening tests. (Dr. Terebessy András, Department of Public Health)**14th week: Test exam.**

Other subjects concerning the border issues of the given subject (both obligatory and optional courses!). Possible overlaps of themes:

Medical statistics, informatics and telemedicine (basic terms in biostatistics – partial overlap)

Medical ethics, bioethics (7th week seminar – partial overlap)

Special study work required to successfully complete the course:

(E.g. field exercises, medical case analysis, test preparation, etc.)

Requirements for participation in classes and the possibility to make up for absences:

Students are required to participate on 70 % of the seminars and on all practices.

We offer several occasions during the semester to make up for the missed practices.

Methods to assess knowledge acquisition during term time:

(E.g. homework, reports, mid-term test, end-term test, etc., the possibility of replacement and improvement of test results)

Students must arrive well-prepared for the practices. Completion of the prespecified tasks will be checked by the practice tutors.

We will provide opportunities to make up for the missed practices several times during the semester.

Requirements for signature:

Students are required to participate on 70 % of the seminars and on all practices.

Type of examination:

Practical exam in the form of a written test at the end of the semester

Requirements of the examination:

(In case of a theoretical examination, please provide the topic list; in case of a practical exam, specify the topics and the method of the exam)

Written practical exam test taken via the e-learning site (Moodle) of the university.

Students are eligible to take the exam if they have obtained the signature.

The written test will be compiled from problem-oriented multiple choice questions which are based on the on-line available seminar material (digests, slide shows, scripts) and the practical knowledge acquired on lab practices. We will provide sample test questions during the semester.

The test will be graded as follows:

90-100% – (5)

80 – 89 % – (4)

70 – 79 % – (3)

60 – 69% – (2)

< 60 % – (1)

Method and type of evaluation:

(Method of calculating the final mark based on the theoretical and practical examination. How the mid-term test results are taken into account in the final mark.)

The final mark will be a 5-grade practical mark obtained on the practical exam test organized in the last week of the semester.

How to register for the examination?:

There is no exam in the exam period.

The practical exam is organized on the last seminar of the semester.

Possibilities for exam retake:

For students who cannot attend the practical exam for reasonable excuses, we provide extra occasions to make up for the practical exam.

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

Obligatory:

1. On-line uploaded material (digests, practicum descriptions, scripts, slide shows).

Recommended:

1. Bernard Rosner. Fundamentals of Biostatistics. Cengage Learning Inc. (2010)
2. Kenneth J. Rothman Epidemiology - An Introduction. Oxford (2012)

INTRODUCTION TO THE METHODOLOGY OF CLINICAL RESEARCH II.

– Experimental studies

Credit value: 2

Number of lessons per week: 2 **lecture:** – **practical course:** 2 × 45 min for 3 weeks **seminar:** 2 × 45 min for 11 weeks

Subject type: optional course

Academic year: 2024/2025

Name of the course leader: *Dr. Zoltán Benyó*

Goals of the course:

Nowadays most physicians will inevitably be involved in clinical research during their careers. Many of them will participate actively in clinical research programs, while others will get in contact with clinical studies via the literature or by interpreting new clinical guidelines. Therefore, at the time of graduation physicians of the 21st century must possess skills which enable them to join research programs and critically interpret scientific evidence. The ultimate goal of the course is to prepare future doctors for these challenges by offering a curriculum which helps to acquire these skills during the academic years of their gradual studies.

The course aims to give a comprehensive insight into the methodology of clinical research. The broad spectrum of methodological approaches will be presented in 2 separate courses built on each other.

The course „**Introduction to the Methodology of Clinical Research II.**” will focus on experimental studies. Accordingly, the course will:

- describe the types of experimental studies and the pros and cons of their application;
- discuss the scientific, statistical and economic aspects of experimental study designs;
- discuss the ethical and legal concepts related to the planning and conduct of these studies;
- emphasize the role of clinical trials in the introduction of new therapies to clinical practice and
- give introduction to the background of the application of methodologies related to clinical trials (questionnaires, systematic review, metaanalysis).

Beyond these, the course will introduce the students (without showing mathematical formulae) the statistical approaches which are closely related to the analyses of experimental studies:

- We will emphasize the utilization of basic biostatistical terms and principles we learnt on the first course in clinical trials
- and discuss the principles of survival analysis and analysis of longitudinal studies.

Moreover, the practicums of the course will provide opportunity to apply the knowledge acquired on seminars to real-life situations. On these labs we aim to perform 2 types of practical tasks in small student groups:

- Performing simple statistical analyses on simulated patient datasets using a comprehensive statistical software package under the guidance of the tutor.
- Problem-based discussion of informed consent forms and critical interpretation of published research.

Place where the subject is taught (address of the auditorium, seminar room, etc.):

Seminar: Semmelweis University, EOK, Tűzoltó street 37-47. Hári Pál auditorium

Practicum: Semmelweis University, EOK, Tűzoltó street 37-47. Department of Biophysics and Radiation Biology

Successful completion of the subject results in the acquisition of the following competencies:

After successful completion of the subject the students:

- will be able to join research projects based on experimental studies (**even as an undergraduate student!**),
- will be able to critically comprehend scientific literature related to experimental studies,
- will understand the basic aspects of study design and analysis related to experimental studies
- will understand the limitations and factors influencing the validity of experimental studies,
- will understand the ethical and legal aspects of experimental studies,
- will have basic knowledge about the statistical methodology used to properly plan and analyse experimental studies
- will be able to perform simple survival analyses and will understand the problematics of correlated outcomes

Course prerequisites:

Successful completion of Introduction to the Methodology of Clinical Research I. – Observational studies (AOVKIK553_1A)

Number of students required for the course (minimum, maximum) and method of selecting students:

Minimum number students: 5

Maximum number students: 60 (the first 60 applicants can attend the course)

How to apply for the course:

Application occurs via the Neptun system

Detailed curriculum:

(Theoretical and practical lessons shall be given separately by numbering the lessons (by weeks). Please provide the names of the teachers of the lectures and practical lessons and indicate guest lecturers. Do not use attachments!

Always attach a CV for guest lecturers!

1st week: Experimental studies (Dr. Miklós Zsuzsanna, Institute of Translational Medicine)

- comparison of observational and experimental studies; types of experimental studies, pros and cons of their application, the methods of randomization

2nd week: Ethical aspects of clinical trials. (Dr. Szentmártoni Gyöngyvér, Department of Internal Medicine and Oncology)

- ethical issues, ethical approval, the informed consent

3rd week: Issues related to study design and implementation. (Dr. Szentmártoni Gyöngyvér, Department of Internal Medicine and Oncology, Dr. Monori-Kiss Anna, Institute of Translational Medicine)

- elements and importance of the research protocol, factors influencing the study design

4th week: PRACTICUM I. (Dr. Szentmártoni Gyöngyvér, Department of Internal Medicine and Oncology)

- critical interpretation of the informed consent process using sample forms

5th week: Correlated outcomes I. (Dr. Veres Dániel, Department of Biophysics and Radiation Biology)

- The problematics of correlated outcomes, characteristics of longitudinal data

6th week: Correlated outcomes II. (Dr. Veres Dániel, Department of Biophysics and Radiation Biology)

- Analysis of correlated outcomes with LME models

7th week: PRACTICUM II. (Dr. Veres Dániel, Department of Biophysics and Radiation Biology)

- Analysis of simulated longitudinal datasets with correlated outcomes using STATA statistical software package.

8th week: Survival analysis. (Dr. Veres Dániel, Department of Biophysics and Radiation Biology)

- Clinical application of survival analysis. Statistical methods related to survival analysis (log rank test, hazard ratios, Cox regression)

9th week: PRACTICUM III. (Dr. Miklós Zsuzsanna, Institute of Translational Medicine)

- Construction of Kaplan-Meyer survival curves, log rank analysis and Cox regression analysis on simulated patient datasets using Stata statistical software package

10th week: Supplementary methodologies. Big data (Dr. Monori-Kiss Anna, Institute of Translational Medicine)

- How to make a perfect questionnaire. The features and analysis of Big Data.

11th week: The clinical phase of drug development (Dr. Tóthfalusi László, Department of Pharmacodynamics)

- Phase I-IV studies. Aims, methods, implementation.

12th week: Economic exploitation of scientific results. (Dr. Lacza Zsombor, Institute of Translational Medicine)

- patents, introduction to the market

13th week: From data to evidence. (Dr. Ferenci Tamás, biostatistician, invited lecturer)

- metaanalysis, systemic review

14th week: Test exam.

Other subjects concerning the border issues of the given subject (both obligatory and optional courses!). Possible overlaps of themes:

Introduction to the Methodology of Clinical Research I. – Observational studies (prerequisite – some basic concepts are revised)
Medical statistics, informatics and telemedicine (basic terms in biostatistics – partial overlap)
Medical ethics, bioethics (7th week seminar – partial overlap)
Special study work required to successfully complete the course: (E.g. field exercises, medical case analysis, test preparation, etc.)

Requirements for participation in classes and the possibility to make up for absences:

Students are required to participate on 70 % of the seminars and on all practices.

We offer several occasions during the semester to make up for the missed practices.

Methods to assess knowledge acquisition during term time:

(E.g. homework, reports, mid-term test, end-term test, etc., the possibility of replacement and improvement of test results)

Students must arrive well-prepared for the practices. Completion of the prespecified tasks will be checked by the practice tutors.

We will provide opportunities to make up for the missed practices several times during the semester

Requirements for signature:

Students are required to participate on 70 % of the seminars and on all practices.

Type of examination:

Practical exam in the form of a written test at the end of the semester

Written practical exam test taken via the e-learning site (Moodle) of the university.

Students are eligible to take the exam if they have obtained the signature.

The written test will be compiled from problem-oriented multiple choice questions which are based on the on-line available seminar material (seminar digests, slide shows, scripts) and the practical knowledge acquired on lab practices. We will provide sample test questions during the semester.

The test will be graded as follows:

- 90-100% - (5)
- 80 – 89 % - (4)
- 70 – 79 % - (3)
- 60 – 69% - (2)
- < 60 % - (1)

Method and type of evaluation:

(Method of calculating the final mark based on the theoretical and practical examination. How the mid-term test results are taken into account in the final mark.)

The final mark will be a 5-grade practical mark obtained on the practical exam test organized in the last week of the semester.

How to register for the examination?:

There is no exam in the exam period.

The practical exam is organized on the last seminar of the semester.

Possibilities for exam retake:

For students who cannot attend the practical exam for reasonable excuses, we provide extra occasions to make up for the practical exam.

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

Obligatory:

1. On-line uploaded material (seminar digests, practicum descriptions, scripts, slide shows).

Recommended:

1. Bernard Rosner. Fundamentals of Biostatistics. Cengage Learning Inc. (2010)
2. Kenneth J. Rothman Epidemiology - An Introduction. Oxford (2012)

CLIMATE CHANGE AND HEALTH IN SOCIOLOGICAL PERSPECTIVES

Institute of Behavioral Sciences

Lecturer: László Antal Z.

Credit: 2

Thematics:

1. week: The history of climate change science
2. week: Climate change and society, sociological perspectives
3. week: Animal and plant health impacts of climate change
4. week: Human health impacts of climate change
5. week: Consumer society and environmental boundaries
6. week: Demographic processes and environmental boundaries
7. week: Climate change and health care
8. week: Adaptation to climate change
9. week: Adaptation to heat waves and to UV radiation
10. week: Adaptation to climate change at local level
11. week: Civil society, social movement and climate change
12. week: Climate communication
13. week: Climate change and the social values

ULTRASONOGRAPHY IN OBSTETRICS AND GYNECOLOGY

(obligatory optional coursee – 6th semester)

Course director: **Prof. Dr. János Rigó**

Lecturer: **Dr. Gábor Szabó PhD**

Department: First Department of Obstetrics and Gynecology

Study time: In every second week 2x45 minutes. Advised Semester: between 6. und 12. Semester

Exam: Written test and practical note

Credit: 1

Minimal/maximal participants: (1/5 person)

Application deadline: 1. December

Prerequisite: Completion of second year

The knowledge gained in theoretical basic subjects (anatomy, physiology) can be used by medical students as practical knowledge in the clinic. As a result of more than four decades of experience, ultrasound examination has a fundamental role in modern obstetrical and gynecological diagnostic. The course helps you to acquire skill in this field. Performing obstetrical-gynecological ultrasound tests and assessment of findings can only be learned through appropriate training. This non-invasive procedure is also safe for patients. The modern ultrasound equipment of the Department and the wide range of patients and diseases provide the opportunity for learning. Not only obstetricians and gynecologists, but also other associate colleagues such as clinical genetics, radiologists, gynecological cancer surgeons, anesthetists, and intensive therapists can utilize the knowledge provided by the subject.

Themes:

Physical basics of ultrasound examination. Parts of the ultrasound device. Application modes (amplitude, motion, brightness, Doppler). Gynecological ultrasound examination. Early pregnancy tests. Ectopic pregnancy. Standard planes of the first ultrasound screening during the 11-13th week of pregnancy. Neurosonography and fetal echocardiography. Standard planes of the second ultrasound screening during the 18-22th week of pregnancy. Ultrasound examinations in the third trimester. Amniotic fluid index and fetal Doppler examinations. 3-4-dimensional ultrasound examinations and their practical application.

THE SCALPEL AND THE PARAGRAPH: SPECIAL ISSUES OF MEDICAL PRACTICE IN LIGHT OF THE LAW

elective subject

Lecturer: Prof. Dr. József Kovács

Department of Behavioural Sciences

1st semester

2 hours / week

Within the framework of the course the participants, who have an affinity for Bioethics and Law, will gain insight into the special characteristics of the legal domain and certain fundamental legal concepts and methods that are relevant for a practicing physician, but cannot be sufficiently investigated into within the framework of other obligatory courses. The course considers the general part of medical law governing the legal relationship between medical practitioners and their patients, first by distinguishing between civil law and criminal law and explaining their respective characteristics. The legal position, the customary rights and obligations of physicians and patients are examined, together with the issues of informed consent. Topics will also include the civil and criminal liability of physicians and the issue of malpractice. Selected medico-legal issues over human life are also examined; these will include foetal rights, modern reproductive technologies, various aspects of human genetic research, and certain end-of-life issues such as advance directives and euthanasia. The foregoing topics will be discussed from the perspective of comparative law, by presenting various court cases from the countries of the European Union and the United States of America as well. Attending students will gain the ability to recognise and analyse legal health care issues by engaging in interactive discussions and informative research.

Attending students will gain insight into the special characteristics of the legal way of thinking, the basic concepts of civil and criminal law, and also the approach to the most controversial medico-legal issues in the European Union and the United States.

Students intending to practice in any field of medicine may find the course profitable.

Minimum number of participants: 10

Maximum number of participants: 20; applications are accepted through the „Neptun” system.

Students are to register through the „Neptun” system. No special achievement/prior completion of other course(s) is required.

Thematics:

1. **Introduction: Aims and objectives of the course; presentation of the interdisciplinary method (instructor: dr.iur. Orsolya Marta Peter PhD, Lecturer).**
2. **The concept of „law”; the branches of law particularly relevant for medical practice (civil/private law; criminal law) (instructor: dr.iur. Orsolya Marta Peter PhD, Lecturer).**
3. **The human being and the law. Legal personhood and capacity to act. Man as a subject to fundamental human rights. (instructor: dr.iur. Orsolya Marta Peter PhD, Lecturer).**
4. **The parties to a medical legal relationship: doctor and patient. The legal position of the physician and the patient; their principal rights and obligations in the various legal systems (instructor: dr.iur. Orsolya Marta Peter PhD, Lecturer).**
5. **Creating a doctor-patient relationship: informed consent in the member countries of the European Union and in the USA (instructor: dr.iur. Orsolya Marta Peter PhD, Lecturer).**
6. **Various legal models of the doctor-patient relationship (mandate agreement, service agreement, treatment agreement etc.) (instructor: dr.iur. Orsolya Marta Peter PhD, Lecturer).**
7. **The physician and civil liability: malpractice/liability for damages in the member countries of the European Union and in the USA (instructor: dr.iur. Orsolya Marta Peter PhD, Lecturer).**
8. **The physician and criminal liability: specific criminal offences that can be committed by a physician/health care specialist (instructor: dr.iur. Orsolya Marta Peter PhD, Lecturer)**
9. **The beginnings of human life and the law: legal position of the human foetus in the various legal systems (instructor: dr.iur. Orsolya Marta Peter PhD, Lecturer).**

10. **The beginnings of human life and the law: surrogacy and the legal issues generated by the recent developments in assisted human reproduction in Europe and in the world (instructor: dr.iur. Orsolya Marta Peter PhD, Lecturer).**
11. **The issues of medical research on humans: the framework set up by law (instructor: dr.iur. Orsolya Marta Peter PhD, Lecturer).**
12. **End-of-life decisions and the law: the “living will” and other forms of advance directives in the various legal systems; the refusal of lifesaving treatments (instructor: dr.iur. Orsolya Marta Peter PhD, Lecturer).**
13. **End-of-life decisions and the law: euthanasia in the member countries of the European Union and in the USA (instructor: dr.iur. Orsolya Marta Peter PhD, Lecturer).**
14. **Review of the semester; suggestions, observations and proposals (instructor: dr.iur. Orsolya Marta Peter PhD, Lecturer).**

Participants will meet weekly (2 hours/week) as a discussion/seminary group.

Participating students are required to prepare and hold an oral presentation (15-20 mins) about a preferred medical legal issue, to be previously approved by the instructor. A suitable schedule for such presentations will be worked out together with the students.

Students are required to attend at least 75% of the meetings; a maximum of 4 (four) absences is acceptable. Attendance will be verified at the beginning of each meeting. In the event of more than 4 (four) absences an additional oral presentation or an essay will be required, provided such excessive absence is unjustified.

No medical certificate/other proof is required up to the maximum number (4) of excused absences. In the event of more than 4 (four) absences an authentic proof of justifiable absence is accepted.

„Aláírás” (the instructor’s „signature” indicating the fulfilment of the term requirements) will be granted as follows:

1. **Preparation and actual holding of an oral presentation.**
2. **Proper attendance (max. 4 absences; proper justification or additional work in the event of more than 4 absences)**

The performance of participating students will be graded as follows:

1. **Excellent (5): less than four absences; active and constructive participation in group discussions; an oral presentation of outstanding quality.**
2. **Satisfactory (3): regular attendance; an oral presentation of good quality.**
3. **Insufficient (1): more than four absences without proper justification; no presentation or presentation of an inferior quality.**

Participants will be given a „gyakorlati jegy” (term mark) at the end of the semester; no further examination is required.

Recommended reading materials:

Kuhse – Singer: A Companion to Bioethics, 2nd Edition (Wiley-Blackwell)

Kuhse – Singer: Bioethics. An Anthology, 2nd Edition (Blackwell)

See also the extensive bibliography in Kuhse-Singer

ANTIBIOTIC THERAPY AND INFECTOLOGY

Held in both semesters.

Lectures: 2 hours/week

Credits: 2

Exam type: multiple choice test

Participation: min. 70% is obligatory

Obligatory elective subject for medical students already trained in microbiology, pharmacology and basic clinical subjects.

The subject gives an overview on the basic principles and practice of antimicrobial therapy. The antibiotics represent one of the most important classes of drugs that are prescribed practically in all branches of clinical medicine. It seems easy to use them and that is why we abuse them. Discussing the most important clinical features of the frequent infections, the subject shows the optimal approach to patients with infectious diseases and antimicrobial treatment.

The first two lessons discuss the specific features of antimicrobial therapy, the basic principles of empiric treatment and the pharmacokinetic/pharmacodynamic concept that substantiates the application of antimicrobials in term of choice, dosage and combination. The following seven lectures deal with the specific features of the most important infections, such as respiratory tract infections, urinary tract and intraabdominal infections, endocarditis, meningitis, sepsis. Obviously, the lecturers bring into focus the considerations concerning antibiotic therapy. In the second half of the course, some of the nosocomial infections, infections of immunocompromised hosts and zoonoses are discussed, followed by the problems of antibiotic prophylaxis and antibiotic policy.

The course is organized only in the first semester

Course director: **Prof. Dr. Endre Ludwig.**

The venue of course: *Szent László Hospital*

1097 Budapest, Gyáli út 5-7. Building N. 19 Lecture Room

Textbooks:

1. E. Ludwig: Antibiotic therapy, Medintel, Budapest, 2003.
2. A. Szalka, L. Tímár, E. Ludwig, Zs. Mészner: Infectology, Medicina, Budapest, 2005.
3. Reese and Betts: A practical approach to infectious diseases. Lippincott Williams and Wilkins 2003.
4. Material of the lectures online availability

Lectures:

- Basic principles of antimicrobial therapy. Microbiological diagnosis, as the basis of antimicrobial therapy. The concept of “drug of choice”
- Diagnosis of infectious diseases: clinical relevance of the various diagnostic tests
- Optimisation of antimicrobial therapy. The pk/pd approach, correlation of dosage and clinical efficacy.
- Infectious diseases with exanthemas
- Upper respiratory tract infections (common cold, acute and chronic rhinosinusitis, acute otitis, tonsillopharyngitis). Epidemiology, the influence of age. Theoretical considerations and practice.
- Community acquired pneumonia. Epidemiology, the difficulties of etiological diagnosis. The impact of emerging bacterial resistance on the clinical efficacy of antibiotics. The modern approach and practice based on it
- The nosocomial infections. Nosocomial pneumonia, difficulties of etiological diagnosis. Antimicrobial treatment. Iv catheter-associated infections.
- Intraabdominal infections (primary and secondary peritonitis, cholecystitis). Urinary tract infections.
- Central nervous system infections. Meningitis, etiological diagnosis, antimicrobial treatment.
- Infections of the immunocompromised hosts. Diagnosis, and the principles of treatment. Invasive fungal infections. Colonisation and infection. Treatment of Candida and aspergillus infections.
- Tropical diseases. HIV and AIDS.
- The modern concept of sepsis. The basis of antimicrobial therapy. Indication of antibiotic combinations. The toxic shock syndrome.

Important note:

Attendance at 70% of the lectures is obligatory. The end semester grade is the result of the multiple choice test.

Recommended textbooks:

1. **Ludwig E.** (szerk): Antibiotikum terápia 2003 Medintel, Budapest, 2003.
2. Szalka A., Tímár L., **Ludwig E.**, Mészner Zs. (Szerk.): Infektológia. Medicina, Budapest, 2005.
3. Reese and Betts: A practical approach to infectious diseases. Lippincott Williams and Wilkins 2003.
4. Figures of the lectures are available electronically

BASICS OF MEDICAL CHEMISTRY**Department of Medical Chemistry, Molecularbiology and Pathobiochemistry**Lecturer: *Prof. Dr. Miklós Csala*

Lectures: obligatory

Credit: 1

Topics:

- 1: Basics of atomic and molecular structure, periodic table, bondings.
- 2: Chemical equations, stoichiometry, reaction types. Acids, bases, salts. Solutions. Concentrations.
- 3: Laws of diluted solutions. Electrolytes, ionization of electrolytes. Conductivity. Acid-base theories.
- 4: Chemical equilibria. Le Chatelier principle, law of mass action. Equilibria in aqueous solutions, principle of pH. Buffers. Carbon dioxide/hydrocarbonate buffer.
- 5: Consultation: preparation for the 1st midterm. Focused on calculations: ionization, pH, buffer, solubility product.
- 6: Chemical thermodynamics. Principles of enthalpy, entropy, free enthalpy. Hess' law. Basics of reaction kinetics. Activation energy and catalysis.
- 7: Electrochemistry. Oxidation and reduction, redox systems in the living cells.
- 8: A short summary of inorganic chemistry. Metals and non-metals. Complexes.
- 9: Calculations in electrochemistry and thermochemistry.
10. Basics of organic chemistry, hybrid states of carbon, organic reaction types. Isomerism, structural isomerism. IUPAC nomenclature.
11. Stereochemistry. Geometric and chiral isomerism, nomenclature. Prochirality.
12. The most important groups of organic compounds. Aliphatic and aromatic skeletons, their reactions. Repetitions of their structures. Consultation before the 2nd midterm – focused on organic chemistry.
13. The most important groups of organic compounds according their functional groups, their reactions. Repetitions of their structures.
- 14: Closing test. 30 multiple choice questions and 10 structures

Exam: closing test. 30 multiple choice questions and 10 structures

Note: Material of the lectures is available on the website of the Department.

Max. 3 absences are allowed.

VALUE OF ULTRASONOGRAPHY IN THE CLINICAL DIAGNOSTICS

(Lecturer: *Dr. Ágnes Szebeni* M.D., D. Sc.)

1. a) Basic physics of medical ultrasound
b) Demonstration of the ultrasound laboratory; technique of ultrasound scanning.
2. a) Sonography of the liver, the spleen, the gallbladder and the bile ducts.
b) Patient demonstrations and training
3. a) Sonography of the pancreas and the pancreas and the lymph nodes.
b) Patient demonstrations and training
4. a) Invasive sonography (US guided biopsies and punctions, endosonography, intraoperative sonography).
b) Videodemonstrations.
5. a) Urogenital sonography.
b) Patient demonstrations and training
6. a) Small part scanning.
b) Patient demonstrations and training
7. a) Vascular sonography
b) Patient demonstrations and training

INTRODUCTORY LECTURES OF TRADITIONAL CHINESE MEDICINE

The topics:

1. Chinese way of thinking about medicine – Introductory lecture
2. Basic principles in Chinese anatomy and physiology (Yin-yang, Chi, meridian, points, cun, etc.)
– 1 lecture
3. The twelve meridians and their points (locations and indications) – 6 lectures
4. The rules of the point selections – 2 lectures
5. The five- element theory, future trends in research and in the clinical use – 1 lecture

LIBRARY INFORMATICS – AOVKPK088_1A

Lecturer: Dr. Lívía Vasas PhD. – Central Library
 Institute: Semmelweis University Central Library, 1088 Budapest
 Duration: One semester, 30x45 minutes (10x3 lessons)

SUGGESTED SEMESTER 5-10.

Exam-form	Practical mark
Credit-value	3 credit-points
Minimum/maximum group-size	8/200

The aim of the subject: Teaching students how to use/search in literature sources of medicine, analyse the result of their work supporting the proper competencies.

Thematic: Medical e-catalogues, e-books, e-libraries, databases, scientific resources of internet

Assistant lecturer: Anna Berhidi, Edit Csajbók, Skultéti Attila, Szluka Péter

Student records officer:

Application deadline:	September 4 -8, 2019
Precondition:	There isn't.

- 1. Introduction, technical details, VPN access, technical details, about the history of the Central Library's Homepage: www.lib.semmelweis.hu and its facilities, UpToDate, ClinicalKey, HS talks: Biomedical & Lifesciences Collections, EBSCOhost, ProQuest, Pharmacopoeia, Turnitin Dissertations: Dart Europe, Open dissertations, OATD**
- 2. Catalogs: books, online books**
 Semmelweis University catalog Hunteka: <http://hunteka.lib.semmelweis.hu/search>
 Online book catalog: <https://lib.semmelweis.hu/nav/ekonyvek>
 National Library of Medicine (Bethesda, USA)
 NLM catalog: <https://www.ncbi.nlm.nih.gov/nlmcatalog>
 Worldcat: <https://www.worldcat.org/>
 Copac: <https://copac.jisc.ac.uk/>
 Books PPT
- 3. Scientific publishers and periodicals:**
 printed/electronic/open access
 - Browser and matching searching, archive and the newest editions Characterization of periodicals/reviews/journals, ISSN, DOI, Cross-mark, Article metrics - Online attention
 - Publishers: Springer, LWW, Wiley, video journal: JOVE
 - Nature: <https://www.nature.com/%0A>
 - BMC <https://www.biomedcentral.com/>
 - PLOS <https://www.plos.org/>, DOAJ <https://doaj.org/>, etc.

4. New routes: Open Science, Open Access

The dangers of publishing on Open Access https://lib.semmelweis.hu/nav/open_access_general_information Support for Open Access Communication at Semmelweis University https://lib.semmelweis.hu/nav/open_access_tamogatas
 The Semmelweis repository <https://repo.lib.semmelweis.hu/>
 The concept of plagiarism, its forms of appearance, Plagiarism Search: Turnitin, Copyright questions

5. NLM databases: history, Open!: <https://openi.nlm.nih.gov/>

PubMed <https://www.ncbi.nlm.nih.gov/pubmed/>
 value added services: registration, advances search.
 MeSH, PMC, etc.
 Dictionary: <https://www.merriam-webster.com/>

6. OVID databases, online books, electronic periodicals, Evidence Based Medicine databases: the role of the EBM in research, full text journals in Ovid databases MEDLINE, PsycINFO, subject heading systems, value-added services, access to the full text version, WHO <https://www.who.int/>**7. Bibliographic and citation databases, search engine: Web of Science platform, Google Scholar; citations, general searching in the databases, bibliographic and citation searching on keywords, using Boolean operators, value-added services**
 Scientometrics: quality of journals: Clarivate Analytics InCites JCR (Science Edition and Social Science Edition), IF: calculating Impact factor; SCImago: SJR**8. Reference Manager:** EndNote, EndNote Online; the role of reference softwares in modern publishing, Literature searching: Importing and exporting records (from Web of Science, OVID Medline, PubMed) creating own records search facilities within our records and from PubMed; data handling: creating groups, filtering duplicates
 Semmelweis Knowledgebase, Scientific Discovery of the Internet: find medical information you can trust, Building search strategies, Google Scholar, Medworm**9. Summary of the course, Test writing****10. Consultation, Retake the 1st/2nd test OR Renewal opportunity for each tests**

INTRODUCTION TO CLINICAL ANATOMY

Semmelweis University, Faculty of Medicine

Department of Anatomy, Histology and Embryology

Credit value : 2

Number of lessons per week: 2 lectures: 2 practical course: 0 seminars: 0

Subject type: obligatory course optional course

Academic year: 2024/2025 (2nd year 2nd semester)

Name of the course leader: Dr. Székely Andrea Dorottya (associate professor)

His/her workplace, phone number: Semmelweis University, Department of Anatomy, Histology and Embryology, +36-1-459-1500/53601

Position: Course Director of the English program, Associate Professor

Date and registration number of their habilitation: 2016.06.17. 8/2016 (SziE/ÁOTE)

Objectives of the subject, its place in the medical curriculum:

Detailed discussion of special anatomical topics with relevance to clinical subjects. Introduction to topographical anatomy with regards to imaging methods. The course is organised parallel or prior to the beginning of the clinical studies. Teaching is done in the form of lectures.

Place where the subject is taught (address of the auditorium, seminar room, etc.):

Semmelweis University, Department of Anatomy, Histology and Embryology
Budapest 1094, Tűzoltó utca 58.

Successful completion of the subject results in the acquisition of the following competencies:

Clear understanding of the macroscopical composition of the human body together with the position and topographical relation of organs. Identification of surface landmarks.

Recognition of anatomical entities during physical examination or medical/surgical interventions. Acquiring knowledge of surface features and/or sectional anatomy forming basis for clinical diagnostics (palpation, auscultation, etc.) and the use of radiological imaging methods
The deeper understanding and restoration of morphology&function in line with therapies and/or rehabilitation.

Course prerequisites:

Successful completion of Macroscopic Anatomy I-II. together with Microscopic Anatomy and Embryology I-II. (valid marks from the final examinations at the end of the 3rd semester). Good command of English.

Number of students required for the course (minimum, maximum) and method of selecting students):

Optional course, voluntary registration for students via the NEPTUN system.

Minimal headcount: 10, maximal headcount: 120 students

Detailed curriculum:

REMARK:

The order of topics may change according to the availability of lecturers.

List of lectures (the exact order or topic may change upon availability of lecturers)

1. week: General introduction, surface anatomy
2. week: Anatomical aspects of radiology
3. week: Anatomical aspects of orthopedic surgery
4. week: Restorative surgery of the organs of the viscerocranium
5. week: Anatomical relevances of vascular diseases, hypertonia
6. week: *Anatomical relevances of assisted reproduction*
7. week: Anatomical aspects of general and local anaesthesia
8. week: Anatomical correlates of general surgery
9. week: Clinical anatomy of the mammary gland, lactation
10. week: Anatomy and neonatology, with special reference to pre-term birth
11. week: Anatomical aspects of peripheral nerve diseases
12. week: Anatomical background of angiology
13. week: Neuroanatomy of memory formation, drugs of abuse
14. week: Consultation, exam competition

Other subjects concerning the border issues of the given subject (both obligatory and optional courses). Possible overlaps of themes:

Morphological subjects including: Macroscopic Anatomy I-II., Microscopic Anatomy and Embryology I-II.; Physiology

Requirements for participation in classes and the possibility to make up for absences:

Weekly lectures are held regularly; lecture notes should be downloaded from Moodle. Missed classes cannot be made up for at a different time.

Type of examination:

A practical mark is earned from a written examination, topics: subject matter of the semester.

Requirements of the examination:

The examination is composed of theoretical questions on the basis of the lecture topics together with the content of the study aids uploaded in Moodle. The written theoretical examination is done using an e-learning module.

TOPIC LIST FOR CLINICAL ANATOMY (written test in moodle)**HYPERTENSION**

- The most prevalent risk factor of global mortality
- The prevalence of high blood pressure in the Western countries
- The threshold of high blood pressure in Europe by home blood pressure monitoring
- BP variability types
- Reasons for measuring more than 20/10 mmHg BP difference between the arms
- The most frequent form of thoracic outlet syndrome
- Paget-Schroetter syndrome
- The types of non-endocrine secondary hypertension
- Renovascular stenosis

ANGIOGRAPHY

Who is the angiographic puncture technique named after?

- In case of coughing up blood, which blood supply area is the most commonly implicated?
- What is the most effective way to test bronchial arteries?
- In the case of subclavian steal, in which artery does the flow reverse?
- How is the puncture site selected for angiography?
- Which diagnostic methods can replace angiography?
- Which blood vessels are connected by the pancreatico-duodenal arcade (or lesser arc of Riolan)?
- Which vessels are connected by the (greater) arc of Riolan?

THORAX

- Landmarks on the ventral surface of the trunk
- Bony structures limiting the superior inlet to the thorax
- Planes and levels in the thorax
- Position of the nipple
- Layers to be penetrated in thoracocentesis
- Types of pneumothorax
- "Triangle of safety" in chest drain
- Separation of the two pleural cavities
- Heart sounds
- Pericardiocentesis

MAMMA

- Structures limiting the sub (retro-)mammary space
- Tissue composition changes within the mammary gland with ageing
- Montgomery glands
- Cutaneous nerves implicated in axillary block dissection
- Malignous tumor locations of the breast
- Radical mastectomies according to Halsted and Patey
- Elongation/growth of lactiferous ducts (hormones)
- Clinical (metabolic) relevance of high prolactin levels during pregnancy and breastfeeding
- Cellular procedures during involution of the mammary gland (when the breastfeeding)

DENTISTRY

- What is the difference between the anatomical and clinical crowns of a tooth?
- What does heterodontia mean?
- Which tooth has the longest root?
- What is a diastema?
- Structures present in both the peri-implant and/or peridental space
- ENT
- What innervates the tympanic membrane?
- What could decrease the width of the bony external acoustic meatus?
- Cochlear implant (placement)

DRUGS OF ABUSE

- How does drug dependence develop?
- Select the drugs of abuse
- Which dopaminergic pathway (system) is implicated in reward mechanism?
- Which of the following drugs acts via Na⁺ ion channels?

ORTHOPEDICS

- Which diseases belong to the field of Orthopedics?
- What causes club foot?
- Which muscle is implicated in congenital torticollis?
- What is the consequence of the presence of the omovertebral bridge?
- What is the positive effect of wearing the Pavlik harness in case of congenital hip dislocation?
- The most frequent secondary neuromuscular symptoms of cerebral palsy

NEONATOLOGY

- How long is the neonatal period?
- Classification of the neonates according to gestational age.
- How long is lanugo present?
- What is the vernix?
- Typical posture of a term infant (see the table/picture)
- What is the amniotic fluid?
- What causes oligohydramnios?
- What is the function of the surfactant?
- What are the clinical signs of a respiratory distress?
- How does the pulmonary perfusion change immediately after delivery?

NEUROLOGY

- Elements of the peripheral nerves
- Connective tissue layers surrounding a nerve fascicle
- The ratio of fascicles versus connective tissue elements
- Main types of peripheral nerve damage
- Main symptoms of peripheral nerve damage
- Perineurial barrier function
- Which cells play a crucial role in axon regeneration?
- Proximal and distal lesions in the peripheral nerves
- The carpal tunnel syndrome
- Terms in segmental innervation (dermatome, myotome)
- C8-Th1 segmental damage
- Segmental damage at L5

ASSISTED REPRODUCTION

- Definition for infertility
- Prevalence of infertility at 20-24 years of the age
- Etiology of female infertility
- Types of ovulatory infertility
- Reasons for anatomical infertility in females
- Pretesticular causes for male infertility
- Testicular causes for male infertility
- Histerosalpingography (HSG)
- Normal spermiogram
- Azoospermia, oligospermia, etc. (see table)
- Forms of assisted reproduction (in the broad sense)
- Source of therapeutical urogonadotropins
- Which endocrine centres/glands may be implicated in the hormonal treatment of anovulatory infertility?
- When was the 1st test tube baby born (i.e., the 1st successful IVF procedure done)?
- What does ICSI stand for?
- Indications of preimplantation genetic diagnosis
- Success rate of IVF

ANAESTHESIOLOGY

- Who was the first to perform a spinal block?
- Sites of peripheral nerve blockades
- The use of ultrasound guidance in regional anaesthesia
- The benefit of using ultrasound guided regional anaesthesia in pregnant patients
- Peripheral veins used for cannulation
- Central veins used for cannulation
- Anatomical spaces used for the cannulation central veins, venous puncture sites (pictures)
- What is the target system of general anaesthesia?
- What is the result of general anaesthesia in the body?

SURGERY

- Anastomotic connections between the superior and inferior mesenteric arteries
- Types of laparotomy
- Which gas is used for laparoscopy?
- The advantages of laparoscopy over laparotomy
- Walls of the inguinal canal
- What is the use/advantage/disadvantage of peritoneum (if it is a good friend of the surgeon...)
- Consequences of peritoneal adhesions during surgery
- Roux en Y anastomosis
- Define pneumoperitoneum
- Differential diagnosis for appendic

Method and type of evaluation:

The result of the examination (i.e. a practical mark) is calculated on the basis of the scores of the test using a 5 scale grading system. Passing level: 51%

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

To be downloaded from the homepage of the Department of Anatomy, Histology and Embryology (<http://semmelweis.hu/anatomia>) or from Moodle.

ANESTHESIOLOGY AND INTENSIVE THERAPY

Dept. of Anesthesiology and Intensive Therapy

First Semester

Lectures

1. Central venous access and other invasive procedures: indications, performance and pitfalls
2. Advanced cardiac and hemodynamic monitoring. Swan-Ganz catheter, PiCCO, measured and calculated parameters, relevancies (45')
Advanced antiarrhythmic therapy: decision between electric and pharmacological treatment (45')
3. Polytrauma, head trauma, chest trauma
4. Ultrasound: stethoscope of the 21st century (45')
Ultrasound in regional anesthesia (45')
5. Acute pancreatitis (45')
The confused patient: principles of management (45')
6. Pathophysiology of thermoregulation: malignant hyperthermia, NMS, hyper- and hypothermia syndromes, fever in the ICU (45')
Anesthesia for one-day-surgery (45')
7. Principles of antibiotic therapy in the ICU (45')
8. Principles of antibiotic therapy in the ICU (45')
9. Difficult airway management (45')
Special respiratory therapy: high frequency and jet ventilation (45')
10. Organ transplantation. End stage organ failure, long term mechanical support, organ transplantation, donor management
11. (Respiratory) Physiotherapy in the ICU
12. CRM: aviation safety and human factors in healthcare
13. Obstetrical intensive therapy: toxemia, HELLP, Mendelson's syndrome, pulmonary embolisation, amniotic fluid embolisation (35')
Pediatric anesthesia (35')
MCQ test (obligatory!) (20')

Topics may change depending on lecturers' availability.

NEONATOLOGY

Course Director: **Prof. Dr. Istvan Seri**

Second Semester

Credits: 2

Lessons: 28

- Principles of patient care in the NICU
- Resuscitation of the newborn
- Neonatal respiratory pathology: Pathophysiology
- Neonatal respiratory pathology: Diagnosis/Treatment
- Neonatal shock: Diagnosis and treatment
- Complications of severe prematurity: P/IVH & PVL
- Perinatal asphyxia/Neonatal Follow-up
- Congenital heart disease: Diagnosis and treatment
- Surgical conditions of the neonate
- Fluid-electrolyte & acid-base homeostasis
- Neonatal imaging
- Closing Session/Exam

Aim of the subject and its place in the curriculum: The Neonatology Optional coursee introduces basic information on neonatal physiology, pathophysiology and the diagnosis and clinical management of the most common neonatal conditions. The course deepens the knowledgebase of the students in pediatrics in general and neonatology in particular.

Competencies gained upon the successful completion of the subject: Recognition of the most common neonatal conditions based on clinical, laboratory and imaging information and gaining a basic knowledge on neonatal resuscitation.

Prerequisite(s) for admission to the subject: Ongoing enrollment in or completed session of the pediatric curriculum.

Minimum and maximum number of students registering for the course: 8-30

Requirement for acknowledging the semester (signature): Attendance of 60% of lectures.

Type of the examination: Multiple-choice written test exam at the end of the course.

Type and method of grading: Pass (60% of questions correctly answered) or fail (<60% of questions correctly answered) at the final exam. Literature, i.e. printed, electronic and online notes, textbooks, tutorials (URL for online material): Uploaded presentation slides on the university website following the lectures.

COURSE ON HUMAN LACTATION & BREASTFEEDING – THEORY, SUPPORT AND PROMOTION

Credits: 2

Lessons: 28

Requirement: Medical Physiology II.

Academic teachers:

Miklos Szabo MD, PhD, Med Habil Neonatologist, Chief of neonatal services

Erzsébet Várady MD Neonatologist, IBCLC

Background and importance of the topic

Optimal infant feeding is one of the most efficient interventions to improve child health and psychosocial wellbeing of mother and child. The gold standard of infant feeding is exclusive breastfeeding/human milk feeding for the first 6 months and while introducing complementary feeding at around 6 months, continuing breastfeeding at least in the first year of life, preferably until 2 years of age.

To achieve this goal, it is paramount, that *all* health professionals, regardless of their subspecialty are equipped with sufficient knowledge, competence and skills to help families in their decision on infant feeding, establishment, maintenance and support of breastfeeding and treatment of breastfeeding complications. The WHO, UNICEF and the Academy of Breastfeeding Medicine has called for action, that theory and evidence-based practice of breastfeeding should be incorporated into the medical school curricula.

Topics of the 14 session course

1. The importance of breastfeeding/human milk feeding for the child, the mother and the society. Risks of not breastfeeding and less than optimal breastfeeding. Definitions related to breastfeeding. Hungarian data on breastfeeding rates, international goals. Communication skills from the aspect of the breastfeeding mother.
2. Anatomy of the breast, physiology of breastmilk production and secretion. The effect of hormones related to breastfeeding on the mother and child. Delayed lactogenesis II. Mechanism of breastfeeding. Difference in the mechanism of breast and bottle feeding. The changing composition of breastmilk (colostrum, transitional milk, mature milk, change during the day, the breastfeeding session and the course of lactation). Biochemical and immunological properties of breastmilk. Special properties and advantages of breast milk for preterm infants.
3. Breastfeeding positions, latching on the breast, milk transfer. Signs of good latch and suckling. Breastfeeding observation. Signs, that breastfeeding is going well. Special issues about the support of mothers after caesarean section. Physiological parameters of breastmilk intake and elimination (stool, urine) during the first week of life. The normal course of breastfeeding during the first year of life. Normal weight gain of the breastfed infant. Continuing breastfeeding after the introduction of complementary feeding. Long term breastfeeding (in the second year).
4. Baby-friendly Hospital Initiative – Ten steps to successful breastfeeding. Supporting breastfeeding after hospital discharge – the role of health professionals, family, community.
5. The golden hour – skin to skin (S2S) contact between mother and infant immediately after birth. Facilitation of S2S care in the delivery room or operating room. Beneficial effects and safety issues. Observation during the golden hour. Sudden unexpected postnatal collapse (SUPC) – risk factors, prevention.
6. Responsive feeding and care – importance and practice. Rooming-in (couplet) care in birthing facilities. Safe sleeping after discharge home.
7. Consultation, in small groups and elaboration of homework mini reviews.
8. Family-friendly maternity care. International Childbirth Initiative. Non-pharmacological pain management during childbirth. Impact of intrapartum procedures and medications on breastfeeding and lactation. Support of mothers after caesarean section.
9. Biological, sociological, psychological and cultural aspects of breastfeeding. Breastfeeding protection. International Code of Marketing Breastmilk Substitutes (The Code).
10. Contraindications to breastfeeding/human milk feeding. Conditions and illnesses of concern. Breastfeeding and drugs. Evidence-based resources on drugs for the lactating mother. Caffeine, alcohol consumption, and smoking of the breastfeeding mother. Acceptable medical reasons for supplementing breastfeeding. Breastfeeding-friendly methods of supplementation. At breast supplementers. Nipple shields. Pacifiers- pros and cons.
11. Obtaining medical and feeding history. Breastfeeding-related examination of the mother and child. Common breastfeeding problems (engorgement, mastitis, flat, inverted, painful, cracked nipples, breast edema, not enough breastmilk, jaundice, etc.). Prevention and treatment.

12. Maintenance of lactation during separation (illness, returning to employment/school). Methods of breast milk expression (hand expression, using breast pump, “hands on pumping”, “power pumping”). Cleaning breast pump kits and infant feeding items. Handling and storage of breastmilk.
13. Preparing to breastfeed during pregnancy. Topics to share with the mother (individual counseling by health professional and breastfeeding class). Contraception for the breastfeeding mother. Lactation amenorrhea method – conditions of efficacy. Other methods of contraception suitable for the breastfeeding mother. Advise on interpregnancy interval. Breastfeeding during pregnancy and tandem breastfeeding.
14. Consultation, in small groups and elaboration of homework mini reviews and virtual practical session: online participation in streaming of lactation consultation with patients

Aim of the course: the student acquires the following theory and practice-based competencies:

Theory based competencies

1.	Knowledge about the basic anatomy (normal and pathological) and physiology (including hormones related to breastfeeding) of the breast and the mechanism of breast milk production and secretion.
2.	Describe contraception related to breastfeeding.
3.	Describe the mechanism of sucking on the breast and compare the mechanism of breast and bottle feeding.
4.	Understand, what is the role of breastfeeding and human milk feeding in maintaining health and prevention of illnesses in the mother and child and the potential problems related to artificial (formula) feeding.
5.	Understand, why exclusive breastfeeding is important and what is its association with optimal health outcome.
6.	Understand the advantages of S2S contact immediately after birth. Describes preventive measures for SUPC.
7.	Knowledge about the existence and aims of the Code (International Code on Marketing Breast milk Substitutes).
8.	Knowledge about potentially adverse outcomes of the infant, mother and society in those cases, when the infant is not breastfeeding.
9.	Understand the meaning of the Baby-friendly Hospital Initiative 10 steps.
10.	Understand the possible impact of medical interventions and drugs during labor and childbirth on the outcome of breastfeeding. The student is aware of it, how to support the mother in breastfeeding after caesarean section.
11.	Understand the role of behavioral, social, cultural and environmental factors in the breastfeeding-related decision and practice.
12.	Knowledge about the evidence-based contraindications of breastfeeding/human milk feeding.

Skill based competencies

1.	Obtain detailed breastfeeding history and perform breastfeeding-related examination of the breast.
2.	Describe the effect of intrapartum interventions and drugs on breastfeeding. Advise the mother on breastfeeding after caesarean section.
3.	Facilitation and support of the golden hour.
4.	Recognize the correct position, attachment on the breast, the signs of milk transfer and can suggest corrections, if needed.
5.	Counsel mothers about establishing and maintaining lactation in case of separation (illness, returning to school/employment).
6.	Counsel mothers on the normal course of lactation and on the prevention of potential complications (not enough breast milk, painful nipple, jaundice, etc.).
7.	Discuss family planning options with the breastfeeding mother.
8.	Describe signs of adequate milk intake by the infant and guide the mother, in case she has the perception not to have enough milk.
9.	Understand the need to encourage the mother to breastfeed after introduction of complementary feeding and after one year of age.
10.	Understand the normal growth pattern of the breastfed infant.
11.	Discuss with the pregnant women the beneficial effects of breastfeeding for baby and mother, share with her information on the expected care in the birthing facility and give practical advice on breastfeeding.
12.	Explain, why is the Code protecting breastfeeding and how to follow the Code in the birthing facility.

Exam:**Written – Test****Grading:**

88 % – 100 % Excellent

76 % – 87 % Good

64 % – 75 % Satisfactory

51 % – 63 % Pass

Under 51% – Fail

We intend to check the efficacy of the course with pre and posttest.

Resources:

1. Meek, J. Y., & Academy of Breastfeeding Medicine. (2019). Educational objectives and skills for the physician with respect to breastfeeding, Revised 2018. *Breastfeeding Medicine*, 14(1), 5-13.
2. WHO. (2009). Infant and young child feeding. Model Chapter for textbooks for medical students and allied health professionals.
3. Gary, A. J., Birmingham, E. E., & Jones, L. B. (2017). Improving breastfeeding medicine in undergraduate medical education: A student survey and extensive curriculum review with suggestions for improvement. *Education for Health*, 30(2), 163.
4. Wambach, K., & Riordan, J. (Eds.). (2016). *Breastfeeding and human lactation*. 5th ed. Jones & Bartlett Learning. Magyar fordításban: Szoptatás és humán laktáció, Semmelweis Kiadó, 2019

OBSTETRICS GENETICS, PRENATAL DIAGNOSIS

Second Semester

Course director, Lecturer: **Dr. Artúr Beke PhD Med. habil**

Department: First Department of Obstetrics and Gynecology

Prerequisite: Completion of second year

Subject type: optional course

Study time: In every week 2x45 minutes. Advised Semester: between 5. and 12. Semester

Exam: Written test and practical note

Credit: 2

Minimal/maximal participants: (5/30 person)

The knowledge acquired during the successful completion of the basic theoretical subjects (medical biology, genetics and genomics, physiology) can be applied in practice by medical students as knowledge that can be utilized in the clinical practice.

Lectures:

- Teratogenic risks and their prevention I. (biological agents - intrauterine infections)
- Teratogenic risks and their prevention II. (physical and chemical agents - maternal disease, medication)
- Risk of fetal minor anomalies and chromosomal abnormalities; Examination of fetal chromosome abnormalities
- Genetic counseling during pregnancy
- Effectiveness of ultrasound examinations in the detection of fetal malformations I. (Craniospinal, Craniofacial, Cardiovascular, and Other Chest Disorders)
- Effectiveness of ultrasound examinations in the detection of fetal malformations II. (Abdominal and Abdominal Disorders, Urogenital Disorders, Limb Disorders, Bone Disorders)
- New opportunities and challenges in prenatal diagnostics
- Communication during obstetric genetic counseling, psychological aspects
- Ethical issues in obstetric genetic care. Consultation

Practices:

- Genetic counseling, genetic diagnostics -Supervisor: Dr. Artúr Beke

ASSISTANT REPRODUCTION

Second Semester

Course director, Lecturer: **Prof. Urbancsek János MD PhD DSc**

Department: First Department of Obstetrics and Gynecology

Prerequisite: Completion of second year

Subject type: optional course

Study time: In every second week 2x45 minutes. Advised Semester: between 5. and 12. Semester

Exam: Oral examination

Credit: 2

Minimal/maximal participants: (10/100 person)

Introduction into the field of human assisted reproduction, which is one of the most quickly and extensively developing field of medicine.

Lectures

- Introduction in the field of assisted reproduction.
- Physiology of the menstrual cycle.
- Pathophysiology of the menstrual cycle.
- Diagnosis of infertility.
- Treatment of infertility I.: Ovulation induction, intrauterine insemination, operative treatment.
- Treatment of infertility: in vitro fertilization.
- Embryological aspects of in vitro fertilization
- New and alternative methods of in vitro fertilization.

Practical lessons:

- According to the topic of the lectures with presentation of the same lecturers given above.

CLINICAL EMBRYOLOGY

Second Semester

Course coordinator: **Dr. Péter Fancsovits PhD Med. habil**

Department: First Department of Obstetrics and Gynecology

Prerequisite: Completion of second year

Subject type: optional course

Study time: In every second week 2x45 minutes. Advised Semester: between 5. and 12. Semester

Exam: Written test and practical note

Credit: 2

Minimal/maximal participants: (10/80 person)

Infertility treatment have evolved extremely fast over the past 30 years. This is particularly the case regarding the improvement of the laboratory methods and new procedures to be established. The new discipline clinical embryology which includes the laboratory methods for assisted reproduction and the understanding of its biological and technical background, has been established for the purpose of ensuring the laboratory background for infertility treatment. This new scientific field has been found at the borderline between biology and medicine, therefore the subject for clinical embryology - with the objective of presenting new research findings for this theme - may be of interest to students for medicine, biology, medical biotechnology, agricultural biotechnology and bioengineering as well. The educational aim of this subject is to gain expanded competencies in the topic of reproductive biology including the processes of arising of male/female gametes, insemination, development of early embryos and implantation. Students may become familiar with the biological and laboratory background of different methods for interventions in assisted reproductive technology. They develop new knowledge about the possibilities of cryopreservation of gametes and embryos before implantation, moreover the methods of genetic testing which can be carried out on gametes or embryos. It may allow students to have access to more important research directions of clinical embryology, to the chance of application for animal biotechnology or other medical use. The students of this subject may obtain overviews about the medical-, bioethical issues in connection with applying the methods of clinical embryology.

Lectures:

- Introduction to clinical embryology and history of assisted reproduction
- Gametogenesis, cell proliferation, process of fertilisation, review of cell biological and physiological basics
- Examination and treatment of female infertility
- Sampling and handling of gametes. Oocyte retrieval, identification and maturation; examination of egg quality. Semen analysis and process
- Laboratory methods of in vitro fertilization
- Traditional in vitro fertilisation (IVF), intracytoplasmic sperm injection (ICSI), fertilisation with surgically extracted spermatozoa from the tissue of testicle – testicular sperm extraction (TESE); the role of the micromanipulation in the clinical embryology. Evaluation of fertilisation
- Embryo culture, assessment of viability of cleaving embryos, embryo selection for transfer
- Use of artificial intelligence in assisted reproduction
- Quality assurance for Embryology Laboratory, investigation of effectiveness of laboratory work

- Cryopreservation of gametes and embryos. Use of donated gametes
- Fertility preservation strategies for patients under treatment of cancer diseases
- Preimplantation genetic diagnosis
- Ethical issues in connection with clinical embryology

Practical course:

- Examination and preparation of semen samples
- Fertilisation of oocytes
- Observation of embryo development, assessment of embryo viability
- Cryopreservation of gametes and embryos

CLINICAL ENDOCRINOLOGY

2nd Department of Internal Medicine

Second Semester

Lectures

- Introduction to clinical endocrinology. Case Presentations.
- Use of hormone measurements in the diagnosis of endocrine diseases.
- Molecular genetics of endocrine diseases.
- Radiological imaging methods of endocrine organs.
- New developments in surgical treatment of endocrine tumors.
- Case presentations: pituitary gland disorders.
- Case presentations: adrenal gland disorders.
- Case presentations: thyroid gland disorders.
- Case presentations: parathyroid gland disorders.
- Sex determination and its disorders.
- Hormone-replacement therapy
- Inherited disorders presenting with endocrine tumors.
- Osteoporosis.
- Endocrine hypertension.

EMERGENCY IN SURGERY

Course Director: **Prof. Dr. Pál Ondrejka**

Second Semester

Purpose of the subject: In the practice of surgery is very important the early detection of emergency cases. For this reason the collaboration with the representatives of other medical professions is indispensable. The goal of our lectures is to present the appropriate procedures of physical examination, laboratory and radiological findings in order to recognize the correct diagnosis; to know what is necessary, **what is possible and what is enough** to do in a case of surgical emergency; when to ask for a consultation for adequate therapy.

The inborn errors, injuries, inflammations and tumors of the organs are also presented. In order to make the lectures more interesting we are going to review the relevant episodes in history of medicine and final arts.

Main topics:

- Introduction, life threatening disorders in surgery, emergency in gastrointestinal surgery,
- acut abdomen.
- Gastric, duodenal, small bowel emergencies.
- Peritonitis acuta.
- Abdominal trauma.
- Surgery of the wound, infections, anaerob infections in surgery (MRSA, Furnier, tetanus, anaerob)
- Small bowel obstruction, large bowel obstruction.
- Esophageal emergencies.
- Biliary emergencies.
- Complications of peptic ulcer.
- Gastrointestinal bleeding.
- Pancreatitis acuta.
- Pancreatitis chronica.
- Appendicitis, diverticulitis, sigmoiditis, typhlitis.
- Surgical intections.

Minimum 80% attendance rate for getting the signature is obligatory.

CLINICAL HEMATOLOGY

2nd Dept. of Internal Medicine

Course Director: **Prof. Dr. Tamás Masszi**

Second Semester

Topics of interest in the field of hematology, state of the art of various hematological and hemato-oncologic diseases

2 hours per week

Main topics:

1. Place and significance of hematology. Normal blood production, basics of hematologic diagnosis.
2. Classification of anemias, diagnosis.
3. Myelodysplastic syndromes.
4. Diagnosis and treatment of acute leukemias.
5. Acute leukemias of the childhood.
6. Classification and treatment of lymphomas I.
7. Classification and treatment of lymphomas II.
8. Clinical picture and diagnosis of hemorrhagic diatheses.
Prophylaxis and treatment of venous thrombosis.
9. Gastroenterological complications of hematological diseases.
10. Dermatologic manifestations of hematological diseases and hematological symptoms of dermatologic diseases.
11. Immunocytopenias.
12. Hematological emergencies.
13. Stemcell transplantation.
14. Infectious complications of hematological diseases

HISTORY OF MEDICINE

Institute of Public Health

Lecturer: *Dr. Fazekas-Pongor Vince*

The history of medical science, considered as a part of the general history of civilization. The study of the history of medicine helps us to describe and understand how people in different times and cultures experienced and dealt with these fundamentals of human existence. This knowledge can inform debate about the present and the future, and help to bring medicine and science to a wide audience. All human societies have medical beliefs that provide explanations for birth, death, and disease. Many cultures in ancient times treated illnesses with magic and herbal remedies. Ancient Egyptians thought that their gods healed them. The ancient Greeks pursued medicine as a science. Hippocrates, the most famous physician of the time (c. 400 B.C.), believed that diseases had natural causes, not supernatural ones. By the Middle Ages, Europe was hit with a terrible epidemic that killed millions of people called the plague, or Black Death. The Renaissance marked a new period of interest in art and science throughout Europe. Despite new medical discoveries, many doctors still practiced old ways. Most sick people could not afford to see a trained physician. Instead, they consulted midwives who assisted with childbirths and made herbal remedies to treat illnesses. Minor surgeries were not done in the hospital but at the local barbershop. Medical research and training improved in the 18th century but there were still no cures for diseases like smallpox, a disease that killed millions of people over thousands of years. Middle Eastern doctors gave people mild doses of the smallpox to combat the disease. The portrayal of the history of medicine becomes more difficult in the 19th century. Discoveries multiply, and the number of eminent doctors is so great that the history is apt to become a series of biographies. Nevertheless, it is possible to discern the leading trends in modern medical thought. In the beginning of 20th century the research and technology have expanded medical knowledge and improved medical practices like surgery. Today, doctors are able to perform less invasive surgical procedures. The science of medicine has progressed dramatically in just the last 50 years. Career opportunities in health care have also expanded. There is a need for more skilled medical professionals, not only in hospitals, but in dentist and doctors' offices, research labs, rehabilitation centres, mental health clinics, nursing homes and even schools.

Topics/week

1. **Introduction. What is Medicine? Methods and sources of Medical History. The birth of paleomedicine (bones teeth, mummies). Prehistoric medicine. Far East.**
2. **Far East Medicine. Chinese civilization, Japan, India.**
3. **Medicine of ancient civilizations, rivers valley's culture: Mesopotamia, Egypt, and the medicine knowledge. Medicine - in the Bible time - Heritage of the empirical knowledge. Practitioners. Theories of diseases.**
4. **Greco-Roman Medicine. Homeric medicine. Asclepius, Hippocrates. Corpus Hippocraticum- the concept and doctrine of his theories about the nature and diseases (the four humors). The Oath. Hygiene and health education. Post-Hippocratic schools – the golden heritage in the school of Alexandria. The roman physicians, diseases. Advance of public health. Water supply and sanitation, climate, soil and health, diseases, endemics. The workers' health, provision of medical care. (Celsus, Galenus)**
5. **Medieval medicine. Byzantine Healers, Arabian Hakims, Monks, Crusaders and medieval „doctors.“ The Arabian medicine: chemistry, pharmacy, hospitals. Razes, Avicenna, Abulcasis. The medieval Monasteries (Monte Cassino). The growth of European cities, sanitary problems of urban life. The first religious medical school in Salerno. Medieval Universities, medical humanists, and Christian caritas.**
6. **Medicine in the Renaissance. The Arts and the humanism. The new mentality of medicine: Paracelsus. The revolution of anatomy: Vesalius and his contemporaries. The first step toward the specialization. Botany and mineralogy. The printing of book's role in medicine. Foundation of the administration of Public Health. Epidemic diseases: communicable and non-communicable diseases. Theories, therapies, and medical care, hospital. Quarantine.**
7. **Experimenters, Teachers and Theoreticians in the Sixteenth and Seventeenth Centuries. Body as machine -old schools: iatrochemical, iatrophysical theories. New schools: animism, tonus, vitalism, stimulation, homeopathy. The circulation of the blood. Harvey's methodology Malpighi. Microscopy. Birth of modern clinical medicine: Sydenham. Boerhaave and his pupils.**
8. **Industrialism in the Eighteenth Century. Clinical medicine- schools of clinical (French, English, German, and Habsburg). The first Vienna School: van Swieten. surgery (Hunter, Valsalva), pathology (Morgagni, Bichat). Public health and hygiene. Occupational health, prison reform, general health (death rate, statistics), Ramazzini, Frank. Smallpox. Infant mortality. Nursing, dispensaries and hospitals, development of obstetrics. Sanitary conditions – filthy towns.**

9. **Clinical medicine in the second half of the nineteenth Century. Bacteriology a new science in medicine. Revolution, concepts and theories under the microscope. New discoveries Pasteur, Koch. Social revolution, industrialism, public health. National and international movements and health reforms, and medical care. Period of great epidemics. International health organization. The Red Cross.**
10. **Development of surgery and gynaecology. The man-midwife (Smellie, Hunter), History of anaesthesia. General and local possibilities. Wells, Morton, Simpson, Jackson). Asepsis and antisepsis. Early efforts to develop aseptic techniques. Semmelweis, Lister. Progress in surgery, Billroth. Cholecystostomy, appendectomies.**
11. **Emergence of specialism. Logical outgrowth of locality pathology, new instruments. Initially the medical professions: Paediatrics, Psychotherapy, Ophthalmology, Otology, Rhinology and Laryngologist, Dentistry, Neurology and Psychiatry, Dermatology and Venerology.**
12. **From the black death to the AIDS. The history of epidemics. The theories and therapies. Tropical medicine. The development of epidemics, the bacteriology and immunology. The new medicaments. Ehrlich and the chemotherapy, sulphonamides, antibiotics. Virology. Salk and Sabin. New diseases and screenings methods.**
13. **Consultation**

Important: 3 absences are allowed. Doctor's certificate is required to certify absence from the exam.

Exam requirement: written test

Textbook:

Chrestomathy on the History of Medicine. Ed. Dr. Forrai J., Dr. Ballér P., Budapest, 1992. SOTE

CLINICAL CARDIOVASCULAR PHYSIOLOGY

Optional course for medical students in the 3rd, 4th and 5th years.

The purposes of the course:

- To refresh and extend – in selected topics – the basic knowledge related to normal and pathological functions of the human circulatory system
- To integrate the latest scientific results related to different organization levels – from molecular physiology to system physiology – of the cardiovascular system.
- To discuss and demonstrate measurement principles and techniques, as well as physiological and pathophysiological mechanisms related to the application of modern non-invasive cardiovascular diagnostic procedures in the clinical practice.

Program:

1. **Investigation of blood pressure regulation by use of transgenic technologies**
2. **Complement-related immunological and cardiopulmonary responses (CARPA). Modern methods for measuring and monitoring arterial blood pressure**
3. **Hemodynamic background of normal and pathological cardiovascular functions**
4. **Pathophysiology of chronic venous insufficiency**
5. **Physiological mechanisms supporting venous return of blood; orthostatic tolerance**
6. **Recent results in control of cerebral blood supply, physiological and clinical aspects**
7. Clinical physiology of the microcirculation
8. Interventional radiological procedures on arteries and veins
9. Age related changes in the vascular system, role of sexual hormones
10. Role of endothelial mechanisms in clinical symptoms
11. The cardiovascular risk and the protection of menopausal women. Coronary circulation
12. Biomechanical properties of cerebral aneurisms, their computer modeling
13. Visit to the MRI cardiovascular diagnostic unit of the Semmelweis University Heart Center
14. **Ultrasonic investigation of the human heart: theoretical background; 2D-, M-, Doppler-mode, color Doppler imaging, echocardiography; diagnostics of valve insufficiency and coronary diseases. Duplex ultrasonic investigation of large vessel function: measurement of vessel wall elasticity, Doppler-indexes**

Students who meet the following criteria will receive 2 credit points: regular attendance of classes and successful written exam. Material for the exam includes lecture topics and textbooks suggested by the lecturers.

CARDIORESPIRATORIC AND NEUROPHYSIOLOGICAL MEASURING METHODS

Optional course for medical students in the 3-6th years

Course director: *Dr. Habil. László Dézsi*, Private Professor of Physiology, Semmelweis University

The purpose of the course: To review the theory and practice of modern measuring methods in experimental and clinical medicine, and providing practical knowledge to medical students on cardiorespiratoric and neurophysiological measurements. The course is based on but further extends the material delivered during the course of Medical physiology. Throughout the lectures we put an emphasis on potential methodological errors of measurements and examinations, as well as how to avoid them.

Detailed Program:

1. **Introduction. Biomedical engineering. Design and safety requirements of biomedical equipments**
2. **Computerized data acquisition and analysis. Telemetry systems**
3. **General metrology. Basics of measurement and control theory**
4. **Home monitoring of cardiovascular health status. Determination of blood glucose and tissue glucose concentrations**
5. **Sampling of continuous signals. Digitizing analogue signals**
6. **Direct and indirect methods to determine cardiac output and peripheral blood flow**
7. **Experimental study of pulmonary function. Measurements of blood gases and the acid-base balance.**
8. **Significance of objective studies in the practice of audiology. Neurophysiological measurements (action potentials, brain stem evoked potentials)**
9. **Investigation of adaptive processes in the cardiovascular system. Investigative methods of experimental angiology**
10. **Measuring blood pressure in the lab and clinics (invasive and noninvasive methods)**
11. **Complement-related immunological and cardiopulmonary responses**
12. **Studying brain function by functional imaging systems**
13. **Experimental methods to study nociception**
14. **Investigating the electrical activity of the heart. Design of ECG amplifiers**

Acknowledgement of the course: Prerequisite of the course is the completion of the first 2 years (Theoretical module). Regular attendance (maximum 3 absences) is required. Signature in the Index and 2 credit points will be awarded after successful exam. Source: material of the lectures, supplementary literature will be provided by the lecturers.

Applications: via Neptun system. Contact person: *Dr. László Dézsi* (e-mail: dezsi.laszlo@richter.hu; phone: 06-1-431-4823; phone/fax: 06-72-536-019). The application of min. 5 students is required.

CLINICAL PHYSIOLOGY OF RESPIRATION AND RESPIRATORY DISEASES

Optional course for medical students in the 3rd, 4th and 5th years.

The aims of the course are to strengthen knowledge on basic physiological principles related to respiration, summarize the most important aspects of cardiorespiratory adaptation in sport activities and also its changes in respiratory diseases and to provide integrated information about the physiological and pathophysiological background of the most important respiratory disorders in light of results from cutting edge research.

Program:

- 1. Physiological function of the respiratory system**
- 2. Smoking, e-cigs, supporting cessation**
- 3. Lung development**
- 4. Inhalation therapy**
- 5. Sleep related respiratory disorders.**
- 6. COPD and COPD exacerbation**
- 7. The lung in systemic diseases**
- 8. Cystic fibrosis**
- 9. Pulmonary circulation**
- 10. Bronchoscopy**
- 11. Cardiovascular exercise testing, COPD**
- 12. Asthma bronchiale**
- 13. Non-invasive ventilation**
- 14. Chest imaging**

Acknowledgement of the course: regular attendance (maximum 3 absences) is required; signature in the Index, and 2 credit points will be provided

MEDICINAL, EPIDEMIOLOGICAL, AND SOCIAL ASPECTS OF DRUG ABUSE**Department of Pharmacology and Pharmacotherapy**Course director: *Prof. Dr. Susanna Fürst***Second semester****Credit: 2****Topics:**

- **Introduction, general concepts.** Non-medical use of drugs. Drugs of abuse. Classification of scheduled drugs under WHO control. Vulnerability. Tolerance, physical and psychological dependence. Molecular basis of drug addiction.
- **Opioids.** Pharmacological action of opioid agonists and antagonists. Opioid receptors, endogenous ligands. Characteristics of opioid dependence.
- **Psychomotor stimulants.** Pharmacological action of amphetamine, its derivatives (methamphetamine, MDMA-“Ecstasy”, etc.) and cocaine. Role of the dopaminergic transmission in the drug abuse.
- **Hallucinogens. Ethanol.** Pharmacological action of hallucinogens, (LSD, mescaline, phencyclidine, etc.). Role of the serotonergic transmission in hallucination. Characteristics of ethanol dependence.
- **Marihuana (hasis, THC)** Pharmacological action of cannabinoids. Cannabinoid receptors and their endogenous ligands.
- **Sedative-hypnotics.** Pharmacological action of benzodiazepines, barbiturates, other sedative-hypnotics. Characteristics of prescription drug dependence. Polydrug-abuse.
- **Epidemiological data.** Significance of epidemiological data collection. Forms of questionnaires. Tendency of drug abuse, national (Hungarian) and international data. High risk groups.
- **Pharmacological treatment.** Traditional medicinal treatment and new methods. Medical treatment of withdrawal symptoms, replacement therapy. Treatment of overdose. Prevention of relapse.
- **Psychotherapy.** Individual and group therapy. The problems of long-term rehabilitation. Counselling.
- **Drug abuse and society.** Legal issues. Statutory rules and regulations. Human rights.
- **Role of public and civil rystalline.** Role, task and potential of governmental and non-governmental rystalline in the prevention of drug abuse.
- **Detection of drug consumption.** Laboratory analysis of blood and urinary samples. The role of objective laboratory control in prevention and reduction of drug abuse.
- **Prevention and harm-reduction.** Primary, secondary and tertiary prevention. Demand-reduction and harm-reduction. Early recognition. Rehabilitation, social reintegration.
- **Psychosocial questions of drug abuse.** Psychosocial aspects. Self-destructive attitudes. Psychological and social background. Role, task and possibilities of the medical doctor.

Absence: Maximum number of absences is 25 percent of the lectures in the semester**Absence justification: Medical certificate is accepted****There is no midterm****Requirement: Participation at the lectures****Evaluation: On the base of the scores of the written test****Exam: written test****The written test is on the last lecture, registration has to be done through the NEPTUN system****How to modify the exam date: Personal discussion for another appointment****Exam absence justification: Medical certificate is accepted**

BASICS OF FAMILY MEDICINE

Department of Family Medicine

Director: **Dr. Péter Torzsa**

Family medicine as a speciality

Past and present of family medicine in Hungary

Daily routine of family doctor

Dr. Kalabay László

Doctor-patient relationship in family practices. Communication skills

Dr. Torzsa Péter

Emergency care in family practice

Dr. Szabó János

Cardiology and prevention in family practice

Dr. Simon Judit

Diabetes mellitus in family practice

Optimal treatment of diabetes mellitus

Dr. Dani Vilmos

Prevention program in family practice

Optimal treatment of hypertension

Dr. Torzsa Péter

Primary care in cities

Dr. Torzsa Péter

Primary care in the countryside

Dr. Szabó János

Care of gipsy patients

Dr. Horváth Péter

Medical ethics and law

Dr. Vajer Péter

Continuing home care

Rehabilitation

Terminal illnesses

Summary

Prof. Dr. László Kalabay

Dr. Péter Torzsa

HISTORY OF THE MEDICAL PROFESSIONALISM

Lecturer: **Dr. Péter Balázs**

Class Sessions: Medical professionalism as an ethical norm is an ancient behavioural pattern and theoretical construction alike based on sacral calling. Consequently, roots of the modern professional mythology may be traced back to the late Neolithic age, but the whole framework was systematized **first** in the old Egyptian and Mesopotamian culture. Since the Hippocratic **era**, the medicine was based on teachings of natural sciences and the Middle Age **joined** the medicine **to the university faculties**, but only the Enlightenment provided **first** the social environment for a de-sacralized professionalism, nevertheless it **copied *mutatis mutandis*** exactly the ancient religious patterns. General part of the topic is concerning the onset of professionalism while discussing different manifestations and transitions related to ideologies, socio-economic circumstances and scientific teachings from the Neolithic age down to the latest market economies. Specific part demonstrates milestones and historic ages, which were decisive in this proceeding: Old Egypt, Mesopotamia, old age Judaism, early and consolidated Christianity, impact of Islam on Europe, Reformation of the Roman Catholic church, Enlightenment, the Communist ideology and the social market economy.

Attendance at lectures, options for additional lectures:

Basic requirement: attendance at 8 sessions. In case of ***vis maior*** non-attendance of more students at a specific session, additional lecture is available.

Justification for non-attendance at lectures

Up to 2 sessions no need for any **certificates**, **missing** more than 3 sessions, **means automatic dropping from** the course.

Justification for non-attendance at the exam

Irrelevant item as the exam is writing an 2000 words essay or holding a 10 minutes presentation during the classes.

Control of knowledge acquired within the time-frame of sessions

No control during the session period

Requirements for confirming the session attendance

Attendance sheet has to be signed at all sessions.

Preliminary and final marks

There are no preliminary marks only final marks at the end of the course.

Type of exam

There are two options

- 1) **2,000 words essay sent to lecturer by the last teaching day of the semester.**
- 2) **Short oral presentation (10 minutes) held during the last 3 sessions of the course.**

Entering for examination

There is no need to register for exam in the Student Administration System (NEPTUN)

Modification of data entered for examination

There is no need to register for exam in the Student Administration System (NEPTUN)

Justification for non-attendance at the exam

Irrelevant because of type of exams detailed above.

Note on readings

Basic course information is available as ppt-file for all attending students together with links of suggested electronic sources via Internet.

HEALTH INFORMATICS**Institute of Digital Health Sciences****Credit:** 2**Lecture:** 2 hours/week

Themes	
1.	Classification and Coding Systems
2.	ICD-10 Coding System
3.	Electronic patient's Record
4.	Electronic patient's Record
5.	DRG System
6.	Hospital Information Systems
7.	WEB 2.0
8.	WEB 2.0 Solutions in Health Care
9.	Introduction to Health Databases
10.	Oncology Database
11.	Evaluation of Country data. Presentation
12.	Evaluation of Aggregated data
13.	Principles of Documentation Making
14.	Documentation of Breast cancer: case study
	Self work: Stomach Cancer Documentation (data collection, evaluating, presentation, documentation) Deadline: half semester. Sending: via Internet

JEWISH MEDICAL ETHICS I - II.**Institute of Behavioral Sciences**

Course Director: **Rabbi Baruch Oberlander**

Credit: 4 credits (2 credits for each semester; I and II)

Attendance at 75% of lectures is obligatory. Missed lectures cannot be made up for. In case of missing more than 25% of lectures (3 lectures) a note from a healthcare professional is required.

Semester grade requirement: A written report (paper) based on list of topics and recommended reading material.

Successful completion of semester I is the prerequisite of signing up for semester II.

Obligatory: Handouts given during lectures

Recommended: Dr. Avraham Steinberg (Translated by Dr. Fred Rosner): *Encyclopedia of Jewish Medical Ethics*, Feldheim Publishers, Jerusalem-New York, 1988, ISBN: 1-58330-592-0

Fred Rosner: *Pioneers in Jewish Medical Ethics*, Jason Aronson, New Jersey, 1997

Fred Rosner: *Medicine in the Bible and the Talmud: Selections from Classical Jewish Sources*, Ktav Publishing House, New York 1977

Rabbi Moshe Tendler–Fred Rosner: *Practical Medical Halachah*, Association of Orthodox Jewish Scientists, New Jersey 1990

David J. Bleich: *Judaism and Healing: Halakhic Perspectives*, Ktav Publishing House, New York 1981

Faitel Levin: *Halacha, medical science, and technology: Perspectives on contemporary Halacha issues*, Maznaim Publishing Corporation, New York-Jerusalem, 1987

Fred Rosner: *Medicine and Jewish Law II*, Jason Aronson, New Jersey, 1993

Semester I.

- 1-2. Lecture: The religious orders and the duty of saving a life
- 3-4. Lecture: Doctors and God – The function of healing and prayer in Jewish ethics
- 5-6. Lecture: Euthanasia – The questions of death and dying in society
- 7-8. Lecture: Smoking and use of light drugs from the aspect of Judaism
- 9-10. Lecture: Medical malpractice in the light of Jewish law and ethics
- 11-12. Lecture: The possibilities for artificial insemination in Jewish law
- 13-14. Lecture: The advantages, disadvantages and conditions of cloning

Semester II.

- 1-2. Lecture: Genetics and Jewish law – What rights do we have over our gene pool?
- 3-4. Lecture: Genetics and Jewish law – The problem of the gene manipulated food products
- 5-6. Lecture: Siamese twins – The question of valuation between two living persons
- 7-8. Lecture: Parasolvency – What is the best method to compensate the doctor?
- 9-10. Lecture: Contraception in Jewish law
- 11-12. Lecture: Permitted and prohibited methods of organ transplantation
- 13-14. Lecture: The questions of DNA identification in Jewish law

CLINICAL ONCOLOGY

– elective for students in the 4th and 5th year

Course Director: **Prof. Dr. Zsolt Tulassay**

2 hours/week, 2 credits

2nd Department of Internal Medicine

- Basic principles of clinical application of chemotherapy, principles of immunotherapy and endocrine therapy.
- Cancer prevention: tobacco dependence and its treatment, chemoprevention, role of surgery in cancer prevention.
- Cancer screening: principles, gastrointestinal, gynecologic, breast, lung.
- Specialized techniques in cancer management: vascular access, interventional radiology, RFA photodynamic therapy, molecular imaging and functional imaging of cancer.
- Cancer of head and neck: molecular epidemiology, treatment and rehabilitation.
- Cancer of the lung: molecular biology, NSCLC, SCLC.
- Cancer of esophagus and stomach: stage directed multimodality treatment.
- Pancreatic cancer: clinical presentation, evaluation, treatment of resectable and advanced diseases.
- Cancer of the liver: etiology, screening populations, clinical management, systemic therapy, regional therapy, radiotherapy.
- Colorectal cancer: molecular biology, screening, staging and prognosis, stage dependent treatment of colon cancer, combined modality treatment of rectal cancer.
- Kidney cancer: molecular biology of cancer, histologic types, localized and metastatic kidney cancer.
- Cancer of the breast: molecular biology, risk factors, diagnosis, prognostic and predictive factors, multimodality primary adjuvant treatment.
- Cancer of unknown primary site: histologic types of CUPS, management of CUPS.
- Immunosuppression related malignancies: AIDS, transplantation, chemotherapy.

The lecturers of the elective are the oncologists of Semmelweis University.

ORGAN TRANSPLANTATION

First Semester

Department: Faculty of Medicine, Department of Transplantation and Surgery

Time: 14x90 minutes

For semesters: 7, 9

Type of exam: written

Credits: 2

Minimum/maximum number of students: 20/140

Course thematics:

1. Introduction - History, Terminology, Organ Donation
2. Pediatric Kidney Transplantation
3. Histocompatibility, Immunologic Aspects and Immunosuppression
4. Kidney Transplantation Indication, Operation, Results, Complications
5. Liver Transplantation
6. Pediatric Liver Transplantation, Hepatocyte Transplantation
7. Follow-up of the Transplant Patient
8. Small Bowel and Multiorgan Transplantation
9. Pancreas and Islet Cell Transplantation
10. Lung Transplantation
11. Heart Transplantation
12. Radiological Aspects of Transplantation
13. Ethics of Transplantation - Case reports
14. Terminal Examination

Sign up: through the Neptun system

Deadline of sign up: September 1

INFLAMMATION BIOLOGY

Department of Genetics, Cell and Immunobiology

Course director: **A. Kristóf Fülöp**, PhD

Prerequisite subject: Immunology, Molecular Cell Biology II.

Credits: 2

In Every Second Academic Year

Lectures (2 hours per week):

- The place of inflammatory processes in the immune response and in the health science
- Molecular mechanisms in the induction of acute inflammation
- Inflammatory cells I.
- Inflammatory cells II.
- Chemotaxis and chemokines in the inflammation
- The systemic acute phase reaction and the termination of inflammation
- Histaminology
- The systemic inflammation
- Chronic inflammatory diseases I.
- Chronic inflammatory diseases II.
- Genomics of inflammation and asthma bronchiale
- Inflammation, regeneration and tumorigenesis
- Inhibition of inflammation, biological therapies
- Review and consultation

Attendance of a minimum of 75% of the lessons is necessary for the end-term signature.

Exam: written test in the exam period.

Literature: see on the homepage

Homepage: <http://gsi.semmelweis.hu>

GENETICS OF SEX

Department of Genetics, Cell and Immunobiology

Course director: **Dr. Sára Tóth**

No Prerequisites

Credits: 2

Second Semester

Lectures (2 hours per week):

1. Genetic background of sex determination; asexual and sexual reproduction; reproductive strategies.
2. From sex determining gene to sex chromosome
3. Male and female sex determination
4. Abnormalities in sex determination I.
5. Abnormalities in sex determination II.
6. Abnormalities in sex determination III.
7. Mechanism and role of X inactivation
8. Epigenetic effects; genome imprinting.
9. Causes of male infertility. Y chromosome mutations and ICSI.
10. Importance of Y chromosomal and mitochondrial polymorphisms in population genetics
11. Influence of sex on heredity
12. Aggressivity and sex
13. Genetics of sexual orientation
14. Ecology and sex; role of endocrine disruptors

Attendance of a minimum of 75% of the lessons is necessary for the end-term signature. No possibility to make up of absences.

Exam: no midterms, practice grade

Core texts: Chapters from Strachan & Read: Human Molecular Genetics 2nd Ed. and Gilbert: Developmental Biology 8th Ed. Both are downloadable from Pubmed Bookshelf.

Lecture presentations and additional texts are available on the homepage: www.dgci.sote.hu

Homepage: <http://gsi.semmelweis.hu>

EPIGENETICS

Department of Genetics, Cell and Immunobiology

Course directors: *Dr. Sára Tóth*

Credits: 2

First Semester

Lectures (2 hours per week):

1. Timeline of epigenetics; levels of epigenetic changes; targets of epigenetics
2. DNA methylation; de novo and maintenance methylation; Dnmt interactions
3. Histone modifications; histone code; histone modifying enzymes
4. Polycomb and trithorax complexes; Methylated DNA binding proteins
5. Transposons, and non-coding RNAs in epigenetic regulation; RNAi
6. Genome imprinting; skewed X inactivation their connection to DNA methylation
7. Epigenetic changes during early development and gametogenesis; Epigenetic consequences of cloning and ART
8. Transgenerational epigenetics; epigenetics of endocrine disruptors; maternal behaviour and its epigenetic consequences
9. Paramutation, transvection and mitotic bookmarking
10. Role of epigenetics in carcinogenesis; epigenetic therapy in cancer
11. Epigenetics in aging and autoimmunity
12. Epigenetic changes in diseases of the central nervous system
13. Methods used for the detection and analysis of epigenetic alterations.

Important notes:

Only for third and upper year students. There are no midterm exams. Attendance of 75% of lectures is necessary for the end-term signature. Exam: Written or oral exam (depending on the number of students).

No possibility to make up of absences.

Core texts: CSHL Epigenetics textbook 2006. Downloadable from http://www-nmr.cabm.rutgers.edu/academics/biochem694/reading/Al-lisetal_2006.pdf

Lecture presentations and additional texts are available on the homepage: www.dgci.sote.hu

Homepage: <http://gsi.semmelweis.hu>

CHEMOTAXIS – its significance in biology and clinical sciences**Department of Genetics, Cell and Immunobiology**Course director: *Dr. László Kóhidai***Credits: 2****Second Semester**

Lectures (2 hours per week):

Week	Lecture	Lecturer
1.	Migratory responses of cells – General significance of chemotaxis in biology	Kohidai László, MD, PhD
2.	Phylogeny of signaling molecules and their receptors with special respect to chemotaxis	Kohidai László, MD, PhD
3.	Chemotaxis in invertebrates and vertebrates	Kohidai László, MD, PhD
4.	Chemotaxis in Inflammatory cells I.: Antigen presenting cell, monocytes-macrophages, eosinophils and neutrophils	Kohidai László, MD, PhD
5.	Chemotaxis in bacteria - A well studied signaling pathway	Kohidai László, MD, PhD
6.	Genetical backgrounds of bacterial chemotaxis	Kohidai László, MD, PhD
7.	Inflammation and chemotaxis	Kohidai László, MD, PhD
8.	Immunological aspects and their clinical implications in general	Kohidai László, MD, PhD
9.	Phagocytosis: the target reaction of chemotaxis	Szabó Rita, PhD
10.	Chemotactic ligands – Characterization of their genomics and proteomics	Kohidai László, MD, PhD
11.	Chemokines	Kohidai László, MD, PhD
12.	The optimal chemotactic ligand	Kohidai László, MD, PhD
13.	Clinical approaches – Tumor biology	Láng Orsolya, MD, PhD
14.	Does persist 'Life' without 'Chemotaxis'?	Kohidai László, MD, PhD

Important notes:

Prerequisite: Medical Chemistry.

Max. allowed absences: 3. Attendance of 75% of lectures is necessary for the end-term signature.

One individual oral presentation (not for grade) is obligatory.

Exam: oral for practice mark

Possibility to make up of absences from the material on the website:

www.chemotaxis.usn.hu and www.dgci.sote.hu**Homepage:** <http://gsi.semmelweis.hu>

NEUROSURGERY**Semmelweis University, Faculty of Medicine****Name of the managing institute (and any contributing institutes):**

Department of Neurosurgery

Name of the subject: Neurosurgery**Credit value:** 2**Number of lessons per week:** 2 **lecture:** 14 **practical course:** - **seminar:** -**Subject type:** optional course**Academic year:** 2024/2025**Name of the course leader:** Prof. Péter Banczerowski**His/her workplace, phone number:** SE- Dept. of Neurosurgery, 1145 Bp., Amerikai út 57.,
+361-467-9325**Position:** Head of Department**Date and registration number of their habilitation:** 2010, reference number: 289**Objectives of the subject, its place in the medical curriculum:**

Neurosurgery is a medical specialty concerned with the prevention, diagnosis and treatment of complex neurological disorders. Neurosurgeons deal with pathologies of the central and peripheral nervous system.

There are several subspecialties in neurosurgery. In neuro-traumatology, cranial and spinal injuries caused by an external mechanical forces are treated. Neuro-oncology is an important and developing field in neurosciences, that primarily deals with diagnosis and treatment of both primary central nervous system tumours and complications of systemic cancer. Vascular neurosurgery involves the treatment of abnormalities of blood vessels of the brain and spinal cord. Neurological spine surgeons treat several degenerative, neoplastic and vascular pathologies involving the bony spine or the neural structures. Neurological spine surgeons rather use minimally invasive operative techniques in order to minimize hospital stay and tissue damage. Functional neurosurgery involves the restoration of neurological condition and function. Pediatric neurosurgery is also

a subspecialty and it aims to treat children with operable disorders of the nervous system.

Place where the subject is taught (address of the auditorium, seminar room, etc.):

SE- Dept. of Neurosurgery, 1145 Bp., Amerikai út 57., Library

Successful completion of the subject results in the acquisition of the following competencies:

In our institute students can experience the various clinical presentations of central and peripheral nervous system abnormalities. We are able to introduce the diagnostic algorithm and special operative techniques with which they gain practical knowledge about neurology and neurosurgery.

Course prerequisites:

Medical Imaging

Number of students required for the course (minimum, maximum) and method of selecting students:

10/80

Detailed curriculum:

(Theoretical and practical lessons shall be given separately by numbering the lessons (by weeks). Please provide the names of the teachers of the lectures and practical lessons and indicate guest lecturers. Do not use attachments!

Always attach a CV for guest lecturers!

1. Introduction to neurosurgery: history of neurosurgery. – Prof. Dr. Nyáry István
2. Basics of micro-neurosurgical anatomy. – Dr. Balogh Attila
3. Neurological investigation of the neurosurgical patient. – Prof. Dr. Bereczki Dániel
4. Increased intracranial pressure. Hydrocephalus. – Prof. Dr. Nyáry István
5. Head and injury and neurotrauma basics. – Prof. Dr. Banczerowski Péter
6. Spine and spinal cord injuries. – Prof. Dr. Banczerowski Péter
7. Spinal tumors. – Prof. Dr. Banczerowski Péter
8. Brain tumors, neurooncology. – Dr. Bagó Attila
9. Vascular malformations of CNS. – Prof. Dr. Nyáry István
10. Degenerative spine diseases. – Dr. Nagy Gábor
11. Epilepsy surgery and investigations. – Dr. Erőss Loránd
12. Functional neurosurgery and stereotactic procedures. – Dr. Erőss Loránd
13. Radiosurgery. – Dr. Nagy Gábor
14. Visiting the operating theatre and examination.

Other subjects concerning the border issues of the given subject (both obligatory and optional courses!). Possible overlaps of themes:

- Neurology
- Anesthesiology and Intensive Care
- Radiology
- Neuroradiology
- Traumatology

Special study work required to successfully complete the course:

(E.g. field exercises, medical case analysis, test preparation, etc.)

Requirements for participation in classes and the possibility to make up for absences:

To take part on lectures every Monday. In case of absences the lectures will be found in Moodle system.

Methods to assess knowledge acquisition during term time:

(E.g. homework, reports, mid-term test, end-term test, etc., the possibility of replacement and improvement of test results)

Requirements for signature:

To gain knowledge from the lectures

Type of examination:

written essay and/or written test

Requirements of the examination:

Lectures of the topics of the curriculum

Method and type of evaluation:

(Method of calculating the final mark based on the theoretical and practical examination. How the mid-term test results are taken into account in the final mark)

The students will be graded from 1 to 5.

offered mark: the students have opportunity to get offered mark, if they write an essay the end of the semester (until a predetermined deadline).

-written multiple choice test: written test comprises 15 multiple choice quiz questions.

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material

- online notes: <https://semmelweis.hu/idegsebeszet/english/education/>

- Schmidek & Sweet's operative neurosurgical techniques / Alfredo Quinones-Hinojosa

- 62. publishing (Notes: I1/412 és I1/413)

SOCIAL MEDIA IN MEDICINE

Institute of Behavioural Sciences

Course leader: *Prof. Dr. Ferenc Túry*

Presenter of the course: *Dr. Bertalan Mesko*

credit: 2 credits; optional coursee

Second Semester

Course objectives:

To present the role of web 2.0 or social media, the new generation of web services, in a medical practice, medical education and communication through specific examples, case studies and practical solutions.

Course Syllabus:

- Week 1: Introduction: Web 2.0 or social media
The role of social media in medicine
- Week 2: Medical search engines
The Google phenomenon
- Week 3: Being up-to-date with RSS
How to follow your field of interest online?
- Week 4: Medical communities online
Facebook from the physician's perspective
- Week 5: Patients on the web
The era of e-patients
- Week 6: The medical blogosphere
From the first comment to blog carnivals: Step by step
- Week 7: Everything you have to know about Wikipedia
Medical wikis
- Week 8: Second Life: Virtual medicine I.
Second Life: Virtual medicine II.
- Week 9: Managing a medical practice online
Should medical professionals use social media?
- Week 10: Education online: medical resources
- Week 11: Podcasts and medical videos
The era of new media
- Week 12: A new way of collaboration: Google Docs
- Week 13: Dangers of social media
Describing topics requested by the students
- Week 14: Future: is there a web 3.0?
The results of the surveys

Participation and making up for absences:

A signature will be given with the prerequisite of participation (minimum 75% of the lectures and seminars). It is possible to make up for an absence by participating in another seminar group the same week. One absence can be overlooked by the teacher if the student writes an essay. The topic of the essay must be discussed with the seminar leader in advance.

Justification of the absence in the lectures and examinations:

Participation list will be recorded at the end of every lecture/seminar. In case of absence medical certificate has to be presented within three workdays to the course leader.

Checks during the semester (reports, written checks) :

One written exam on week 12. It can be made up during the semester.

Requirements for the signature at the end of the semester:

Regular participation on the lectures and seminars, filling in two surveys online (week 2 and 12). One written exam (week 12)

Method of the calculation of marks:

- Written exam: 60 points
- Two surveys: 30 points
- Work during classes: 10 points

Categories:

- 5: 85-100 points
- 4: 75-84 points
- 3: 65-74 points
- 2: 50-64 points
- 1: 50 points

Requirements for the exam: fulfilment of the requirements of the semester

Application for the exam: Through the Neptun system.

Changing the application for the exam: Through the Neptun system.

Justification of the absence from the exam: Medical certificate has to be presented within three workdays to the course leader.

Course and recommended text books:

Pilling János (szerk.) (2011): Medical communication, Medicina Könyvkiadó, Budapest.

<http://www.med20course.com>

<http://www.sciencerooll.com>

CULTURE IN MEDICINE, CULTURE OF MEDICINE – Popular Themes of Current Clinically Applied Medical Anthropology

Institute of Behavioral Sciences

Course Director: *Prof. Dr. Ferenc Túry*

Lecturer: *Dr. László Lajtai*

Credit: 2

Second Semester

Weekly topics of the seminars:

1. „We have never been modern?” – An initiation to critical approaches to evidence base in medicine – How to respond? - / - Discussion of the semester: Requirements and timescale.
 2. Alternatives 1: Narratives and explanatory models – Confusions and the lay perspective
 3. Alternatives 2: Complementary medicine – Competition at our doorstep
 4. Alternatives 3: Healing and folk medicine – Wisdom or beliefs?
 5. Alternatives 4: Biomedicine for anthropology, or the twist of perspectives
 6. Challenges 1: Migrants, refugees and minorities
 7. Challenges 2: Reproduction, sex, age, death and other trends in „western” medicalization
 8. Challenges 3: Nutrition and taboos - biopower and social body
 9. Challenges 4: Placebo, pharmaceuticals and the rule of pharmaceutical industry
 10. Challenges 5: Public medicine, private medicine and the reproduction of inequities
 11. Favourite themes 1: Alcohol, drug, and AIDS at crossroads of culture and law
 12. Favourite themes 2: Shrinks and madness – CBS and the mirage of the normal
 13. Fieldworks: Discussion 1.
 14. Fieldworks: Discussion 2.
- Recapitulation, feedback and evaluation.

ART OF LEARNING

Institute of Behavioral Sciences

Course Leader: *Dr. János Kollár*

First and Second Semester

Objectives of the subject, its place in the medical curriculum:

Improving students' learning and presentation skills, increasing their performance in the acquisition of study materials.

Place where the subject is taught (address of the auditorium, seminar room, etc.):

Seminar room.

Successful completion of the subject results in the acquisition of the following competencies:

- knowledge of creativity development practices,
- increase in educational and presentation skills (including the development of individual skills and knowledge of technical innovations),
- knowledge of mnemonic methods,
- knowledge of the wide application of the possibilities offered by the Internet (information search, communication),
- knowledge of the theory and practice of relaxation.

Course prerequisites:

None.

Number of students required for the course (minimum, maximum) and method of selecting students:

Minimum: 3, maximum: 10.

How to apply for the course:

By using Neptun.

Detailed curriculum:

1. Meeting 1: Keys of Originality - participants can learn simple but effective methods that can be used on a daily basis to develop their creativity.
2. Meeting 2: Lecturing technique - mastering the basic rules of presentation, acknowledging modern presentation methods developed in recent years and their application. Rules for developing and exercising confident performing skills.
3. Meeting 3: Learning technique - Acquiring mnemonic methods and appropriate time management to support learning.
4. Meeting 4: Advantages on the Internet - learning the application of RSS, doing own research by using RSS. Mapping Internet resources that can be used for learning and research. Relaxation: Learning the basics of relaxation, mastering the creation of body-soul-spirit harmony.
5. Meeting 5: Exam - Participants present their own presentation by using their knowledge acquired in the course, receive feedback from each other and from the course leader.

Lecturer: Dr. János Kollár

Requirements for participation in classes and the possibility to make up for absences:

Out of the 20 hours of the 5 meetings, a maximum of 4 hours of absence is accepted.

Methods to assess knowledge acquisition during term time:

The course ends with an exam at the 5th meeting.

Requirements for signature:

1. Making a presentation at an appropriate level.
2. Active participation, respect for the work of fellow students and active support.

Type of examination:

Practical grade based on the above mentioned requirements.

Requirements of the examination:

Preparing a presentation based on the topics discussed during the course at an appropriate level.

Method and type of evaluation:

5 grade evaluation.

- | | |
|---------------|--|
| Excellent: | Active and constructive participation, high quality performance of tasks. Completing the exam presentation to a high standard. |
| Good: | Active and constructive participation, good performance of tasks. Completing the exam presentation to a good standard with minor errors. |
| Satisfactory: | Passive participation, completion of the exam presentation at an appropriate level. |
| Pass: | Passive participation, preparation of a poor-quality exam presentation. |
| Failed: | Passive participation, failure to present or failure to complete the exam presentation. |

How to register for the examination:

The exam is a part of the course. Special registration is not required.

Possibilities for exam retake:

In case of failure, the student will be given a one-time opportunity to improve his/her presentation.

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:**Books:**

1. Kermani, K. 1990. Autogenic Training. Souvenir Press Ltd. London.
2. Herkert, R.. 1993. Die 90-Sekunden Pause. Integral Verlag, Wessobrunn.
3. Tracy, B. 2005. Focal Point. Amacom, American Management Association International, New York.
4. O'Connor, J., Seymour, J. 1993. Introducing NLP. Thorsons Publisher Ltd. London.
5. Metzger, W., Schuster, M. 1996. Lernen zu lernen. Springer-Verlag Berlin Heidelberg.
6. Burke, J. 2001. The Knowledge Web. Simon & Schuster. New York.

DISRUPTIVE TECHNOLOGIES IN MEDICINE

Supervisors: **Dr. Mária Judit Molnár**
Dr. Bertalan Meskó

Code: AOSGRI374_1A

Credit: 1

Disruptive technologies bring groundbreaking changes to medicine and healthcare. While medical students are being prepared for the present conditions, medical technology is going to add different values and require new skills by the time students graduate, therefore modern medical education must prepare them for a world they will have to face in their professional lives. This course was designed to present and analyze today's medical challenges with tomorrow's technologies in a meaningful way addressing skills that students will be able to implement in their everyday practices.

Second Semester

Topics

- I. Introduction
- II. Personalized medicine and point of care diagnostics
- III. Personalized medicine- Genomic health
- IV. Personalized medicine - Imaging health
- V. Social Media and Medicine - Introduction
- VI. Social Media and Medicine - Filtering online
- VII. Social Media and Medicine - Sharing information
- VIII. Harnessing big data in healthcare
- IX. Mobile health and telemedicine
- X. Biotechnology and gene therapy
- XI. Regenerative medicine
- XII. Medical robotics, bionics, virtual reality
- XIII. Future of medical technologies

Textbooks:

Social Media in Clinical Practice, Springer, 2013

The Guide to the Future of Medicine <http://sciencerooll.com/2013/10/30/whitepaper/>

INTRODUCTION TO PHARMACOLOGICAL RESEARCH

Semmelweis University, Faculty of Medicine

Name of the managing institute (and any contributing institutes):

Dept. Pharmacology and Pharmacotherapy

Name of the subject: Introduction to pharmacological research

Credit value: 2

Number of lessons per week: 2 lecture: 2 practical course: seminar:

Subject type: optional course

Academic year: both semesters in each academic year

Name of the course leader: Dr Zoltán Zádori

His/her workplace, phone number:

Semmelweis University, School of Medicine, Dept. Pharmacology and Pharmacotherapy; 459-1500/56392; 20/666-3319

Position: associate professor

Date and registration number of their habilitation: 2017; 05/2017

Objectives of the subject, its place in the medical curriculum:

The aim of the optional course is to rise the demand of following the recent literature in students. It also aims to improve the capability of critical evaluation and presentation of the information of the articles. To reach these aims, the students will present original articles.

The course will start with the review of the methods of searching original articles on the internet and ways of obtaining the full text version of the relevant papers. In addition, basics of short scientific presentation will be explained. Later on the students will present the papers independently. Tutors, i.e., researchers of the department, will help in selection, processing and presentation of the articles. The audience (researchers at the department and fellow students) will evaluate and improve the mode and quality of presentation. Pharmacological methods, applied at the department, will be demonstrated during the semester.

The course will be available for the Hungarian, English and German students of the Basic-, Preclinical- and Clinical modules from the 3rd semester. The language of the course is English.

We believe that our effort is highly fit to the new, state-of-the-art training approach of the Faculty of General Medicine, which places great emphasis on students gaining skills in following the literature, interpreting it correctly and acquiring appropriate presentation and discussion skills during their undergraduate training.

Place where the subject is taught (address of the auditorium, seminar room, etc.):

floor IV., room Knoll, NET, Budapest, Nagyvárad sq. 4., 1089 and Zoom

Successful completion of the subject results in the acquisition of the following competencies:

Obtaining the latest and most important knowledge of pharmacology and medical biology; ability of correct interpretation and presentation of the core knowledge; insight into the methodology and latest trends of pharmacological research.

Course prerequisites:

Prerequisite: Medical biochemistry I.

Taking the following courses simultaneously is also considered necessary: Medical biochemistry II., Medical physiology I.

Number of students required for the course (minimum, maximum) and method of selecting students:

Minimal number of students: 10

Maximal number of students: 45

Way of selection: the order of application in Neptun

Detailed curriculum:

(Theoretical and practical lessons shall be given separately by numbering the lessons (by weeks). Please provide the names of the teachers of the lectures and practical lessons and indicate guest lecturers. Do not use attachments!

Always attach a CV for guest lecturers!)

Class	Title of topics	Tutor/Lecturer
1-2	Methods of searching the original articles on the internet and ways of obtaining the full text version of the relevant papers. Basics of short scientific presentation. Dr. Zoltán Varga, sen. res. associate	
3-4	Pharmacological modulation of mitochondrial function in ischemic heart disease.	Dr. Péter Ferdinandy, professor
5-6.	The role of microbiota in health and disease	Dr. Zoltán Zádori, associate prof.
7-8.	Perspectives in the research of antipsychotic agents.	Dr. Júlia Timár, associate prof.
9-10.	Potentially new therapeutic indications for the RAS modulatory drugs.	Dr. Mahmoud Al-Khrasani, ass. prof.
11-12.	Recent advances in pain research.	Dr. Kornél Király, assistant prof.
13-14.	Pharmacology of exosomes in ischemic preconditioning in the heart.	Dr. Zoltán Gircz, sen. res. associate
15-16.	Cell culture models in the field of cardiology and oncology	Dr. Anikó Görbe, associate prof.
17-18.	Pharmacological modulation of preconditioning.	Dr. Péter Ferdinandy, professor
19-20.	Opioid analgesics. Which way further?	Dr. Pál Riba, associate prof.
21-22.	Increasing the lifespan. How can pharmacology help?	Dr. Ildikó Miklya, associate prof.
23-24.	New directions in the drug therapy of IBD.	Dr. Zoltán Zádori, associate prof.
25-26.	Unbiased network theoretic target prediction in various diseases	Dr. Bence Ágg, assistant prof.
27-28.	Pharmacology of cognitive enhancers.	Dr. László Hársing, scientific cons.

Other subjects concerning the border issues of the given subject (both obligatory and optional courses!). Possible overlaps of themes:

Medical biochemistry, Medical physiology, Pharmacology. No overlap.

Special study work required to successfully complete the course:

Attending the classes is a basic requirement. In addition, each student must give a presentation per semester, answer the questions raised, participate actively in the discussion, form an opinion on the presentation and ask questions.

Requirements for participation in classes and the possibility to make up for absences:

Attending the classes is mandatory and controlled. Four absences are acceptable. Over that the credit is refused. There is no replacement for missed classes, however, the original publications, the slides of the lectures and the recording of the event (in the case of Zoom meeting) will be available for the students in the Moodle system of the university.

Methods to assess knowledge acquisition during term time:

There is no formal examination during the term time. The presenting student will be, of course, asked to respond for the questions and

comments of the course leaders, researchers and PhD and fellow students at the department.

Requirements for signature: Successful test exam and no more than four absences.

Type of examination: Single choice test exam.

Requirements of the examination:

There is a test exam at the end of the course. The single choice test questions ask about the actual publication-based lectures during the semester. Accordingly, test questions are updated every semester.

Method and type of evaluation:

Evaluation of the test exam on a scale of 1-5.

Possibilities for exam retake:

In justified cases, we provide an opportunity for a supplementary exam, after oral consultation.

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

Original publications, slides of the lectures and the recording of the events (in the case of Zoom meeting) will be available for the students in the Moodle system of the university.

HEALTHCARE MANAGEMENT

Course Leader: Dr. habil. Éva Belicza Ph.D.

Prerequisite: Internal Medicine I.

Credit: 2

Lecture: 2 hours / week

Thematics:

- 1st week: Introduction: the role of management in healthcare, basics
- 2nd week: Healthcare economics I.
- 3rd week: Healthcare economics II.
- 4th week: Healthcare financing
- 5th week: Healthcare system models and their international comparison
- 6th week: Organisational management
- 7th week: Organisational behavior
- 8th week: Human resource management in healthcare
- 9th week: Change management in healthcare
- 10th week: Patient safety in practice
- 11th week: Quality management and development in healthcare
- 12th week: Health politics
- 13th week: Project and time management
- 14th week: Summary

MATHEMATICAL AND PHYSICAL BASIS OF MEDICAL BIOPHYSICS

Lecturer: **Dr. Miklós Kellermayer**

Credit: 1

14 hours lecture in the first four weeks of the semester.

Thematics:

1. Mathematics necessary for understanding biophysical laws
2. Physical quantities and units
3. Kinematics – physics of motion
4. Statics – changes of shape, forces, mechanical stress, pressure
5. Dynamics – work, energy
6. Oscillations, waves
7. Fluid mechanics
8. Thermodynamics
9. Electricity – charges in rest and in motion
10. Magnetism, magnetic induction

The presence in at least 75 % of the lessons is obligatory.

The grade is based on the result of test written on the 5th week. This test should be written by all students irrespective of taking this elective subject. The result of test is expected to be at least satisfactory (2) as a condition for signature in Medical biophysics 1. The elective subject helps in the preparation for this test.

Evaluation: practical grade based on the result of test written on the 5th week.

Textbook: Lecture notes on the homepage of the department.

High school physics textbooks.

MEDICAL GENOMICS

Department of Genetics, Cell and Immunobiology

Lecturer: **Prof. Dr. Csaba Szalai**

Medical genomics introduces the basic knowledge in medical and human genomics and the associated genomic methods. The main topic of the course is the genetic and genomic background of the most common multifactorial diseases, like asthma, allergy, type 1 diabetes mellitus, type 2 diabetes mellitus, obesity, high blood pressure, atherosclerosis, Alzheimer disease and Parkinson disease. The lectures show the most important genes and genetic variations in these diseases which can influence the susceptibility to the them and how this knowledge can be used to get to know the pathomechanisms of these diseases and to reveal novel therapy and drug targets. There are also lectures about pharmacogenomics and how our genes influence our responses to different environmental effects. As genomics belongs to systems biology, a lecture introduces to basic terms of systems biology, and concentrating on diseases, some examples of the application and utilization of this scientific field are also be shown.

Planned lectures:

- Introduction to genomics, the human genom
- Multifactorial diseases
- Genomic methods
- Asthma, allergy
- Type 1 diabetes mellitus
- Type 2 diabetes mellitus
- Obesity
- High blood pressure
- Atherosclerosis
- Alzheimer and Parkinson diseases
- Gene-environmental interactions
- Pharmacogenomics
- Systems biology

Prerequisite subjects: Medical Biochemistry, Molecular and Cell Biology I, II and III.

SYSTEMS NEUROSCIENCE I–VI.**Faculty of Medicine, Department of Anatomy, Histology and Embryology****Type of course: optional course-unit****credit: 2****Name of the responsible person: Dr. Gábor Gerber****Second Semester**

Role of the course in the training of the Department:

The Systems Neuroscience program follows the approach of systems theory in understanding the brain. The aim is to provide students a view of the brain as a whole via unfolding, at least in part, its immense complexity. This is a major challenge of all time, but the right answer should be one that can integrate actual knowledge. As we are in the fortunate period of time when high performance tools (both hardware and software) and large datasets are getting more and more available, systems thinking is inevitable in brain research. Therefore, throughout the course students will learn how different approaches - reductionist, holist and functionalist – are all useful and necessary in understanding the brain.

In one way the course is structured by introducing the students the different levels of organization all being complex systems themselves. After an introductory about the systems science approach of the brain (course 2) we discuss the molecular machineries at the subcellular level (course 3) then turn into the cellular level by learning why and why not the neuron is considered as the unit of brain organization (course 4). In the next step it is shown how billions of neurons make up the cerebral cortex and how this evolutionarily new structure can perform diverse cognitive and other functions (course 5). Finally, whole brain functions and functioning will be approached via its role in behavior (course 6).

In other way, each course will show how the brain functions at lower organizational levels such that synaptic and neuronal populations of different structures as well as a whole. Such holistic approaches have high importance in recent efforts made in deciphering the neurobiological basis of neuropsychiatric and neurological diseases (courses 5,6). Finally, with the closing series of lectures (course 7,8) we aim to provide tools, rules and examples, which help integrating knowledge acquired throughout the courses and also provide an outlook whereby the brain can be compared to other complex systems (course 2). Another notable feature of the Systems Neuroscience program is its interdisciplinary nature: it will introduce the students into several state of the art methods both experimental (molecular biology, cellular and extracellular physiology, different kinds of imaging) and theoretical (data and network analyses, simulation and modelling).

Each course includes visiting the lecturers' lab.

The course will start with an introductory about the history and culture of the geopolitical region thought as Central Europe.

The program of the course:

Weekly schedule of the Courses

1. **Central European Culture**
2. **Introduction to Systems Neuroscience**
3. **Genomic analysis of single neurons. Neuronal proteomics.**
4. **Single neurons and beyond**
5. **Neocortex: from structure to function**
6. **Neural rhythms: normal and pathological. Brain imaging: from normal to pathological.**
7. **Neuroelectricity**
8. **Statistics and the Brain**

Practical courses: introduction into cutting edge research techniques during the lab visits

Consultations: personally with the actual course leader

Requirements of course participation and options to recover missed hours:

1. **Total absence allowed: 10% of the total course hours**
2. **Recovering missing hours: studying the material provided by the course leaders, consultation**

Eligibility: US grade point average (GPA) of 3.0. Students with a GPA lower than 3.0 should inquire with the Directors on the possibility of a waiver.

Justification of absence from course hours or exams:

Hungarian medical certificate

Number and schedule of the examinations:

The course is divided into eight blocks each covering different fields and scheduled in a weekly basis. Each block ends with an exam in the last teaching day of the actual week.

Requirements of the successful completion of the program:

written or oral test in each course material

Marks:

In case of a written test grades are given after obtaining points as follows: 0-50% fail, 51-60% pass, 61-75% fair, 76-90% good, above 90% excellent.

Types of exam: test, essay, verbal

Requirements of the examinations:

Verbal and electronic etc. material provided by the lecturers. Syllabus is available upon opening the program on the web page.

Registration for exams: NEPTUN

Rescheduling the tests:

N/A

Each student has to take an examination in each block of the course.

Justification of absence from the exam:

Hungarian medical certificate (see above).

List of useful literature (books, papers etc):

It is made available for the students two weeks before the first lecture

PRECLINICAL AND CLINICAL NEUROPSYCHOPHARMACOLOGY AND PSYCHOPHARMACOGENETICS

(Hungarian: Preklinikai és klinikai neuropszichofarmakológia és pszichofarmakogenetika)

Name of the Programme: Medicine, uninterrupted graduate programme

Neptun-Code (planned): AOVGYH198_1A

Institute: Department of Pharmacodynamics

Name of the tutor/lecturer: Dr. György Bagdy PhD, Dsc.

Phone: +36-1-4591495, +36-1-2104411, +36-1-2102927

E-Mail: bagdy.gyorgy@pharma.semmelweis-univ.hu

Further tutors: Juhász Gabriella Associate Professor, PhD, Lévy György PhD, CSc, Gyertyán István PhD, Gonda Xénia PhD, Ujváry István PhD, Tamási Viola PhD, Vas Szilvia PhD, Eszlári Nóra researcher psychologist (MA)

Number of lectures /week:

blocked course (2X7 lessons)

Credit points: 1

Brief course summary:

The aim of this course is to introduce the function of the central nervous system (CNS), diseases that impact the CNS as well as the (psychiatric, neurological, neurosurgical and addictological) way of their treatment for the interested students. The course creates a bridge between theoretical and clinical subjects. During the course, genetics, molecular sciences, animal models and human investigating methods are demonstrated as well as the possibilities and limits of their application using concrete examples.

Course data

Recommended semester of completing the course	Lecture (contact hrs/ week)	Practice (contact hrs/ week)	Seminar (contact hrs/week)	Individual lecture	Total number of contact hours/ semester	Semester	Consultation
from the 4 th semester	14				14	Spring semester* Winter semester* Both semesters*	

Semester program

I. Lecture topics/week

1. week:	Principles of the function and pharmacological modification of the central nervous system. (György Bagdy) (I-III.) Animal models of diseases affecting the central nervous system (György Lévy) (IV-V.) The dopamine theory of schizophrenia. Antipsychotic drug research (István Gyertyán) (VI-VII.) Experimental studies in learning and memory (István Gyertyán) (VIII.) Genetics of behavioural characteristics influencing psychiatric disorders (Nóra Eszlári) (IX.)
2. week:	Application of neuroimaging techniques in the neuropsychopharmacology (Gabriella Juhász) (X.) Pharmacogenetics (Xénia Gonda) (XI.) Sleep and behaviour. The neurotransmitter regulation of sleep (Vas Szilvia) (XII.) The phenomenon of hallucination: from tribal customs to chemical structures (Ujváry István) (XIII.) The role of "omic" methods in the innovation of psychopharmacocons (Viola Tamási) (XIV.)

Course requirements

Prerequisites: previous attendance of courses in Biology, Physiology and Biochemistry

Semester acceptance conditions: (*successful course attendance, mid-term tests, absence, etc.*)

Attendance of 11 of 14 lectures is required.

Knowledge testing during the semester: -

Requirements of the signature at the end of the semester:

Attendance of 11 of 14 lectures. Repetition of the lessons during the course is not possible.

Individual activity of the student during the semester (*protocol, etc.*) -

Performance control in the examination period final examination

Performance control in the examination period (*written, oral, written and oral*) written, correction examination: oral

Prescribed external practice: -

List of teaching materials: (List of textbooks, hand-outs, scripts, etc.)

1. Kirilly E., Gonda X., Bagdy G.: CB1 receptor antagonists: new discoveries leading to new perspectives. ACTA PHYSIOLOGICA 205:(1) pp. 41-60. (2012)
2. Lazary J., Juhasz G., Hunyady L, Bagdy G.: Personalized medicine can pave the way for the safe use of CB(1) receptor antagonists. TRENDS IN PHARMACOLOGICAL SCIENCES 32:(5) pp. 270-280. (2011)
3. J.M. Monti, S.R. Pandi-Perumal, B.L. Jacobs and D.J. Nutt (Eds): Serotonin and Sleep: Functional, and Clinical Aspects, Birkhauser, Basel, 2008.
4. J.N. Crawley: What's Wrong with my Mouse? Wiley-Liss, New York, 2000.

List of course materials: classroom, projector

Scientific, course related researches, publications/essays:

1. Juhasz G, Hullam G, Eszlari N, Gonda X, Antal P, Anderson IM, Hökfelt TG, Deakin JF, Bagdy G. Brain galanin system genes interact with life stresses in depression-related phenotypes. Proc Natl Acad Sci U S A. 2014 Apr 22;111(16):E1666-73. doi: 10.1073/pnas.1403649111. Epub 2014 Mar 24. PubMed PMID: 24706871.
2. Bagdy G, Juhasz G. Biomarkers for personalised treatment in psychiatric diseases. Expert Opin Med Diagn. 2013 Sep;7(5):417-22. doi: 10.1517/17530059.2013.821979. Epub 2013 Jul 22. PubMed PMID: 23875948; PubMed Central PMCID: PMC3786517.
3. Kátai Z, Adori C, Kitka T, Vas S, Kalmár L, Kostyalik D, Tóthfalusi L, Palkovits M, Bagdy G. Acute escitalopram treatment inhibits REM sleep rebound and activation of MCH-expressing neurons in the lateral hypothalamus after long term selective REM sleep deprivation. Psychopharmacology (Berl). 2013 Aug;228(3):439-49. doi: 10.1007/s00213-013-3046-4. Epub 2013 Mar 21. PubMed PMID: 23515582.
4. Lazary J, Juhasz G, Hunyady L, Bagdy G. Personalized medicine can pave the way for the safe use of CB₁ receptor antagonists. Trends Pharmacol Sci. 2011 May;32(5):270-80. doi: 10.1016/j.tips.2011.02.013. Epub 2011 Apr 16. Review. PubMed PMID: 21497918.
5. Adori C, Low P, Andó RD, Gutknecht L, Pap D, Truszka F, Takács J, Kovács GG, Lesch KP, Bagdy G. Ultrastructural characterization of tryptophan hydroxylase 2-specific cortical serotonergic fibers and dorsal raphe neuronal cell bodies after MDMA treatment in rat. Psychopharmacology (Berl). 2011 Feb;213(2-3):377-91. doi: 10.1007/s00213-010-2041-2. Epub 2010 Oct 30. PubMed PMID: 21052985.

ULTRASONOGRAPHY IN OBSTETRICS AND GYNECOLOGY

Department: Department of Obstetrics and Gynecology

Study time: In every second Semester 2×45 minutes. Advised Semester: between 6. und 12. Semester

Exam: Written test and practical note

Credit: 1

Minimal/maximal participants: (1/5 person)

Application deadline: 1. December

Prerequisite: Completion of second year

The knowledge gained in theoretical basic subjects (anatomy, physiology) can be used by medical students as practical knowledge in the clinic. As a result of more than four decades of experience, ultrasound examination has a fundamental role in modern obstetrical and gynecological diagnostic. The course helps you to acquire skill in this field. Performing obstetrical-gynecological ultrasound tests and assessment of findings can only be learned through appropriate training. This non-invasive procedure is also safe for patients. The modern ultrasound equipment of the Department and the wide range of patients and diseases provide the opportunity for learning. Not only obstetricians and gynecologists, but also other associate colleagues such as clinical genetics, radiologists, gynecological cancer surgeons, anesthesiologists, and intensive therapists can utilize the knowledge provided by the subject

Themes:

Physical basics of ultrasound examination. Parts of the ultrasound device. Application modes (amplitude, motion, brightness, Doppler). Gynecological ultrasound examination. Early pregnancy tests. Ectopic pregnancy. Standard planes of the first ultrasound screening during the 11-13th week of pregnancy. Neurosonography and fetal echocardiography. Standard planes of the second ultrasound screening during the 18-22th week of pregnancy. Ultrasound examinations in the third trimester. Amniotic fluid index and fetal Doppler examinations. 3-4-dimensional ultrasound examinations and their practical application.

György Bagdy

CARDIAC ELECTROPHYSIOLOGY

Semmelweis University, Faculty of Medicine

Name of the managing institute (and any contributing institutes):

Gestor Institute: Department of Physiology

Name of the subject: Cardiac electrophysiology

Credit value: 2

Number of lessons per week: 2 lecture: 2 practical course: seminar:

Subject type: optional course

Academic year: 2024/2025

Name of the course leader: András TÓTH, DSc.

His/her workplace, phone number: Semmelweis University, Department of Physiology; phone: +36-1-459-1500/60436

Position: External lecturer

Date and registration number of their habilitation: 18/2009 (SZTE, ÁOK).

Objectives of the subject, its place in the medical curriculum:

The course is intended to provide up-to-date and extended knowledge based on the latest literature for practically all medical students, especially those planning to be cardiologists or internists in order to meet a predictable future requirement of a strongly established knowledge related to the electrophysiological background and ion channel dependent pathomechanisms of severe, often lethal heart diseases and to facilitate their better understanding of the corresponding scientific literature. Their expected competent knowledge on cardiac electrophysiological mechanisms will significantly help young MDs to introduce novel, highly effective cardiopharmacological agents and/or to select optimal clinical therapeutic strategies. Via providing a detailed introspection into molecular and cellular basis of the electric activity of the heart the course is willing to offer the students an opportunity to collect an important section of these competences during their student years. During the course the motivated students may collect a comprehensive knowledge on:

- the biophysical basis of cardiac electrophysiology; the principles of operation and regulation of major cardiac ion channels
- the kinetic properties and regulation of ion currents generating cardiac action potentials; the significance of the repolarization reserve; the molecular background of substantial differences between atrial and ventricular and among various ventricular action potentials; and the basic pathomechanisms of arrhythmogenesis
- the principles of intracellular Ca^{2+} homeostasis in cardiomyocytes; the major mechanisms of excitation/contraction coupling; functional adaptation of the Ca^{2+} -cycle; pathomechanisms of Ca^{2+} -dependent and Ca^{2+} -facilitated heart diseases and several therapeutic strategies
- common genetic disturbances leading to malfunction of cardiac ion channels
- most important experimental techniques and animal models applied in experimental cardiac electrophysiology and the human/clinical relevance of the collected data

Finally a practical demonstration (13-th week) based on the material of the lectures is organized in order to help realistic, problem-oriented application of the theoretical knowledge via jointly processing experimental data derived from a few running scientific projects

Place where the subject is taught (address of the auditorium, seminar room, etc.):

Semmelweis University; EOK; H-1094 Budapest, Tűzoltó u. 37-47

Successful completion of the subject results in the acquisition of the following competencies:

Understanding of the human physiology which is foundation of medical practice.

Course prerequisites:

Medical Physiology 1 (the course is suggested for 2-4 year students)

Minimum and maximum number of students registering for the course: Minimum 5 and maximum 80 students

Detailed curriculum:

1. week: **Introduction**
 - the role and importance of cellular level cardiac electrophysiology in medical practice
 - historical background
2. week: **Basic contexts of electrophysiology; propagation of stimulus in cardiac muscle**
 - biophysical principles of transcellular ion movements, Nernst equation, Donnan equilibrium, equilibrium potential
 - generation and maintenance of the resting potential
 - generation and propagation of the action potential (AP)
3. week: **Ion channels**
4. week: **Action potentials in the heart; major contributing ion channels/ion currents**
 - generation of the cardiac action potentials, fast and slow AP
 - atrial-ventricular and ventricular regional differences in action potentials and distribution of ion channels
 - Na⁺ and Ca²⁺ specific ion channels and -currents
 - properties of various of K⁺ currents (early/late, ultrarapid/rapid/slow, ATP-dependent, inward rectifying, etc.) and their role in the AP
5. week: **Developmental mechanisms of cardiac arrhythmias**
 - significance of the repolarization reserve, consequences of its decrease
 - mechanisms of generation of afterpotentials; extrasystole
 - ventricular arrhythmias: torsade de point (TdP), ventricular fibrillation
 - atrial fibrillation
6. week: **Experimental techniques in cardiac electrophysiology 1. – Microelectrode based measurements**
 - action potential measurements with conventional microelectrodes
 - ion current determinations using the „patch clamp” technique
7. week: **Ca²⁺ homeostasis in cardiac cells**
 - intracellular Ca²⁺ compartments
 - ion transport mechanisms involved in the Ca²⁺ cycle
 - cardiac Ca²⁺ transporters, their major characteristics and principles of function
 - the relationship between intracellular Ca²⁺ movements and AP repolarization
8. week: **The electromechanical coupling (ECc) and its regulation in cardiac cells**
 - regulation of the Ca²⁺ transport and -homeostasis
 - conditions for steady state activity of the heart
 - mechanisms of functional adaptation of the heart
9. week: **Perturbations of Ca²⁺ homeostasis and their role in development and progress of a number of heart diseases**
 - Pathomechanisms leading to cellular Ca²⁺ overload or Ca²⁺ deficit
 - Ca²⁺-dependent and Ca²⁺-facilitated heart diseases
 - afterpotentials and arrhythmogenesis; atrial fibrillation
 - ischemia/reperfusion injury
 - malignant hypertrophy and heart failure
10. week: **Experimental techniques in cardiac electrophysiology 2. Optical techniques**
 - basic principles of the application of fluorescent „tracer” molecules
 - „single” and „multichannel” measurements in isolated cardiomyocytes, isolated heart
 - novel, complex imaging (mapping) experimental techniques
11. week: **Experimental (animal) models and their clinical relevance**
 - the importance of experimental (animal) models in cardiology
 - small animal (mouse, rat, guinea pig) models
 - large animal (dog, rabbit, goat, etc.) models
 - human relevance of data and information derived from animal models
 - significance of human models and samples

12. week: **Genetic background of malfunction of cardiac ion channels**
- „QT” syndromes and their genetic background
 - consequences of genetics originated disturbances of Ca²⁺ transporters
 - transgenic animal models
13. week: **Antiarrhythmic drug classes + a few examples from arrhythmia research**
- Classification of antiarrhythmic drugs provided by Vaughan Williams
 - Principles of the „Sicilian Gambit”
 - Modernized scheme of antiarrhythmic drug classes
 - A few examples from experimental arrhythmia research
14. week: **Consultation**

Other subjects concerning the border issues of the given subject (both obligatory and optional courses!). Possible overlaps of themes:

Minimal overlap with Medical Physiology 1 and Cardiology

Requirements for participation in classes and the possibility to make up for absences:

It is required to attend at least 75% of the lectures (10 lectures).

Missing attendance may be partially compensated at a consultation offered during the semester

Methods to assess knowledge acquisition during term time: (E.g. homework, reports, mid-term test, end-term test, etc., the possibility of replacement and improvement of test results)

Understanding of the material of the previous lectures will be verified by two „multiple choice” tests (10-10 questions) + interactive during the lectures

Requirements for signature:

It is required to attend at least 75% of the lectures (10 lectures).

Missing attendance may be partially compensated at a consultation offered during the semester

Type of examination:

Colloquium. Oral exam. Theoretical exam.

Requirements of the examination:

Before the exam the examinee should suggest at least six topics he/she knows best from at least six lectures. From the suggested topics the examiner will pick two to be orally presented.

The most important requirement is the best possible understanding of the selected lectures.

Lecture 1:	---
Lecture 2:	---
Lecture 3:	<ol style="list-style-type: none"> 1. Basic features and classification of ion channels 2. Characterization and principles of regulation of voltage-gated ion channels 3. Characterization and principles of regulation of ligand-gated ion channels
Lecture 4:	<ol style="list-style-type: none"> 1. Heterogeneity of action potentials and depolarizing ion currents in the heart 2. Repolarizing ion currents in the heart – the principle of repolarization reserve 3. Atrium specific, nonselective and anion currents in the heart
Lecture 5:	<ol style="list-style-type: none"> 1. Principal mechanisms of arrhythmogenesis 2. Atrial fibrillation 3. Ventricular arrhythmias
Lecture 6:	<ol style="list-style-type: none"> 1. Cardiomyocyte isolation techniques; patch-clamp measurement 2. Multicellular heart preparations; action potential measurements
Lecture 7:	<ol style="list-style-type: none"> 1. Major Ca²⁺ compartments in cardiomyocytes 2. Trans-sarcolemmal Ca²⁺ transport in cardiomyocytes 3. Ca²⁺ transport in the sarcoplasmic reticulum and in mitochondria
Lecture 8:	<ol style="list-style-type: none"> 1. Principal mechanisms of the EC-coupling – the local control theory 2. Control of Ca²⁺ release and Ca²⁺ content of the sarcoplasmic reticulum – principle of flux balance 3. Mechanisms of functional adaptation of the heart
Lecture 9:	<ol style="list-style-type: none"> 1. Afterpotentials and arrhythmogenesis 2. Intracellular Ca²⁺ overload and ischemia/reperfusion injury 3. Cardiac hypertrophy and heart failure
Lecture 10:	<p>Basic properties of Ca²⁺-sensitive dyes; Ca²⁺ measurements in isolated single cardiomyocytes and in isolated intact heart; subcellular Ca²⁺ measurements</p> <p>Optical mapping of membrane potential; principles of using genetically encoded Ca²⁺ indicators;</p>
Lecture 11:	<ol style="list-style-type: none"> 1. QT syndromes and their genetic background; consequences of genetic disorders of Ca²⁺ transporters 2. Transgenic animal models in cardiac electrophysiology – principles and perspectives of human gene transfer
Lecture 12:	<ol style="list-style-type: none"> 1. Advantages and limitations of small and large animal models; human relevance of data and information derived from animal models 2. Animal models of arrhythmogenesis, ischemic heart disease and heart failure human relevance of data and information derived from animal models
Lecture 13:	---

Method and type of evaluation:

Two simple topics from the corresponding topic list will be picked randomly by the examinee.

The overall grade of the exam is the mean of two partial grades:

Excellent (5):	4.51 - 5.00
Good (4):	3.51 - 4.50
Satisfactory (3):	2.51 - 3.50
Pass (2):	2.00 - 2.50
Fail (1):	below 2.00

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

Obligatory:

1. The material presented during the classroom lectures and made also available on-line.

Suggested:

1. Ion channels for communication between and within cells; Erwin Neher Nobel Lecture, 1991
2. Heart Rate and Rhythm Ed. O.N Tripathi, U. Ravens and M.C. Sanguinetti; Springer, 2011
3. Excitation-Contraction Coupling and Cardiac Contractile Force D. Bers; Springer, 2001
4. Basis and Treatment of Cardiac Arrhythmias Ed.: R.S. Kass, C.E. Clancy; Springer, 2006
5. Electrical Diseases of the Heart Ed. I. Gussak, C. Antzelevitch; Springer, 2008
6. Handbook of Cardiac Electrophysiology Ed. A. Natale; Informa UK, 2007
7. Klinikai szív-elektrofiziológia és aritmológia Sz. Fazekas T., Merkely B., Papp Gy., Tenczer J.; Akadémiai Kiadó 2009

BIOMEDICAL INNOVATION FOR THE 21st CENTURY

We would like to bring to the attention of Semmelweis University students a newly started English course on the topic of engineering innovation in medical research and patient care. By Béla Merkely Rector, the course is being promoted with the Pázmány Péter Catholic University Faculty of Information Technology and Bionics. The course does not require any engineering previous experience. This course was designed for medical student with basic biophysical knowledge.

The aim of the course is to introduce those interested in areas where engineering opportunities are becoming increasingly important in patient care. Each lecture converges on a theme that is presented by a medical and an engineering specialist based on their own perspectives. This allows the audience to learn about the engineering and medical aspects of the same topic. On the other hand, this course provides a deeper insight into the specific field of medical engineering to facilitate the development of research collaboration between the two fields. We strive to promote medical developments and facilitating a safe but rapid transfer of research results into clinical practice.

Language English.

Exam: 2-page essay on a selected topic.

Held by Medical and Engineering specialists

Thematics

- Recent advances in biomedical engineering.
- Microfluidics for diagnostics and therapy.
- Robotics for healthcare: robotics surgery from minimal invasive surgery to DaVinci.
- Ultrasound diagnostics and therapy.
- Advances in bioimage processing.
- Deep learning algorithms in medical imaging.
- Proteomics: the new era of microbiology.
- 3D printing and 3D planning in medicine.
- Prosthetics in medical and engineering field.
- *Biosignal processing for personalized treatment.*
- Gene Therapy from the perspective of Systems Biology.
- Organ-on-a-chip, and investigation and development of stem cell based therapies.
- From patents to university spin-off companies.

CLINICAL HUNGARIAN from the second semester of the 3rd year

Division of Foreign Languages and Communication – Faculty of Health Sciences

H-1088 Budapest, Vas u. 17., room 130

Mailing address: H-1085 Budapest, Üllői út 26.

Phone: +(36-1) 486-4960 Fax: +(36-1) 486-4962 Bakó

Head of the Division: **Katalin Zöldi Kovács Ph.D.**

CLINICOPATHOLOGY

Semmelweis University, Faculty of Medicine

Name of the managing institute (and any contributing institutes):

Department of Pathology, Forensic and Insurance Medicine

Name of the subject: CLINICOPATHOLOGY

Credit value: 3

Number of lessons per week: 28 lecture: 28 practical course: seminar:

Subject type: optional course

Academic year: 2024/2025.

Name of the course leader: Lotz Gábor MD.

His workplace, phone number: Department of Pathology, Forensic and Insurance Medicine, 06208259665

Position: associate professor

Date and registration number of their habilitation:

Objectives of the subject, its place in the medical curriculum: Practical application of 3rd year theoretical material in Clinics with the active supports of clinicians and specialist in pathology.

Place where the subject is taught (address of the auditorium, seminar room, etc.):Lecture room Department of Pathology, Forensic and Insurance Medicine

Successful completion of the subject results in the acquisition of the following competencies:

Completion of the subject may provide additional experiences to the students to apply theoretical knowledge in their future medical practice.

Course prerequisites: Completion of the final exam of Pathology (6th semester requirement).

Number of students required for the course (minimum, maximum) and method of selecting students: minimum 5, maximum 180

Detailed curriculum:

(Theoretical and practical lessons shall be given separately by numbering the lessons (by weeks).

Please provide the names of the teachers of the lectures and practical lessons and indicate guest lecturers. Do not use attachments! Always attach a CV for guest lecturers!)

- | | | | |
|----|--|-----|----------------------------------|
| 1. | Dr. Kiss: Introduction, case presentation | 5. | Dr. Attila Kovács: Pancreas |
| 2. | Dr. Lilla Madaras: Gynecology | 6. | Dr. Judit Halász: Pediatrics |
| 3. | Prof. Dr. András Kiss: Liver | 7. | Dr. Attila Kovács: Head and Neck |
| 4. | Prof. Dr. Janina Kulka & Dr. Lilla Madaras: Breast | 8. | Prof. Dr. András Kiss: GI |
| | | 9. | Dr. Deján Dobi: Kidney |
| | | 10. | Dr. Eszter Székely: Cytology |
| | | 11. | Dr. Eszter Székely: Urology |
| | | 12. | Dr. Jeannette Tóth: Eye |
| | | 13. | Dr. István Kenessey: Final exam |

Other subjects concerning the border issues of the given subject (both obligatory and optional courses!). Possible overlaps of themes:

Subject overlaps with 3rd year medical studies in pathology as well as with all clinical subjects.

Requirements for participation in classes and the possibility to make up for absences: Attending at least 9 lectures.

Requirements for signature: Attending at least 9 lectures. Individual essay work from a future determined topic which was lectured during the semester.

Type of examination: Written. Essay

Requirements of the examination: Topic of the performed lectures (see above).

Method and type of evaluation: *(Method of calculating the final mark based on the theoretical and practical examination. How the mid-term test results are taken into account in the final mark.)*

Subjective evaluation of the essay work.

Possibilities for exam retake: No retake opportunity. In the absence of the essay signature will be refused.

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

Material will be submitted to the Moodle system of the University.

DEVELOPMENTAL BIOLOGY: from gene to newborn. I. -

“Our real teacher has been and still is the embryo, who is, incidentally, the only teacher who is always right.”

Hamburger 1900-2001

Regulatory mechanisms and early development of embryology

2 hours/week, 2 credits

Prof. Dr. Imre Oláh

Department of Human Morphology and Developmental Biology**Introduction to developmental biology**

Comparative embryology, epigenesis and preformation, evolutionary embryology, medical implications

Regulatory elements of the ontogenesis I.

Hormones, growth factors, transcription factors, instructive and permissive interactions

Regulatory elements of the ontogenesis II.

DNA-methylation, X chromosome inactivation, genomic imprinting

Cell-cell and cell-extracellular matrix interactions

Adhesion molecules, integrins, cytoskeleton and cell movement, cell polarization

Cell lineages

Fate map, stem cells, peripheral blood fibrocytes, cell specification, polarity in biological system

Neurogenesis

Origin of neural cells, switch between neuronal and glial fates, axonal specificity, synaptic plasticity

Neural crests and placods

Origin of neural crest and placods, flexibility and heterogeneity of neural crest cells.

Myogenesis

Embryonic origin of skeletal, smooth and cardiac muscles. Induction of myogenesis, regulatory factors of myogenesis, regeneration of skeletal muscles

Teratogenesis

Morphogens, morphogenetic period, cancer as an altered development, stem cell therapy, teratogens.

Primordial germ cells (PGC)

Origins, migration, mitosis, differences between male and female PGC, maturations

Fertilization

Acrosome reaction, prevention of polyspermy, activation of egg metabolism

Embryonic induction

Spemann organization center, mosaic and regulative zygotes

Early embryonic development

Cleavage, neurulation, X-chromosome inactivation, parental imprinting

Gastrulation

Differentiation of mesoderm, primary tissue formation

Axis formations in birds and mammals

Symmetry breaking, left-right asymmetry formation.

ORGANOGENESIS**2 hours/week, 2 credits****Prof. Dr. Imre Oláh****Department of Human Morphology and Developmental Biology****Axial and paraxial mesoderm**

Formation of axial skeleton, somitogenesis, clinical correlations

Segmentation and Homeobox genes

Retinoic acid, gain of function, loss of function

Intermediate mesoderm I.

Development of kidney, clinical correlations

Intermediate mesoderm II.

Development of gonads, sex determination, clinical correlations

Lateral plate mesoderm, splanchnopleura I.

Vasculogenesis, blood formation, hematopoietic stem cell.

Lateral plate mesoderm, splanchnopleura II.

Early development of the heart. Cardiac anlage, cardiac jelly, cardiac skeleton, development of coronary vessels, contribution of neural crest cells, epicardial body, clinical correlations

Lateral plate mesoderm, somatopleura

Development of the limb, evolutionary and ontogenetic aspects, clinical correlations

Branchiogenic arches and their derivatives

Clinical correlations

Prechordal plate as head organizer, AVE-anterior ventral endoderm

Cranial neural crest and head mesoderm, somatic and visceral head and neck, clinical correlations

Development of arteries

Branchiogenic, parietal and visceral segmental arteries, clinical correlations

Epithelio-mesenchymal interactionsEcto-endoderm \leftrightarrow mesoderm, tooth and lung development, clinical correlations**Neurogenesis**

Antero-posterior, and craniosacral regionalization, axon guidance, growth, synapsis formation

Development of eye

Retina, lens

Entoderm formation

Foregut and its derivatives (thymus, thyroid, parathyroid), development of pancreas

Environmental regulation of development

Developmental symbiosis, seasonality and sex, nutritional contribution

BIOINFORMATICS

Department of Bioinformatics

Credit value: 2

Number of lessons per week: lecture: 1 **practical course:** 1

Subject type: optional course

II. semester

Name of the course leader: Prof. Dr. Balázs Gyórfy

Objectives of the subject, its place in the medical curriculum:

Today, we have plenty of data in medicine and the challenge lies not any more in obtaining the data but in interpreting the data. Figuring the result of genomics, transcriptomics and other omics technologies present a serious obstacle in understanding the molecular mechanism behind definite diseases. Luckily, bioinformatics is at hand to assist in solving these problems.

Bioinformatics comprises of the computer-assisted evaluation of clinical and biological data. We will discuss in detail three areas of bioinformatics. The first contain databases dealing with clinical and biological data. These also include biobanks and data repositories for storing and accessing information. The second area contains the data processing, modelling, visualization and interpretation. The third pillar is the interpretation of the data within the clinical context of a selected disease.

We will give lectures on the most important chapters of medical bioinformatics including databases, decision-support tools, genomics, transcriptomics, proteomics, medical informatics and artificial intelligence.

Successful completion of the subject results in the acquisition of the following competencies:

Students will be able to understand the theoretical basics and to utilize the most important bioinformatical tools. They will know the advantages and limitations of each method. The students will have a hand-on experience of these tools enabling successful application in research projects and in clinical diagnostics.

Course prerequisites:

Completed first two semesters.

Number of students required for the course (minimum, maximum) and method of selecting

students:

minimum: 20

maximum: 60

Thematics

I. section: Basics of bioinformatics

1. Introduction to bioinformatics (Balázs Gyórfy)
2. Utilization of a training and test set (János Tibor Fekete)
3. Statistical errors and dichotomania (János Tibor Fekete)
4. Survival analysis* (Balázs Gyórfy)
5. ROC analysis: predicting sensitivity and specificity * (János Tibor Fekete)

II. section: Omics

6. Similar genes and proteins, BLAST* (Balázs Gyórfy)
7. Introduction to genomics (Balázs Gyórfy)
8. Genomics: quality control* (Ádám Nagy)
9. Genomics: alignment of data to a reference genome * (Ádám Nagy)
10. Genomics: identifying mutations (SNV, indels) (Ádám Nagy)
11. Genomics: determining the consequence of a mutation* (Ádám Nagy)
12. Genomics: what is the clinical relevance of a mutation, ClinVar, dbSNP* (Ádám Nagy)
13. Genomics: mutation signatures (Ádám Nagy)
14. Genomics: copy number variations* (Ádám Nagy)
15. Genomics: identifying processing artefacts and quality issues (Otília Menyhárt)
16. Proteomics: pre-processing (Balázs Gyórfy)
17. Transcriptomics: processing RNA-seq data (Balázs Gyórfy)
18. Proteomics: tools to analyze immunohistochemistry results (Áron Bartha)
19. Proteomics: processing mass spectrometry (Áron Bartha)
20. Proteomics: understanding molecular functions, Uniprot (Otília Menyhárt)
21. Genomics: GeneBank (Attila Marcell Szász)

III. section: Integrative science

22. Application of multi-omic tools (Otília Menyhárt)
23. Clinical studies utilizing multi-omics (Otília Menyhárt)
24. Multiple hypothesis testing* (Balázs Gyórfy)
25. Analyzing COVID-19 (Ádám Nagy)
26. Reproducibility issues in medicine (Otília Menyhárt)

IV. section: Artificial intelligence

27. Introduction to artificial intelligence (Balázs Gyórfy)
28. Machine learning* (János Tibor Fekete)
29. The Bayes rule (János Tibor Fekete)
30. Clinical application of a decision tree (Áron Bartha)
31. Determining distance* (Balázs Gyórfy)
32. Clustering* (Balázs Gyórfy)
33. Neuronal networks* (Balázs Gyórfy)
34. Principal component analysis (Áron Bartha)
35. Support Vector Machines (János Tibor Fekete)
36. Regression* (Áron Bartha)
37. Diagnostic tools using artificial intelligence (Attila Marcell Szász)

V. section: Medical informatics

38. Using REDcap (Attila Marcell Szász)
39. Electronic health records (Áron Bartha)
40. Time distortion and computer addiction (Otília Menyhárt)
41. Development, learning and work (Otília Menyhárt)
42. Outlook (Balázs Gyórfy)

Each lecture comprises of three 15-minute talks. Starred lectures have associated exercises.

The exercises are held by:

Balázs Györfly, Áron Bartha, János Tibor Fekete, Máté Balajti, Ádám Nagy

It is recommended to bring a private laptop for the exercises.

Other subjects concerning the border issues of the given subject (both obligatory and optional courses!). Possible overlaps of themes: Biophysics (biostatistics), translational medicine Requirements for participation in classes and the possibility to make up for absences: According to the current regulation of the University. Missed exercises can be repeated at the last exercise.

Methods to assess knowledge acquisition during term time:

(E.g. homework, reports, mid-term test, end-term test, etc., the possibility of replacement and improvement of test results)

Completed exercises give 33% of the final result.

Requirements for signature:

Maximal number of missed lectures: 25% of all lectures.

Type of examination:

The semester ends with a colloquium.

Requirements of the examination:

(In case of a theoretical examination, please provide the topic list; in case of a practical exam, specify the topics and the method of the exam)

The final exam will comprise a theoretical part (42 multiple-choice selection test) and an exercise. The exercise will comprise a bioinformatic evaluation of a new data. Any support tool, including utilization of a private laptop is allowed when solving this final exercise.

Method and type of evaluation:

(Method of calculating the final mark based on the theoretical and practical examination. How the mid-term test results are taken into account in the final mark.)

Completed exercises (33%), multiple-choice test (33%), final exercise (33%)

Possibilities for exam retake:

According to the current Study and Examination Regulations.

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

The lectures contain all necessary information, a hard copy of the slides will be provided at each lecture.



Faculty of Medicine
6th year

Obligatory INTERNSHIPS AND RESPONSIBLE DEPARTMENTS

Internal Medicine

**Department of Internal Medicine and Oncology
(former 1st Department of Internal Medicine)**
Budapest VIII., Korányi Sándor u. 2/A Phone: 459-1500 / ext 51465
Head of the Department: **Dr. István Takács**
Tutor: **Dr. Péter Studinger**
Email: studinger.peter@semmelweis.hu

**Department of Internal Medicine and Hematology
(former 2nd and 3rd Department of Internal Medicine)**
Budapest, VIII. Szentkirályi u. 46. Phone: 459-1500
Head of the Department: **Prof. Dr. Tamás Masszi**
Tutor: **Dr. Katalin Keltai**
E-mail: keltaikati@gmail.com

Infectology

Department of Internal Medicine and Hematology, Division of Infectology at Szent László Hospital
Budapest, Albert Flórián u. 5-7.
Head of the Department: **Dr. Gergely Kriván**
Tutor: **Dr. János Sinkó**
E-mail: infectology.hun@gmail.com (Ms. Júlia Nagy)

Surgery

Department of Surgery, Transplantation and Gastroenterology
Budapest VIII., Üllői út. 78. Phone: 459-1500 / ext. 52120
Head of the Department: **Prof. Dr. Attila Szijártó**
Tutor: **Dr. Péter Ónody**
E-mail: kovacs.zsanett@med.semmelweis-univ.hu (Ms. Zsanett Kovács)

Traumatology

Department of Traumatology
Semmelweis University Clinic for Traumatology Budapest VIII, Korányi Sándor utca 2.
Dr. Manninger Jenő Trauma Center Budapest VIII., Fiumei út 17. Phone: 461-4723
Uzsoki Hospital, Department of Orthopedics-Traumatology Budapest XIV., Uzsoki u. 29. Phone/fax: 467-3851
Mobile: 06-20-825-8680
Head of the Department: **Dr. Tamás Bodzay**
Tutor: **Dr. Dániel Koczka**

Vascular surgery

Department of Vascular and Endovascular Surgery
Budapest, XII., Városmajor u. 68. Phone: (+36-1) 458-6700
Head of the Department: **Prof. Péter Sótónyi M.D.**
Tutor: **Dr. László Hidi**

Pediatrics**Pediatric Center, Bókay street Department**

Budapest VIII., Bókay J. u. 53. Phone: +36-1-313-8212

Director, Head of the Department: **Prof. Dr. Attila Szabó**

Tutor: **Dr. Ádám Balogh**

E-mail: education.bokay@semmelweis.hu (Ms. Enikő Stalmár) (Phone: 52656)

Pediatric Center, Tűzoltó street Department

Budapest IX., Tűzoltó u. 7-9. Phone: 215-1380

Head of the Department: **Prof. Dr. Gábor Kovács**

Tutor: **Dr. Klára Horváth**

Pediatric Center Tűzoltó street Department

Budapest IX., Tűzoltó u. 7-9. Phone: 215-1380 / ext. 52976

Head of the Department: **Prof. Dr. Attila Szabó**

Tutor: **Dr. Klára Horváth**

Obstetrics and Gynecology**Department of Obstetrics and Gynecology**

Budapest VIII., Baross u. 27. Phone: 266-0473

Head of the Department: **Prof. Dr. Nándor Ács**

Tutor: **Dr. Gyula Richárd Nagy**

E-mail: szlaby.emese@med.semmelweis-univ.hu (Ms. Emese Szlaby)

Neurology**Department of Neurology**

Budapest VIII., Balassa u. 6. Phone: 210-0330

Head of the Department: **Prof. Dr. Dániel Bereczki**

Tutor: **Dr. Róbert Debreczeni** (debreczeni.robert@med.semmelweis-univ.hu)

E-mail: kovacs.andrea@med.semmelweis-univ.hu (Ms. Andrea Kovács)

Psychiatry**Department of Psychiatry and Psychotherapy**

Budapest VIII., Balassa u. 6. Phone: 210-0330 / ext. 51100

Head of the Department: **Dr. János Réthelyi**

Tutor: **Dr. Erika Szily**

E-mail: szecci.tunde@med.semmelweis-univ.hu (Ms. Tünde Szécsi)

Family Medicine in Daily Practice**Department of Family Medicine**

Budapest VIII., Stáhly u. 9. Phone: 355-8530

Head of the Department: **Dr. Péter Torzsa**

Tutor: **Dr. Ádám Becze**

E-mail: fekete.ilona@med.semmelweis-univ.hu (Ms. Ilona Fekete)

Prehospital Emergency Medicine

National Ambulance Service

Budapest XIV. Erzsébet királyné útja 87. Phone:350-6931

Director: **Dr. Gábor Göbl**

E-mail: fabula.katalin@mentok.hu (Ms Katalin Fabula)

Basics of Transfusion Medicine

Department of Transfusion Medicine

Budapest VIII., Nagyvárad tér 4.

Phone: 210-2940

Head of the Department: **Prof. Dr. Attila Tordai**

E-mail: kristof.szilvia@semmelweis.hu (Ms. Szilvia Kristóf)

STUDY PROGRAM

 6th Year in the 2024/2025 academic year

 11–12th Semester

Course name	lecture (h/week)	lecture (h/semester)	practice (h/week)	practice (h/semester)	seminar (h/week)	seminar (h/semester)	credit points	prerequisite(s)	examination
OBLIGATORY									
Basics of Transfusion Medicine	AOKTRF776_SA		40					1 Intensive Therapy and Anaesthesiology, Internal Medicine I (Hematology, Infectology, Immunology, Rheumatology)	practical mark
Family Medicine in Daily Practice	AOKCSA645_SA				40			0 Internal Medicine II (Hematology, Infectology, Immunology, Rheumatology), Medical Imaging, Pulmonology - Thoracic Surgery	signature
Infectology (rotation)	AOKSZL644_SA				40			0 Internal Medicine II (Hematology, Infectology, Immunology, Rheumatology), Medical Imaging, Pulmonology - Thoracic Surgery	signature
Internal Medicine	AOKBHK785_SA				240			8 Internal Medicine II (Hematology, Infectology, Immunology, Rheumatology), Medical Imaging, Pulmonology - Thoracic Surgery	comprehensive examination
Internal Medicine	AOKBOK786_SA				240			8 Internal Medicine II (Hematology, Infectology, Immunology, Rheumatology), Medical Imaging, Pulmonology - Thoracic Surgery	comprehensive examination
Internal Medicine	AOKKAR662_SA				240			8 Internal Medicine II (Hematology, Infectology, Immunology, Rheumatology), Medical Imaging, Pulmonology - Thoracic Surgery	comprehensive examination
Neurology	AOKNEU657_SA				120			3 Neurology and Neurosurgery	comprehensive examination
Obstetrics and Gynaecology	AOKNO1655_SA				160			4 Clinical Genetics, Obstetrics and Gynaecology	comprehensive examination
Pediatrics	AOKGY1848_SA				240			6 Internal Medicine II (Hematology, Infectology, Immunology, Rheumatology), Pediatrics, Clinical Genetics	comprehensive examination
Pediatrics	AOKGY2849_SA				240			6 Internal Medicine II (Hematology, Infectology, Immunology, Rheumatology), Pediatrics, Clinical Genetics	comprehensive examination
Physical Education XI.	AOKTSI009_11A			1				0	signature
Physical Education XII.	AOKTSI009_12A			1				0	signature

Course name	lecture (h/week)	lecture (h/semester)	practice (h/week)	practice (h/semester)	seminar (h/week)	seminar (h/semester)	credit points	prerequisite(s)	prerequisite(s)	examination
Prehospital Emergency Medicine	AOKOMS663_SA				80			2	Intensive Therapy and Anaesthesiology, Emergency Medicine and Oxyology, Traumatology	practical mark
Psychiatry	AOKPSI658_SA				120			3	Psychiatry and Psychotherapy	comprehensive examination
Six-week Facultative course	AOKANG661_SA				240			6	Internal Medicine I (Hematology, Infectology, Immunology, Rheumatology), Surgery I-II + the last course of the chosen field (announced in the 5th year at latest)	practical mark
Surgery	AOKSB1646_SA				160			6	Traumatology, Urology, Ophthalmology	comprehensive examination
Traumatology (rotation)	AOKTRA651_SA				40			0	Traumatology, Urology, Ophthalmology	signature
Vascular surgery	AOKSBE650_SA				40			0	Traumatology, Urology, Ophthalmology	signature

Comment:

Please read more about the rules concerning the criteria of selecting the foreign clinical practice positions and accepting the practice period spent abroad: : that can be found on our website <https://semmelweis.hu/registrar/>

Please note the followings:

1. When not at Semmelweis University the one week Traumatology is to be completed at a surgical department providing *neurochirurgia* as well.
2. It is strongly required to keep the instructions of the Examination and Studies Regulations concerning the requirements of the diploma work focusing especially on the deadlines.
3. The final exams can be done only on the exam dates published by the clinical departments of Semmelweis University.

Please note: there are no individual requests and the rule should be kept **strictly**.

INTERNAL MEDICINE

To be present for at least 7 hours per day (35 hours per week), **including 1 week Infectology and 1 week Family Medicine.**

Activities should include the following subjects: general survey of hospital/department organization, examination of patients in the Medical Department, with special emphasis to case history taking and full physical examination.

The students should gain practice in patient documentation, problem-oriented medical record keeping, taking of pulse, blood pressure. of patients, making 12-lead ECG.

Participate in the preparation of diagnostic and therapeutic plan for patients.

Be present at invasive and semi-invasive interventions (taps of abdominal and chest fluid, preparation of bone marrow smear etc.).

To spend time at the outpatient department.

To practice basic laboratory techniques needed in bedside diagnosis (urinalysis, stool examination, use of dip sticks etc.).

To be on night duty once during the period.

Consultations in gastroenterology, diabetes, hematology, endocrinology, cardiology, sonography, X-ray, ECG etc.

Watch endoscopy performed.

See the intensive coronary care unit.

Regular consultations with the doctor responsible for the student.

All these activities should be carefully supervised by members of the medical staff.

The students should also practice communication with patients and their relatives, while giving them relevant medical information on the disease but avoiding conflicts with medical confidentiality.

Students should take an active part in medical consultations concerning their patients, as well as in the medical conferences in the department.

INFECTOLOGY IN INTERNAL MEDICINE

One-week infectology practice within sixth year's rotation in internal medicine

Subject: Infectious diseases (Infectology)

Head of Division: *Dr. Gergely Kriván*

Location: Department of Internal Medicine and Hematology, Division of Infectology at Szent László Hospital
1097 Budapest, Albert Flórián út 5-7.

Time period: 40 hours a week

Registration: NEPTUN system

Program: a detailed program plan will be announced about locations and tutors of daily practice in time.

Group size: Our institution can only accept a limited number of students at a time. In order to keep the program interactive and due to changing infection control rules, structure and logistics of the practice may change and the maximum number of participants may be restricted. For places available please check the NEPTUN system.

Overview

Knowledge in infectious diseases has been part of ancient medical practice and science for ages. Epidemics, isolation of patients with communicable diseases, vaccinations and anti-infective therapy had a significant impact not only on the progress in healthcare but also on history and socio-cultural development of mankind. Although infectology is often considered being of marginal importance within internal medicine, it should be noted that an increasing number of diseases and conditions seem to have an infectious background. In addition, around a third of chapters within major medical textbooks deal with infectious diseases. As a result of the recent pandemic caused by SARS-CoV-2 virus unprecedented attention is being paid to infectious disease management globally.

Currently development of infectology has two important directions that are complementary to each other. The traditional one will target classical and emerging infections often of global scope, like COVID-19, influenza, gastrointestinal infections, hepatitis, or malaria etc. A newer branch of infectology is focusing on infections related to modern medicine, like nosocomial outbreaks caused by multiresistant organisms or infections occurring in immunocompromised hosts. Prophylaxis and therapy of infections as well as knowledge on antibiotic therapy is of significant importance in both fields.

Program details

During infectology rotation you will be invited to take part in rounds at the Departments of Infectious Diseases (infection control situation permitting), participate in round table discussions on current topics in infectology, discuss real life cases especially in the immunocompromised host setting, and gain insight into modern HIV/AIDS. management.

Sessions are intended to be as interactive as possible, so you are encouraged to actively take part in discussions and feel free to ask questions from the tutors at all times.

Completion of rotation and signature: Registered students must attend all courses to receive their signature. We can only accept hospital discharge papers for verification of absences. The absence must be substituted at a later time period, assigned by the tutor. In the case of further absences, the practice cannot be accepted. Excuses like having been unable to locate the venue of practice are not acceptable. Students arriving later than 10 minutes past the scheduled start of the sessions will not be accepted to take part in the program.

SURGERY

- Acting as a HO or SHO under strict supervision, including administration and practical skills.
- Admitting of patients with full physical examination, including breast and PR examinations.
- Theoretical planning for examinations and treatments for the examined patients.
- Continuous observation and registration of the patient's condition with administration.
- Writing of discharge reports.
- Performing different injections (iv., im, sc), insertion of venflons, phlebotomies. To determine blood group, performing of transfusions under strict supervision. Completion of administration.
- Insertion of NG tubes.
- Catheterization (urethral and suprapubic).
- Removal of clips and stitches.
- Changing of dressings.
- Assistance at abdominal and thoracic wash-outs or punctures.
- Taking part in consultations with other specialists.
- Theoretical decisions about operations. Consenting.
- Taking part in operations, scrubbing in, stitching.
- Examination and treating of emergency patients.
- Taking part in anesthesiological preparation of patients.
- Observation of premedications.
- Assistance at several anesthesiological procedures, including spinal, peridural and GA.
- Assistance at intubations. If possible, independent intubation.
- Measurement of CVP.
- Assistance at jugular and subclavian venal punctures.
- Suction of the throat and trachea.
- Observation of ITU work.

HO	house officer
SHO	senior house officer
PR	per rectum
NG	nasogastric
GA	general anesthetic
CVP	central venous pressure
ITU	intensive therapy unit
- Observation of postoperative treatment.
- Observation of resuscitation and reanimation.
- Observation of autopsies of the ward.
- Being present at every medical discussion of the ward.
- Observation of outpatient work.
- Assistance in outpatient work including assistance at day surgical operations.
- Changing of dressings of outpatients.
- Treatment of infected wounds.
- Assistance at i.v. anesthesia.
- Performing and assisting at local anesthesia.
- Observation and assistance at ultrasound, endoscopies and X-ray examinations.
- As interns, students take part in the daily rounds and report on the patients examined by them or treated in their section. Interns examine the patients under the supervision of the ward chief or ward surgeon. Interns are required to be personally involved in the examinations and the evaluation of the findings.

Involvement in the preparation of the documentation of the patients.

Involvement in the preoperative preparations as well as in the postoperative care and treatments.

Take part in the operations as second assistants.

Take part in on-call duty without numerical limitations. During on-call (night) duty, interns should-under the supervision of the ward chief or authorized surgeon – be involved in solving all problems caused by either acute or chronic diseases.

Interns are required to take part in all consultations organized for them.

Interns will be eligible for the final examination if the above conditions have all been met and their academic achievements during their internship proved.

TRAUMATOLOGY

Credits: 0

Total number of hours: 40 lectures: practices: 40 seminars:

Type of the course (mandatory/elective): Mandatory

Academic year: 2024/2025

Course director (tutor): Dr.Tamás Bodzay

Contact details: Semmelweis University Traumatology Department
06 20 825 86 80

Email: office.trauma@semmelweis.hu

Position: Head of Department

Date of habilitation: in progress

Objectives of the course and its place in the medical curriculum:

Traumatology as a specialty deals with the treatment of injured patients, independent of the injured organ, patient's age or previous diseases. In developed countries, the 4-5th leading cause of death is injury, while in the actively working population, the rate of death is even higher. Morbidity in children and in the elderly is also high. Since the patient examination and therapeutic algorithm somewhat differ from the previously taught examination and treatment methods in the curriculum, our aim is to offer a general and practical approach to treating trauma patients for students. The prerequisite for 6th year Traumatology is the material and exam from the 5th year in Traumatology, to be used in a more practical manner. Beside this, familiarization and active participation in the daily routine of a Traumatology department play a role in the students' curriculum.

Location of the course (lecture hall, practice room, etc.):

- Semmelweis University Clinic for Traumatology
1083 Budapest, Korányi Sándor u. 2.
- Uzsoki Hospital, Department of Orthopedics-Traumatology, Conference room (ground floor)
1145 Budapest, Uzsoki street 29-41.
- Dr. Manninger Jenő Trauma Center, Budapest, Conference room (8th floor)
1081 Budapest, Fiumei street 17.
- In the Member States of the European Union (and in Switzerland and Norway), clinical practice is accepted and recognized if it is earned at a Traumatology or Orthopedic-Traumatology department at state-accredited university clinics or teaching hospitals – the legal ground for this is the mutual recognition of diplomas issued by the accredited institutions.
- Abroad at a Traumatology or Orthopedic-traumatology department of an accredited teaching hospital accredited by the Hungarian Accreditation Committee – HAC (this can be checked on the following website: <https://semmelweis.hu/registrar/medicine/rotation/approved-institutes/>).
- Abroad in the country of students' choice, which has been approved by the department (which meet the requirements posted on the Traumatology Department's website).

Competencies gained upon the successful completion of the subject:

During practices, students will have the opportunity to learn the following: physical examination of injured patients, bandaging, suturing, casting techniques, and the uses of orthoses and splints. Consultation of typical and the more frequent trauma cases, radiologic diagnostics, as well as shadowing, observing and/or assisting in the operating theater are also part of the curriculum. In the ER, students will have an opportunity to examine and participate in the trauma care of patients under supervision.

Prerequisites for course registration and completion:

Traumatology IV

According to the academic and examination regulations of Semmelweis University

Detailed course description:

- 1.) Daily attendance of morning conference. After becoming acquainted with the introduced cases, students will have the opportunity to examine the hospitalized patients and familiarize themselves with patient's documentation.
- 2.) Assisting or observing in the operative theater, depending on the operative program.
- 3.) Students shall participate in patient admission, examination, follow and help in the evaluation of the diagnostic examinations, and take part in the acute treatment of traumatized patients during on duty shifts.
- 4.) Participating in grand rounds, patient presentation, and following up on referrals.
- 5.) Consultation with attending tutor of actual clinical cases, planning the treatment and the course of patient follow up.
- 6.) Taking part in patient follow up examinations. Examining the range of motion, function, evaluating x-rays and CT scans. Identification and treatment of complications.

Detailed syllabus:

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. First Aid 2. Evaluation of the mental-stage/orientation with the Glasgow-score 3. Evaluating and management of external wounds 4. Termination of bleeding 5. Transportation of trauma patient 6. Transient fixating bandage of traumatic part of body 7. Preparation of the surgical area 8. Surgical scrub-in and clothing 9. Infiltrational anaesthesia 10. Incision and drainage 11. Management of infected, necrotic wound | <ol style="list-style-type: none"> 12. Closure 13. Stitch removal 14. Applying pressure-bandage 15. Reuniting closed fractures 16. Fracture stabilization 17. Reduction of dislocation 18. Transient fixation of broken extremities 19. Insertion of Foley's catheter in men 20. Insertion of Foley's catheter in women 21. Venous-cannulating 22. Pain management 23. Assisting surgical procedures |
|---|--|

Related subjects due to interdisciplinary fields (both obligatory and elective) and potential overlaps between subjects:

Orthopedics, First aid, Sports Medicine, Neurotraumatology, Hand Surgery, General Surgery, Special aspects of the treatment of the multiple injured patients, Artificial Intelligence in Diagnostics and Surgery Planning

In ease of illness, 10 hours of absence is allowed if the student can provide documents of medical treatment, and this absence can be made up at a later time which is convenient for the tutor. Absence of more than 10 hours cannot be made up and we cannot accept the practice for the student.

Attendance requirements; conditions under which students can make up for absences and the method of absence justification:

The certificate (for students spending the practice abroad) or attendance sheet (students spending the practice in Budapest) must be handed in or scanned and emailed to the Traumatology Department upon completion of the practice.

Means of assessing the students' progress during the semester:

The interactive seminars and practices allows for the assessment of students' progress. There will be no formal test/quiz during the practice week.

Duration of the practice: 1 week (40 hours)

The certificate (for students spending the practice abroad) or attendance sheet (students spending the practice in Budapest) must be handed in or scanned and emailed to the Traumatology Department upon completion of the practice.
No absence of the practice is allowed.

Requirement for acknowledging the semester (signature):

Attendance of the practice (one week - 40 hours), as well as the signed and stamped attendance sheet (and/or certificate) according to the directions written on the department's website (based on where the student spends their practice)

Form of assessment in the study period:

The interactive seminars and practices allows for the assessment of students' progress. There will be no formal test/quiz during the practice week.

Type of assessment:**Final exam — oral exam**

The exam for 6th year students is organized by the Traumatology Department following the one week Traumatology practice as part of the 6 week surgery practice, The prerequisite for the surgery exam is that the student takes both the Traumatology and Vascular Surgery examinations prior to the General Surgery examination. The average of the 3 partial grades (Traumatology, Vascular Surgery and General Surgery) constitutes the score of the final exam.

Examination requirements:

Oral examination. One of the following topics is chosen by the student. The knowledge of the topic is based on material of the textbook, lecture material uploaded in Moodle, and knowledge acquired during practices from both 4th and 6th years.

Topic list:

1. Treatment of the open fractures, guidelines, methods
2. Nonoperative treatment methods of fractures (traction, functional treatment, external fixation, guidelines of the treatment of fractures)
3. Osteosynthesis, methods
4. Mechanism, diagnosis and treatment of joint dislocations
5. Clinical symptoms of fractures, diagnosis
6. Primary and immediate care of skull and brain injuries, in-hospital diagnostic examination methods
7. Classification of skull fractures, and treatment principles
8. Concussion and contusion of the brain and their treatment
9. Epidural, subdural and intracerebral hematoma; symptoms, diagnosis and treatment
10. Examination of spinal injuries; diagnosis. Surgical indications in the management of spinal injuries
11. Fixation of vertebral fractures. Rehabilitation of spinal injuries
12. Rib fracture classification, treatment and prognosis
13. Treatment and diagnosis of hemo- and pneumothorax
14. Guidelines for observing patient with blunt abdominal injuries, diagnosis and treatment of parenchymal and bowel injuries
15. Types and treatment of the injuries of the shoulder girdle (soft tissue and bony lesions)
16. Treatment of humeral fractures (humerus neck and diaphysis)
17. Diagnosis and treatment of olecranon fractures
18. Treatment of forearm fractures in adults
19. Typical radial bone fracture (distal radius fracture) principals and treatment methods
20. Perilunuluxation and fracture of the scaphoid bone. Therapy of Bennett's fracture. Metacarpal and phalangeal fractures.
21. Soft tissue and tendon injuries of the hand. Septic hand.
22. Types, treatment and associated injuries of pelvic fractures.
23. Types, therapy and probable complications of hip fractures (femoral neck and intertrochanteric fractures)
24. Diagnosis, treatment, complications and prognosis of intracapsular fractures of the femoral neck
25. Principles of endoprosthesis replacement (arthroplasty) surgery
26. Diaphyseal fractures of the femur
27. Intraarticular fractures of the knee and treatment methods
28. Diagnosis and treatment of patellar fractures
29. Ligament injuries of the knee – injury mechanism, diagnosis and treatment
30. Cartilage injuries of the knee joint (including meniscus injuries). Principles of arthroscopy
31. Open and closed tibia fractures – treatment and rehabilitation
32. Ankle sprain injuries – examination and treatment methods. Complications of ankle fractures and their treatment methods.
33. Types and treatment of ankle fractures
34. Calcaneal fracture and its therapy
35. Symptoms and therapy of Achilles tendon ruptures
36. Compartment syndrome of the lower extremity – diagnosis and treatment

Type and method of grading:

Grading is based on a 5 scale grading system (1-5). The grade of the oral exam in Traumatology is a partial grade of the Surgery final exam.

Literature, i.e. printed, electronic and online notes, textbooks, tutorials (URL for online material):**Name of Textbook:**

The Trauma Manual: TRAUMA AND ACUTE CARE SURGERY Third edition Editors: Andrew B. Peitzman Michael Rhodes C. William Schwab Donald M. Yealy Timothy C. Fabian Publisher: Wolters Kluwer / Lippincott Williams & Wilkins

Internet

The lecture material can be downloaded from Semmelweis University's E-learning portal <https://itc.semmelweis.hu/moodle/?lang=en>

VASCULAR SURGERY

Department of Vascular and Endovascular Surgery

Type of the subject: mandatory

Credits: 0

Interval of practice: 1 week

Total number of hours per week 40

Syllabus of the subject

Objectives of the course and its place in the medical curriculum:

Vascular surgical pathologies include a number of diseases with a high mortality rate, which are increasing nowadays. In our country, the number of limb amputations performed for non-traumatic reasons is three times higher than the average of Western European countries. This data also draws attention to the importance of vascular medicine. The purpose of the practice is to describe chronic and emergency, life- and limb-threatening vascular diseases, and to present their differential diagnosis. Knowledge of the patient's symptoms and complaints is still important in the accurate diagnosis of vascular surgical diseases, and the emphasis is on the outpatient examination at the patient's bedside, where questioning the patient is essential for establishing the correct diagnosis. The students also receive a general training where they learn to ask patients questions that enable them to effectively investigate the patient's complaints. The physical examination is the basis of vascular examinations. It may be sufficient to establish a diagnosis even without other imaging tests. Perhaps there is no other specialty where the patient's general condition co-morbidities, and age have such an influence on the burden of surgery and intervention. Students learn that establishing a diagnosis is not the same as establishing a therapy plan.

Competencies acquired through the completion of the course:

As a general practitioner, students will be able to assess the most important emergency cases of vascular origin (stroke, dissection, aneurysm rupture, acute limb ischemia) and perform the first steps. They learn the basics of the physical examination of the vascular system, the forms of imaging examinations, and the indications for its request. After evaluating the results of the physical and imaging tests, they take the necessary therapeutic steps and direct the patients to the appropriate type and level of specialist care. In the field of vascular diseases, they learn the place and role of primary and secondary prevention.

Prerequisites for course registration and completion:

Anatomy of the vascular system, regional anatomy of the neck, abdomen, and extremities. Vascular pathology, pathophysiology. Completed Cardiology-angiology course.

Student headcount conditions for starting the course (minimum, maximum) and method of student selection:

Subject and course enrollment in Neptun according to the block schedule.

Detailed course description:

General Information:

The practice takes place in five locations: vascular surgery outpatient clinic, vascular surgery department, vascular surgery operating room, angiography laboratory, ultrasound diagnostic laboratory. Each student spends 1 day at each location, in a rotating system. Monday morning briefing (important information related to the internship: tour of locations, explanation of rotation schedule, distribution of necessary documents, information about the test exam). The tutor present at the practice locations confirms attendance with his signature. The signed attendance sheet must be submitted to the departmental secretariat on the last day of the practical week.

Knowledge assessment: On the last day of the internship, the test will take place, which will be conducted using the Moodle system. The test is evaluated with a five-point grade, by converting the achieved percentage values: 100-90%: excellent, 89-80%: good, 79-70%: moderate, 69-60%: sufficient, <60%: insufficient. The exam grade obtained in this way will NOT be included in Neptun. The results are sent to the education secretariat of the Surgery, Transplantation and Gastroenterology Clinic (ST&G) in the form of an official notification. The result of the test is counted as one-third of the theoretical grade of the surgery examination in the examination result.

Absence, substitution: A certified absence can only be made up at a time agreed with the department's education administrator. It is sufficient to make up the practice according to the day of absence. Only students who have completed the practical at each location and who have submitted a completely filled out and fully signed attendance sheet to the departmental secretariat may take the test exam. Due to the large number of students and the severely limited capacity of individual practice locations, you may have to wait several weeks for a replacement, so it is recommended to complete the practice with your own group according to the block schedule.

External vascular surgery practice:

In accordance with faculty regulations, internships can only be carried out at external training sites officially accepted (accredited) by the faculty. The documents for reporting and authorizing this and certifying the fulfillment must be used in accordance with the faculty regulations. In the case of an internship completed at an external training location, it is also mandatory to write the test. This will take

place at a specific time, according to the consultation with the department's education administrator.

Appearance at practice locations: A white coat is mandatory at all locations (use of your own coat is allowed) and other equipment according to current regulations (e.g. face mask). A guarded changing room is provided at the clinic. Practice in the ward begins at 7:00 a.m. with the morning visit. The student must participate in the visit. Practice at the outpatient clinic starts at 9:00. At the other locations, practice starts at 8:00 a.m.

Knowledge and competences that can be acquired at each practice location:

I-II. Students' ward and outpatient activities:

In the ward and the outpatient clinic, the primary focus is meeting the patient, the examination, and the specific questioning of the patient's vascular system problem. We usually hold a morning meeting at 7:30 a.m., which the student assigned to the class must also attend. Our goal is to provide assistance with a thorough knowledge of emergency, life, limb, or other target organ (stroke) cases. Under the guidance of the tutor, the student participates in ward visits, where he learns about the medical history of the inpatient patients, the types of operations that have already been performed, or the planned surgical options. When taking an anamnesis, the student learns what the specific questions are that help to find out to what extent the patient's complaints may stem from a vascular lesion. What are the dynamics of the lesion, how acute or emergency care is needed. In the physical examination, palpation of the vascular status, examination with a mini-doppler device, and recognition of signs of acute blockage are the primary goals. The student can participate in bandaging operated patients, setting up injection and infusion treatments, and can use and observe computer systems.

III. Getting to know the diagnostic possibilities of vascular patients:

The student spends at least one day in the angiography lab. One of the goals of the consultations in the department and the outpatient clinic, as well as in the operating room, is for the student to learn about the most common invasive and non-invasive diagnostic options and to be able to choose from them if necessary. In addition to all this, they have the opportunity to get to know the ultrasound diagnostic laboratory operating at the vascular surgery outpatient clinic.

IV. Operating theater activity:

In the operating room, observation is primarily carried out, but you can even actively participate in some processes. During the time between operations, information related to the operations can be discussed, especially the explanation of the algorithm for setting up the indication for the operation. In certain surgeries, it may be possible to perform assistant activities in the surgeries, depending on the nature of the surgery.

V. Vascular surgery outpatient clinic:

The student participates with the assigned specialist in the examination of vascular patients. You yourself perform a patient examination (palpation, auscultation, doppler, and participation in the evaluation of the findings), the patient's admission to care, the treatment de-

cision mechanism, and aspects of the control of operated patients are discussed. You see a large number of acute and chronic patients in a relatively short period of time. At the ambulance, you can really learn about real diagnostic and therapeutic algorithms in actual cases. The student can often follow these patients in the ward, in the angiography lab and in the operating room.

Attendance requirements; conditions under which students can make up for absences and the method of absence justification:

25% absence is allowed, however, missed practice elements must be made up. Confirmed absences can only be made up at a time agreed with the departmental education administrator by joining the designated group. It is sufficient to make up the practice according to the day of absence. Only students who have completed the practical at each location and who have submitted a completely filled out and fully signed attendance sheet to the departmental secretariat may take the test exam. Due to the large number of students and the severely limited capacity of individual practice locations, you may have to wait several weeks for a replacement, so it is recommended to complete the practice with your own group according to the block schedule.

Type of assessment: Test exam, as a condition for signature.

Examination requirements:

Examination topics:

- Epidemiology and risk factors of arterial and venous diseases
- Screening, prevention and conservative treatment of arterial diseases
- General symptoms and physical examination of arterial and venous diseases
- Vascular ultrasound diagnostics
- Vascular CT and MR diagnostic methods
- Angiography and intervention
- Basic vascular surgery techniques. Vascular grafts
- Lower extremity obliterative arterial diseases
- Supraaortic branches and upper limb arteries
- Aortic aneurysms, peripheral arterial aneurysms
- Renal and visceral occlusive diseases and aneurysms
- Aortic dissections
- Chronic venous insufficiency. Deep vein thrombosis
- Vascular access: surgically created arteriovenous fistulas
- Malformations
- Vasculitis in the clinical practice of vascular surgery/interventional radiology/angiology
- Diabetic foot, amputations
- Chronic peripheral lymphedema.

List of course books, textbooks, study aids and literature facilitating the acquisition of knowledge to complete the course and included in the assessment, precisely indicating which requirement each item is related to (e.g., topic by topic) as well as a list of important technical and other applicable study aids:

Sótonyi P., Szeberin Z.: Vascular Medicine, Semmelweis Kiadó, 2019 (university course book in English)

PEDIATRICS (Túzóltó street Department)

According to the curriculum, 6th-year medical students must complete a 6-week pediatric practical rotation. During this rotation, students will work in a different ward each week, allowing them to acquire and practice a wide range of activities and procedures on both infants and children.

Students should practice or potentially practice the following procedures during the rotation:

- Measuring pulse and blood pressure, and accurately measuring weight and height (including infants) using percentile tables.
- Actively participating in blood sampling, taking throat swabs, etc., under the supervision of the ward physician.
- Practicing various injection techniques (venous, intramuscular, subcutaneous) under the supervision of the ward physician.
- Preparing and controlling infusion and transfusion accessories, and performing these activities under the supervision of the ward physician. This includes determining blood groups.
- Assisting with special diagnostic or therapeutic interventions and learning to perform them under supervision (e.g., bone marrow sampling, lumbar puncture).
- Conducting blood counts and urine analyses (including sediment analysis), based on necessary physiological knowledge.
- Taking case records and maintaining temperature charts.
- Participating in daily student rounds, where simpler differential diagnostic questions are discussed with guidance from a full or associate professor.
- Attending tutorials on important theoretical subjects, gaining insight into the hospital's perspectives on debated questions.
- Additionally, students are expected to interact effectively with pediatric patients of various ages, perform basic nursing duties (feeding, drinking, bathing, changing diapers, administering medications), and engage in ward activities such as physical examinations, discussions about illnesses, therapies, and differential diagnoses.

Exam type: Bedside practical exam and oral exam.

Exam requirements: The list of topics is available on the department's website and on Moodle.

Note: Only legibly, completely, and accurately filled out, institutionally sealed, original acceptance letters are recognized by the Pediatric Center.

OBSTETRICS AND GYNECOLOGY

Essential Requirements in Obstetrics

- Prenatal care (anamnesis, lab tests, screening during pregnancy, obstetrical examinations, Leopold's manoeuvres)
- Cardiotocography (NST, OCT)
- Ultrasonography (evaluation)
- Abnormal pregnancy (diagnosis and therapy), intercurrent diseases (diabetes, heart diseases, renal diseases). Preeclamptic toxemia, hypertension, twins, hemorrhages, abortions
- Normal labor
 - fetal and maternal monitoring, management of the stages of labor (examinations during labor)
- Abnormal labor
 - breech delivery, transverse lie (diagnosis)
- Obstetric operations (assistance at labor and delivery)
- Obstetric operations (vacuum extraction, forceps, cesarean section, episiotomy)
- Postnatal care
 - Evaluation of the premature, dysmature and eutrophic newborns
 - Fundamentals of neonatal management
- Essential Requirements in Gynecology
- Gynecologic anamnesis
- Gynecologic examinations (to be carried out)
 - vaginal examination
 - colposcopy – cytology (basic knowledge, how to take a PAP smear)
 - examination of the breast
- Gynecologic operations (assistance)
 - bartholin abscess, cyst
 - D and C
 - abdominal hysterectomy
 - vaginal hysterectomy
 - colporrhaphy
- Postoperative management (basic knowledge)
- Outpatient clinics (to take part in the office work of outpatient clinics for gynecology, genetic counseling, adolescent gynecology, menopause, endocrinology, etc.)
- Bleeding disorders
- Cervical, corporal, ovarian, vulvar cancer (etiology, screening, diagnosis, therapy)
- Inflammation of the genital tract (PID)
- Urinary incontinence
- Contraception

NEUROLOGY

General information

Tutor: **Dr. Róbert Debreczeni**
Tel.: 210-0330, Fax: 210-1368

Office hours at the Department of Neurology:

Monday 13,00-14,00 Friday 10,00-12,00

Responsible Secretary: Andrea Kovács (Andi)

Rotation periods: set by the English Secretariat, but for individual changes one might apply at the Department of Neurology. To ease the scheduling of other 6th year practices the Department shall organize “early rotations” right after taking the 5th year semifinal exam.

Neurology rotation is 3 weeks long. Students receive their schedule and assignments on the first day of practice. During the training students must write one neurological case report. It is also obligatory to spend one day at our Outpatient Clinic and to take part in one nightduty (no sleep in). Students’ activity in the wards, at the Outpatient Clinic and during duty, and also the case report is evaluated by the student’s tutor on an assessment sheet. The assessment form and the case report must be presented at the final exam. During the training period two days of absence are allowed.

Final examination

One can register for the exam only through the Neptun-system.

The final examination consists of:

1. **practical part: neurological examination skills, decision making, tested at the bedside;**
2. **theoretical part: 3 theoretical questions.**

Examinations start at 10 a.m. Students must present their index book, assessment form, case report and in case of retake the permission from the Office of Dean.

On event of failing the earliest possible retake is 10 days later.

Official textbooks:

1. **Arányi Zs., Kamondi A., Kovács T., Szirmai I.: Investigation of neurological patients**
2. **Adams: Principles of Neurology. McGraw-Hill**
3. **Lindsay, Bone, Callender: Neurology and Neurosurgery Illustrated. Churchill Livingstone**

Other suggested books:

1. **Marsden, Fowler: Clinical Neurology. Raven Press**
2. **Duus: Topical Diagnosis in Neurology. Thieme Medical Publishers**
3. **Gilroy: Basic Neurology. Pergamon Press**
4. **Weiner- Lewitt: Neurology of House Officer. Williams and Wilkins**
5. **Bannister: Brain and Bannister’s Clinical Neurology. Oxford University Press**
6. **Mumenthaler: Neurology. Georg Thieme Verlag.**

6th year Medical Student Clinical Neurology Learning Objectives

Neurologic History and Examination

1. Perform a competent history, noting the following factors:
 - A. Establish the onset, progression and character of the disorder identifying all related symptoms.
 - B. Perform a standard neurologic review of symptoms with regard to personality, memory, headaches, pain, seizures, impairments of consciousness, vision, hearing, language function, swallowing, coordination, gait, weakness, sensory alterations, sphincter disturbance, and involuntary movements.
2. Perform a neurologic examination
 - A. Perform a screening mental status examination to include: level of consciousness assessment, and aphasia assessment.
 - B. Examine for meningismus, straight leg raising maneuver.
 - C. Cranial nerve examination
 - D. Motor examination including: tone, strength and bulk, pronator drift, abnormal movements.
 - E. Perform a reflex examination (muscle stretch reflexes, superficial reflexes, pathologic reflexes)
 - F. Coordination examination including finger-to-nose- test, heel-to-shin test, rapid alternating movements.
 - G. Gait examination: stance and Romberg test, gait, tandem gait, ability to rise from sitting, toe walking and heel walking.
 - H. Perform sensory examination including primary modalities (pain, temperature, position, vibration) and secondary/cortical modalities (stereognosis, graphesthesia, double simultaneous stimulation).
- I. Acquire the following skills:
 - A. Anatomic and physiologic basis of the neurologic examination.
 - B. Competent history, physical and neurologic examination.
 - C. Localize the lesion using the clinical database.
 - D. Develop a differential diagnosis of the clinical problem.
 - E. Assess the acuteness of neurological diseases, recognize neurological emergencies.
 - F. Formulate a plan of investigation and management.
- II. Describe the indications, techniques, results, contraindications and risks of the followings:
 - A. Lumbar puncture (investigation of CSF)
 - B. EEG, EMG, ENG, Transcranial magnetic stimulation
 - C. CT, MRI, SPECT, PET
 - D. Carotid and transcranial Doppler ultrasound
- III. Disorders of motor function
 - A. Differentiate between upper and lower motor neuron lesion (UMN, LMN).
 - B. UMN facial weakness and LMN facial weakness.
 - C. Disorders of coordination. Recognize symptoms of cerebellar disorders. Define ataxia, dysmetria, wide-based gait, and discuss the localization.
 - D. Define and differentiate involuntary movement disorders: tremor, rigidity, spasticity, athetosis, chorea, dystonias, myoclonus, tics. Discuss the findings and treatment of: Parkinson's disease, essential tremor, tardive dyskinesia, Huntington's chorea, Wilson's disease.
- IV. Disorders of sensation
 - A. Differentiate central sensory disorders from peripheral sensory disorders.
- V. Disorders of vision
 - A. Localize the lesions causing vision disorders and visual field defects.
 - B. Differentiate papilledema from papillitis.
 - C. The innervation deficit of the ocular muscles.
 - D. Recognize gaze problems and nystagmus.
 - E. Assess pupillary abnormalities.

- VI. **Episodic disorders**
- A. Seizure disorders: generalized and partial seizures, distinguish seizure from syncope.
 - B. Describe Todd's postictal phenomenon.
 - C. Evaluation of a patient for new-onset seizure.
 - D. The anticonvulsants, their indications and side effects.
 - E. Management of a patient in status epilepticus.
 - F. Narcolepsy and obstructive sleep apnea.
- VII. **Cerebrovascular diseases**
- A. Define the following: asymptomatic carotid bruit, TIA, amaurosis fugax, ischemic infarct, lacunar infarct, hemorrhagic infarct, parenchymal hemorrhage, SAH.
 - B. The clinical features of various territorial infarcts.
 - C. Treatment options to prevent infarction in atrial fibrillation and carotid stenosis.
 - D. The clinical features for hypertensive parenchymal hemorrhage.
 - E. The clinical picture and diagnosis of SAH. Early medical/surgical management of a patient with a SAH.
- VIII. **Multiple sclerosis (MS)**
- A. The criteria for the clinical diagnosis of MS.
 - B. The treatment of MS.
- IX. **Head trauma**
- A. Define the temporal profile, symptoms and treatment of: commotion, concussion, anterograde and retrograde amnesia, subdural hematoma, epidural hematoma, contusion or hemorrhage, liquorrhea.
- X. **Dizziness and disorders of hearing**
- A. Define vertigo, and contrast it with other type of dizziness.
 - B. Describe nystagmus, hanging head test (Hallpike maneuver), calorics.
 - C. identify the clinical features of: benign paroxysmal positional vertigo, vestibular neuronitis, Meniere's disease, brainstem TIA with vertigo, acoustic neuroma.
- XI. **Disorders of higher cognitive functions**
- A. Define and assess: dementia, delirium, amnesia, confabulation, hallucination.
 - B. Define normal-pressure hydrocephalus.
 - C. Define the anatomical basis for aphasia and dysarthria.
 - D. Differentiate the aphasias on the basis of ability to produce speech, comprehension, naming, repetition.
- XII. **Disorders of altered consciousness**
- A. Define hypnoid and non-hypnoid unconsciousness.
 - B. The anatomic basis of consciousness.
 - C. Assess the comatose patient, evaluation and treatment.
 - D. Localize the following: decorticate and decerebrate rigidity, conjugately deviated eyes, pathologic respiration, pinpoint pupils, anisocoria, intact versus absent oculocephalic response
 - E. Diagnosis and management of increased intracranial pressure (ICP).
 - F. Symptoms brain herniations.
- XIII. **Headaches and facial pain**
- A. Clinical features of migraine, cluster headache, tension headache, trigeminal neuralgia, "organic" headache.
 - B. Treatment for common headaches.
- XIV. **Brain tumors**
- A. Clinical presentation and diagnosis of primary brain tumors.
 - B. Metastatic tumors to the brain in adults.

- XV. Infections**
- A. Bacterial meningitis, viral meningitis, encephalitis including herpes simplex, chronic meningitis, brain abscess. Neurosyphilis. Lyme disease.
 - B. HIV and the nervous system.
- XVI. Spinal cord disorders**
- A. Neurological symptoms caused by compression, transection and hemisection of the spinal cord.
 - B. Autonomic deficits caused by spinal cord lesion.
 - C. Clinical presentation of vitamin B12 deficiency.
- XVII. Peripheral nervous system disorders**
- A. Clinical syndromes of neuropathy, neuromuscular junction disorders, myopathy.
 - B. Describe: radicular pain, radiculopathy, mononeuropathy, meralgia paresthetica, mononeuritis multiplex, polyneuropathy, paresthesia, fasciculation.
 - C. Clinical findings in root lesions at C5, L4, L5, S1.
 - D. Intervertebral disc herniation
 - E. The tunnel syndromes.
 - F. The acute inflammatory demyelinating polyneuropathy (Guillain-Barre synd.)
 - G. The motoneuron disease.
 - H. The myasthenia gravis.
 - I. Duchenne muscular dystrophy, myotonic dystrophy, polymyositis.
- XVIII. Alcohol related disorders**
- A. Wernicke-Korsakoff syndrome, dementia.
 - B. Delirium tremens, alcohol withdrawal seizure.
 - C. Cerebellar degeneration, peripheral polyneuropathy.

Neurology Examination Question List for 6th year Students

1st series Priority questions

1. Brainstem reflexes
2. The facial nerve
3. Differential diagnosis of vertigo and dizziness
4. Localisation of paresis syndromes
5. Symptoms of upper and lower motroneuron lesion
6. Types and localisation of aphasias
7. Classification of unconscious conditions
8. Examination of the unconscious patient
9. Unconsciousness due to metabolic origin
10. Neurological emergencies
11. Clinical manifestation of increased intracranial pressure. Herniations.
12. Traumatic intracranial bleedings
13. Trauma of the spine and spinal cord
14. Clinical syndromes of impaired circulation of the internal carotid artery
15. Clinical syndromes of impaired circulation of the vertebro-basilar system
16. Emergency in cerebrovascular disorders
17. Diagnostic procedures in cerebrovascular disorders.
18. Disturbance of cerebral venous circulation.
19. Intracerebral bleedings.
20. Diagnosis, treatment and prognosis of subarachnoid hemorrhage
21. Status epilepticus
22. Meningitis, encephalitis
23. Multiple sclerosis
24. Signs of brain tumors
25. Signs of tumors of the spine and spinal space
26. Brain edema
27. Diagnostic criteria of dementia
28. Diagnosis of Parkinson's disease
29. Wernicke-Korsakow syndrome
30. Guillain-Barre syndrome
31. Disturbance of micturition and defecation
32. Myasthenia gravis

2nd series

1. Neurological causes of impaired visual acuity. Visual field defects.
2. Ocular movement and gaze disorders
3. Disorders of the vestibular system.
4. Syndromes of lower cranial nerve dysfunctions.
5. Syndromes of pons and mesencephalon lesions
6. The muscle tone control
7. Neuroanatomical basis of sensory disturbances
8. Functional systems of cerebellum. Signs of cerebellar disorders.
9. Gait disorders
10. Symptoms of frontal lobe damage
11. Symptoms of temporal lobe damage
12. The limbic system
13. Symptoms of parietal lobe damage
14. Symptoms of occipital lobe damage
15. Classification of aphasia
16. Agnosia, apraxia, alexia, agraphia
17. The basal ganglia
18. Disorders of the thalamus
19. Localisation of memory disturbances
20. Imaging techniques (angiography, CT, MR, PET, SPECT)
21. Investigation of cerebral circulation
22. EEG in the diagnostic workup
23. EMG, nerve conduction studies, transcranial magnetic stimulation and evoked potentials (BAEP, VEP, SSEP)
24. The lumbar puncture and the examination of cerebrospinal fluid
25. The cerebral circulation, and its regulation
26. Classification of cerebrovascular disorders
27. TIA
28. Causes of cerebral ischaemia in young adults
29. Treatment and prevention of cerebral ischemia
30. Classification of epilepsy
31. Diagnostic workup of epilepsy
32. Differential diagnosis of syncope and other types of disturbed consciousness
33. Treatment of epilepsy

3rd series

1. Neurological disorders caused by viral infections
2. Neurological disorders caused by Herpes virus
3. Prion-diseases, slow virus infections
4. Neurological consequences of AIDS
5. Clinical types and treatment of multiple sclerosis
6. Hystopathological classification of brain tumors
7. Metastatic tumors of the brain
8. Paraneoplasias of the nervous system (PML, neuropathies, cerebellar deg., Lambert-Eaton sy.)
9. Disorders associated with parkinsonian syndrome
10. Treatment of Parkinson's disease
11. Hyperkinetic movement disorders
12. Classification of encephalopathies
13. Primary degenerative dementias
14. Multiple system atrophy
15. Disturbed cerebrospinal fluid circulation (hydrocephalus)
16. Syndrome of brachial plexus damage
17. Syndrome of radial, ulnar and median nerve damage
18. Syndrome of lumbosacral plexus damage
19. Etiology of polyneuropathies
20. Neuropathies in diabetes mellitus
21. Inherited neuropathies (Charcot-Marie, Dejerine-Sottas)
22. Low back pain, and cervical disk disease
23. Malformation of the spine and spinal cord
24. Symptoms of the disorder of spinal cord
25. Motoneuron diseases
26. Muscular dystrophies
27. Muscle disorders
28. Primary headache syndromes
29. The neuralgias
30. The physiological sleep and the sleep disorders
31. Genetic disorders in neurology (Huntington chorea, fragile X, dystrophia myotonica)

PSYCHIATRY

Department of Psychiatry and Psychotherapy

Tutor: *Dr. Erika Szily*

Teaching Psychiatry for the sixth-year students at the Department of Psychiatry and Psychotherapy at Semmelweis University

The goals of the psychiatric practices (3 weeks)

The goal of our Clinic is to teach medical students about the most important signs and symptoms of the most common diseases as psychiatric disorders have a relatively high prevalence in the population. Considering the high prevalence and the last but not least economic consequences, psychiatric disorders can be a burden for every society. Every medical student must be familiar with the high prevalence of depressive and anxiety disorders. Hungary was once one of the leading countries among those with high suicide rates; therefore, we require them to get acquainted with important details of the main causes and therapeutic possibilities of suicide, as well. As many psychiatric disorders can mask somatic diseases, medical students have to learn about the differentiation of these conditions.

In the 5th year students must base their knowledge on lectures and materials of practice where they have an opportunity to talk to a psychiatric patient, so they can learn how to detect the most important signs and symptoms of diseases. During the 6th year, they need to explore patients and write a case report according to the sample that is available on the website of our Clinic. Before the oral exam they have to discuss this case report with the responsible tutor who will give a mark for it. Students are not allowed to take their final exam without a marked case report. We have a certificate form on our website containing all the details students must bring from the hospital where they have completed their rotation.

The link is: <http://semmelweis.hu/pszichiatria/oktatas/the-english-version-can-be-found-here/>

Objectives/target abilities:

- The ability how to obtain a complete and reliable history
- The method of asking about specific psychiatric symptoms or how to evaluate the information provided by the patients including:
 - orientation and attention
 - affect
 - thought disorder
 - memory
 - psycho-motor abilities
 - perception
 - motivation, intellect and personality
- The ability of noticing states of potential psychiatric emergency
- The ability to recognize specific symptoms that can refer to any hidden psychiatric problem which is not told by the patients
- The ability of summarizing all the gained information in a detailed case report
- The ability of establishing a tentative diagnosis and to know what kind of tests (either laboratory or psychological or neuro-radiological, etc) are needed for the correct diagnosis
- Being aware of the most important effects and side/adverse effects of drugs used in psychiatry
- To learn that the practitioner must always consider the possible existence of psychiatric disorders even when there are a lot of somatic symptoms, since they can also appear as a result of psychiatric diseases

We have 5 wards with different profiles in our Clinic. Students must join these wards according to their schedule made by our training coordinator. Everybody has a tutor within the ward he or she is scheduled to. The tutor presents the specific profile of that particular ward, but they also have the opportunity to go and see other wards, too. They spend a day at the out-patient department of our Clinic, which is very useful because there are many patient examinations referred from other departments of Semmelweis University. Thus, they can gain insight into the most important psychiatric features of internal medicine, neurology, surgery etc. Students must join for one all-night-duty and they have to participate in the emergency treatment performed during this period.

Under the supervision of an appointed physician students have to:

Participate in the work of one unit;

Evaluate patients independently;

Write a detailed case history of one patient which has to be presented at the exam;

Participate in consultations.

The internship in Psychiatry has to be completed at a Department of a University or in a Teaching Hospital which has a contract with a University. Students completing the internship abroad have to present a document of evaluation (i.e. Certificate downloadable from our website) indicating their performance during the internship and a grade from 5 (excellent) to 1 (failure).

Requirements

1. The 6th year includes a 3-week-long rotation in Psychiatry in a hospital or clinic which is accredited for teaching by Semmelweis University.
2. If you want to complete your rotation abroad, then before you start it, you must present at our department an officially stamped statement of acceptance issued by the teaching hospital abroad where you intend to spend your rotation.
BE AWARE: The Letter of Acceptance for the 4-week-long Psychiatry internship requested from practice places abroad must state:
 - a) The training place abroad is a teaching hospital
 - b) A brief description of how Psychiatry is taught in that institution
 - c) The name of the responsible tutor (name, e-mail)
3. The Psychiatry practice must consist of 8 hours on 40 (8x5) workdays at psychiatric wards. Students participate in the everyday work of the ward(s), in patients' admission, in ward rounds and in therapeutic decisions. One afternoon duty is obligatory within the rotation period.
4. Writing a case report during the rotation period is a task for every student. A sample case report is available on the website of our department
<http://semmelweis.hu/pszichiatria/oktatas/the-english-version-can-be-found-here/>
5. Case reports should not include patients' personal data (name, birth date, national insurance number, etc). Only those practice places are acceptable where the release of the case report is not forbidden by law. Students completing the internship abroad have to present at the exam the CERTIFICATE in which the tutor has indicated their performance during the internship on the scale: excellent-satisfactory-unsatisfactory and commented on their strengths and weaknesses.

Without these documents students are not allowed to take their final exam in Psychiatry.

Please note that the Final Examination in Psychiatry cannot be taken within the 3rd week of the rotation, just after the completion of 3 full weeks.

Sign-up for the exams: through the NEPTUN SYSTEM.

7. It is important to bring to the final exam this signed Certificate of the practice the case report (or a detailed report of the case report by the tutor on a separate sheet of paper) the mark for the case report, the filled-in *Register of observed psychiatric conditions* that was signed continuously by the tutors during the 5th and 6th year. The form is available on our website:
<http://semmelweis.hu/pszichiatria/oktatas/the-english-version-can-be-found-here/>

Psychiatry Examination Question List for 6th year Students

English questions for the Psychiatry and Psychotherapy final examination

Questions A

1. Diagnosis and classification in psychiatry (DSM-IV, DSM-5, ICD-10 and 11, the logic of diagnostic systems in psychiatry, diagnostic instruments)
2. Important test procedures in psychiatry (laboratory, psychological, brain imaging, electrophysiology)
3. Psychopharmacology I.: Antipsychotics and anxiolytics: mechanism of action, indications, effects and side effects
4. Psychopharmacology II.: Antidepressants, mood stabilizers, ant-dementia medications and stimulants: mechanism of action, indications, effects and side effects
5. Other biological therapies: electroconvulsive therapy, sleep, rTMS, bright light treatment.
6. Major and minor neurocognitive disorders (Dementia): etiology, diagnostic criteria and clinical management
7. Delirium-etiology, diagnostic criteria and clinical management
8. Schizophrenia-etiology, diagnostic criteria, subtypes, course and outcome, differential diagnosis
9. Schizophrenia-acute and long term treatment, rehabilitation

10. Mood (affective) disorders-etiology, diagnostic criteria, subtypes, course and outcome, differential diagnosis
11. Mood (affective) disorders-acute and long term treatment
12. Anxiety disorders: panic disorder and agoraphobia, generalized anxiety disorder, phobic disorders, etiology, epidemiology, diagnostic criteria, subtypes, course and outcome, differential diagnosis
13. Somatoform disorders, somatization and conversion disorders and hypochondriasis-etiology, diagnostic criteria and clinical management
14. Alcohol use disorder-epidemiology, diagnostic criteria (including alcohol withdrawal and alcohol hallucinosis), course and outcome
15. Psychoactive Substance use disorders-diagnostic criteria and clinical management
16. Disorders of childhood and adolescence-diagnostic criteria of psychiatric disorders usually first evident in infancy, childhood or adolescence

Questions B

17. The neurobiological basis of mental disorders
18. Posttraumatic stress disorder: etiology, epidemiology, diagnostic criteria, subtypes, course and outcome, differential diagnosis, and treatment.
19. Obsessive-compulsive disorder: etiology, epidemiology, diagnostic criteria, subtypes, course and outcome, differential diagnosis, and treatment.
20. Alcohol use disorder (including alcohol withdrawal and alcohol hallucinosis) treatment and rehabilitation
21. Eating disorders-diagnostic criteria and clinical management
22. Old-age psychiatry
23. Sleep disorders-diagnostic criteria and clinical management
24. Sexual disorders-diagnostic criteria and clinical management
25. Personality disorders-diagnostic criteria (clusters a-b-c) and clinical management
26. Basic concepts and methods in psychotherapy.
27. Cognitive-behavioral therapy
28. Psychotherapy with special populations (addictology patients, psychotic patients)
29. Basic psychoanalytic concepts
30. Family therapy. Autogenic training. Hypnosis
31. Suicide and self-injurious behavior: etiology, epidemiology and prevention
32. Rehabilitation and community psychiatry, transcultural psychiatry

6 weeks elective practice option within Psychiatry

It is possible to extend the 3 week-long mandatory rotation with this six-week-long optional course to help students further deepen their practical knowledge. Furthermore, aspiring residency trainees in psychiatry may also take the six-week-long optional course to express their intention of specialization. During this optional course student may also study the prerequisites of the practical board exam in Psychiatry. (Course completion requires students to write and defend a psychiatric case report during the elective practice period on a patient of your choice. At the end of the internship, it is necessary to prepare a Power Point report on a selected patient, which the students present to the doctors of the Clinic, and then obtain a practice evaluation.

The 6-week elective internship is divided into 3 weeks by the students, according to the schedule, a student participates in the clinical work in 2 wards, thereby helping to gain experience and learning, as they may encounter different clinical diagnoses in each department.

AFTERNOON DUTY: During the six-week elective internship, at least two afternoon shifts are mandatory. Students are required to actively participate at one of the afternoon duties during the three-week-long mandatory rotation and two evening duties during the six-week-long optional course. During their duty day students are at work at the Outpatient unit (Ambulancia) between 1 pm-4 pm and join the night duty team until 9 pm. After 9 pm, students may opt in for the rest of the night duty if they want to. During the optional course, students will also be introduced to the foundation of the out-patient psychiatric care and the management of the most common psychiatric conditions that occur in other medical fields (eg. psychiatric emergencies). The topics of psychiatry required for this course are identical to the topics for the final exam published online at the Department's homepage.

FAMILY MEDICINE IN DAILY PRACTICE within Internal Medicine

One week Family Medicine practice within sixth year's rotation in Internal Medicine

Department of Family Medicine

Head of the Department: *Dr. Péter Torzsa M.D. Ph.D.*

Contact details: H- 1085 Budapest, Stáhly u. 7-9. Phone: +36-1-355-8530

Tutor: *Dr. Ádám Becze*

Total number of hours: 40 lectures: – practices: 5×8

Type of the course (mandatory/elective): mandatory

Academic year: 2024/2025

Aim of the subject and its place in the curriculum:

Family practice training is based on a one-to-one model involving a tutor and a medical student. The training is practice oriented. Medical students can gain experience about what kind of work a family practice involves while taking an active part in managing the consulting hours and being involved in patient treatment and care and screening.

Location of the course (lecture hall, practice room, etc.):

Accredited tutorial practices

Competencies gained upon the successful completion of the subject:

Medical students working together with the family practice team are involved in patient care during the consulting hours as well as in the patients' home.

During the training they learn how to

- do physical examination
- make a diagnosis
- make a differential diagnosis
- set up a therapeutic plan
- write a case study
- manage paperwork and patient data recording
- manage expert activity

The medical students' communicative skills develop and they get to know the statistical characteristics of the practice as well as the patient flow, morbidity and mortality data of the practice they are trained at.

During the training medical students are expected to keep a practice training diary and to shortly document the cases they meet (and to make detailed documentation of one particular case).

Prerequisite(s) for admission to the subject:

Internal medicine, Pharmacology, Laboratory medicine, Family Medicine, Public Health

Minimum and maximum number of students registering for the course:

Student selection method in case of oversubscription:

Where they are assigned

How to register for the course:

To register for the course in the 'Neptun' system

Detailed thematic of the course:

In a one-week training:

- Paperwork and data management
- Registration of a new patient and setting up a patient care summary for them
- Making out a prescription by hand
- Writing a referral (to hospital or to consultation)
- Compiling a therapeutic sheet and updating it
- Expert activity
- Judging whether the patient is fit for work and managing sick leave documentation
- Compiling patient data for official rehabilitation and social assessment
- Examining patients, diagnosis/therapy
- Recognising and treating upper and lower respiratory infections
- Recognising and treating urogenital infections
- Recognising and treating gastrointestinal infections
- Therapy/care
- Therapy, care and rehabilitation of cardiovascular and hypertonic patients
- Therapy, care and rehabilitation of diabetic patients and patients with metabolic diseases
- Therapy, care and rehabilitation of cancer patients
- Therapy, care and rehabilitation of patients with musculoskeletal diseases
- Therapy, care and rehabilitation of patients with cardiorespiratory diseases

Potential overlap(s) with other subjects:

Internal medicine – Diagnosing and treating symptoms

Public health issues and preventive medicine – communicable diseases, diseases to notify

Surgery – acute abdominal symptoms, treatment of wounds

Policy regarding the attendance and making up absences:

It's obligatory for the student to attend 75 percent of the training sessions.

Means of assessing the students' progress during the semester:

During the short training period there is no assessment.

Requirement for acknowledging the semester (signature):

Attending the training sessions, a completed diary and an assessment sheet filled in by the tutor.

BASICS OF TRANSFUSION MEDICINE

Department of Transfusion Medicine

Course Director: *Prof. Dr. Attila Tordai*

1. Introduction, the history of transfusion medicine
2. Immunological introduction: basic mechanisms important in transfusion medicine, immune response to incompatible transfusion
3. Organ donation and transplantation programs in Hungary and Europe
4. Blood donors, bloodletting for donation, donor screening, risk assessment and reduction, international trends
5. The molecular structure and physiological role of red cell antigens
6. Infectious diseases transmitted by transfusion, epidemiology, screening, prevention
7. Red cell, platelet and granulocyte antigen systems
8. The blood group serology compatibility
9. Immunological complications of transfusions: hemolytic and non hemolytic
10. Non immunological complications of transfusions: circulatory and iron overload, infections
11. Unstable blood products: Red cell, platelet, granulocyte and plasma: manufacturing, storage, quality parameters
12. Challenges and approaches of blood supply management, international examples
13. Steps and practices of transfusion execution, international outlook
14. Transfusion aspects of the coagulation system, generation and clinical application of coagulation factor products, substitution therapies
15. Effects of massive transfusion, factor substitution in acquired bleeding disorders
16. Introduction of the HLA system, diagnostics in transplantation immunogenetics
17. Generation and clinical use of albumin and immunoglobulin blood products
18. Solid organ transplantation and its transfusion aspects: complications, case reports
19. Stem cells, regenerative medicine
20. Patient blood management: restrictive transfusion approaches
21. Indications of red cell transfusion, stimulation of red cell formation
22. Indication of platelet and granulocyte transfusions
23. Apheresis and photopheresis
24. Hungarian and international legal aspects of transfusion medicine
25. Test examination

AMBULANCE PRACTICE (Prehospital Emergency Medicine)

National Ambulance Service

Lecturer: *Dr. Gábor Góbl*

Syllabus

During the 2 weeks practice students will join the staff of an ALS (Advanced Life Support) Unit. They will experience the acute, in-field presentation of emergencies, occasionally urgencies, as well as the special viewpoints of interhospital transfer.

- Goal of the ambulance practice is to gain insight into:
 - Patient's assessment in the prehospital setting (primary and secondary survey)
 - Recognition of critically ill conditions and the emergency interventions required (airway management, CPR, IV. line, volume substitution, pain relief, etc).
 - Recognition of severe emergencies (ACS, stroke, hypertensive emergencies, bronchial asthma, trauma, poisoning, psychiatric disorders, etc).
 - Patient's mobilization, immobilization, special viewpoints of extrication
 - Monitoring patient en route to the hospital, transportation trauma.

The certification of the practice should contain the

- period of time spent at the ambulance station
- list and short summary of 15 cases the student participated at
- signature of the local director of the Ambulance Service

Note: Absence in 25% of practice time is possible, however informing the coordinator in advance and discussion of the new term of the practice are required.

Mode of certifying absences: oral

Evaluation: "completed" or "not completed"

Important information: Solely in the Neptun registered students are welcome at the Medical and Educational Directorate (1134 Budapest Róbert Károly krt. 77. 5th Floor) on the first day of the term at 9 in the morning. All the information concerning the location of the practice, schedule of work, information about safety at work, etc. will be announced at this time. Without getting this information nobody will be allowed to start the practice, and there will be no opportunity for replacement.

We ask the students not to turn directly to us with their wish to change schedule.

CARDIORESPIRATORIC AND NEUROPHYSIOLOGICAL MEASURING METHODS

Optional course for medical students in the 3-6th years

Course director: *Dr. Habil. László Dézsi,*

Private Professor of Physiology, Semmelweis University

The purpose of the course: To review the theory and practice of modern measuring methods in experimental and clinical medicine, and providing practical knowledge to medical students on cardiorespiratoric and neurophysiological measurements. The course is based on but further extends the material delivered during the course of Medical physiology. Throughout the lectures we put an emphasis on potential methodological errors of measurements and examinations, as well as how to avoid them.

Detailed Program:

- 1. Introduction. Biomedical engineering. Design and safety requirements of biomedical equipment**
- 2. Computerized data acquisition and analysis. Telemetry systems**
- 3. General metrology. Basics of measurement and control theory**
- 4. Home monitoring of cardiovascular health status. Determination of blood glucose and tissue glucose concentrations**
- 5. Sampling of continuous signals. Digitizing analogue signals**
- 6. Direct and indirect methods to determine cardiac output and peripheral blood flow**
- 7. Experimental study of pulmonary function. Measurements of blood gases and the acid-base balance.**
- 8. Significance of objective studies in the practice of audiology. Neurophysiological measurements (action potentials, brain stem evoked potentials)**
- 9. Investigation of adaptive processes in the cardiovascular system. Investigative methods of experimental angiology**
- 10. Measuring blood pressure in the lab and clinics (invasive and noninvasive methods)**
- 11. Complement-related immunological and cardiopulmonary responses**
- 12. Studying brain function by functional imaging systems**
- 13. Experimental methods to study nociception**
- 14. Investigating the electrical activity of the heart. Design of ECG amplifiers**

Acknowledgement of the course: Prerequisite of the course is the completion of the first 2 years (Theoretical module). Regular attendance (maximum 3 absences) is required. Signature in the Index and 2 credit points will be awarded after successful exam. Source: material of the lectures, supplementary literature will be provided by the lecturers.

Applications: via Neptun system. Contact person: Dr. László Dézsi (e-mail: dezsi.laszlo@richter.hu; phone: 06-1-431-4823; phone/fax: 06-72-536-019). The application of min. 5 students is required.

COMPLEMENTARY ELECTIVE INTERNSHIP PRACTICE

Heart and Vascular Center
 Department of Internal Medicine and Hematology
 Department of Internal Medicine and Oncology
 Pediatric Center, Bókay street Department
 Pediatric Center, Tűzoltó street Department
 Department of Neurology
 Department of Psychiatry and Psychotherapy
 1st Department of Surgery and Interventional Gastroenterology
 2nd Department of Surgery
 Department of Transplantation and Surgery
 Department of Obstetrics and Gynecology
 Credit: 5

Duration: 5 weeks (2 “gap” weeks + 3 weeks in May)

Practice time: 40 hours per week

Lecturers: *Dr. Béla Merkely*
Dr. Tamás Masszi
Dr. István Takács
Dr. Attila Szabó
Dr. Gábor Kovács
Dr. Dániel Bereczki
Dr. János Réthelyi
Dr. Attila Szijártó
Dr. Gábor István
Dr. László Kóbori
Dr. Nándor Ács

Topic of the subject:

During the practice the student is assigned to a Tutor or to a Medical Team and is shadowing the work of them. Student can work only under the continuous careful supervision of a tutor who is responsible for the student. Daily work hours for the student: 8 hours
 Activities during the practice should include the following:

- examination of patients in the department, with special emphasis to case history taking and full physical examination
- gain practice in patient documentation, problem-oriented medical record keeping
- participate in the preparation of diagnostic and therapeutic plan for patients, differential diagnosis of the case
- take an active part in medical consultations concerning their patients, as well as in the medical conferences in the department
- participate actively or as an observer at invasive and semi-invasive interventions, diagnostic or imaging procedures
- evaluation of routine laboratory results
- evaluation of imaging results
- possible participation on night or weekend duties
- get to know the work of the special sections of the department
- regular consultations with the doctor responsible for the student
 students should also practice communication with patients and their relatives, while giving them relevant medical information on the disease but avoiding conflicts with medical confidentiality.

Prerequisite of the course: Completion of the first 10 semester’s subjects.

Special academic work required for completion of the course: Under the supervision of the Tutor(s) the student takes part of the management of out- and inpatients of the Dept thereby obtaining competence in the subdiscipline.

Type of exam: Bedside practical exam

Suggested print, electronic, online material: Material given by the hosting subject for the final year.

PHYSICAL EDUCATION XI-XII.

Practice: 1 hour per week

The subjects taken into consideration when calculating the average of the diploma are the following:

- all subject with final exam
- list of the subjects ending with a semifinal:
 - Medical biology
 - Medical chemistry
 - Genetics and genomics
 - Immunology
 - Otorhinolaryngology
 - Dermatology
 - Clinical Genetics
 - Oncology (from 2025)
 - Orthopedics
 - Pulmonology (from 2025)
 - Radiology
 - Urology
 - Forensic Medicine
 - Ophthalmology
 - Oral surgery and dentistry
 - grade of the thesis
 - grade of the written part of the final board examination
 - grade of the oral part of the final board examination
 - grade of the practical part of the final board examination

GENERAL INFORMATION

Deadline of paying the tuition fee in the 6th year: the first semester's fee is to be paid until 11 July, 2023, the second semester's until 29 January, 2024

The professor responsible for the student's instruction during the clinical rotation outside Hungary is requested to give a detailed certificate of the student's performance. It is requested to be done in the Student Handbook! This certificate in the Student Handbook must be signed by the professor, the Head of the Department as well as by the director of the hospital or the Dean of the University the hospital is affiliated to. ***Semmelweis University reserves the right to accept a certificate or refuse it in justified cases.*** Students have to present these certificates to the concerned departments. After the departments have accepted them, students have to retain the originals and hand them in at the English Secretariat.

Tuition fee reduction:

In case the student completes all the rotations regardless whether the 1 week Transfusion course is completed at Semmelweis University or abroad, he/she has to pay 80% of the tuition fee valid in the academic year. The relevant acceptance letters should be handed in latest until December 15, 2023. Otherwise the student is not entitled for the reduction!

Please write a letter of request addressed to the Academic Program Director when applying for the 20% reduction!

Please note:

that you have to sign up for the General Board Examination held in June latest until April 30, 2024! For the August exam latest until July 15, 2024 and for the November exam latest until October 15, 2024!

FACULTY OF DENTISTRY

BASIC MODULE



Faculty of Dentistry
1st year

BASIC MODULE

1st semester			
subjects code	subjects	credit code	examination
obligatory	Macroscopic Anatomy and Embryology I	C6L1P5	examination
obligatory	Physical Foundations of Dental Materials Science	C2L2P0	examination
obligatory	Medical Chemistry	C4L2P2	examination
obligatory	Cell Science	C3L1P2	examination
obligatory	Biophysics I	C4L1.5P2,5	examination
obligatory elective	Introduction to the Hungarian Language	C0L0P4	term grade
obligatory elective	Medical Terminology	C2L0P2	term grade
obligatory	Physical Education I	C0L0P1	signature
Total Credit		21	

BASIC MODULE

2nd semester				
subjects code	subjects	credit code	examination	prerequisites
obligatory	Macroscopic Anatomy and Embryology II	C8L2P6	c.examination#	Macroscopic Anatomy and Embryology I
obligatory	Microscopic Anatomy and Embryology I	C4L2P2	examination	Cell Science
obligatory	Dental Biochemistry I	C4L2P2	examination	
obligatory	Biophysics II	C3L1.5P2.5	c.examination#	Biophysics I, Physical Foundations of Dental Materials Science
obligatory	Hungarian for Dental Medical Purposes I	C0L0P4	term grade	Introduction to the Hungarian language
obligatory	General Dental Materials	C1L1P0	examination	Macroscopic Anatomy I, Physical Foundations of Dental Materials Science
obligatory	First Aid	C1L0P1	term grade	
obligatory elective	Medical Informatics	C2L0P2	term grade	
obligatory	Physical Education II	C0L0P1	signature	
obligatory elective	Dental Medical Terminology	C1L0P2	practice mark	Medical Terminology
obligatory elective	Dental Psychology	C1L2P0	examination	
obligatory elective	Medical Sociology	C1L1P1	examination	
obligatory elective	History of Medicine	C1L2P0	examination	
criterion requirement	Dental Assistant Practice (summer, 2 weeks)	C0L0P30	signature	Prerequisite of registering to the 3rd semester
criterion requirement	Dental Laboratory Practice (summer, 2 weeks)	C0L0P30	signature	General Dental Materials, Macroscopic anatomy and embryology II, Prerequisite of registering to the 3rd semester
Total Credit		27		

Explanation

15 credits should be gained from the **elective subjects** during the 5-year studies – see the elective list after the 3rd year study program

#The grade influences the qualification of the diploma.

C = Credit point

L = Lecture (hours/week)

P = Practice (hours/week)

LIST OF TEXTBOOKS (The list may change!)

- 1 **Sobotta Atlas of Human Anatomy** (Package), 15th English ed. Musculoskeletal system, internal organs, head, neck, neuroanatomy, By Waschke & Paulsen, ISBN-13: 9780702052507 2013
- 2 **Gray's Anatomy for students** with STUDENT CONSULT Online Access, 3rd Edition by R. Drake, A. W. Vogl, A. Mitchel Elsevier; 2014; ISBN 9780702051319
- 3 **Gosling, Harris, Humpherson, Whitmore & Willan: Human Anatomy, Color Atlas and Textbook**, 6th Edition, Elsevier 2016.
- 4 **Stevens & Lowe's Human Histology**, Elsevier, 4th ed ISBN 978-0-723435020, 2015.
- 5 **The Developing Human – Clinically Oriented Embryology**, 10th ed. by KL Moore, TVN Persaud and M Torchia, Saunders, 2015; ISBN 9780323313384
- 6 **Neuroanatomy An Illustrated Colour Text**, 4th Edition by Crossman & Neary Publication Date: 13/04/2010 ISBN-13: 9780702030864
- 7 **Oral Anatomy, Histology and Embryology**, 4th Edition, by B. Berkovitz Paperback with STUDENT CONSULT Online Access and e-book ISBN: 9780723434115 Copyright: 2009
- 8 **McMinn's Color Atlas of Head and Neck Anatomy**, by Logan, Reynolds, Rice & Hutchings, 5th Edition, Elsevier 2016.
- 9 Ebbing, DD-Grammon, SD: General Chemistry. 9th ed. 2009. Houghton Mifflin Co. Boston ISBN 10: 0-618-85478-6 / 13: 978-0-618-85478-7
- 10 Harper's Illustrated Biochemistry, 30th edition, Lange, ISBN-10: 0071825347
- 11 Laboratory Manual I-II (Bp.)
- 12 Hrabák: Selected Collection of Chemical Calculations (SOTE) (Bp.)
- 13 Csermely P.-Hrabák A.: Principles of Organic Chemistry. Bp. 1999.
- 14 Harvey Lodish et al.: Molecular Cell Biology, 6th edition, ISBN-13: 978-0716776017, ISBN-10: 0716776014
- 15 Wilson, Mansfield, Heath, Spence: Dental Technology and Materials for Students. Blackwell Scientific Publications. ISBN 0632017635
- 16 Powers, Wataha: Dental Materials Properties and Manipulation. Mosby ISBN 9780323078368
- 17 Primary Preventive Dentistry. Ed.by Norman O.Harris, F.Garcia-Godoy. 5th ed. Appleton and Lange, Stamford. 1999. ISBN 0-8385-8129-3
- 18 Damjanovich – Fidy – Szöllösi (eds) Medical Biophysics, Medicine, Budapest, 2009. ISBN 978 963 226 127 0
- 19 Miklós Kellermayer: Medical Biophysics Practices. Semmelweis Publishers, Budapest, 2015. ISBN 978-963-331-349-7.
- 20 Alberts et al. Essential Cell Biology (4th edition) Garland Science, ISBN-13: 978-0815344544; ISBN-10: 0815344546
- 21 McMinn and Abrahams' Clinical Atlas of Human Anatomy with STUDENT CONSULT Online Access 7th Edition by Abrahams, Spratt, Loukas & van Schoor ISBN-13: 9780723436973 Publication Date: 22/03/2013
- 22 Andrea, Barta – Éva Katalin, Varga – Ákos, Zimonyi: Medical terminology for students of dentistry. Bp., 2019 (e-book, available on the course's Moodle site).

Recommended textbooks:

- 1 Zumdahl: Chemical Principles. 3rd ed. 1998. Houghton-Mifflin Co. Boston. ISBN 0-395-83995-5
- 2 McCabe J.F.: Applied Dental Materials. Blackwell Scientific Publications. ISBN 0-632-02826-2
- 3 First Aid manual. St Andrews' Ambulance Association and the British Red Cross St John Ambulance. Ed. Dorling Kindersley, 2002. ISBN: 0751337048.
- 4 Wheater's Functional Histology, A Text and Colour Atlas, 6th Edition by B Young, G O'Dowd and P Woodford ISBN 9780702047473, Churchill Livingstone, Edinburgh, 2013.
- 5 Junqueira's Basic Histology: Text and Atlas; 13th Edition by Anthony Mescher, New York, McGraw-Hill Medical, ISBN13 978007178033,2013.
- 6 **Langmann's Medical Embryology**, 13th Edition by TW Sadler, Wolters Kluwer, ISBN 9781469897806, 2014
- 7 **Netter's Head and Neck Anatomy for Dentistry**, 3rd Edition, Elsevier, 2016.
- 8 **McMinn and Abrahams' Clinical Atlas of Human Anatomy** with STUDENT CONSULT Online Access 7th Edition by Abrahams, Spratt, Loukas & van Schoor ISBN-13: 9780723436973 2013.
- 9 **A.L. Kierszenbaum Histology and Cell Biology: An Introduction to Pathology** 3rd Edition, Paperback with STUDENT CONSULT Online Access and E-Book ISBN: 9780323085885 2012.
- 10 **Illustrated Dental Embryology, Histology, and Anatomy**, 3rd Edition by Mary Bath-Balogh ISBN: 9781437717303, 2011.

MACROSCOPIC ANATOMY AND EMBRYOLOGY I – II**Department of Anatomy, Histology & Embryology****Course Director:** *Dr. Andrea D. Székely***LEARNING OBJECTIVES**

Aims of the lectures in anatomy: Presentation of the important and/or complicated chapters such as introductory chapters, thorax, pelvis, hand, foot, skull, heart, chapters of the visceral organs, central nervous system, organs of special senses, topographical anatomy, together with the developmental relevances, introduction to general and organ based embryology.

Aims of the practical sessions in the dissecting room: Based on the weekly programs (see separate), students will both observe prosected cadaver specimens (bones, joints, muscles, viscera, brain) and perform dissections on parts of, or on an entire, embalmed cadaver. Students are supervised by the lab instructors. Bones, joints, muscles and peripheral nervous system will be primarily taught in the dissecting room.

LECTURES: First semester: 1×45 min; second semester: 3×45 min.

PRACTICAL CLASSES: First semester: 5×45 min; second semester: 5×45 min.

ECTS CREDITS: Altogether 14 (first semester: 6; second semester: 8).

MIDTERM TESTS: Oral

ACCEPTENCE OF THE SEMESTER:

Active participation in lectures, and dissection room sessions is obligatory for every student. Students should attend at least 75% of the scheduled hours to gain a signature proving the validity of the semester. Absences are therefore limited in **25%**. Attendance will be recorded in the lectures and in the dissection room classes.

To gain a signature proving the validity of the semester students should attend at least 75% of the scheduled practical hours including the midterm tests. In case the latter has not been fulfilled, there will be two make up dates offered during the last two weeks of the semester. Students are eligible to sit for the final examination only upon presentation of a dissected specimen. The dissection work may be done during the two semesters. The specimen will be evaluated by a departmental board.

TYPE OF EXAMS: oral and written

First semester: semifinal examination, second semester: final exam

Semifinal and final examinations consist of written and oral (practical and theoretical) parts

1. Written pretest (e-learning module – access to SeKA account is obligatory)
2. Macroscopic Anatomy (successful identification of structures on true anatomical specimens) including correct answers to relevant theoretical questions)

LIST OF TEXTBOOKS

Sobotta Atlas of Human Anatomy (Package), 15th English ed. Musculoskeletal system, internal organs, head, neck, neuroanatomy, By Waschke & Paulsen, ISBN-13: 9780702052507 2013

Gray's Anatomy for students with STUDENT CONSULT Online Access, 3rd Edition by R. Drake, A. W. Vogl, A. Mitchel, Elsevier; 2014; ISBN 9780702051319

McMinn and Abrahams' Clinical Atlas of Human Anatomy with STUDENT CONSULT Online Access, 7th Edition By Abrahams, Spratt, Loukas & van Schoor ISBN-13: 9780723436973 , 2013

Human Anatomy, Color Atlas and Textbook, 6th Edition by J Gosling, P Harris, J Humpherson, I Whitmore and P Willan; ISBN 9780723438274 Elsevier, 2016.

Fitzgerald's Clinical Neuroanatomy and Neuroscience, 7th Edition, Elsevier, 2015.

Oral Anatomy, Histology and Embryology, 4th Edition, by B. Berkovitz Paperback with STUDENT CONSULT Online Access and e-book ISBN: 9780723434115 Copyright: 2009

McMinn's Color Atlas of Head and Neck Anatomy, by Logan, Reynolds, Rice & Hutchings, 5th Edition, Elsevier 2016.

Recommended textbooks:

1. **Illustrated Dental Embryology, Histology, and Anatomy, 3rd Edition by Mary Bath-Balogh ISBN: 9781437717303, 2011.**
2. **Netter's Head and Neck Anatomy for Dentistry**, 3rd Edition, Elsevier, 2016.
3. **Anatomy, A Photographic Atlas**, 8th Edition by Rohen, Yokochi; Wolters Kluwer, 2016, ISBN: 978-1-4963-0870-2
4. **Bräuer: Sobotta Flashcards** (Muscles; Bones, Ligaments, and Joints) URBFI, 2013.
5. **KL Moore–AF Dalley: Clinically Oriented Anatomy**. 4th ed. Lippincott William and Wilkins, 1999.
6. **RMH McMinn: Last's Anatomy, Regional and Applied**. Churchill Livingstone, Edinburgh 1990. ISBN 0-443-03484-4
7. **Neuroanatomy An Illustrated Colour Text**, 4th Edition by Crossman & Neary Publication Date: 13/04/2010 ISBN-13: 9780702030864
8. **Functional Anatomy Anatomy, Histology and Embryology for medical and dental students** by M. Réthelyi and J. Szentágothai, Medicina, 2018.

COURSE DESCRIPTION

Macroscopic Anatomy and Embryology I

Lectures and dissection classes

Subject matter: Macroscopy and clinically oriented anatomy of the parts of the musculoskeletal system, i.e. osteology, arthrology and myology, together with the vascular and nervous supply of the limbs and the trunk. Skull (viscerocranium, neurocranium). Cavities, muscles of the head & neck region. Macroscopy of the brain and spinal cord, membranes (dura, arachnoid and pia mater). General and organ based embryology, developmental malformations.

Credits: 6

Prerequisite: none

Week	Lectures	Dissection room
Week 1	The role of anatomy in the medical curriculum. Terminology. General arthrology and myology	General introduction to practical work in the dissection room, tools and rules Bones of the upper limb and the girdle, shoulder joint, dissection of the upper limb
Week 2.	Clinical anatomy of the upper limb	Muscles (flexors) of the upper limb/ girdle Elbow joint
Week 3.	Clinical anatomy of the lower limb	Upper limb, arm, forearm Muscles and joints of the hand
Week 4.	Gametes, fertilization, cleavage, blastulation	Dissection of the muscles, vessels and nerves of the upper limb (branches of the axillary a+v, brachial plexus)
Week 5.	Implantation, structure of the placenta, placental circulation. Fetal membranes	Dissection of the muscles, vessels and nerves of the upper limb 1. Midterm test (oral): Upper limb including the girdle
Week 6.	Gastrulation, formation and derivatives of germinal layers. Folding of the embryo. Body axes, cranio-caudal and dorsoventral differentiation	Lower limb, pelvis, hip joint Dissection of the muscles, vessels and nerves Cadaver and free limb dissection
Week 7.	Components, muscles, joints, ligaments and movements of the vertebral column Components and movements of the thorax. Diaphragm	Dissection of the limbs and superficial regions of the trunk (cadaver) Knee joint, bones of the leg and foot
Week 8.	Components of the abdominal wall. Rectus sheath. Subinguinal hiatus. Inguinal canal. Adductor and femoral canals.	Dissection of the limbs and superficial regions of the trunk (cadaver) Inspection of the structure of the body wall on prosected specimens (torso) Femoral vessels, lumbar plexus
Week 9.	Bony framework of the skull: spaces of viscerocranium.	Sacral plexus Diaphragm Components of the body wall, rectus sheath, hernia canals Inspection of the structure of the body wall on prosected specimens (torso)
Week 10.	Introduction to the study of the nervous system. General organization of the central and peripheral nervous systems	Dissection of the lower limb and superficial regions of the trunk (cadaver) Inspection of the structure of the body wall on prosected specimens (torso)
Week 11.	Blood supply to the brain. Meninges, CSF, ventricles	Bones of the skull Internal and external skull bases Bones of the facial skeleton, mandible. Orbit, nasal cavity, pterygopalatine fossa
Week 12.	Macroscopy of the brain stem, cerebellum and spinal cord.	Bones of the skull Internal and external skull bases Bones of the facial skeleton, mandible. Orbit, nasal cavity, pterygopalatine fossa
Week 13.	Neurulation. Development of the central nervous system.	Morphology of the brain and spinal cord Blood supply, meninges, sinuses CSF circulation, cisterns Cadaver dissection Demonstration of prosected specimens
Week 14.	Development of the skull, vertebral column and the limbs	Telencephalic hemispheres, gyri and sulci, Diencephalon, lateral and 3 rd ventricles, Brain stem, cerebellum, 4 th ventricle Frontal sections of the brain Non-obligatory assessments I-II : Topics of the semester

Midterm tests: The time and topics of midterm tests will be announced in the departmental homepage at the beginning of the semester (<http://semmelweis.hu/anatomia>).

Topic list for the semifinal examination:

Macroscopic Anatomy and Embryology I

Musculoskeletal Anatomy

- General osteology, classification of bones
- Continuous connections of bones. Components and classification of joints
- General myology
- Structure and movements of the vertebral column, the gross anatomy of the muscles acting upon it
- Movements and muscles of the head&neck (atlantooccipital and atlantoaxial joints)
- Osteofibrous structure of the thoracic cage (bones, joints, ligaments, movements)
- Joints of the shoulder girdle, the gross anatomy of the muscles acting upon them
- Shoulder joint, the gross anatomy of the muscles acting upon it
- Axillary fossa, quadrangular and triangular spaces
- Muscles and cross section of the arm
- Muscles and cross section of the forearm
- Elbow joint, the gross anatomy of the muscles acting upon it
- Cubital fossa
- Structure and movements of the radiocarpal joint, gross anatomy of the muscles acting upon it
- Osteofibrous spaces and muscle compartments of the hand, tendinous sheaths
- Muscles, joints and movements of the fingers
- Composition of the pelvis (bones, ligaments and membranes)
- Hip joint and the gross anatomy of the muscles concerned with the movements
- External and internal muscles of the hip, supra- and infrapiriform hiatuses.
- Osteofibrous compartments, muscles and of the thigh
- Knee joint and the gross anatomy of the muscles concerned with the movements. Popliteal fossa
- Subinguinal hiatus, vascular and muscular compartments; adductor canal, femoral canal
- Osteofibrous spaces and muscle compartments and cross section of the leg (crus)
- Ankle joint together with the gross anatomy of the muscles acting upon it
- Subtalar and talocalcaneonavicular joints, the muscles acting upon them
- Structure of the foot, arches of the foot
- Diaphragm
- Muscles and spaces of the abdominal wall, rectus sheath

- Inguinal canal, femoral canal
- Pelvic floor (muscles); urogenital diaphragm, perineal muscles
- Components and connections of the anterior, middle and posterior cranial fossae.
- External skull base, connections
- Walls and connections of the orbit
- Walls and connections of the nasal cavity
- Oral cavity, temporal and infratemporal fossae
- Walls and connections of the pterygopalatine fossa

Macroscopy of the nervous system

- Blood supply to the brain, meninges, CSF
- Hemispheres, lateral ventricles, diencephalon, the 3rd ventricle
- Brain stem, cerebellum, the 4th ventricle, spinal cord
- Frontal sections of the brain
- Dorsal branches of the spinal nerves, intercostal nerves
- Cervical plexus
- Brachial plexus
- Lumbar plexus
- Sacral plexus

General Embryology

- Spermatogenesis, spermiogenesis
- Oogenesis
- Fertilization
- Cleavage of the zygote
- Blastocyst formation; the bilaminar embryonic disc
- Implantation
- Major parts of the early embryo (primary and secondary yolk sacs, amnion, chorion, chorionic cavity, body stalk)
- Gastrulation, formation of the intraembryonic mesoderm; the notochord
- Neurulation (neural tube and neural crest), formation of brain vesicles
- Derivatives of ectoderm, endoderm and mesoderm
- Folding of the embryo
- Development of the fetal membranes (chorion and amnion)
- The umbilical cord
- Placenta (structure and formation)
- Twin formation
- Development of the skull
- Development of the vertebral column and limbs
- Development of the musculoskeletal system

Macroscopic Anatomy and Embryology II including Maxillofacial Anatomy

Lectures and dissection classes

Subject matter: Morphology, development, topography and clinically oriented anatomy of the internal organs (i.e. cardiovascular, gastrointestinal, respiratory and urogenital systems).

Morphology and topography of the intracranial spaces. Course and branches of cranial nerves. Autonomic nervous system. Maxillofacial Anatomy

Credits: 8

Prerequisite: Macroscopic Anatomy and embryology I

Week	Lectures	Dissection room
1	1. Composition of the oral cavity, palate, tongue and the faucial isthmus 2. Temporomandibular joint, muscles of mastication 3. Anatomy of teeth	Muscles of facial expression, neck muscles, triangles, cervical fasciae Muscles of mastication, TMJ
2	4. Nasal cavity, paranasal sinuses 5. Morphology of the pharynx and esophagus, peripharyngeal spaces 6. Anatomy of the larynx	Oral cavity, teeth, tongue Pharynx, nasal cavity, larynx
3	7. Classification of cranial nerve nuclei 8. Salivary glands 9. Autonomic nervous system. Sympathetic and parasympathetic nervous systems	Dissection of the temporal region Dissection of the face, neck and parotid region (cadaver)
4	10. Trigeminal nerve (CN 5). Cutaneous innervation 11. Facial (CN 7) and hypoglossal (CN 12) nerves 12. Glossopharyngeal (CN 9), vagus (CN 10) and accessory (CN 11) nerves	Dissection of the infratemporal and pterygopalatine regions (cadaver) Head and neck prosections
5	13. Orbit, eye bulb. Extraocular muscles and eye movements. Oculomotor (CN3), trochlear (CN4) and abducent (CN6) nerves 14. Vessels, lymph nodes and lymphatic drainage of the head&neck 15. Development/derivatives of the foregut together with the pharyngeal clefts/arches/pouches	Head and neck prosections Dissection of the orbit Cranial nerve branches (cadaver)
6	16. Innervation of the teeth and the gingiva, the anatomy of dental local anaesthesia 17. Face development together with developmental malformations. 18. Imaging anatomy of the jaws, teeth and the maxillary sinus (Radiology lecture)	Dissection of cranial nerve branches MAXILLOFACIAL MIDTERM
7	19. Internal organs of the thoracic cavity. Divisions of the mediastinum. Lymphatic drainage. 20. Chambers of the heart, external features, annuli fibrosis, valves. Vessels, conducting system of the heart. Surface projection of the heart, pericardium. Auscultation points. 21. Morphology of the trachea and the lung. Pleura.	Dissection of the cadaver, opening of the thorax. Morphology of the heart
8	22. Development of the heart. Fetal circulation 23. Development of arteries and veins 24. Stomach and small intestines (duodenum, jejunum, ileum)	Morphology of the heart Dissection of the posterior mediastinum
9	25. Large intestine, rectum 26. Development of midgut and hindgut. 27. Liver, gall bladder, pancreas, spleen. Portocaval anastomoses	Dissection of the cadaver. Opening of the abdominal cavity, celiac trunk Superior mesenteric artery, duodenum
10	28. Peritoneum, peritoneal recesses, peritoneal relations of abdominal organs. 29. Development of the peritoneum, Separation of body cavities. 30. Macroscopy of urinary organs	Inferior mesenteric artery Dissection of the kidney, renal capsules and the retroperitoneal region (cadaver)

Week	Lectures	Dissection room
11	31. Development of the lung. Circulatory adaptation in the newborn 32. Development of urinary organs. 33. Morphology and coats of the testicle. Epididymis.	Ureter, urinary bladder, male urethra Dissection of the retroperitoneal organs (cadaver)
12	34. Morphology of the spermatic cord, seminal vesicle and prostate. Morphology of the penis and male urethra. 35. Anatomy of the ovary, Fallopian tube and uterus 36. Vagina, external genital organs. Female and male perineum.	Male genital organs Female genital organs
13	37. Development of genital organs 38. Topographical and sectional anatomy of the pelvis 39. Topographical and sectional anatomy of the abdomen	Macroscopy of the pelvic floor Revision; cross sectional anatomy
14	40. Topographical and sectional anatomy of the thorax 41. Topographical and sectional anatomy of the neck 42. Topographical and sectional anatomy of the head.	Revision Non-obligatory assessment: Limbs and internal organs (except for the head and neck region)

Midterm tests: The time and topics of midterm tests will be announced in the departmental homepage at the beginning of the semester (<http://semmelweis.hu/anatomia>).

Topic list for the final examination:

Macroscopic Anatomy and embryology I

(see there)

Macroscopic Anatomy and embryology II

- Muscles of the neck, triangles of the neck, cervical fasciae
- Orbit, accessory organs of the eye, extraocular muscles, eye movements.
- Shape, external features of heart
- Skeleton of heart, anuli fibrosi
- Structure of heart wall
- Chambers of heart
- Endocardium, ostia, valves of heart
- Pulse generating and conducting system of heart
- Vessels of the heart
- Pericardium
- Position and surface projections of heart. Radiology of heart
- Percussion and auscultation (area of cardiac dullness, heart sounds)
- Pulmonary circulation
- Parts and topography of the aorta
- Arch of aorta together with its branches
- Blood supply, venous and lymphatic drainage of the thoracic wall and mammary gland
- Thoracic duct, right lymphatic trunk
- Thoracic aorta and its branches
- Abdominal aorta and its branches
- Subclavian artery, axillary artery together with their branches
- Celiac trunk and its branches
- Superior mesenteric artery and its branches
- Inferior mesenteric artery and its branches
- External and internal iliac artery and its branches
- Superior vena cava and its tributaries
- Inferior vena cava and its tributaries
- Azygos and hemiazygos veins and their tributaries
- Portal vein and its tributaries, portocaval anastomoses
- Esophagus (anatomy)
- Stomach (macroscopy and peritoneal relations)
- Duodenum (macroscopy, shape, position, vessels)
- Jejunum and ileum (macroscopy, shape, position, vessels)
- Colon (macroscopy, shape, position, vessels)
- Rectum, anal canal (macroscopy, shape, position, vessels)
- Liver (macroscopy and peritoneal relations)
- Gall bladder and biliary passages (anatomy)
- Pancreas (macroscopy, shape, position, vessels)
- Trachea and bronchial tree
- Lung (macroscopy, shape, position, vessels)
- Surface projection of pleura and lung
- Pleura, pleural cavity
- Mediastinum (divisions and content)
- Kidney (macroscopy, shape, position, vessels)
- Urinary passages (macroscopy of ureter and urinary bladder)
- Macroscopy of the male and female urethrae
- Testis (macroscopy, shape, position, vessels)

- Epididymis, vas deferens, spermatic cord
- Scrotum, coats of testis
- Seminal vesicle, prostate
- Macroscopy of penis
- Ovary (macroscopy, shape, position, vessels)
- Uterine tube (shape, position, vessels)
- Uterus (shape, parts, position, supporting structures, vessels)
- Broad ligament (lig. latum) and its components
- Vagina, external female genital organs
- Topography of the female pelvic organs (connective tissue spaces, peritoneal relations)
- Topography of the male pelvic organs (connective tissue spaces, peritoneal relations)
- Pelvic floor, perineum
- Peritoneum, greater and lesser omentum, mesentery, omental bursa
- Sympathetic nervous system (cervical and thoracic parts, sympathetic trunk)
- Sympathetic nervous system (abdominal and pelvic parts)
- Sacral parasympathetic system

- Macroscopy questions in Maxillofacial Anatomy
- Oral cavity (divisions, boundaries)
- Frontal section of the oral cavity, sulcus lateralis linguae
- Faucial isthmus, palate
- Macroscopy of the tongue (parts, vessels, innervation)
- Floor of mouth (descriptive anatomy)
- Pharynx, muscles, para- and retropharyngeal spaces
- Nasal cavity and paranasal sinuses
- Larynx (skeleton, fibroelastic membranes joints and muscles)
- Larynx (mucous membrane, cavity)
- Types and morphology of teeth
- Tooth eruption and exfoliation
- Blood supply and innervation of upper teeth
- Blood supply and innervation of lower teeth
- Temporomandibular joint
- Muscles concerned with the opening and closing of the mouth
- Muscles of facial expressions
- Muscles and mechanism of mastication
- Anatomy of the parotid gland, parotid nest

- Anatomy of the submandibular gland, submandibular region
- Anatomy of the sublingual gland, sublingual region
- Branches of the ophthalmic nerve (CN 5/1)
- Branches of the maxillary nerve (CN 5/2)
- Branches of the mandibular nerve (CN 5/3)
- Branches of the facial nerve (CN 7)
- Branches of the glossopharyngeal nerve (CN 9)
- Branches of the vagus nerve (CN 10)
- Branches of the accessory and hypoglossal nerves (CN 11 & 12)
- Lymph nodes and lymphatic drainage of the head & neck region
- External carotid artery and its branches
- Maxillary artery and its branches
- Course and branches of the internal carotid artery
- Veins of face and neck
- Cranial sympathetic and parasympathetic nervous systems
- Cervical plexus

- Maxillofacial Embryology
- Tooth development together with their malformations
- Development of the jaws
- Development of the face
- Developmental malformations of the face
- Derivatives of pharyngeal grooves and pouches
- Derivatives of pharyngeal arches
- Development of the primary and secondary palates
- Development of the tongue

- Organ development
- Fetal circulation
- Formation of atria, development of the interatrial septum
- Formation of ventricles, development of the aorticopulmonary septum
- Development of arteries
- Development of the inferior vena cava and the portal vein
- Development of the superior vena cava, azygos and hemiazygos veins
- Development and differentiation of the midgut
- Development and differentiation of the hindgut
- Formation of the liver and pancreas

MICROSCOPIC ANATOMY AND EMBRYOLOGY I (– II)**Department of Anatomy, Histology & Embryology****Course Director:** *Dr. Andrea D. Székely***LEARNING OBJECTIVES**

Aims of the lectures in embryology: Presentation of the early development from the differentiation of the germ cells to the formation of the human embryo (general embryology). Presentation of the development of organs and functional systems parallel with the gross anatomical and histological lectures including the frequently occurring malformations.

Aims of the lectures in histology: Presentation of the cell, basic principles in cell biology (mitosis, cytoskeleton, cellular motility), detailed presentation of the basic (epithelial, connective, muscle and nervous) tissues. Complementing gross anatomy with a detailed presentation of the fine structure of organs, including the ultrastructural details together with the molecular background. Important chapters: basic tissues, viscera, central nervous system.

Aims of the practical sessions in the histology room: Facilitate the understanding of ground (epithelial, connective, muscle and nervous) tissues and the fine structure of the organs through the observation and interpretation of histological specimens.

LECTURES: 2 × 45 min in both semesters**PRACTICAL CLASSES:** I: 2 × 45 min; II: 2 × 45 min.**ECTS CREDITS:** Altogether 8 (I: 4; II: 4).**MIDTERM TESTS:** written (e-learning type)**ACCEPTENCE OF THE SEMESTER:**

Active participation in lectures, and dissection room sessions is obligatory for every student. Students should attend at least 75% of the scheduled practical classes to gain a signature proving the validity of the semester. Absences are therefore limited in **25%**. Attendance will be recorded in the Histology classes.

Students are obliged to participate in the midterm test or their semester would not be accepted. Missed midterms should be retaken at the given retake timepoints the department offers during the last two weeks of the semester.

TYPE OF EXAMS: oral and written

I: semifinal examination, II: final exam

Semifinal and final examinations consist of written and oral parts

1. Written pretest (e-learning module – access to SeKA account is obligatory)
2. Oral test in Microscopic Anatomy: identification of structures on virtual histological specimens including relevant theoretical questions

LIST OF TEXTBOOKS

9. **The Developing Human – Clinically Oriented Embryology**, 10th ed. by KL Moore, TVN Persaud and M Torchia, Saunders, 2015; ISBN 9780323313384
10. **Histology: A Text and Atlas: With Correlated Cell and Molecular Biology**; 7th Edition by MH Ross and W Pawlina ; Wolters Kluwer 2015, ISBN 9781451187427
11. **Wheater's Functional Histology, A Text and Colour Atlas, 6th Edition** by B Young, G O'Dowd and P Woodford Churchill Livingstone, Edinburgh, 2013, ISBN 9780702047473
12. **Oral Anatomy, Histology and Embryology**, 4th Edition, by B. Berkovitz Paperback with STUDENT CONSULT Online Access and e-book ISBN: 9780723434115 Copyright: 2009

Recommended textbooks:

13. **Langmann's Medical Embryology**, 13th Edition by TW Sadler, Wolters Kluwer, ISBN 9781469897806, 2014
14. **Junqueira's Basic Histology: Text and Atlas**; 13th Edition by Anthony Mescher, New York, McGraw-Hill Medical, 01/03/2013 ISBN13 978007178033
15. **Wheater's Functional Histology, A Text and Colour Atlas**, 6th Edition by B Young, G O'Dowd and P Woodford ISBN 9780702047473, Churchill Livingstone, Edinburgh, 2013.
16. **Langmann's Medical Embryology**, 13th Edition by TW Sadler, Wolters Kluwer, ISBN 9781469897806, 2014
17. **Illustrated Dental Embryology, Histology, and Anatomy**, 3rd Edition by Mary Bath-Balogh ISBN: 9781437717303, 2011.

COURSE DESCRIPTION

Microscopic Anatomy and Embryology I.

Lectures in Histology; practical classes in Histology

Subject matter

Histology: Microscopy of the ground (basic) tissues (epithelia, glandular tissues, connective and supporting tissues, types of muscle tissues. Histology of the corpuscular elements of the blood, cells of the red bone marrow. Microscopical structure of the internal organs (cardiovascular, gastrointestinal, respiratory and the urogenital systems)

Credits: 5

Prerequisite: Cell Science

Week	Lectures	Histology laboratory
1	1. Epithelial tissues, cell contacts, intercellular connections 2. Glandular epithelium	Simple and stratified epithelial tissues
2	3. Connective tissue cells and fibres. 4. Connective tissue fibres. Types of connective tissue	Transitional epithelium Glandular epithelium
3	5. Supporting tissues (cartilage, bone) 6. Ossification, bone remodelling	Connective tissue fibres and cell types
4	7. Muscle tissues I 8. Muscle tissues II	Supporting tissues (cartilage, bone) Types of bone formation
5	9. Histology of vessels 10. Histology of the tongue and salivary glands	Types of muscle tissues Histology of the peripheral nervous system Histology of vessels
6	11. Tooth development, malformations 12. Histology of teeth I Enamel and dentine	Midterm (basic tissues, nerve tissue, vessels) Tooth development, tooth
7	13. Histology of teeth II Cementum and dental pulp 14. Histology of teeth III Parodontal tissues	Salivary glands, lip, tongue, lingual papillae
8	15. Histology of the esophagus and stomach 16. Microscopical anatomy of the small intestines	Esophagus, cardia Stomach, small intestine, large intestine
9	17. Histology of the liver, gall bladder and pancreas 18. Microscopical anatomy of the large intestines	Liver, gall bladder and pancreas
10	19. Histology of the airways 20. Histology of the kidney	Larynx, trachea, lung
11	21. Histology of urinary passages 22. Histology of the testicle	Histology of the urinary system (kidney, ureter, urinary bladder)
12	23. Histology of the spermatic cord, seminal vesicle and prostate 24. Histology of the ovary, oogenesis	Male genital system 1.
13	25. Histology of the Fallopian tube, uterus and the vagina 26. Histology of the placenta, umbilical cord and the mammary gland	Male genital system 2. Female genital system 1.
14	27. Histology summary I 28. Histology summary II	Female genital system 2 Placenta, umbilical cord, mammary gland

Topic list for the semifinal examination

Microscopic Anatomy and Embryology I.

General Histology, Histology of Organs

- Definition and classification of epithelial tissues
- Simple epithelia
- Stratified epithelia
- Membrane specializations of epithelia
- Glandular epithelia
- Cells of connective tissue
- Ground substance and fibres of connective tissue
- Types of connective tissue
- Histology of cartilage
- Histology of the bone tissue
- Intramembranous ossification
- Endochondral ossification
- Growth and remodeling of bone
- Smooth muscle and myoepithelial cells
- Skeletal muscle tissue
- Cardiac muscle tissue
- Histological structure of arteries and arterioles
- Composition of capillaries and veins
- General composition of parenchymal (solid/compact) organs
- Wall structure of hollow organs
- Fine structure of the intestinal villi, enteroendocrine system
- Lip and tongue
- Histological structure of the esophagus
- Histological structure of the stomach
- Histological structure of the small intestine (duodenum, jejunum, ileum)
- Histological structure of the large intestine
- Histological structure of the liver
- Histological structure of the gall bladder, extrahepatic bile ducts and pancreas
- Histological structure of the larynx, trachea and lung
- Histology of kidney
- Histological structure of the ureter and urinary bladder
- Histological structure of the male genital apparatus (testicles, epididymis, spermatic cord, seminal vesicle, prostate and penis)
- Histological structure of the female genital apparatus (ovary, uterine tube, vagina and the mammary gland)
- Uterus (proliferative, secretory phases) menstrual cycle
- Placenta and umbilical cord

Maxillofacial histology

- Structure of enamel
- Amelogenesis
- Structure of dentin
- Dentinogenesis
- Fine structure of the dental pulp
- Structure and formation of cementum
- Parodontal tissues
- Parts and structure of gingiva
- Tooth eruption
- Histology of the palate
- Histology of the tongue
- Fine structure of salivary glands

GENERAL DENTAL MATERIALS

Lecturer: *Dr. Judit Borbély D.M.D., PhD – associate professor*

Second Semester

Lectures (1 hour/week)

Topics of the lectures (weekly, numbered):

1. History of dental education
2. Impression materials I
3. Impression materials II
4. Casts, models and dies
5. Metals, technologies
6. Investment materials, flasking methods
7. Precious alloys, non-precious alloys
8. Dental resins
9. Dental ceramics
10. Dental cad/cam technology
11. Implant materials
12. Luting materials
13. Filling materials
14. Tooth whitening materials

Department of Prosthodontics, Faculty of Dentistry, Semmelweis University
Detailed information on the subject is available on our website under
<https://semmelweis.hu/fogpotlastan/en/angol/>

PHYSICAL FOUNDATIONS OF DENTAL MATERIALS SCIENCE

Tutor: *Dr. István Voszka*

First Semester

Lecture (2 hours/week)

1. Basic forms of material, atoms, interactions, bonds
2. Multiatomic systems. Gases. Interpretation of temperature. Boltzmann-distribution. Fluids. Interface phenomena. Liquid crystals.
3. Solid materials.
4. Methods for structure examination (diffraction, microscopic, spectroscopic methods)
5. Crystallisation. Metals, alloys.
6. Ceramics, polymers, composites.
7. Mechanical properties of materials 1. Elasticity.
8. Mechanical properties of materials 2. Plasticity, hardness.
9. Mechanical properties of materials 3. Rheological properties, viscoelasticity.
10. Other physical (optical, electrical, thermal) properties of materials
11. Comparison of the properties of dental materials
12. Bases of biomechanics. Structure, mechanical and other properties of tissues.
13. Physical bases of implantology.
14. Physical bases of orthodontics.

MEDICAL CHEMISTRY**Institute of Biochemistry and Molecular Biology****Department of Molecular Biology**

EOK Building, H-1094 Budapest, Tűzoltó u. 37-47.

Lecturer of the course: Csaba Sóti MD, DSc (soti.csaba@med.semmelweis-univ.hu)**Course coordinator:** Gergely Keszler MD, PhD (keszler.gergely@med.semmelweis-univ.hu)**Credit:** 4**Lessons (in hours):** 28 lectures and 28 practicals**Subject code:** FOKOMBT304_1A

The principal aim of the course is to prepare students for the understanding of the subjects of Biochemistry, Molecular cell biology, Physiology and Pharmacology. This requires a firm knowledge of the foundations of general, organic and inorganic chemistry.

Lectures:*General chemistry*

1. Atomic structure; the periodic table of elements
2. Primary chemical bonds
3. Secondary bonds and interactions
4. Chemical equilibria
5. Electrolytes; ionization of water
6. Acid-base theories, pH of strong acids and bases
7. pH of acids and bases
8. The theory of buffers
9. Buffers of physiological importance, cation and anion hydrolysis, pH of salt solutions
10. Solubility of salts and bases, the solubility product
11. Laws of dilute solutions. Specific and equivalent conductivity
12. Thermodynamics 1 – Enthalpy
13. Thermodynamics 2 – Entropy
14. Thermodynamics 3 – Direction of reactions
15. Electrochemistry 1
16. Electrochemistry 2
17. Reaction kinetics
18. Complex compounds, reactive oxygen species

Organic chemistry

1. Foundations of organic chemistry; the hybrid states of carbon
2. Nomenclature and constitution of organic compounds
1. Configuration and conformation of organic compounds
2. Saturated and unsaturated hydrocarbons
3. Reactions of alkyl halides and aromatic compounds
4. Classification and reactions of hydroxyl compounds
5. Classification and reactions of oxo compounds
6. Structure, function and reactions of organic acids
7. Nitrogen-containing organic compounds
8. Sulphur or phosphorus-containing organic compounds

Practicals:

- | | |
|--|--|
| 1. Introduction, acid-base titration 1 (titration of strong acids) | 9. Permanganometry |
| 2. Concentration and pH problems | 10. Theoretical midterm exam |
| 3. Acid-base titration 2 (titration of weak acids). | 11. Determination of the ionization constant of phenol red by photometry |
| 4. Salts | 12. Electrochemistry |
| 5. Titration curves, consultation (buffers) | 13. Complexometry. Precipitation titration |
| 6. Physiological buffer systems | 14. Isomers, molecule models |
| 7. 7. Electrochemistry | |
| 8. Thermochemistry, thermodynamics | |

Lectures and practical lessons

Two lectures are held every week; practical lab lessons (duration: 2×45 min) and seminars (2×45 min) are held in alternating weeks. For detailed schedules see the Moodle website of the subject.

Acknowledgment of the semester:

1. Attendance of at least 75% of the practical lessons is prerequisite of acknowledging the semester. Missed practicals and seminars can only be made up in the same week with another group; certificate of participation issued by the host teacher needs to be presented by the student to his/her own teacher. However, only one missed class can be made up during the semester. Students earn a lab point in each practical lesson they participate and perform the experiment in a proper way.
2. One has to pass the theoretical midterm exam.

Theoretical midterm examination

The midterm will take place in week 10, during the regular practical lesson. Passing the theoretical midterm is a **prerequisite** for receiving the end-of-semester **signature**.

The written test must be completed within 90 minutes and includes 4 calculation problems and 2 theoretical topics from the midterm topic list. Students earning an excellent grade (5) on the midterm will receive a **bonus in** the semifinal exam: they do not have to solve the **calculation** question. Failed or missed midterm exams can be retaken twice, but the best grade one can get in the retake is a pass (2). The latter restriction does not apply to students having missed the midterm due to illness (medical certification is to be presented).

Practical midterm examination (lab test)

An optional written practical midterm test (30 min) is held online, on the Moodle platform, in week 14. The test consists of 10 short questions which are based on the laboratory experiments performed during the semester. Performance in the laboratory work during the whole semester is also taken into account at the evaluation. Scores earned in the lab test (max. 10) will be added to the practical points (max. 6) earned during the practicals. Students who collect at least 12 points (out of the maximum $10 + 6 = 16$) will receive a **bonus**: they do not have to pick a **practical question** in the exam.

Examination and grading:

The oral and written exam is based on the topic list announced in the beginning of the semester, and it takes place before a two-member committee (examiner and co-examiner). The exam can be passed if all these topics are sufficiently answered. Students pick 3 questions (general chemistry, organic chemistry, practice) and a calculation problem to be solved in writing. Students, who achieve at least 12 points at the practical midterm and at the labs during the semester, get exempted from picking the practical question. The bonus is valid during the whole exam period (in case of an unsuccessful exam) and in CV exams too.

Exemption from attending the course

Students who learned general, and organic chemistry at university levels prior to the commencement of their studies at Semmelweis University might be exempted from attending the Medical Chemistry course. Students are kindly asked to present their official documents (academic transcripts and a detailed syllabus on the courses they have completed) to the tutor (Gergely Keszler).

Recommended textbooks

Ebbing-Gammon: General Chemistry, latest edition

Hrabák-Csermely-Bauer: Principles of Organic Chemistry (2nd edition, 2007, editor: A. Hrabák)

Hrabák: Selected Collection of Chemical Calculations and Biochemical Exercises (latest edition)

E-learning system (Moodle) (<https://itc.semmelweis.hu/moodle>)

Topic list:**I. General chemistry**

1. The covalent bond, the molecular geometry of inorganic molecules (e.g. carbon monoxide, carbon dioxide, ammonia). Ionization energy, electron affinity, electronegativity. The ionic bond, hydroxylapatite and fluoroapatite
2. The structures of polyatomic ions, the complexes
3. The secondary bonds and interactions between molecules
4. Laws of dilute solutions: vapor pressure, freezing point depression, boiling point elevation
5. The phenomenon of osmosis, its biological significance, isotonic, hypotonic and hypertonic solutions
6. Chemical equilibria, the equilibrium constant and the degree of dissociation, their correlation. The Le Châtelier principle (example: formation, properties, salts, practical use of hypochlorous acid.)
7. Gas mixtures: partial pressure, volume %. The composition of the air. Dissolution of gases in liquids, Henry's law, the decompression sickness
8. The structure and dissociation of water. Acid-base theories. The pH and pOH concept, calculation of the pH of strong acids or bases, and their titration curves. Acid-base indicators
9. The dissociation of weak acids and bases, the concept of specific and equivalent conductivity, their correlations with the dissociation. Titration curves of weak acids
10. The buffers: principle, mechanism of action, calculation of the pH. The titration curves of polyprotic acids (phosphoric acid)
11. Buffers of physiological importance
12. The first law of thermodynamics. Heat of reaction, combustion heat, heat of formation. Hess' law
13. The second law of thermodynamics. The direction of the chemical reactions, Gibbs free energy
14. Oxidation, reduction, oxidation number, standard reduction potential
15. The galvanic cells: arrangement, reactions, calculation of the electromotive force
16. Types of electrodes, redox systems of biological importance
17. The concentration cells, the principle of measuring the pH

II. Organic chemistry

18. The concept of isomerism, types of structural isomerism, nomenclature of organic compounds
19. Geometric isomerism in unsaturated and cyclic compounds
20. Stereoisomerism, chiral compounds, optical activity, D-L and R-S nomenclature
21. Conformations of organic compounds, examples with open chain and cyclic molecules
22. Properties and reactions of alkenes
23. Characteristics, reactions and biological roles of aromatic compounds
24. Alcohols, enols, phenols
25. Oxo compounds: aldehydes and ketones. Their chemical reactions, the mechanism of the nucleophilic addition. Oxo-enol tautomerism
26. Properties and reactions of compounds containing a carboxyl group
27. Substituted carboxylic acids (Halogenated, oxo-, hydroxy-; aromatic; mono-, di- and tricarboxylic acids)
28. Nitrogen-containing organic compounds: classification and properties of amines
29. Carboamides, amides of the carbonic acid, imines

III. Laboratory

30. Principle of concentration determination by volume measurement: titrations
31. Titration of strong acids and bases
32. Titration of weak acids and bases
33. Titration of gastric juice
34. Titration curves of mono- and polyprotic acids
35. Titration based on redox reaction: permanganometry
36. Complexometry: determination of copper concentration
37. Electrochemical measurements: the Daniell cell, concentration cell, redox and non-polarizable electrodes
38. Principle of spectrophotometry, areas of application: determination of the K_d value of the phenol red indicator
39. Precipitation titration

CELL SCIENCE

Department of Genetics, Cell- and Immunobiology

Address: NET Building, H-1089 Budapest, Nagyvárad tér 4.

Course director: Edit Buzás MD, DSc

Course coordinator: Orsolya Láng MD, PhD

Credit: 3

Neptun code: FOKOGEN666_1A

Aim of the course:

Course Cell Science is developed for Dentistry students as a part of the Basic Module. The Course presents the most important aspects of cell-morphology and cell function. Cell Science Course provides a detailed discussion of compartmentalization in the eukaryotic cell as well as describes the most significant characteristics of the basic cellular functions (migration, endocytosis, cell-cell communication, division, stem cell differentiation, ageing and cell death). The practices introduce the students to the microscopic techniques used for cell morphological studies. The purpose of the course is to demonstrate the complexity of cell structure and function relationships as well as to present basic methods of in vitro cell culturing and their potential medical applications

Location of the course (lecture hall, practice room, etc.):

Lecture: Basic Medical Sciences Center (H-1094 Budapest, Tűzoltó street 37-47.)

Practical classes: NET building; Lab rooms L13-L16 (H-1089 Budapest, Nagyvárad place 4.)

Lectures (1 hour per week):

1. Cell theory. Model cells in medicine
2. Cell membrane
3. Structure and function of the nucleus
4. Endoplasmic reticulum
5. Golgi complex, vesicular transport and secretion
6. Endocytosis. Autophagy
7. Cell adhesion and cell junctions
8. Cytoskeleton
9. Cellular movement
10. Structure and function of mitochondria and peroxisomes
11. Cell communication. Extracellular vesicles.
12. Cell cycle and mitosis
13. Stem cells and differentiation
14. Cellular ageing and cell death

Practices (2 hours per week):

1. The light microscope
 2. The general cell structure. Light microscopic microtechnique
 3. The electron microscope. Cell membrane
 4. The interphase nucleus. Cyto(histo)chemistry
 5. Immunohistochemistry. Super-resolution microscopy
 6. Cell and tissue culture
 7. Endoplasmic reticulum
 8. Golgi complex and secretion
 9. Endocytosis and lysosomes
 10. Cell surface differentiation, enzyme-histochemistry
 11. Store and supply of energy. Mitochondria. Peroxisome.
 12. Mitosis
 13. Meiosis
 14. Cell death (necrosis and apoptosis)
- The order of topics may vary

Course requirements: Students must participate at least 75% of the classes. More than three absences from the practice invalidate the semester, no signature is given. There are no extra practices.

Midterms: During the semester two Moodle exams will be organized in weeks 6th and 12th. Writing the tests is not obligatory, but students who achieve 80% of the total score will be invited to the competition. In addition, in case of a successful examination, those students who obtain more than 50% of the total score in the exam, will get one better mark. This option is only available until the end of the regular examination period, and cannot be transferred to the extended exam period, CV, and FM courses.

The competition is expected to take place in week 13, students can obtain offered grades in accordance with the Study and Examination Policy.

Exam: The course ends with an exam consists of a Moodle test (multiple choice, essays, etc. covering theoretical and practical part of the subject).

The course ends with an exam consists of a written test (multiple choice, essays, drawings, etc. covering theoretical part of the subject). Further details will be announced on the website of the department (<http://gsi.semmelweis.hu>).

Core text: Alberts et al. Essential Cell Biology (4th edition) Garland Science ISBN-13: 978-0815344544 ISBN-10: 0815344546

Lecture and practice presentations and additional texts are available on the homepage: <http://gsi.semmelweis.hu> (The user name and password is on course datasheet of the Neptun)

DENTAL BIOCHEMISTRY I**Department of Medical Biochemistry****Credits:** 4**Total number of hours:** 56; **lectures (hours):** 28; **practices (hours):** 28**Type of the course:** obligatory

Academic year: 2023/2024

Code of the course FOKOBMT305_1A**Course Director:** *Dr. Kraszimir Kolev***Contact details:** H-1094 Budapest, Tűzoltó u. 37-47. Phone: +36-1-459-1500#60010 e-mail: Kolev.Krasimir@med.semmelweis-univ.hu**Position:** Professor**Date of habilitation:** 2008 **Ref.:** 266**Aim of the course:**

The aim of this course is to examine biologically important molecules - namely amino acids, carbohydrates, lipids and nucleotides - identify their contributions to metabolic processes emphasized from a medical point of view, examine the structure and function of proteins, and address mechanisms of catalysis performed by enzymes. Furthermore, three basic biochemistry modules are outlined: The enzymology module, encompassing general principles of enzyme kinetics and how enzymes influence efficiency and controllability of chemical processes in biological systems, as well as how they affect structure and regulation of metabolic pathways; the bioenergetics module, addressing the relationships between mass-energy conversions in the human body emphasizing nutritional aspects, also elaborating on thermodynamic aspects of metabolism; and the 'first' intermediary metabolism module, presenting the salient features of carbohydrate and lipid metabolism which are essential for understanding physiological and pathological processes of the human body. During practices, students apply the theoretical knowledge acquired at lectures as part of case-oriented discussions in an effort to interpret - from a molecular point of view - relevant conditions.

Location of the course (lecture hall, practice room, etc.):

Premises located in the Basic Medical Sciences building (laboratory rooms located on the first floor and lecture halls located on the ground floor).

Upon the successful completion of the curriculum, the student should be able to:

Identify biochemical structures, know and understand the reactions in which medically important molecules participate; know and understand inter-organ biochemical processes; know and understand integrated metabolic functions of the human body. Overall, such knowledge is essential for understanding physiological and pathological processes and, consequently, for making sound professional decisions.

Prerequisite (s) for admission to the course: None**Terms and Conditions for Starting Student Course (Minimum, Maximum), Student Selection Method:** Not applicable for obligatory subjects**How to apply for the course:** Application is through the Neptun online system**The course in thematic details:****Lectures:** weekly 1×90 min (2 hours)**Practices (P):** 2 hours every week**Lecturers:** Dr. Komorowicz Erzsébet (KE), Dr. Szöllősi András (SZA), Dr. Bak Judit (BJ), Dr. Iordan Iordanov (II)

Week	Lectures: weekly 1×90 min (2 hours)	Practices (P): 2 hours every week
1	The chemical structure of proteinogenic amino acids. The peptide bond. The primary, secondary and tertiary structure of proteins. (SZA)	P: Structural and chemical characteristics of amino acids; pH and temperature dependent properties.

Week	Lectures: weekly 1×90 min (2 hours)	Practices (P): 2 hours every week
2	The quaternary structure of proteins. Covalent modifications of proteins. Comparison of the structure-function aspects of myoglobin and haemoglobin. (SZA)	P: Structural and chemical characteristics of amino acids; pH and temperature dependent properties. Gel electrophoresis of LDH subunits.
3	Thermodynamic and structural aspects of enzyme function. Fundamentals of enzyme kinetics. Regulation of enzyme activity. Enzymes as components of physiological systems. Mechanisms of serine proteases. (SZA)	P: Interpretation of pathological conditions stemming from alterations in protein structure, elucidated by atomic resolution techniques.
4	Kinetic models of enzymatic function. Michaelis-Menten kinetics. Significance of the Michaelis constant (Km). Inhibition of enzymatic reactions. Allosterity and cooperativity in enzymatic reactions. Levels of regulation of enzymatic reactions: compartmentalization, altering gene expression, reversible modification of the catalytic activity of enzymes. Enzymatic control by proteolytic activity. (SZA)	P: Determination of kinetic parameters of trypsin
5	The thermodynamics of biochemical pathways. Reversible and irreversible reactions. The coupling of endergonic and exergonic reactions in the human body. High energy compounds. The central role of ATP in the energetics of cells. Reducing equivalents. (B))	P: Regulation of enzyme activity. Identification of metabolic pathways.
6	Reactions and control of the citric acid cycle. Sources of citrate. The pyruvate dehydrogenase complex. The synthesis of ATP. ATP production by oxidative phosphorylation in mitochondria. Redox reactions of terminal oxidation (electron transport chain, ETC). The enzyme complexes of ETC. (B))	P: Bioenergetics. Determination of P/O ratio
7	Carbohydrates. Digestion and absorption of carbohydrates, cellular glucose uptake, glucose transporters. Glycolysis. (B))	P: Carbohydrates in the diet. Food fibers and additives.
8	Gluconeogenesis. Regulation of glycolysis and gluconeogenesis. Cori-cycle. Metabolism of glycogen. Mobilization of glycogen in liver and muscle. (B))	P: Lactic acidosis
9	Blood glucose level and its regulation: hyperglycaemia. Insulin release, insulin receptors. Phosphorylation cascade. Lactate synthesis. Effects of glucagon. Biochemistry of diabetes mellitus. (B))	P: Determination of blood glucose level.
10	Metabolism of lipids – overview. Absorption of lipids. Metabolism of chylomicrons. (II)	P: Structure and function of the most important lipids in the body and in the diet.
11	Mobilization of fatty acids in adipose tissue, its regulation. Transport in the circulation. Free fatty acids, VLDL, IDL. (SZE)	P: Membrane-forming lipids and their pathologies. Precursor molecules for signal transduction.
12	Oxidation of fatty acids. Ketone bodies. Synthesis of fatty acids. Biosynthesis of triacylglycerol, phospholipids, their regulation. (II)	P: Tissue-specific aspects of lipoprotein lipase (LPL); LPL deficiency.
13	Metabolism of cholesterol, cholesterol transport in circulation. (KE)	P: Determination of triglycerides and cholesterol in blood plasma.
14	Biosynthesis and metabolism of bile acids, the importance of bile acids in lipid digestion. Cholesterol uptake and release by cells. (KE)	P: Signal transduction of insulin

Requirement for special study: not applicable

Policy regarding attending practice; policy regarding absences:

Practices are mandatory. It is not possible to make up for missed practices. In case of absences amounting to more than 3 practices, the

semester is not acknowledged. Arriving to a practice with a delay of more than 10 minutes is considered an absence. Practice/seminar participation performance will be evaluated by the tutors: as such, maximum 10 points per semester can be obtained that may count towards the examination grade, see under “Grading system” for further details.

Means of assessing acquired knowledge during the semester:

Midterms: A midterm will take place in the 6th and another in the 11th week, during the practice/seminar (allocated time per midterm: 30 minutes). Each midterm will consist of multiple choice questions (MCQs) from which max 30 points can be obtained (15 points per midterm). It is obligatory to gather 15 points from both midterms in order to be allowed to sit for the exam. For those students who fail to amass ≥ 10 points from both midterms, one or both midterms can be retaken in the last week during the practice/seminar (allocated time per midterm: 20-30 minutes). The midterm points will be added as “points” to the result of the exam, as detailed in “Grading system”, see below.

Lectures: At the end of some lectures, there will be a Kahoot on the topic of the lecture and the correct answers are registered as bonus points from lectures in the Moodle system. These points are taken into consideration at the oral exam .

Requirement for acknowledging the semester, and for allowing the student to take the exam: Attendance of at least 75 % of the practical classes. and at least 15 points from both midterms.

Competition: The competition is held on the last week during the practice/seminar (allocated time: 40 minutes) and consists of 70 multiple choice questions (MCQs). Only students who amass 21 or more points from the midterms (not the retakes) can participate in the competition. Points obtained from midterms or practice/seminar performance do not count to the score of the competition. Students who score at least 90% of the best result achieved by any student in the course will be invited for the oral exam; this short oral exam will take place in the last day of the last week (after 2 pm, exact time and place will be announced in the last week). On the basis of the written and oral part exemption from the semifinal exam may be granted with a grade of 5 (top 5 % scorers) or 4 (top 5.1-10% scorers).

Exam Type: Colloquium (examination), Form: written test and oral exam, based on material of the official textbook, lectures and practices published at the department’s Moodle e-learning system (<https://itc.semmelweis.hu/moodle/>).

Exam Requirements: The material for the written test exam is the material of the lectures and practices in the subject, with the corresponding textbook chapters.

Types and modes of grading:

Grading system:

If the score of the MCQ exam is 49 or below, then the grade of the final exam is ‘fail’.

If students reach 50 points on the MCQ exam, the midterm points, practice/seminar performance points and lecture Kahoot points (total max. 40 points) will be added to the MCQ score.

Grade calculation of the final exam from the total points (MCQ+semester):

- 95–140: grade 5 (excellent)
- 86–94: grade 4 (good)
- 71–85: grade 3 (satisfactory)
- 50–70: grade 2 (pass)

The grade of the final exam is based on the points obtained at the written MCQ semi-final exam, the two midterms, the practice points, and the oral exam following the written MCQ exam as detailed below.

Grading of the written part:

- Block1: 30 MCQ (30 min) on proteins and enzymes (threshold to pass 12 points)
- Block2: 30 MCQ (30 min) on bioenergetics and carbohydrate metabolism (threshold to pass 12 points)
- Block3: 30 MCQ (30 min) on lipid metabolism (threshold to pass 12 points)

Subtotal threshold: the sum of scores from Block1, Block2, and Block3 should be at least 45 points Total grade of the written part: if the subtotal threshold is achieved, the points of the midterms (max. 30 points) and practices (max. 10 points) are added and the grade is determined as follows:

Fail (1): if the score in any block is less than 12, OR the subtotal is less than 45, OR the total is less than 60

Pass (2): 60 - 74 points

Satisfactory (3): 75 - 89 points

Good (4): 90 - 109 points

Excellent (5): 110 - 130 points

Oral part

Only students who pass the written part proceed to the oral part held on the same day. The examiner chooses 5 MCQ that have been correctly answered by the student in the written part, and the student should interpret them. If the student has achieved at least 15 or more points from the two midterms, they need to answer only 3 oral questions.

Final grade

The final grade is based on the total written grade weighted by a factor determined by the examiner based on the student's performance in the oral part. In case of retake exams students must repeat both the written and oral parts (successful partial results cannot be transferred to subsequent exams).

How to apply for the exam: The exam dates are announced on the 12th week of the semester. We provide at least one exam date each week. Applications are made in the Neptun system in accordance with the University Study and Exam Rules.

Opportunities to repeat the exam: A retake is possible on the closest announced exam date at least one day after an unsuccessful exam.

Printed, electronic and online notes, textbooks, tutorials, and literature for online learning (html for online material):

Harper's Biochemistry (30th edition, or latest)

Online material published in the department's Moodle e-learning system (<https://itc.semmelweis.hu/moodle/>).

BIOPHYSICS ITutor: *Dr. István Voszka***First Semester**

Week	Lecture (1.5 hours per week)	Laboratory (2.5 hours per week)
1	Introduction to biophysics, radiations, electromagnetic spectrum	Laboratory safety rules, data analysis
2	Ray optics: Fermat's principle, refraction, image formation by lenses, microscope	Resonance
3	Wave optics: Huygens' principle, diffraction, interference, resolution of lenses	Emission spectroscopy. Light sources
4	Light scattering, absorption, reflection, color vision	Spectrophotometry
5	Structure of matter: atoms, molecules, crystals	Statistics
6	Thermal emission, emission of human body, infradiagnostics	Detection of nuclear radiations
7	Luminescence and its applications in medicine	Dosimetry
8	Lasers with applications in medicine	Special light microscopes Amplifier
9	Photobiology, applications in medicine	Optics of the eye
10	Modern microscopy techniques	Polarimeter
11	X-ray production, spectral characteristics, interactions with matter	The attenuation of gamma-radiation
12	X-ray diagnostics	Determination of skin-impedance
13	Nuclear radiations, isotope diagnostics	Concentration determination with refractometer
14	Clinical applications of nuclear radiations	Repetition

BIOPHYSICS II**Second Semester**

Week	Lecture (1.5 hours per week)	Laboratory (2.5 hours per week)
1	X-ray diagnostics	Signal processing-1: human body as signal source
2	Skin impedance	Signal processing-2: amplifiers, digital signal processing
3	ECoulter counter	Dosimetry of ionising radiation
4	Gamma energy determination	Biophysics in dentistry
5	Pulse generators (e.g. pacemaker, defibrillator)	Medical sonography
6	Ultrasound	Biophysics of sensory functions: vision and hearing
7	Audiometry	ECG, pulse generators, pacemaker
8	Isotope diagnostics	Transport processes 1: flow
9	Densitography (CT)	Transport processes 2: diffusion
10	Flow of fluids.	Transport processes 3: membrane potential
11	Electrocardiography	MRI - medical imaging
12	Diffusion	Biostatistics 1: descriptive statistics
13	Sensory function	Biostatistics 2: hypothesis testing
14	Repetition	Biostatistics 3: regression analysis

DENTAL PSYCHOLOGY**Institute of Behavioral Sciences**

Code: FOKVMAG019_1A

Credit: 2

Head of the Department: **Prof. Dr. József Kovács**Tutor: **Dr. Gyöngyvér Salavecz****Second Semester**

Course objectives:

- to introduce the concepts of stress, emotions, states of consciousness, and their role in pain perception
- to emphasize suggestive communication and therapeutic methods that may be used to improve doctor-patient relationship in dental practice
- to enable students to recognize and understand psychological and psychopathological issues when encountered in everyday dental practice

Topics:

- 1-2. Control problems and their relations to dental practice
- 3-4. Principles of perception, pain, consciousness, emotions and communication -and their relations to dentistry.
- 5-6. Stress and stress management in dental practice
- 7-8. Psychological crisis, presuicidal syndrome, and burn-out prevention
- 9-10. Role of psychological factors in producing and enhancing pain.
Psychological interventions for pain suppression.
- 11-12. National holiday
- 13-14. Psychotherapeutic methods
- 15-16. Fables and imagination in dental practice
- 17-18. Substance misuse and surrounding areas in dentistry
- 19-20. Dental consequences of eating disorders
- 21-22. Hypnosis and relaxation therapies, and their possible use in dental practice
- 23-24. Conscious states, sleep, dreaming, general anesthesia
- 25-26. Affects, emotion and motivation
- 27-28. Review

Department:**Institute of Behavioral Sciences****Department of Psychology**

NET Building, 20th floor

1089. Budapest, Nagyvárud tér 4.

Phone: 210-2953

Secretary: NET Building, 20th floor, Room-2005. Phone: 2102930/ 56114.

Lecturers:	Dr. György Purebl	e-mail: purgyor@net.sote.hu
	Dr. Róbert Bódizs	e-mail: bodrob@net.sote.hu
	Dr. Adrienne Stauder	e-mail: staadr@net.sote.hu
	Dr. László Harmat	e-mail: laszloharmat@yahoo.com
	Éva Pollák	e-mail: evipoll@yahoo.com
	Gabor Suhai	e-mail: shgabor@gmail.com

Participation and making up for absences:

Participation list will be recorded at the end of every lecture. To participate on at least 75% of the total number of lessons is a prerequisite for getting the signature. Maximum number of absences in a semester is 3.

Certifying absence from lesson and exam:

Medical certificate presented to the course leader.

Semester requirements:

Course will conclude with a written **examination** in the examination period.

Requirement of semester signature:

A signature will be given with the prerequisite of participation. One absence can be overlooked by the teacher if the student writes an essay. The topic of the essay must be discussed with the course leader in advance.

Method of granting grade: The result of the **examination**.

Type of exam: written **examination**

Exam requirements: Content of the lectures

Sign up for exam: through the Neptun system

Modifying sign up for exam: through the Neptun system

Certifying absence from exam:

A telephone message to the secretary of the Institute or an email message to the course leader.

Recommended text books:

- 1 Behavioral dentistry. Mostofsky DI, Forgione AG, Giddon DB (eds.), Blackwell Munksgaard, 2006.
- 2 Behavior & Medicine. 4th Edition, Danny Wedding, Hogrefe & Huber Publishers, Seattle, 2006.
- 3 Fadem B: Behavioral Science, Lippincott Williams & Wilkins, 5th ed., 2008.
- 4 Sarafino E.P.: Health Psychology. Biopsychosocial interactions. 6th ed., New York, Wiley, 2008.
- 5 Kopp M. - Skrabski Á.: Behavioral Sciences Applied in a Changing Society, Corvina, 1996.

MEDICAL SOCIOLOGY (Dentsoc)**Second Semester**

Hour/semester: 28

Credit: 1

Code: **FOKVMAG235_1A****Lecturer of the course:** Prof. Dr. Purebl György**Contact details:** SE ÁOK Magatartástudományi Intézet, 1089. Nagyváradi tér 4, (36-1)210-2930/ext.56199, or (36-1) 210-2940/ext.56199; or (36-1)210-2953; purebl.gyorgy@med.semmelweis-univ.hu**Position:** Professor, Director of the Institute of Behavioral Sciences, Semmelweis University—Budapest.**Date of habilitation and reference number:** 05/2019 Semmelweis University, Budapest**Course leader:** Bence Döbrössy dobrossy.bence @med.semmelweis-univ . hu**Teachers:** Bence Döbrössy e-mail: dobrossybence@gmail.com Dr. Edmond Girasek email: girasek.edmond@gmail.com**Location of the course (address of lecture hall, seminar room etc.):**

Nagyvárad téri Elméleti Tömb, 1089 Budapest Nagyváradi tér 4.

Elméleti Orvostudományi Központ 1094 Budapest Tűzoltó utca 37-47

FOOC, 1088 Budapest, Szentkirályi u. 47.

Goals of the subject:

The aim of this course is to help students realise that social factors have a considerable influence on oral/ dental health and dentistry. Social, economic and cultural factors have a great effect on the dentist-patient relationship, the way people make sense of their symptoms and seek dental help, their oral/ dental health related behaviour as well as on the aetiology of oral and dental conditions.

By understanding how different societies are structured and organised and how the categories people belong to (gender, ethnicity, occupation, educational level, financial situation to name but a few) shape all aspects of their lives and opportunities, our hope is that students will better comprehend the social reality influencing the dental health status of people and the practice of dentistry for dentists.

Syllabus of the subject:

Week		
1	Introduction to sociology, basic concepts and principles.	Practice
2	General health and oral health status through history	Lecture
3	Social determinants of oral health and oral health related behaviour	Lecture
4	Intercultural dentistry	Lecture
5	Patient expectations regarding dentistry: the theory and practice of dental patient satisfaction studies.	Lecture
6	Norms, deviance and dentistry	Lecture
7	Covid and Sociology- a summary class.	Lecture
8	Introduction to practicals. Project work discussion	Practice
9	Social inequality and health inequality	Practice
10	Health Care Systems workshop	Practice
11	21st century dentistry technological and socio-cultural changes	Practice
12	Dental help seeking behaviour, illness behaviour	Practice
13	Medicalisation in dentistry, cosmetic dentistry	Practice
14	Project reports	Practice

Courses (obligatory and elective) which in part or entirely overlap the topics of above course:

Public Health

The Basics of Digital Healthcare

Special academic work required for completion of the course:

Project work done in the practicals

Attendance on practices and lectures, replacement in case of missed sessions:

75% of practicals must be attended. One practical absence can be made up by undertaking an extra task set by the practical leader or by participating in the practical with another group

Consequences of absence from sessions and exams:

No signature is given if 75% of the practicals is not attended, the project work is not done

Method of checking acquired knowledge during the study period:

Completion of project work is required for getting a signature. The project work is graded and makes up 40% of the final grade.

Requirements of an accepted semester (signature of the lecturer):

Completion of project work and 75% practical attendance is required for getting a signature

Type of the exam:

written exam in the examination period (60% of the final grade)

Requirements of the exam:

- The written exam will consist of multiple choice questions and an essay type case analysis where students are required to understand, explain and apply to the given case concepts and knowledge acquired in the course.
- In order to undertake the exam successfully, students must know the material made available to them on the departmental home page as well as the textbook.
- The material covered in the exam:
 - 21st century dentistry technological and socio-cultural changes
 - Dental help seeking behaviour
 - Intercultural aspects of dentistry
 - Medicalisation in dentistry, cosmetic dentistry
 - Patient expectations regarding dentistry
 - Social determinants of oral health and oral health related behaviour
 - Social inequalities and inequalities in dental health
 - Socio-cultural aspects of pain
 - Systems of dental health care provision
- The profession of dentistry

Grading of courses:

40%- project work

60% -written examination

Grades:

0-50 points – 1

51-60 points – 2

61-74 points – 3

75-84 points – 4

85 points and over 5

All lecture notes and slides are made available on Moodle (<https://itc.semmelweis.hu/moodle/>)

textbook: Graham Scrambler (ed) Sociology as Applied to Health and Medicine, Palgrave Macmillan 2018

Exam sign up: Through the Neptun System

Modifying: Through the Neptun System

Absence from the exam: With medical document submitted to the course director

HISTORY OF MEDICINE

Institute of Public Health

Lecturer: **Dr. Fazekas-Pongor Vince**

The history of medical science, considered as a part of the general history of civilization. The study of the history of medicine helps us to describe and understand how people in different times and cultures experienced and dealt with these fundamentals of human existence. This knowledge can inform debate about the present and the future, and help to bring medicine and science to a wide audience. All human societies have medical beliefs that provide explanations for birth, death, and disease. Many cultures in ancient times treated illnesses with magic and herbal remedies. Ancient Egyptians thought that their gods healed them. The ancient Greeks pursued medicine as a science. Hippocrates, the most famous physician of the time (c. 400 B.C.), believed that diseases had natural causes, not supernatural ones. By the Middle Ages, Europe was hit with a terrible epidemic that killed millions of people called the plague, or Black Death. The Renaissance marked a new period of interest in art and science throughout Europe. Despite new medical discoveries, many doctors still practiced old ways. Most sick people could not afford to see a trained physician. Instead, they consulted midwives who assisted with childbirths and made herbal remedies to treat illnesses. Minor surgeries were not done in the hospital but at the local barbershop. Medical research and training improved in the 18th century but there were still no cures for diseases like smallpox, a disease that killed millions of people over thousands of years. Middle Eastern doctors gave people mild doses of the smallpox to combat the disease. The portrayal of the history of medicine becomes more difficult in the 19th century. Discoveries multiply, and the number of eminent doctors is so great that the history is apt to become a series of biographies. Nevertheless, it is possible to discern the leading trends in modern medical thought. In the beginning of 20th century the research and technology have expanded medical knowledge and improved medical practices like surgery. Today, doctors are able to perform less invasive surgical procedures. The science of medicine has progressed dramatically in just the last 50 years. Career opportunities in health care have also expanded. There is a need for more skilled medical professionals, not only in hospitals, but in dentist and doctors' offices, research labs, rehabilitation centres, mental health clinics, nursing homes and even schools.

Topics/week

- 1. Introduction. What is Medicine? Methods and sources of Medical History. The birth of paleomedicine (bones teeth, mummies). Prehistoric medicine. Far East.**
- 2. Far East Medicine. Chinese civilization, Japan, India.**
- 3. Medicine of ancient civilizations, rivers valley's culture: Mesopotamia, Egypt, and the medicine knowledge. Medicine - in the Bible time - Heritage of the empirical knowledge. Practitioners. Theories of diseases.**
- 4. Greco-Roman Medicine. Homeric medicine. Asclepius, Hippocrates. Corpus Hippocraticum- the concept and doctrine of his theories about the nature and diseases (the four humors). The Oath. Hygiene and health education. Post-Hippocratic schools – the golden heritage in the school of Alexandria. The roman physicians, diseases. Advance of public health. Water supply and sanitation, climate, soil and health, diseases, endemics. The workers' health, provision of medical care. (Celsus, Galenus)**
- 5. Medieval medicine. Byzantine Healers, Arabian Hakims, Monks, Crusaders and medieval „doctors.“ The Arabian medicine: chemistry, pharmacy, hospitals. Razes, Avicenna, Abulcasis. The medieval Monasteries (Monte Cassino). The growth of European cities, sanitary problems of urban life. The first religious medical school in Salerno. Medieval Universities, medical humanists, and Christian caritas.**
- 6. Medicine in the Renaissance. The Arts and the humanism. The new mentality of medicine: Paracelsus. The revolution of anatomy: Vesalius and his contemporaries. The first step toward the specialization. Botany and mineralogy. The printing of book's role in medicine. Foundation of the administration of Public Health. Epidemic diseases: communicable and non-communicable diseases. Theories, therapies, and medical care, hospital. Quarantine.**
- 7. Experimenters, Teachers and Theoreticians in the Sixteenth and Seventeenth Centuries. Body as machine -old schools: iatrochemical, iatrophysical theories. New schools: animism, tonus, vitalism, stimulation, homeopathy. The circulation of the blood. Harvey's methodology Malpighi. Microscopy. Birth of modern clinical medicine: Sydenham. Boerhaave and his pupils.**
- 8. Industrialism in the Eighteenth Century. Clinical medicine- schools of clinical (French, English, German, and Habsburg). The first Vienna School: van Swieten. surgery (Hunter, Valsalva), pathology (Morgagni, Bichat). Public health and hygiene. Occupational health, prison reform, general health (death rate, statistics), Ramazzini, Frank. Smallpox. Infant mortality. Nursing, dispensaries and hospitals, development of obstetrics. Sanitary conditions – filthy towns.**
- 9. Clinical medicine in the second half of the eighteenth Century. Bacteriology a new science in medicine. Revolution, concepts and theories under the microscope. New discoveries Pasteur, Koch. Social revolution, industrialism, public health. National and international movements and health reforms, and medical care. Period of great epidemics. International health organization. The Red Cross.**

10. **Development of surgery and gynaecology. The man-midwife (Smellie, Hunter), History of anaesthesia. General and local possibilities. Wells, Morton, Simpson, Jackson). Asepsis and antiseptics. Early efforts to develop aseptic techniques. Semmelweis, Lister. Progress in surgery, Billroth. Cholecystostomy, appendectomies.**
11. **Emergence of specialism. Logical outgrowth of locality pathology, new instruments. Initially the medical professions: Paediatrics, Psychotherapy, Ophthalmology, Otolaryngology, Rhinology and Laryngology, Dentistry, Neurology and Psychiatry, Dermatology and Venereology.**
12. **From the black death to the AIDS. The history of epidemics. The theories and therapies. Tropical medicine. The development of epidemics, the bacteriology and immunology. The new medicaments. Ehrlich and the chemotherapy, sulphonamides, antibiotics. Virology. Salk and Sabin. New diseases and screenings methods.**
13. **Consultation**

Important: 3 absences are allowed. Doctor's certificate is required to certify absence from the exam.

Exam requirement: written test

Textbook:

Chrestomathy on the History of Medicine. Ed. Dr. Forrai J., Dr. Ballér P., Budapest, 1992. SOTE

FIRST AID

Department of Oxyology and Emergency Care Faculty of Health Sciences

1088 Budapest, Vas u. 17., room 145

Phone: +(36-1)486-5840

Head of the Department: Andrea Szekely, MD, PhD, DEAA

Teacher: Istvan Hornyak associate professor

Second Semester

• *Topics*

- Principles of first aid. Recognition of an emergency. Assessment of the scene.
- Dangerous scene. Safety measurements on the scene. Call for an ambulance.
- Emotional viewpoints of managing emergencies.
- Assessment of the patient with ABCDE approach. Responsiveness – unresponsiveness. Assessment of the responsive patient: complaints, signs for the severe condition. Positioning of the patient in specific conditions.
- The unconscious patient. Airway management. Assessment of the vital signs.
- Recovery position.
- Heart attack. Sudden death. Chain of survival.
- BLS (Basic Life Support)
- BLS
- AED (Automated External Defibrillator). PAD (Public Access Defibrillation)
- BLS + AED
- BLS + AED
- Chocking. Drowning. Electrocutation.
- Injuries. Extrication of the patient: Emergency lifting. Helmet removal. Mobilization and immobilization of injured patients.
- Bleeding control. Bandages. Burns. Fractures, dislocation, sprain.
- Fainting. Shock. Allergy
- Stroke. Convulsions. Diabetes mellitus: Hypoglycaemia. Shortness of breath.
- Poisoning. Drugs. Drunkenness.

Note: Participation at 75% of practices is necessary. Compensation of absences is possible in subsequent practices. Development in learning skills will be controlled all the time during the practices in the semester. Mode of certifying absences: oral – referring to practices

Requirements: The student should be able to recognize emergencies, and call for help

start with BLS + AED

provide airway management in unconscious patients

provide first aid for patients complaining for chest-pain, shortness of breath, signs for hypoglycaemia and having suffered from fainting, shock condition, convulsion, injuries.

The practical exam on the last practical lesson is evaluated with 5 grades method.

MEDICAL INFORMATICS

Name of the educational organizational unit: SE EKK Institute of Digital Health Sciences

Name of the subject: Medical Informatics

Type of the subject: 2 practice / week

code: FOKVDEI316_1A

credit value: 2

Name of the lecturer of the subject: *Dr. Miklós Szócska*

Teachers: Dr. Ádám Zoltán Tamus (PhD, associate professor)

Tamás Tóth PhD, senior lecturer

Zoltán Sándor (PhD, senior lecturer)

Zoltán Tóth (PhD, senior lecturer)

Administrator: Ms. Júlia Nagy

Term: spring

The exercise of the subject in the in the realization of the aim of the education:

To introduce the students to the medical application of informatics, the characteristics of modern, integrated information systems with respect to quantitative aspects and to decision demands of the modern sciences.

The medical informatics leans on methods of mathematics, statistics and computer sciences and it also includes from the different engineering, management and informatics procedures.

Topics of the subject:

Topic of the practical practices: 2×14 practices = 28 practices

1. MS Excel – basics of data storage
2. MS Excel – processing of data
3. MS Excel – data representation, diagrams
4. MS Excel – advanced level exercises
5. Collection and processing of medical data
6. Practice, preparation for the test
 1. test (Excel exercises)
7. Basics of databases
8. Data extraction from databases, performing queries
9. Online health information sources
10. Presentation techniques and tools
11. Data security, data protection
12. The future of health informatics
 2. test (computer-based test)

Requirements of participation of the lessons and the possibility of substitution of the absence:

- According to rules of the Study and Examination Regulations. Attendance at min. 75% of the classes
o Max. 3 absence allowed from practices
- A practical grade will be assigned based on the results of the two tests

The mode of the certificate in case of absence from the lessons and from the exams:

According to rules of the Studies and Exam Code. No certificate accepted.

The requirements of signature at the end of the term:

Attendance of at least 75% of the practices, at least 50% result of both tests

Type of the exam:

Practical mark

Exam requirements:

The practical note is determined based on the results of the two mid-term examinations.

List of lecture notes, course books, study-aids and literature which can be used to acquisition of the syllabus:

The educational materials are available at <http://dei-cloud.semmelweis.hu>. Username and password are announced at the first practice.

Recommended literature:

Meskó Bertalan: The Guide to the Future of Medicine, Webicina 2014 ISBN 9789631200072

Microsoft Office Help and Training Center: <https://support.office.com/>he educational materials are available at

<http://dei-cloud.semmelweis.hu>

Username and password is announced at the lecture/first practice.

LANGUAGE COURSES – Medical Terminology

Department of Languages for specific purposes

Lecturer: **Dr. Fogarasi-Nuber Katalin**

Subject name: Medical Terminology; Dental Medical Terminology

Code: FOKVNYE345_1A; FOKVNYE318_1A

Credit value: 2 / 1

Thematics:

The aim of this course is to help students understand English, Latin and Greek medical and dental medical terms used in Hungary and worldwide. The material implies anatomical and clinical vocabulary adjusted to the schedule of the anatomy course. Terms for diagnoses and procedures are demonstrated by authentic medical documents. In addition, students get acquainted with the basic linguistic phenomena required for diagnostic skills.

Attendance and absence:

Attendance of lessons is obligatory. Students are allowed to have maximum 3 absences a semester. In case of more absences, the teacher may deny giving the signature. Students who miss a class, can make up for it (max. once a semester).

Certifying absence:

A medical certificate is required if the student has been absent more than 3 times.

Requirements:

midterms (week 7 and 13)

Topics of midterms: vocabulary, construction of Latin phrases, used in anatomy, pathology, pharmacology

Students who fail a midterm have to retake it.

Semester signature:

Attendance of lessons is obligatory. Students are allowed to have maximum 3 absences a semester. In case of more absences, the teacher may deny giving the signature. Students who miss a class, can make up for it (max. once a semester). Students have to write the two midterms.

Evaluation:

The evaluation of student performance is based on the marks for the 2 written papers as well as the active participation in classes.

0–50 % = 1

51 –60 % = 2

61 –75 % = 3

76 –89% = 4

90–100% = 5

Textbooks:

Teaching material

1. Andrea, Barta – Éva Katalin, Varga – Ákos, Zimonyi: Medical terminology for students of dentistry. Bp., 2019 (e-book, available at the Department for Languages for specific purposes).

Excerpts of the following optional textbooks (chapters containing the basic vocabulary of dentistry):

2. Donáth Tibor (szerk.): Anatómia szótár - Lexicon Anatomiae - Anatomical dictionary - Anatomisches Wörterbuch. Budapest, Semmelweis Kiadó.
3. Paulsen F. - Waschke J.: Sobotta Atlas of Human Anatomy. Munich-Jena.

Medical Terminology

Week	Topics
1.	Skills: Communication between medical professionals, distinguishing medical English and Latin-Greek medical terminology Vocabulary: parts of the human body, anatomical planes and directions Linguistic phenomena: pronunciation, alphabet, basic form and dictionary entry of medical nouns and adjectives
2.	Skills: Part-whole theory in anatomical nomenclature Vocabulary: general terms of skeletal system Linguistic phenomena: possessive phrases in anatomy and in elemental diagnostics
3.	Skills: Part-whole theory in diagnostics adjusted to anatomical studies Vocabulary: bones of the upper and lower extremities Linguistic phenomena: nouns and their adjectives in anatomy
4.	Skills: Attribution in anatomical nomenclature and maxillofacial diagnoses Vocabulary: bones and joints of skull, terms used in maxillofacial surgery Linguistic phenomena: nouns and their adjectives
5.	Skills: Attribution in dental and clinical diagnostics adjusted to anatomical studies Vocabulary: oral and nasal cavity, related clinical terms Linguistic phenomena: nouns and their adjectives in possessive phrases
6.	Skills: Understanding complex anatomical and diagnostical phrases Vocabulary: tooth names, parts of teeth Linguistic phenomena: nouns and their adjectives in possessive phrases of anatomy and elemental dental and clinical diagnostics
7.	1 st midterm Skills: Distinguishing types of medical and dental medical documentation Vocabulary: pectoral girdle Linguistic phenomena: common endings of anatomical and clinical terms
8.	Skills: Understanding plural forms in anatomy and in clinical documentation Vocabulary: bones, joints and muscles of hand and elbow, Greek and Latin endings of clinical terms Linguistic phenomena: plural phrases in anatomy
9.	Skills: Describing symptoms and locations in dental and clinical diagnoses Vocabulary: pelvic girdle Linguistic phenomena: possessive phrases of anatomy and dental diagnostics
10.	Skills: Understanding plural forms in clinical diagnostics Vocabulary: joints and muscles of lower extremity, Linguistic phenomena: complex phenomena of anatomical phrases and accident surgical diagnoses
11.	Skills: Describing common facial and dental lesions Vocabulary: muscles of neck and face Linguistic phenomena: complex phenomena of diagnostic phrases
12.	Revision
13.	2 nd midterm
14.	Evaluation of student performance; retake of the midterms

Dental Medical Terminology

Week	Topics
1.	Skills: Distinguishing pharmaceutical products Vocabulary: musculoskeletal system, composition, diseases and injuries Linguistic phenomena: gramma, litra, gutta; numerals
2.	Skills: Understanding medical prescriptions, factory products Vocabulary: circulatory system, composition, diseases Linguistic phenomena: Using Genitive and Accusative in prescriptions
3.	Skills: The use of anatomical and clinical word stems, pre-and suffixes Vocabulary: gastrointestinal tract, composition, symptoms, diseases Linguistic phenomena: splitting terms in pre-and suffixes and stems
4.	Skills: Understanding terms related to caries; ICD-10 in use Vocabulary: respiratory system, composition, significance, symptoms and diseases, terms used in conservative dentistry Linguistic phenomena: Prepositional phrases in diagnostics and prescriptions
5.	Skills: Use of terms pertaining to diseases of pulp and periapical tissues, phrases on surgical procedures due to a condition, conditions after a procedure Vocabulary: urinary passages, pelvis, ureter, and bladder, endodontic terms Linguistic phenomena: instructions in prescriptions (Imperative, passive and active voice)
6.	Skills: Use of terms related to the developmental disorders of dentition and craniofacial malformations, phrases on surgical procedures due to a condition, conditions after a procedure Vocabulary: urogenital apparatus, terms used in oral pathology Linguistic phenomena: instructions in prescriptions; packaging materials used in pharmacology
7.	Midterm test
8.	Skills: Understanding terms of drugs types, prescribing magistral products Vocabulary: terms of drug types and effects Linguistic phenomena: Greek and Latin roots of pharmacological terms, prepositional phrases in diagnostics and prescriptions
9.	Skills: Use of terms related to gingival, tongue and periodontal diseases, terms pertaining to sensory organs Vocabulary: anatomical and clinical terms of sensory organs in medical documentation, parodontological terms, terminology of maculopapular rash Linguistic phenomena: Analysis of metaphorical terms describing sensory organs
10.	Skills: Understanding terms related to salivary gland disorders, writing diagnoses and prescriptions Vocabulary: endocrinological terms, terms pertaining to endocrine and exocrine glands Linguistic phenomena: complex phenomena of medical terminology
11.	Skills: Understanding terms related to diseases of the lips and oral mucosa. Infectious diseases Vocabulary: nomenclature of microorganisms, terms describing forms of cheilitis and stomatitis Linguistic phenomena: Latin terms and constructions used in clinical and dental infectology
12.	Skills: Use of terms describing tumour diseases of the oral cavity, dental lesions Vocabulary: histopathological findings, attrition of teeth Linguistic phenomena: Latin-Greek terms combined in complex diagnoses
13.	Endterm test
14.	Evaluation of student performance; retake of the midterms

Introduction to the Hungarian Language, Hungarian for Dental Medical Purposes I

Institute of Languages for specific purposes

Lecturer: *Katalin Fogarasi PhD, habil.*

Subject name: Introduction to Hungarian Language, Hungarian for Dental Medical Purposes I

Code: FOKVNYE319_1A; FOKONYE320_1A

Credit value: 2

Thematics:

The subject prepares students for the most important everyday communication situations in Hungary. Students get acquainted with the basics of the Hungarian language necessary for everyday communication. In the 2nd semester students expand their communication skills in language basics and become familiar with simpler terms used in conversations in the pharmacy and dental office and in the medical records of internal medicine.

Attendance and absence:

A maximum of 7 absences is allowed; if the number of absences exceeds this, students may make up missed classes in another group (maximum two times) in agreement with the instructor. Students who miss more than 25% of the classes will not be allowed to get a signature.

Certifying absence:

For more than the allowed number of absences, a medical certificate of long-term illness or hospitalization is required.

Requirements:

Two oral tests in weeks 7 and 14

Topic: the material covered

Make-up and upgrade opportunities: to be arranged outside of class with the instructor.

Semester signature:

A maximum of 7 absences is allowed; if the number of absences exceeds this, students may make up missed classes in another class (maximum two times) in agreement with the instructor. Students who miss more than 25% of the classes will not be allowed to get a signature; attendance in classes; attendance in both oral tests.

Evaluation:

Students will receive a term grade based on the average of their oral tests and their class work. The second oral test is marked by two teachers on separate mark sheets and an average is calculated. An unsatisfactory oral answer must be repeated – the 'fail' (1) grade for these students will also count towards the end-of-term grade. Assessment of oral tests:

- 0-49% = fail (1)
- 50-59% = pass (2)
- 60-74% = fair (3)
- 75-89% = good (4)
- 90-100% = excellent (5)

Curriculum and detailed course requirements

Term 1 Introduction to the Hungarian Language

Hungarian Language is a course for students in the first year without any previous exposure to Hungarian. Students will be introduced to the basic vocabulary of general Hungarian. Topics of the course are arranged into 14 teaching units (weeks), with special attention to the most important expressions. Each text is linked to vocabulary, grammar issues and tasks. The course consists of 56 hours (4 hours per week).

- Week 1.** the alphabet, greetings, the verb 'lenni' ('to be') in the present tense; a few adjectives: hungry, thirsty, tired, sad, happy...
- Week 2.** nationalities: Hungarian, English, German, Iranian, Canadian, Russian...; occupations: e.g., dentistry student, student, dentist, doctor, teacher, assistant, dental technician; using verbs (general introduction)
- Week 3.** using verbs in simple sentences (e.g., stand, sit, read, watch, ask, speak, cook, rest, walk, dance, like, know, study) + days and parts of the day
- Week 4.** verbs ending in -ik ('lakik' – 'live', 'dolgozik' – 'work', 'dohányzik' – 'smoke'); eat, drink + nouns with accusative ending
- Week 5.** 'I like reading', 'I can dance', 'I would like to be a dentist' 'tilos' ...-ni (it is forbidden to...), 'szabad ...-ni' (you are allowed to...) (eat, drink, smoke) when? (months, seasons) who with? (live, study)
- Week 6.** numbers: How much does it cost? How old are you? What is the time? What time is it? What number (bus, tram); what size (rubber gloves); which (floor, district) How (by metro, etc.)
- Week 7.** Revision, oral test
- Week 8.** adjectives (cold, hot, etc.) sensitive to (cold, heat) (What are you sensitive to?) practising verbs
- Week 9.** Where do you live? (details: district, street, floor, etc.)
- Week 10.** the three directions (to – in – from) in detail: a) library, school, restaurant, bank, café, shop, hospital, polyclinic, pharmacy b) university, square, clinic) What is the apartment/surgery like?
- Week 11.** Practicing the three directions (with the help of drawings, situations)
- Week 12.** What do we do 'from morning till night'?
- Week 13.** Revision
- Week 14.** Oral test

Textbooks

Teaching materials and audio recordings using authentic medical documentation, edited by the instructors of the Department of Languages for Specific Purposes

Term 2 Hungarian for Dental Medical Purposes I

Hungarian for Dental Medical Purposes I. is a course for students who completed the course Introduction to the Hungarian Language in the first term.

Course objectives are to acquire basic knowledge and skills in order to understand general medical communication, apply the acquired skills freely and creatively to minimize communication problems with Hungarians and use medical language correctly in practice.

- Week 1.** Revision, dialogues (common verbs, interrogatives)
- Week 2.** Possessive form in the Hungarian language; body parts
Adjectives: healthy, sick, weak, having a fever, having a cold
Verbs: cough, sneeze, stay, examine, take (medications)
- Week 3.** At the pharmacy 1.
- Week 4.** At the pharmacy 2. How long? Since when?
- Week 5.** Internal medicine chart 1. (patient data, family & social history)
Past tense
- Week 6.** Internal medicine chart 2. (medications, allergies, past surgeries, present complaint) Comprehension: coherent, lengthy text in 3rd person singular (3SG)
- Week 7.** Revision, oral test
- Week 8.** Introduction to Dental English; names of teeth. Which tooth hurts? Where exactly does it hurt?
- Week 9.** Questions about pain 1. Practice (pronunciation, grammatical explanations)
- Week 10.** Questions about pain 2. Practice (pronunciation, grammatical explanations)
- Week 11.** Questions about pain 3. Practice (discussing possible answers, practicing listening comprehension, targeted questions)
- Week 12.** Reading and discussing sample dialogues
Gapped dialogues: independently construct the dentist's sentences based on the answers; independently construct the patient's sentences based on the dentist's questions.
History taking (questions on charts – complaint, pain)
- Week 13.** Revision
- Week 14.** Oral test

Textbooks

Teaching materials and audio recordings using authentic medical documentation, edited by the instructors of the Department of Languages for Specific Purposes.

Physical Education

Department of Physical Education

Subject: Physical Education I

Type of Subject: Obligatory

Code of Subject: FOKOTSI007_1A

Credit: 0

Name of the Lecturer: Várszegi Kornélia

The objectives of Physical Education:

One aim of the course is to improve the health status of medical students, maintaining and increasing physical performance, creating the conditions for better physical quality of life.

The syllabus (preferably a week and numbered):

1st year semester I:

1st Week:	General information Health and Safety, Fire and Environmental protection. The mid-year adoption requirements, the construction of the classes and the presentation of the university recreational and sports opportunities for extra – curricular activities. Heart rate measurements, Ruffier test and evaluation of the results.
2nd Week:	Athletic Exercises to improve stamina. Preferably outdoors, on grass ground running, with the aim of developing good running and breathing techniques.
3rd Week:	Flying disc Introduction the basic of Frisbee rules and practicing the basic technical elements in pairs and game situation.
4th Week:	Tennis Introducing the basis technical elements of tennis (forehand and backhand shot), improving hand-eye coordination.
5th Week:	Agility ladder Introducing different running, skipping techniques using agility ladder.
6th Week:	Football Introducing the basic technical elements of football. Single exercises and exercises in pairs to improve the ball skill development.
7th Week:	Badminton Introducing the basic technical and tactical elements of badminton. Introducing the basic rules and game.
8th Week:	Circuit training Bodyweight exercises and exercises with basic equipment to learn the correct functional movement pattern.
9th Week:	Ruffier test and ball skill developing exercises Compare the results with the previous test to bring the importance of the health of the cardiovascular system to the attention.
10th Week:	Meta Introducing the game and the basic rules. Aim to improve the ball skill development, improve reaction time, speed and explosiveness.
11th Week:	Obstacle course To complete a built up obstacle course using different creeping- climbing, hovering, pulling, skipping, throwing techniques for general skill development.

- 12th Week: Core training**
Postural correction exercises using the own bodyweight especially to strengthen the core muscles to prevent the health of the vertebrae.
- 13th Week: Skipping rope**
Endurance and coordination developing exercises at different levels using skipping rope.
- 14th Week: Dumbbell exercises**
Strengthening exercises with dumbbells.

Requirements to participate in the sessions and the potential for absences:

Active participation in sport classes.

The method of proof for the workshops and the exam absence:

The absence cannot be proved, should make up for the lost lessons

Requirements for signature at the end of semester (including the number of tasks to be solved learning outcomes and type):

Active participation in 10 classes approved by the staff.

How to prove absence regarding the exam:

Absence must be retaken!

Subject: Physical Education II

Type of Subject: Obligatory

Code of Subject: FOKOTSI007_2A

Credit: 0

Name of the Lecturer: Várszegi Kornélia

The objectives of Physical Education:

One aim of the course is to improve the health status of medical students, maintaining and increasing physical performance, creating the conditions for better physical quality of life.

The syllabus (preferably a week and numbered):**1st year semester II:**

- 1st. week: General information:**
Accident, fire and environmental knowledge. Requirement for acceptance of the semester system, the structure of the classes and the presentation of the university recreational sports opportunities for extra-curricular activities.
- 2nd. week: Basketball:**
Dribbling, passing and shooting drills in order to improve fine motor skills.
- 3rd. week: Bench exercises:**
Using the dimensions of the sport bench by running, skipping, jumping, lifting etc. exercises.
- 4th. week: Rubber band exercises:**
Strength and coordination training by taking advantage of the elastic features of the object.
- 5th. week: Floorball:**
Introducing the sport to the Students by exposing the major rules, proper technique of stick handling. Passing and shooting drills.

- 6th. week:** **“Double-trouble”:**
Strength and stretch training in pairs by applying different starting positions. Functional movements executed in pairs.
- 7th. week:** **Volleyball:**
Introducing the fundamental elements of the game (serves, hits, digs etc.) Exposing the major rules and techniques.
- 8th. week:** **Frisbee:**
Taking the next step into the game by applying tactical elements in match situations. Passing and catching drills in different moving forms.
- 9th. week:** **Ruffier test and ball skill developing exercises**
Compare the results with the previous test to bring the importance of the health of the cardiovascular system to the attention. Sport games on the side (Dodge-ball, King of the court etc.)
- 10th. week:** **Circuit training:**
General strengthening drills at each stations. Applying different intensity level, regarding the various conditions of the Students.
- 11th. week:** **Tennis:**
Involving the new strokes into the learning process: form of serves, the volleys, the smash etc.
- 12th. week:** **Badminton:**
Introducing the new technical and tactical elements of the game (drop shots, lobs, smash etc.) Exposing the rules of doubles.
- 13th. week:** **Core exercises:**
Relative (own body) weight exercises applying different equipment (hand weights, rubber band etc.) with the aim of postural correction, by strengthening the core muscles in order to avoid spinal deformations.
- 14th. week:** **Box exercises:**
Applying the sport box by jumping, lifting, slaloming, carrying (etc.) it by this enhance the level of strength and stamina.

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes! (2x90 mins/week sport training (competitive sport, for qualified only): cheer dance, cheerleader, men’s football, handball, basketball, volleyball)

Requirements to participate in the sessions and the potential for absences:

Active participation in sport classes.

The method of proof for the workshops and the exam absence:

The absence cannot be proved, should make up for the lost lessons.

Requirements for signature at the end of semester (including the number of tasks to be solved learning outcomes and type):

Active participation in 10 classes (15 times for trainings!) approved by the staff.

How to prove absence regarding the exam:

Absence must be retaken!

Obligatory SUMMER PRACTICE

I.

Department of General Dental Preclinical Practice

Address: Budapest, 1088, Szentkirályi u. 47

Tel: 459-1472; 459-1500/59112; 59322

Head and tutor of department: Prof. Dr. Krisztina Márton D.M.D., Ph.D

Assistant lecturer: Dr. Anna Júlia Dézsi (tutor), Dr. Tamás Demeter Ph.D

Clinical specialist: Dr. Csilla Erdei, Dr. Dávid Jelencsics, Dr. Fanni Andrea Vass

Resident: Dr. Zsófia Vince

Credit value: 0

Dental Assistant Practice – 2 weeks (60' hours)

- Week 1** Introduction of the Practice, administration. Fire and Job Security Rules for Students, Code of Conduct.
- Lecture:** Introduction of the Dental Clinical and Training Centre, patient check in.
General tasks of the dental assistants, main parts of their profession and responsibilities in the different departments. Structure of the patient administration system
- Practice:** Basic and auxiliary materials used in the dental office: Phosphate cements, polycarboxylate cements, calcium-hydroxide
- Lecture:** Infection control, documentation and quality assurance.
Contamination, disinfection, principles of sterilization, chairside assistant responsibilities.
Hand hygiene, avoidance of pinprick accidents
- Practice:** Hand hygiene practice.
Visiting the Central Sterilization Unit.
- Lecture:** Environmental aspects in dentistry.
- Practice:** Basic and auxiliary materials used in the dental office: mixing procedures of different types of impression materials: alginate.
Impression taking on phantom heads
- Lecture:** Ergonomics and four-handed dentistry, dentist work position, patient position on upper and lower arch
- Practice:** Presentation of four-handed dentistry and practicing four-handed treatment on phantom heads.
Presentation of manual and machine mixing of impression materials, mixing procedures of different types of impression materials: silicone, polyether
- Presentation of the Dental Clinical and Training Centre
Interactive quiz
- Week 2** (practicing the things learnt the previous week)
Clinical assistant practice in the clinical Department

II.***Dental Laboratory Technical Practice (60 hours)*****Topics of the practical sessions:****1. week:** visiting of a dental laboratory

- Introduction of the laboratory, of its structure. Demonstration of the cast making, metal casting and porcelain veneering.
- Getting acquainted with the making of fixed and removable dental appliances.
- Presentation of a specific odontotechnological workphase, as a group assignment (8 minute ppt presentation).

2. week:

- Introduction to the training laboratory, handing out of the instruments, demonstration of the instruments
- Cast making
- Wax pattern making of an incisor and a premolar tooth.
- Waxing up of an occlusal surface.
- Artificial teeth

Important note: Document certifying the completion of the practice must be handed in at registration! Registration to the next year is not allowed without it!

BASIC MODULE



Faculty of Dentistry
2nd year

STUDY PROGRAMME
BASIC MODULE

3rd semester				
subjects code	subjects	credit code	examination	prerequisites
obligatory	Microscopic Anatomy and Embryology II	C4L2P2	c.examination#	Macroscopic Anatomy II, Microscopic Anatomy and Embryology I
obligatory	Dental Biochemistry II	C3L2P1	c.examination#	Dental Biochemistry I
obligatory	Molecular Cell Biology I	C3L1P2	examination	Dental Biochemistry I, Medical Chemistry
obligatory	Medical and Dental Physiology I	C8L5P3.5	examination	Microscopic anatomy and Embryology I, Macroscopic anatomy II, Biophysics II
obligatory	Restorative dentistry Pre-Clinical I	C4L0P3	term grade	Odontotechnology and Prosthodontics Pre-clinical I, Macroscopic anatomy and embryology II, General Dental Preclinical Practice
obligatory	Basic Immunology	C2L2P1	examination	Cell Science, Dental Biochemistry I
obligatory	General Dental Preclinical Practice	C4L1P3	examination*	Physical Foundations of Dental Materials Science, Macroscopic Anatomy and embryology I
obligatory	Hungarian for Dental Medical Purposes II	C0L0P4	term grade	Hungarian for Dental Medical Purposes I
obligatory	Physical Education III	C0L0P1	signature	
	Total Credit	27		

BASIC MODULE

4th semester				
subjects code	subjects	credit code	examination	prerequisites
obligatory	Medical and Dental Physiology II	C8L5P3.5	c.examination#	Medical and Dental Physiology I, Microscopic anatomy and Embryology II, Molecular Cell Biology I
obligatory	Odontotechnology and Prosthodontics Preclinical Course II	C4L1P3	term grade	Odontotechnology and Prosthodontics Preclinical Course I Macroscopic anatomy II
obligatory	General and Oral Microbiology	C3L2P2	examination*	Microscopic Anatomy and Embryology II, Molecular Cell Biology I, Medical and Dental Physiology I
obligatory	Genetics and Genomics	C2L1.5P1	examination	Microscopic Anatomy and Embryology II, Basic Immunology, Molecular Cell Biology I
obligatory	Conservative Dentistry and Endodontics, Pre-clinical I	C4L1P3	term grade	Odontotechnology and Prosthodontics Preclinical Course I, General Dental Preclinical Practice
obligatory	Hungarian for Dental Medical Purposes II	C4L0P4	signature	Hungarian for Dental Medical Purposes I
obligatory	Molecular Cell Biology II	C4L2P2	c.examination#	Dental Biochemistry II, Molecular Cell Biology I
obligatory	Physical Education IV	C0L0P1	signature	
	Total Credit	25		

Explanation

15 credits should be gained from the **elective subjects** during the 5-year studies – see the elective list after the 3rd year study program

#The grade influences the qualification of the diploma.

15 credits should be gained from the elective subjects during the 5-year studies.

C = Credit point, L = Lecture (hours/week), P = Practice (hours/week)

LIST OF TEXTBOOKS (The list may change!)

- 1 Textbook: Koeppen-Bruce M- Stanton- Bruce A: Berne & Levy Physiology (7th edition).
- 2 Practice book: Practices in Medical Physiology (Edited by: Péter Enyedi and Levente Kiss, 2017)
- 3 Harper's Illustrated Biochemistry (30th edition). ISBN-13: 978-0071825344
- 4 Wilson, Mansfield, Heath, Spence: Dental Technology and Materials for Students. Backwell Scientific Publications. ISBN 0-632-01763-5
- 5 A.Newbrun: Cariology Quintessence. ISBN 0867152052
- 6 C.M.Sturdevant: Operative Dentistry. Mosby ISBN 0-80166366-0
- 7 Herbert T. Shillingburg: Fundamentals of Fixed Prosthodontics – Quintessence 4th ed. 2012. ISBN 931386500
- 8 R.M. Basker, J.C. Davenport: Prosthetic Treatment of the Edentulous Patient – McMillan Press Ltd 5th ed. 2011. ISBN 978-1405192613
- 9 Lodish: Molecular Cell Biology (8th edition)
- 10 Abul Abbas, Andrew Lichtman, Shiv Pillai, Basic Immunology 6th Edition,Elsevier, 2019.
- 11 Immunology seminars (e-book)
- 12 Szabó: Basics of Medical Microbiology. E-book, Semmelweis; 2022

Recommended textbooks:

- 1 Murray,Robert K.-Granner,Daryl K-Mayes,Peter A.-Rodwell,Victor W: Harper's Illustrated Biochemistry. 26th Ed. McGraw-Hill. ISBN 0-07-138901-6 (Online version: www.lib.sote.hu)
- 2 G.Nikiforuk: Understanding Dental Caries (1-2) Karger. ISBN 3-8055-3906-1(set)
- 3 Biochemistry Laboratory Manual. Ed.Gy.Szabados. Bp. Semmelweis Univ.
- 4 Field, James: PreClinical Dental Skills at a Glance, Blackwell Publishers (Wiley) ISBN-13: 9781118766675
- 5 Hermann Péter, Szentpétery András: Gnatológia (Semmelweis Kiadó, 2018)

MICROSCOPIC ANATOMY AND EMBRYOLOGY (I –) II

Department of Anatomy, Histology & Embryology

Course Director: *Dr. Andrea D. Székely*

LEARNING OBJECTIVES

Aims of the lectures in embryology: Presentation of the development of the organs and functional systems parallel with the gross anatomical and histological lectures including the frequently occurring malformations.

Aims of the lectures in histology: Presentation of the cell, basic principles in cell biology (mitosis, cytoskeleton, cellular motility), detailed presentation of the basic (epithelial, connective, muscle and nervous) tissues. Complementing gross anatomy with a detailed presentation of the fine structure of organs, including the ultrastructural details together with the molecular background.

Important chapters: basic tissues, viscera, central nervous system.

Aims of the practical sessions in the histology room: Facilitate the understanding of ground (epithelial, connective, muscle and nervous) tissues and the fine structure of the organs through the observation and interpretation of histological specimens.

LECTURES: 2 × 45 min in both semesters

PRACTICAL CLASSES: 2 × 45 min in both semesters

ECTS CREDITS: Altogether 8. 4 credits in both semesters

MIDTERM TESTS: written (e-learning type)

ACCEPTENCE OF THE SEMESTER:

Active participation in lectures, and dissection room sessions is obligatory for every student. Students should attend at least 75% of the scheduled practical classes to gain a signature proving the validity of the semester. Absences are therefore limited in **25%**. Attendance will be recorded in the lectures and in the histology classes.

Students are obliged to participate in the midterm test or their semester would not be accepted. Missed midterms should be retaken at the given retake timepoints the department offers during the last two weeks of the semester.

TYPE OF EXAMS: oral and written

I.: semifinal examination, II.: final exam

Semifinal and final examinations consist of written and oral parts

1. Written pretest (e-learning module – access to SeKA account is obligatory)
2. Oral test in Microscopic Anatomy: identification of structures on virtual histological specimens including relevant theoretical questions

LIST OF TEXTBOOKS

1. **The Developing Human – Clinically Oriented Embryology**, 10th ed. by KL Moore, TVN Persaud and M Torchia, Saunders, 2015; ISBN 9780323313384
2. **Histology: A Text and Atlas: With Correlated Cell and Molecular Biology**; 7th Edition by MH Ross and W Pawlina ; Wolters Kluwer 2015, ISBN 9781451187427
3. **Wheater's Functional Histology, A Text and Colour Atlas**, 6th Edition by B Young, G O'Dowd and P Woodford Churchill Livingstone, Edinburgh, 2013, ISBN 9780702047473
4. **Oral Anatomy, Histology and Embryology**, 4th Edition, by B. Berkovitz Paperback with STUDENT CONSULT Online Access and e-book ISBN: 9780723434115 Copyright: 2009

Recommended textbooks:

5. **Langmann's Medical Embryology**, 13th Edition by TW Sadler, Wolters Kluwer, ISBN 9781469897806, 2014
6. **Junqueira's Basic Histology: Text and Atlas**; 13th Edition by Anthony Mescher, New York, McGraw-Hill Medical, 01/03/2013 ISBN13 978007178033
7. **Wheater's Functional Histology, A Text and Colour Atlas**, 6th Edition by B Young, G O'Dowd and P Woodford ISBN 9780702047473, Churchill Livingstone, Edinburgh, 2013.
8. **Langmann's Medical Embryology**, 13th Edition by TW Sadler, Wolters Kluwer, ISBN 9781469897806, 2014
9. **Illustrated Dental Embryology, Histology, and Anatomy**, 3rd Edition by Mary Bath-Balogh ISBN: 9781437717303, 2011.

COURSE DESCRIPTION

Microscopic Anatomy and Embryology II

Lectures in Histology and Embryology; practical classes in Histology

Subject matter

Histology: Microscopical structure of the CNS and PNS (cerebrum, cerebellum, brain stem, spinal cord, ganglia) organs of special senses (apple of eye, inner ear), endocrine glands (pineal, pituitary, thyroid, suprarenal glands) skin and appendages, lymphatic system and the mammary gland.

Embryology: Development of the central and peripheral nervous systems, development of the organs of senses together with their malformations

Credits: 4

Prerequisites: Macroscopic Anatomy II (successful final examination)
Microscopic Anatomy and Embryology I (successful examination)

Week	Lectures	Histology laboratory*
Week 1	1. Blood, corpuscular elements of blood. Bone marrow, erythropoiesis, leukopoiesis 2. Cellular components of lymphatic tissue. Thymus, tonsils, MALT	Lymphatic system, PNS and CNS
Week 2	3. Structure and circulation of lymph nodes and spleen 4. Nerve tissue	Lymphatic system, PNS and CNS
Week 3	5. Development of the neural tube. Cranio-caudal and dorso-ventral differentiation. Structure of CNS 6. Formation and derivatives of the neural crest and placode ectoderm	PNS and CNS
Week 4	7. Fine structure of the spinal cord. Spinal reflexes, receptors, effectors, monosynaptic/proprioceptive reflexes 8. Brain tracts, neurotransmitters, neuronal circuits, "connectomics"	PNS and CNS
Week 5	9. Central autonomic nervous system. Monoaminergic and cholinergic neurones and pathways. „Ascending Reticular Activating System“ (ARAS) 10. Somato- and viscerosensory systems. Sensory pathways.	PNS and CNS
Week 6	11. Functional connectivity of the sensory cortex, thalamus and insula 12. Neuroanatomy of pain.	Microscopy of the CNS - consultation
Week 7	13. Neuroanatomy of movements/locomotion I. Somatomotor cortical tracts. Visceromotor system, control of micturition 14. Structure of the cerebellum, cerebellar connections	Microscopy of the CNS - consultation
Week 8	15. Neuroanatomy of movements/locomotion II. Planning /programming of and eliciting movements. Gait control mechanism. The role of cerebellum and basal ganglia 16. External ear, middle ear.	Microscopy of the CNS - consultation
Week 9	17. Inner ear. Bony and membranous labyrinth. Development of the organ of hearing. 18. Control of balancing and posture together with the movements of the eye and head. Awareness of spatial position.	Midterm test Histology of endocrine organs, skin and organs of special senses
Week 10	19. Spiral organ of Corti. Auditory pathway. Neuroanatomy of hearing, understanding and control of speech. 20. Fibrous and vascular coats of the eyeball. Lacrimal gland, lacrimal apparatus.	Histology of endocrine organs, skin and organs of special senses
Week 11	21. Inner coat of the eyeball, retina. Development of the eye 22. Neuroanatomy of vision. Visual pathway, visual recognition, orientation in space.	Histology of endocrine organs, skin and organs of special senses
Week 12	23. Circadian rhythm, sleep/wake cycle; neuroanatomy of resting state and activation 24. Endocrine system I, Hypothalamus, the hypothalamo-hypophysial system, epiphysis	Histology of endocrine organs, skin and organs of special senses
Week 13	25. Taste sensation and olfaction. Limbic system 26. Neuroanatomy of energy metabolism, food intake, hedonism and addiction	Midterm test Histology of endocrine organs, skin and organs of special senses
Week 14	27. Neuroanatomy of emotions, motivation, aggression, empathy and behaviour. The reward system 28. Neuroanatomy of stress, fear, anxiety and depression. Determination, alertness together with personality, consciousness and well-being.	Histology of endocrine organs, skin and organs of special senses

*The topics of the Histology laboratories together with the accurate time and topics of the MIDTERM tests are going to be announced in the departmental homepage (as well as in the Handbook)

Requirements for acceptance of the semester:

Active participation in practical lessons/consultations, including the midterm tests, is obligatory for every student. Students should attend at least 75% of the scheduled hours to gain a signature proving the validity of the semester. Absences cannot be made up for.

Methods to assess knowledge acquisition during term time:

During the semester the knowledge of the students will be evaluated in two (2) written (e-learning type) midterm test. Attendance is obligatory at the midterm test. Students absent from the midterm test should reattend at a given timepoint or their semester will not be accepted. The time and topics of the midterm tests will be announced in the departmental homepage/moodle at the beginning of the semester.

Type of examination:

Final (written and oral) examination, topics: subject matter of the subjects Microscopic Anatomy and Embryology I-II. Final examinations consist of written theoretical and oral practical parts.

1. Written pretest (e-learning module)
2. Microscopic Anatomy - identification of structures on digitized tissue slides - including relevant theoretical questions from the subject matter of the semester

Final examinations are composed of written theoretical and oral practical parts. The written theoretical examination is done using an e-learning module while the practical examination is conducted with the help of digitized histological tissue slides. Students will receive two separate marks for the two parts of the examination. In case of an unsuccessful (fail = 1) examination part, the whole semifinal examination needs to be retaken. Those with a 4 (good) or 5 (excellent) written examination mark are exempted from rewriting the written pretest in the retake examination in case of failing during the practical part of the given semifinal examination. The final mark is calculated on the basis of the results (marks) gathered during the written and oral parts of the given examination by the president of the examination committee.

Topic list for the final examination:
Microscopic Anatomy and Embryology I

(see there)

Microscopic Anatomy and Embryology II
Development of the nervous system and organs of special senses

Development and primary differentiation of the neural tube
 Development of telencephalon
 Development of the peripheral nervous system (neural crest, placodes)
 Development of the organ of vision
 Development of the organ of hearing & equilibrium

Histology

Histology of the neurons developing from the neural tube
 Glial cells
 Histology of the neurons and supporting cells developing from the neural crest
 Fine structure of peripheral nerves
 Receptors and effectors

Interneuronal synapses

Microscopical anatomy development of the pituitary gland with special relevance to the posterior lobe
 Blood supply, histology and development of the anterior and intermediate lobes of the pituitary gland
 Microscopical anatomy of the pineal gland
 Microscopical anatomy and the development of the thyroid gland
 Microscopical anatomy and the development of the parathyroid gland
 Microscopical anatomy and the development of the cortical layering of the suprarenal gland
 Microscopical anatomy and the development of the suprarenal gland
 Histology of the islands of Langerhans
 Histological structure of lymph nodes
 Spleen (fine structure and circulation)
 Thymus
 Tonsils, MALT
 Microscopical structure of the skin
 Histology of the mammary gland (lactating and non-lactating)

Organs of special senses

Coats of the eyeball (tunica fibrosa, vasculosa, nervosa)
 Lens, accommodation
 Light reflex of the pupil
 Chambers of the eye, vitreous body
 Eyelids, conjunctiva, lacrimal apparatus
 Cornea reflex
 Visual pathway, optic nerve (CN 2)
 External ear, tympanic membrane.
 Tympanic cavity, auditory tube,
 Hearing ossicles, their joints and muscles
 Bony and membranous labyrinth
 Cochlea and cochlear duct
 Organ of Corti. Auditory pathway, vestibulocochlear nerve (CN 8)
 Vestibular system
 Taste sensation, taste buds, tracts
 Organs of olfaction and taste, olfactory nerve (CN 1)

Microscopy of the central nervous system

Fine structure (microscopy) of the spinal cord
 Proprioceptive reflexes
 Nociceptive reflexes
 Autonomic reflexes
 Fine structure of the medulla oblongata
 Fine structure of the pons
 Fine structure of the midbrain
 Classification of cranial nerve nuclei
 Tracts of the brain stem
 Reticular formation, monoaminergic systems
 Fine structure of the cerebellum
 Cerebellar afferents and efferents
 Fine structure of the thalamus
 Hypothalamo-hypophyseal system
 Fine structure of the basal ganglia
 Fine structure of the cerebral cortex, cortical fields
 Tracts of the protopathic sensibility (anterolateral system)
 Tracts of the epicritic sensibility (posterior funiculus/medial lemniscus)
 Pyramidal (tract) system
 Extrapyrmidal system
 Limbic system (nuclei and tracts)
 Reflex arc of mastication
 Anatomical bases for trigeminal pain
 Autonomic innervation of salivary glands

Literature, i.e. printed, electronic and online notes, textbooks, tutorials (URL for online material):
List of textbooks

1. The Developing Human – Clinically Oriented Embryology, 10th ed. by KL Moore, TVN Persaud and M Torchia, Saunders, 2015; ISBN 9780323313384
2. Histology: A Text and Atlas: With Correlated Cell and Molecular Biology; 7th Edition by MH Ross and W Pawlina ; Wolters Kluwer 2015, ISBN 9781451187427
3. Wheater's Functional Histology, A Text and Colour Atlas, 6th Edition by B Young, G O'Dowd and P Woodford Churchill Livingstone, Edinburgh, 2013, ISBN 9780702047473
4. Oral Anatomy, Histology and Embryology, 4th Edition, by B. Berkovitz Paperback with STUDENT CONSULT Online Access and e-book ISBN: 9780723434115 Copyright: 2009
5. Functional Anatomy, Histology and Embryology for medical and dental students by M. Réthelyi and J. Szentágothai, Medicina, 2018.
6. Langmann's Medical Embryology, 13th Edition by TW Sadler, Wolters Kluwer, ISBN 9781469897806, 2014
7. Junqueira's Basic Histology: Text and Atlas; 13th Edition by Anthony Mescher, New York, McGraw-Hill Medical, 01/03/2013 ISBN13 978007178033
8. Wheater's Functional Histology, A Text and Colour Atlas, 6th Edition by B Young, G O'Dowd and P Woodford ISBN 9780702047473, Churchill Livingstone, Edinburgh, 2013.
9. Illustrated Dental Embryology, Histology, and Anatomy, 3rd Edition by Mary Bath-Balogh ISBN: 9781437717303, 2011.

Further study aids:

To be downloaded from the homepage of the Department of Anatomy, Histology and Embryology or from Moodle

GENERAL AND ORAL MICROBIOLOGY

Department of Medical Microbiology

Program Director: *Dr. Dóra Szabó*

Tutor: *Dr. Ágoston Ghidán*

First Semester

Lectures (2 hours per week)	Practices (2 hours per week)
Introduction to microbiology. General bacteriology (morphology, physiology and cultivation of bacteria) Bacterial genetics.	Introduction to basic microbiology. Microscopic examination of bacteria (staining procedures).
Infections and diseases (pathogenesis of bacterial infection, virulence, importance of biofilm formation). Specific and non-specific host defences. Active and passive immunization.	Cultivation of aerobic and anaerobic bacteria (culture media, colony morphology of bacteria).
Sterilization and disinfection. Antibacterial chemotherapy (mode of actions, resistance, side effects).	Methods used for sterilization and disinfections (physical and chemical possibilities).
Gram-positive facultative and obligate anaerobic cocci. Gram-negative facultative anaerobic, microaerophilic and obligate anaerobic cocci and coccobacilli.	Antibiotic susceptibility of bacteria
Gram-positive aerobic and anaerobic rods. Gram-positive spore-forming rods.	In vitro antigen-antibody reactions (serological methods).
Gram-negative facultative anaerobic rods. Gram-negative anaerobic rods.	Gram-positive and -negative cocci and coccobacilli
Mycobacteria. Rickettsia, Chlamydia. Mycoplasma.	Gram-positive rods (Corynebacterium, Lactobacillus, Actinomyces).
Spirochetes. Importance of bacterial infections involving the oral, perioral tissues and salivary glands.	Gram-negative rods (Enterobacteriaceae)
Medical importance of fungi (general mycology, chemotherapy of fungal infections). Importance of fungal infections involving the oral and perioral tissues.	Gram-negative anaerobic rods (Bacteroides, Prevotella, Porphyromonas, Fusobacterium, Leptotrichia). Gram-positive spore-forming aerobic and anaerobic rods (Bacillus, Clostridia)
Protozoa (general characterization and the most important human pathogenic protozoa). Helminths (general characterization and the most important human worms).	Mycobacteria. Spirochetes. Rickettsiae. Chlamydiae. Mycoplasma.
General properties of viruses. Antiviral chemotherapy. Adeno- and Poxviruses.	Medically important fungi
Important respiratory pathogen viruses. Important enterally transmitted viruses.	Medically important protozoa. Medically important helminths.
Hepatitis viruses. Retroviruses (AIDS). Viruses and cancer.	General virology (cultivation of viruses, cell-virus interactions, serological tests and molecular techniques used in laboratory diagnosis of viral diseases)
Arbo- and robovirus infection. Rabies. Slow viruses. Viral infections involving the oral, perioral tissues and salivary glands.	Pathogenesis and symptomatology of viral diseases.
Normal oral flora. Oral ecosystem and dental plaque. Microbiology of dental caries, periodontal diseases. Dentoalveolar infections.	Summary of microbiological laboratory techniques and diagnostic procedures. Consultation.

Note: Three delay of less than 5 minutes will be considered as one absence. Delay of more than 15 minutes from the practice will also be considered as absence. There is no possibility to make up the practice. More than 3 absences invalidate the semester. During the semester two midterm tests must be passed. Examination procedure: written test from minimum questions followed by an oral exam. Written test: from each topic (general microbiology, systemic bacteriology, mycology, parasitology, virology) the candidate will get 4-4 questions and 50% per topic must be achieved in order for the candidate to proceed to the oral exam. If any part of the examination is unsatisfactory, the mark, is unsatisfactory.

BASIC IMMUNOLOGY

Department of Genetics, Cell and Immunobiology

Course director: **Prof. Dr. Edit Buzás**

Tutor: **Dr. Marianna Csilla Holub**

Subject code: FOKGEN037_1A

Prerequisite subject: Anatomy (Maxillofacial Anatomy) IV., Biochemistry, Molecular and Cellbiology III; Medical and Dental Physiology II

Credits: 3

	Lectures (2 hr / week)	Practicals / Seminars (1 hr / week)
1.	The role, processes, organs and cells of the immune system	Basic terms
2.	Principles of natural immunity	The immune system in the lab
3.	The complement system	Methods based on antigen-antibody interactions I: Immunoserology
4.	Inflammation and acute phase reaction	Methods based on antigen-antibody interactions II: Immunassays
5.	Antigen, antigen presentation and MHCs	Methods based on antigen-antibody interactions III: Flow cytometry
6.	Antigen receptors and their formation	Complement assays
7.	T lymphocytes and cell-mediated immune response	HLA typing
8.	B lymphocytes and humoral immune response	Vaccination I
9.	Mucosal immunity	Vaccination II
10.	Immune response in infections	Biological therapies I
11.	Immunodeficiencies	Biological therapies II
12.	Hypersensitivity	Hypersensitivity I
12.	Tolerance and autoimmunity	Hypersensitivity II-IV.
13.	Antitumor immunity	Screening methods for autoantibodies
14.	Immunology of transplantation	Case studies II

The sequence of lessons may change.

Attendance of a minimum of 75% of the practices is necessary for the end-term signature. The presence at the seminars (practices) are registered weekly, more than three absences from the seminars invalidate the semester as well. The sessions can be attended in an appropriate mental and health condition.

Semi-final exam: written/Moodle test. Students have to reach more 50 % of the exam scores (30 out of 60) to pass.

Bonus points can be collected during the semester in lectures and by the midterm(s). Students who achieve the threshold by collecting bonus can take a simplified exam.

Literature:

Abul Abbas, Andrew Lichtman, Shiv Pillai, Basic Immunology 6th Edition, Elsevier, 2019.

Immunology seminars (e-book): <http://gsi.semmelweis.hu> (The user name and password is on the course datasheet of the Neptun.)

GENETICS AND GENOMICS

Department of Genetics, Cell- and Immunobiology

Course director: **Prof. Dr. Edit Buzás**

Course coordinator: **Dr Hegyesi Hargita**

Subject code: FOKGEN240_1A

Prerequisite subject: Medical Biochemistry, Molecular and Cell Biology III, Medical and Dental Physiology II

Credit: 2

Lectures (1,5 hours per week):

1. Introduction to human genetics, the human genome
2. Genetic variations
3. Chromosomal aberrations I
4. Chromosomal aberrations II
5. Epigenetics
6. Monogenic inheritance (Autosomal dominant)
7. Monogenic inheritance (Autosomal recessive)
8. Role of sex in inheritance
9. Introduction to genomics. Methods in genomics
10. Genomic approach of complex inheritance
11. Pharmaco- and nutrigenomics
12. Gene and genome manipulation
13. Genetics of biological processes
14. Population genetics and genomics; Genome and environment

Practices (1 hour per week):

1. Genetic aspects of cell cycle and cell division disorders
2. Cytogenetics I
3. Cytogenetics II
4. Pedigree analysis:
5. Autosomal inheritance I (AD)
6. Autosomal inheritance II (AR)
7. Sex-linked inheritance I (XR)
8. Sex-linked inheritance II (XD, mitochondrial)
9. Complex inheritance I
10. Complex inheritance II.
11. Meiosis, gametogenesis; pre-implantation genetic testing
12. From genes to bedside

Important notes:

Students must visit at least 75% of the practices. More than three absences from the practice or more than three absences from the lecture invalidate the semester, no signature is given. There are no extra practices.

During the semester, written tests will be given on the material covered during the practical and lecture sessions to help you master the material. Completion and passing of the test is not a prerequisite for the end-of-semester signature. Based on the total score of the test, you may be invited to the end-of-semester competition and, as an exam facilitation, you will not be asked questions on two items (cytogenetics and epigenetics).

Core text: Medical Genetics and genomics (e-book)

Lecture and practice presentations and additional texts are available on the homepage: <http://gsi.semmelweis.hu> (The user name and password is on course datasheet of the Neptun)

DENTAL BIOCHEMISTRY II

Department of Medical Biochemistry

Credits: 3

Total number of hours: 42; lectures (hours): 28; practices (hours): 14

Type of the course: obligatory

Academic year: 2021/2022

Code of the course FOKOMBT305_2

Course Director: Dr. Kraszimir Kolev

Contact details: H-1094 Budapest, Tűzoltó u. 37-47. tel: +36-1-459-1500#60010 email: Kolev.Krasimir@med.semmelweis-univ.hu

Position: Professor

Date of habilitation: 2008 Ref.: 266

Aim of the course:

The aim of the course is to comprehensively describe metabolic processes in the human body, from a medical point of view. The main theme of the semester is to elaborate further on carbohydrate and lipid metabolism commenced in Medical Biochemistry I, elaborate on amino acid and nucleotide metabolism, examine more thoroughly intermediary metabolism including the integration of processes throughout the organs and the human body as a whole. Furthermore, this course aims to afford to medical students the skills of being able to interpret complex physiological processes in the human body at a molecular level. During practices they discuss rapidly developing, promising areas of medicine („tomorrow's medicine"). The medical biochemical orientation of the course is based on the presentation of molecular bases of diseases that pose serious public health problems (cardiovascular, neurodegenerative, cancer states), with particular emphasis on discussing potential molecular targets of therapy.

Location of the course (lecture hall, practice room, etc.):

Premises located in the Basic Medical Sciences building (laboratory rooms located on the first floor and lecture halls located on the ground floor).

Upon the successful completion of the curriculum, the student should be able to:

Identify biochemical structures, know and understand the reactions in which medically important molecules participate; know and understand inter-organ biochemical processes; know and understand integrated metabolic functions of the human body. Overall, such knowledge is essential for understanding physiological and pathological processes and, consequently, for making sound professional decisions.

Prerequisite (s) for admission to the course: Medical Biochemistry I

Terms and Conditions for Starting Student Course (Minimum, Maximum), Student Selection Method: Not applicable for obligatory subjects.

How to apply for the course: Application is through the Neptun online system.

The course in thematic details:

Lectures: weekly 1×90 min (2 hours)

Lecturers: Dr. Dóra Ravasz (RD), Prof. Krasimir Kolev (KK), Dr. Komorowicz Erzsébet (KE), Dr. Törőcsik Beáta (TB)

Week	Lectures: weekly 1x90 min (2 hours)	Practices (P): 2 hours every other week
1	Nitrogen balance. Digestion of proteins. Function of proteases, their regulation. Absorption of amino acids, amino acid transporters. (RD)	P: Determination of transaminases and creatine kinase activity
2	Catabolism of amino acids. Elimination of ammonia, reactions and regulation of ornithine cycle. Degradation of amino acids: fate of their carbon skeleton. The role of vitamins in amino acid metabolism. (RD)	P: Determination of transaminases and creatine kinase activity
3	Biosynthesis and degradation of heme. Iron homeostasis (RD)	P: Vitamin B12 deficiency and methylmalonic acidemias
4	Structure and function of nucleotides. The fate of nucleotides obtained through diet. Formation and elimination of uric acid; its metabolic role in humans. Synthesis and degradation of purine and pyrimidine nucleotides. Effects of cytostatic drugs on nucleotide metabolism. (KK)	P: Vitamin B12 deficiency and methylmalonic acidemias
5	Integration of metabolism. Metabolism of red blood cells. Red blood cell enzymopathies. Kidney metabolism, and dependence on fasting and acidosis. Metabolism of muscle and heart. Comparison of kidney and liver gluconeogenesis. Metabolic adaptation to physical effort. (TB)	P: Acute and chronic liver disease
6	The starvation-feeding cycle and its regulation. Regulation of hepatocyte metabolism in starvation. (TB)	P: Acute and chronic liver disease
7	General overview of blood clot formation and elimination. Fibrinogen and fibrin. Prothrombin activation and regulation of thrombin activity. Triggers of blood clotting, amplification of the initiation. (TB)	P: Tumor metabolism
8	Fibrinolysis. Activation of plasminogen. Inhibitors of plasmin. (KE)	P: Tumor metabolism
9	Inhibitors of blood coagulation and negative feedback mechanisms. (KE)	P: Prothrombin time and activated partial thromboplastin time. Molecular background of inherited thrombophilia
10	Cellular elements of the haemostatic system. Platelets and von Willebrand factor. Neutrophils and endothelial cells in haemostasis. Hemodynamic and biochemical interactions in haemostasis. The role of endothelial dysfunction in atherosclerosis. LDL oxidation and pattern-recognition receptors (TLR, scavenger receptors). (KE)	P: Prothrombin time and activated partial thromboplastin time. Molecular background of inherited thrombophilia
11	Membrane transporters. Na ⁺ /K ⁺ ATPase isoforms. (TB)	P: Measurement of fibrin stabilization and soluble fibrin monomers. Molecular background of acquired thrombophilia
12	Chemical neurotransmission. Cholinergic neurotransmission. Biosynthesis of acetylcholine. receptors, acetylcholine esterase. Molecular mechanism of exocytosis. (TB)	P: Measurement of fibrin stabilization and soluble fibrin monomers. Molecular background of acquired thrombophilia
13	Noradrenergic neurotransmission. Synthesis and metabolism of norepinephrine. Synaptic uptake. Adrenergic receptors. Molecular mechanism of epinephrine and norepinephrine effects on various organs. (TB)	P: The relationship between metabolism and the functions of the nervous system
14	Glutamatergic and GABA-ergic neurotransmission. (TB)	The relationship between metabolism and the functions of the nervous system

Potential overlap(s) with other topics: none

Requirement for special study: not applicable

Policy regarding attending practices; policy regarding absences:

Practices are mandatory. It is not possible to make up for missed practices. In case of absences amounting to more than 2 practices, the semester is not acknowledged. Arriving to a practice with a delay of more than 10 minutes is considered an absence. Practice/seminar participation performance will be evaluated by the tutor: as such, maximum 10 points per semester can be obtained that may count towards the final grade, see under “Grading system” for further details.

Lectures: At the end of each lecture, there will be a Kahoot on the topic of the lecture, consisting of 5 questions; 20 secs are allocated per question. Points can be earned by correctly responding to at least 4 out of 5 Kahoot questions. Maximum 1 point can be earned per lecture, as outlined by the lecturer. Through the Kahoots, students may obtain points that will be added to the points earned at the final exam, as detailed in “Grading system”, see below.

Means of assessing the students’ progress during the semester:

A midterm will take place in the 6th and another in the 11th week, during the practice/seminar (allocated time per midterm: 30 minutes). Each midterm will consist of multiple choice questions (MCQs) from which max 30 points can be obtained (15 points per midterm).

It is obligatory to gather ≥ 15 points from both midterms in order to be allowed to sit for the exam. For those students who fail to amass ≥ 10 points from both midterms, one or both midterms can be retaken in the last week during the practice/seminar (allocated time per midterm: 30 minutes). The midterm points will be added as “points” to the result of the exam, as detailed in “Grading system”, see below.

Lectures: At the end of some lecture, there will be a Kahoot on the topic of the lecture and the correct answers are registered as bonus points from lectures in the Moodle system. These points are taken into consideration at the oral exam.

Requirement for acknowledging the semester, and for allowing the student to take the final exam: Attendance of at least 75 % of the practical classes and at least 15 points from both midterms.

Competition: The competition is held on the last week during the practice/seminar (allocated time: 40 minutes) and consists of 70 multiple choice questions (MCQs). Only students who amass 21 or more points from the midterms (not the retakes) can participate in the competition. Points obtained from midterms or practice/seminar performance do not count to the score of the competition. Students who score at least 90% of the best result achieved by any student in the course will be invited for the oral exam; this short oral exam will take place in the last day of the last week (after 2 pm, exact time and place will be announced in the last week). On the basis of the written and oral part exemption from the semifinal exam may be granted with a grade of 5 (top 5 % scorers) or 4 (top 5.1-10% scorers).

Exam Type: Final. Form: written test and oral exam, based on material of the official textbook, lectures and practices published at the department’s Moodle e-learning system (<https://itc.semmelweis.hu/moodle/>).

Exam Requirements: The material for the written test exam is the material of the lectures and practices in the subject, with the corresponding textbook chapters.

Method and type of evaluation (*written plus oral*):

Written part: this part consists of 120 Multiple Choice Questions (MCQs) to be answered within 120 minutes. It will consist of 4 blocks:

Block I: 30 points; protein structures, enzymology, bioenergetics.

Threshold for passing block I: 12 points

Block II: 30 points; carbohydrates, lipids

Threshold for passing block II: 12 points

Block III: 30 points; amino acids, nucleotides, metabolic integration

Threshold for passing block III: 12 points

Block IV: 30 points; blood coagulation, membrane biochemistry, neurobiochemistry, signal transduction

Threshold for passing block IV: 12 points

A fifth block (block V) comprised of the points obtained by the midterms is also added (see below).

Bonus points from practice/seminars performance is added to the five blocks (see below).

Seminar/practice points: maximum 10 points.

Two midterms: maximum 30 points (15+15).

The mark for the *written part* is determined as follows:

Mark 1 (fail): Total points for the five blocks of the examination if < 74 points, or a score < 12 in any of the blocks I-IV, or < 60 points in [Block I+ Block II+ Block III+ Block IV]

Mark 2: 75-95 (including the bonus points from midterms and practices/seminars)

Mark 3: 96-110 (including the bonus points from lectures and practices/seminars)

Mark 4: 111-125 (including the bonus points from lectures and practices/seminars)

Mark 5: 126-160 (including the bonus points from lectures and practices/seminars)

Those students who amass ≥ 75 points in the written part, may proceed to the oral part.

Oral part:

During the oral part of the examination, the examiner will select 4 test questions which the candidate has answered correctly in the written examination of the day. The candidate must interpret his/her answers to these questions.

The final grade is determined on the basis of the written and oral parts of the examination. No mark of the written part guarantees passing the exam.

How to apply for the exam: The exam dates are announced on the 12th week of the semester. We provide at least one exam date each week. Applications are made in the Neptun system in accordance with the University Study and Exam Rules.

Opportunities to repeat the exam: A retake is possible on the closest announced exam date at least one day after an unsuccessful exam.

Printed, electronic and online notes, textbooks, tutorials, and literature for online learning (html for online material):

Harper's Biochemistry (30th edition, or latest)

Online material published in the department's Moodle e-learning system (<https://itc.semmelweis.hu/moodle/>).

MOLECULAR CELL BIOLOGY I

Institute of Biochemistry and Molecular Biology

Department of Molecular Biology

EOK Building, H-1094 Budapest, Tűzoltó u. 37-47.

Lecturer of the course: Miklós Csala MD, DSc (csala.miklos@semmelweis.hu)

Course coordinator: Gergely Keszler MD, PhD (keszler.gergely@semmelweis.hu)

Credit: 3

Lessons (in hours): 14 lectures and 28 practicals

Subject code: FOKOMBT306_1A

This subject focuses on the main procedures in molecular biology and cell biology. It serves as a base for several fields in medicine, such as molecular pathology, molecular diagnostics, pharmacology, gene therapy and medical biotechnology.

Lectures:

10. Introduction to molecular cell biology. Structure of nucleotides and nucleic acids. Packaging of DNA into chromatin
11. Structure of the human genome
12. Principles of DNA replication
13. DNA repair
14. PCR, investigation of genetic polymorphisms
15. Transcription in pro- and eukaryotic cells; mRNA processing
16. Regulation of prokaryotic transcription
17. Regulation of eukaryotic transcription
18. The genetic code and translation
19. Posttranslational modification, folding and quality control of proteins
20. Protein targeting into metabolic compartments
21. MicroRNAs, epigenetic regulation of transcription
22. Gene expression analysis, real-time PCR
23. Molecular cloning,

Practicals: (4x45 min every other week):

1. Column chromatography
2. Genotyping of a taste receptor polymorphism (PCR-RFLP I)
3. PCR-RFLP II
4. PCR-RFLP III
5. Midterm examination
6. Induction of beta-galactosidase in *E. coli*
7. Biuret test, Ellmann's reaction

Acknowledgment of the semester:

1. Attendance of at least 75% of the practical lessons is prerequisite of acknowledging the semester. In case of more than two missed labs the semester cannot be acknowledged and the student is not going to be allowed to sit for the terminal exam. Missed practicals can be made up only in the same week with another group; certificate of participation issued by the host teacher has to be presented by the student to his/her own teacher. However, only one make-up class can be attended during the semester. Students can collect "practical points" during the labs. These points are taken into account at the Molecular cell biology II final exam at the end of the academic year.
2. It is obligatory to pass the theoretical midterm.

Theoretical midterm examination

The theoretical midterm exam will take place during weeks 9–10. The midterm exam is oral; one has to pick just one question from the topic list. The examiner cannot be your own lab teacher. Passing the midterm is prerequisite of getting the signature at the end of the semester. Students earning “excellent (5)” or “good (4)” midterm

marks will earn 2 or 1 practical points, respectively, to be added to the practical points collected during the semester. Failed or missed midterms can be made up twice. In case of medically certified absence one may receive any grade in the retake midterm. In the case of retaking a failed or unexcusedly missed midterm, the maximum grade one can receive is a “pass (2)”.

Examination and grading:

The oral exam is based on the topic list announced in the beginning of the semester, and it takes place before a committee of two (examiner and co-examiner). Students pick three random questions from the DNA, RNA and Protein group of the following topic list. The exam can be passed if all three topics are sufficiently answered.

Topic list:**I. DNA**

1. Chemical structure of nucleotides; primary and secondary structures of nucleic acids (DNA and various RNAs)
2. Condensation levels of DNA in the eukaryotic cells; the role of topoisomerases and chromatin proteins
3. Structure of the human genome: coding and gene regulatory sequences; non-coding genomic sequences: introns, pseudogenes, repetitive sequences
4. Principles of the semiconservative DNA replication; replication fork, leading and lagging strand
5. DNA replication in the pro- and eukaryotic cells; comparison of the enzymes, proteins involved
6. The telomere; function and significance of the telomerase; biological and medical significance of its presence or absence
7. Common types of DNA damage and repair mechanisms; DNA lesions versus mutations
8. Formation of spontaneous point mutations
9. Possible effects of point mutations or single nucleotide polymorphisms on the encoded proteins
10. The principles and mechanisms of PCR and real-time PCR; their application in research and medicine

II. RNA

11. Structure and function of RNA polymerase of *E. coli*; initiation of transcription in prokaryotes; the prokaryotic transcription unit
12. Termination of transcription in prokaryotes; post-transcriptional RNA modifications in prokaryotic cells
13. The eukaryotic transcription unit; initiation and termination of transcription in the eukaryotic cells

14. Regulation of transcription in eukaryotes
15. Maturation of mRNA
16. Formation and regulatory functions of microRNAs in eukaryotic cells
17. Significance of DNA methylation and histone modifications
18. Alternative maturation of eukaryotic mRNA
19. In vitro analysis of gene expression by reverse transcription real-time PCR and DNA microarray
20. DNA-binding proteins and their characteristic structural motifs with examples

III. Proteins

1. The genetic code; codon-anticodon interaction; function and role of aminoacyl-tRNA synthetases
2. Structure and function of the ribosome; the ribosome cycle; role of tRNA in translation
3. Initiation of translation in pro- and eukaryotic cells
4. Regulation of eukaryotic translation; the role of eIF2 α phosphorylation
5. Elongation and termination of translation in pro- and eukaryotic cells; pharmacological inhibitors of translation
6. Post-translational modifications of proteins, characteristic modifications in the endoplasmic reticulum
7. Maturation and quality control of proteins; ERAD
8. Intracellular protein trafficking by gated transport
9. Intracellular protein trafficking by transmembrane transport- The role of genetic variations in the development of diseases, the importance and possibilities of identifying genetic factors
10. Production of recombinant DNA (cloning), and its main applications (reporter and expression vectors)

MOLECULAR CELL BIOLOGY II

Institute of Biochemistry and Molecular Biology
Department of Molecular Biology
 EOK Building, H-1094 Budapest, Tűzoltó u. 37-47.

Lecturer of the course: Miklós Csala MD, DSc (csala.miklos@semmelweis.hu)
Course coordinator: Gergely Keszler MD, PhD (keszler.gergely@semmelweis.hu)
Credit: 4
Lessons (in hours): 28 lectures and 28 practicals
Subject code: FOKOMBT306_1A

This subject focuses on the main procedures in molecular biology and cell biology. It serves as a base for several fields in medicine, such as molecular pathology, molecular diagnostics, pharmacology, gene therapy and medical biotechnology.

Prerequisites for subject registration:

Successful exams in Molecular Cell Biology I and Dental Biochemistry II

Lectures:

1. Control of the cell cycle 1
2. Control of the cell cycle 2
3. Control of the cell cycle 3
4. Control of the cell cycle 4
5. Programmed cell death – apoptosis 1
6. Programmed cell death – apoptosis 2
7. Molecular basis of tumorigenesis
8. Types of non-apoptotic programmed cell death
9. Proteostasis, the ubiquitin–proteasome system
10. Mechanisms of autophagy
11. Molecular biology of viruses 1
12. Molecular biology of viruses 2
13. Methods in molecular biology 1: knock-out techniques
14. Methods in molecular biology 2: gene therapy
15. Nuclear receptors. Transcriptional factors, DNA-binding domains
16. Signal transduction 1
17. Signal transduction 2
18. Signal transduction 3
19. transduction 4
20. Intracellular signals: mTOR, AMP kinase, hypoxia
21. Mechanisms of ageing
22. Components of the cytoskeleton. Molecular motor proteins
23. Vesicular transport. Mechanisms of exo- and endocytosis
24. Formation of the metabolome of cellular compartments 1
25. Formation of the metabolome of cellular compartments 2
26. Endoplasmatic and mitochondrial stress response
27. Extracellular matrix, tissue architecture, adhesion molecules
28. Methods in cell biology (cell cultures, cell fractionation, *in vivo* microscopy)

Practicals: (4x45 min every other week):

1. Molecular cloning and in vitro protein synthesis 1: recombinant DNA construction, bacterial transformation
2. Molecular cloning and in vitro protein synthesis 2: analysis of the DNA construct, in vitro mRNA synthesis
3. Molecular cloning and in vitro protein synthesis 3: protein expression by in vitro translation
4. Purification of a bacterially expressed protein by affinity chromatography
5. Theoretical midterm exam
6. SDS-page and western blot
7. Analysis of subcellular fractions

Acknowledgment of the semester:

Attendance of at least 75% of the practical lessons (i.e. not missing more than two labs) is prerequisite of acknowledging the semester. It is also obligatory to pass the theoretical midterm exam (see below).

Theoretical midterm examination

The theoretical midterm exam will take place during weeks 9–10. The midterm exam is oral; one has to pick just one question from the topic list. The examiner cannot be your own lab teacher. Passing the midterm is prerequisite of getting the signature at the end of the semester. Students earning “excellent (5)” or “good (4)” midterm marks will earn 2 or 1 practical points, respectively, to be added to the practical points collected during the semester. Failed or missed midterms can be made up twice. In case of medically certified absences one may receive any grade in the retake midterm. In the case of retaking a failed or unexcusedly missed midterm, the maximum grade one can receive is a “pass (2)”.

Practical midterm examination

An optional, written practical midterm online Moodle test can be taken at the end of the semester. The test consists of 20 questions (each question worth 1 point) covering the experiments performed in the 1st and 2nd semesters. The questions are to be answered in the (random) order as they appear; i.e. it is not possible to page back or forth. Performance at the laboratory activity during both semesters and theoretical midterm scores are also taken into account in the evaluation. Scores earned in the practical midterm (max. 20) will be added to the max. 6–6 practical points and max. 2–2 theoretical midterm points that could be collected during both semesters. Students who have earned at least 25 points (out of a possible maximum of 36) will receive exemption from the practical topics in the comprehensive exam.

Examination and grading:

The oral exam is based on the topic list announced in the beginning of the semester, and it takes place before a two-member committee of two (examiner and co-examiner). Students pick five random questions from each group of the following topic list. The exam can be passed if all five topics are sufficiently answered. Students who have achieved at least 25 practical points during the two semesters, receive a bonus: no practical question has to be answered. This bonus is valid during the whole exam period (in case of a retake exam), as well as in the next semester (in a “CV”-course).

Topic list:**I. DNA and RNA**

1. Chemical structure of nucleotides; primary and secondary structure of nucleic acids (DNA and different types of RNA)
2. Condensation of the genetic material in pro- and eukaryotic cells; the role of topoisomerases and chromatin proteins
3. The role of genetic variations in the pathogenesis of diseases; methods to study genetic factors
4. Principles of the semiconservative DNA replication; replication fork, leading and lagging strand synthesis
5. Comparison of DNA-replication in pro- and eukaryotes
6. Telomeric repeat sequences: replication of the telomeric regions of eukaryotic chromosomes; functions and importance of the telomerase
7. Types of point mutations; mechanisms of their development; possible effects of DNA sequence variations on the corresponding protein
8. Structure and function of the RNA-polymerase of *E. coli*; initiation and termination of transcription in prokaryotes
9. Characterization, role and synthesis of different types of RNA
10. Structure of the eukaryotic genes, initiation and termination of transcription in eukaryotes
11. Processing of the eukaryotic mRNA
12. Function and application of PCR and real-time PCR
13. Methods for the investigation of genetic mutations and poly-

morphisms (RFLP, allele-specific PCR, DNA-sequencing and primer extension)

14. Generation and application of recombinant DNA, reporter- and expression vectors

II. Post-transcription

1. Regulation of eukaryotic gene expression by RNA interference (miRNA, siRNA)
2. Epigenetic regulation of eukaryotic transcription: the role of DNA methylation and histone modifications
3. The genetic code; structure and function of tRNAs; aminoacyl-tRNA synthetases; codon-anticodon connections
4. The structure of prokaryotic and eukaryotic ribosomes; the ribosome cycle; binding of tRNA to ribosomes
5. Initiation of the translation in pro- and eukaryotes; regulation of eukaryotic translation; the role of phosphorylation of eIF2 α
6. Elongation and termination of pro- and eukaryotic translation; pharmacological inhibitors of translation
7. Post-translational modifications of proteins
8. Types, structure and synthesis of collagen
9. Investigation of gene expression by real-time PCR and DNA-microarray methodology
10. Definition of proteostasis; types of intracellular protein degradation
11. Types, mechanism and role of autophagy

III. Signal transduction and cell cycle

1. Nuclear receptors: steroid, thyroid, retinoid and Ah receptors
2. Classification and function of membrane receptors
3. Types and functions of GTP-binding proteins in signaling
4. Activation mechanisms of serine / threonine protein-kinases with examples
5. cAMP signaling pathway; regulation of gene expression by cAMP
6. Phosphatidylinositol signaling pathways
7. NFκB and TGFβ signaling
8. Structure and function of tyrosine kinase receptors, the Erk1 / Erk2 MAP kinase cascade
9. Insulin signaling
10. Integrating role of mTOR, and its effects on translation
11. Role of AMPK in the regulation of the metabolism and autophagy
12. Mechanisms of cellular oxygen sensing; adaption to hypoxia
13. Regulation of the cell cycle in the G₁ phase, transition to S phase
14. Regulation of the cell cycle in the G₂ and M phases
15. Molecular sensors detecting DNA damage and completion of DNA replication during the cell cycle
16. Molecular background of tumor generation
17. Structure and function of the apoptosome, DISC and PID-Dosome complexes
18. Members of the Bcl-2 superfamily and their roles in various apoptotic pathways, the „survival signal“
19. Function and activation of apoptotic caspases, role of granzyme B
20. Regulation of p53 levels and activity; role of p53 in determining the cell's fate

IV. Cell Biology

1. Principles of the organization of the eukaryotic cells; compartmentation; main features of subcellular organelles
2. Structure of cytoskeleton; structure and function of motor proteins
3. The protein secretory pathway; role of the rab cycle in the regulation of vesicular transport
4. Endo- and exocytosis
5. Endoplasmic reticulum stress, connection between the Unfolded Protein Response (UPR) and apoptosis
6. Protein quality control in the endoplasmic reticulum; the fate of misfolded proteins; ERAD
7. Characteristics of the proteome of subcellular organelles; maintenance of the internal milieu of subcellular organelles

V. Lab

1. Quantification of proteins by biuret reaction and Ellmann-method
2. Investigation of subcellular cell fractions
3. Investigation of the gene expression in prokaryotes: induction of β-galactosidase in *E. coli*
4. Purification of a bacterially expressed protein by affinity chromatography
5. SDS-polyacrylamide gel electrophoresis and Western blot
6. *In silico* tools in molecular biology
7. Genotyping of the TAS2R38 tasting receptor by PCR-RFLP
8. Analysis and generation of a recombinant DNA
9. *In vitro* transcription and translation

MEDICAL AND DENTAL PHYSIOLOGY

Department of Physiology

Credit Points: 8 (semester I) + 8 (semester II)

Head of the Department: *Dr. Attila Mócsai, Full Professor*

Course Director: *Dr. András Balla, Associate Professor*

Tutor: *Dr. András Balla*

Aim of Medical and Dental Physiology course:

The goal of Medical and Dental Physiology course is to give the students the understanding of the concepts and principles of medical and dental physiology. The lectures provide the information base while the seminars and practices provide the student with an opportunity to assimilate and integrate the material. Appropriate clinical perspectives are presented throughout the course.

First semester

1. Introduction, body fluids. Functions of cellular membranes, transport across membranes. Transepithelial transports.
2. Signal transduction: receptors, G proteins, second messengers. Cellular calcium metabolism, receptors of growth factors and cytokines. Membrane trafficking and vesicular transport.
3. Ion channels and resting membrane potential. Action potential. Physiology of nerve cells, synaptic transmission in the central nervous system.
4. Neuromuscular junction and physiology of skeletal muscle. Autonomic neurotransmitters and physiology of smooth muscle.
5. Physiology of the blood.
6. Physiology of the heart I: origin and spread of cardiac excitation Cardiac cycle. Regulation of cardiac output.
7. Electrocardiography (ECG). Physiology of blood circulation: introduction.
8. Hemodynamics, systemic circulation. Microcirculation.
9. Venous circulation and lymph flow. Local control of circulation. Reflex control of circulation.
10. Circulation of blood in the brain and coronary circulation. Splanchnic circulation, circulation of skin and skeletal muscle.
11. Respiration: pulmonary ventilation. Gas exchange in the lungs. Pulmonary circulation, ventilation-perfusion relationship.
12. Gas transport, hypoxias. Regulation of respiration. Adaptation of cardiovascular and respiratory system.
13. Renal function: renal circulation, glomerular filtration. Tubular functions. Concentration, dilution.
14. Regulation of body fluids and osmotic concentration. Introduction to acid-base balance. Acid-base balance: role of lungs and kidneys.

Second semester

1. General principles of regulation in the gastrointestinal tract. Motor functions of the gastrointestinal tract.
2. Secretory functions of the gastrointestinal tract. Digestion and absorption of food.
3. Endocrine regulations. The hypothalamo-adenohypophyseal system; growth hormone, somatomedins.
4. Function of the adrenal cortex. Function of the thyroid gland. Energy balance, quality and quantity requirement of food.
5. Hormonal regulation of intermediary metabolism.
6. Calcium metabolism, bone tissue, growth. Function of the reproductive system: endocrinology of the sexual differentiation and development.
7. Function of the reproductive system: male sexual function; female sexual function; endocrinology of pregnancy, parturition, and lactation.
8. Introduction to neurophysiology. Physiology of nerve & glia cells.
9. Sensory functions.
10. Physiology of hearing and equilibrium.
11. Physiology of vision.
12. Motor functions.
13. Integration of autonomic responses.
14. Electroencephalogram (EEG); sleep phenomena. Learning and memory. Regulation of behavioral mechanisms, motivation; emotion.

Practices, semester I:

- Typing of Blood Groups, Blood Coagulation Test
- Blood cell counting, determination of hemoglobin concentration and hematocrit.
- Leukocyte differential count on peripheral blood smear
- Recording and analyzing the human ECG
- Blood pressure measurement in humans
- Computer simulation: Skeletal and smooth muscle
- Evaluation of acid-base parameters with the Siggaard-Andersen nomogram

Practices, semester II:

- Human pulmonary function tests
- Smooth muscle of rabbit small intestine
- Oral glucose tolerance test (OGTT)
- Electrooculography (EOG) and investigation of the vestibular system
- Reflex function
- Computer simulation: Studies on circulatory reactions of a virtual rat
- Computer simulation: Neuromuscular junction

Attendance on practices and lectures, replacement in case of missed sessions:

The lecture hours per week are 5; the practice hours per week are 3.5. Students must write a lab report for each practice using the Practical Book. The Practical Book should be signed by the teacher not later than one week after the practice. Participation in the practices is obligatory. No more than three absences or no more than 10.5 practice hours from practices are allowed for any reason; otherwise the semester will not be credited. There are no extra practices and missed practices cannot be retaken.

Consequences of absence from sessions and exams:

No more than three absences from practices are allowed for any reason; otherwise the semester will not be credited. There are no extra practices and missed practices cannot be retaken. Failing to certify absence from an exam causes registering "absence" = "nem jelent meg" in the NEPTUN system.

Method of checking acquired knowledge during the study period:

The knowledge of the students is tested in a written form on a weekly base. The short tests cover the material of lectures of the previous week. Missed tests cannot be repeated. The evaluation of the weekly written test will be expressed as a percentage. The average of percentages of the nine best written tests results in a five-point scale:

0-50% = 1, 51-60% = 2; 61-70% = 3, 71-85% = 4, 86-100% = 5.

This grade (lab grade) is taken into account in the exams.

Requirements of an accepted semester (signature of the lecturer):

- 1) The attendance in minimum 75% of practices is necessary for the end-term signature. Students must write a lab report for each practice using the Practical Book. The Practical Book should be signed by the teacher not later than one week after the practice. Participation in the practices is obligatory. No more than three absences from practices are allowed for any reason; otherwise the semester will not be credited.
- 2) The average of the taken in account weekly tests must be above 50% to obtain the end-term signature. Students who do not meet this requirement need to take a written test covering the material of the semester in the 14th week of the semester during the "Competition exam", and achieving a result of 50% or higher is necessary to obtain the end-term signature.

Grading of courses:

Exam of the Medical and Dental Physiology I: The students need to bring ID card and the laboratory report book to participate in the exam. The oral exam consists of two theoretical questions (I-II). Grouping of questions, the topics of the exam can be found in the webpage of the Department of Physiology.

I: 1 and 2 topics of the semifinal exam

II: 3, 4 and 5 topics of the semifinal exam

The overall result of the oral exam is based on the two theoretical grades but a failed (1) theoretical question results in an overall failed (1) exam. The mathematical average of three partial grades (lab grade and two oral exam grades) gives the grade of the exam:

Excellent (5): 4.51 - 5.00

Good (4): 3.51 - 4.50

Satisfactory (3): 2.51 - 3.50

Pass (2): 2.00 - 2.50

Fail (1): below 2.00 or in case of failed (1) theoretical question.

The following rules will be enforced during the exam: electronic devices must be kept in the baggage; baggage and coats should be placed next to the wall of the lecture halls or the practice rooms; any form of communication is disallowed; students not complying with these rules will be disqualified immediately.

Final exam: The final exam consists of a written and an oral part. The written and oral part of the final exam starts at 8:45 by showing up in the selected exam place. Your exam place and examiners are announced in written form at 8:30 (attached to the front door of the corridor of the Physiology Practice Rooms). The students need to bring ID card and the laboratory report book to participate in the exam. The written part consists of 30 questions and takes 45 minutes. Grading of the written part:

0-14	correct answers = 1
15-18	correct answers = 2
19-22	correct answers = 3
23-26	correct answers = 4
27-30	correct answers = 5

The oral exam starts at 9:45 and consists of two theoretical questions (I-II). Grouping of questions, the topics of the final exam can be found in <http://semmelweis.hu/elettan/teaching/second-semester>.

- I: 1, 2, 3, 4 and 5 topics of the final exam
 II: 6, 7 and 8 topics of the final exam

The overall grade of the final exam is the mean of four (lab grade, written exam grade, two oral exam grades), but a failed (1) theoretical question results in an overall failed (1) exam.

Excellent (5):	4.51 - 5.00
Good (4):	3.51 - 4.50
Satisfactory (3):	2.51 - 3.50
Pass (2):	2.00 - 2.50
Fail (1):	below 2.00 or in case of failed (1) theoretical question.

The following rules will be enforced during the exam: electronic devices must be kept in the baggage; baggage and coats should be placed next to the wall of the lecture halls or the practice rooms; any form of communication is disallowed; students not complying with these rules will be disqualified immediately.

Exam registration:

Registration for the exam must be recorded through the NEPTUN system.

Rules of repeating exams:

Repetition of the exam is possible at least three days after the unsuccessful trial.

List of textbooks:

Textbook: Koepfen-Bruce M- Stanton- Bruce A: Berne & Levy Physiology (7th edition). 2017. ISBN: 9780323393942

Practice book: Practices in Medical Physiology (Edited by: Péter Enyedi and Levente Kiss). 2017. ISBN: 9789633314159.

RESTORATIVE DENTISTRY PRE-CLINICAL I

Department of Conservative Dentistry

Head of Department: **Professor János VÁG DMD, PhD.**

Second Semester

Phantom-course (Pre-clinical laboratory course)

Lecturer of course: Beáta KERÉMI DMD, PhD

Manual training (3 hours per week)

Introduction to practice: general Department's policy. Rules of the house. Distribution of instruments. Handing over of instruments.

- General dental anatomy, Mühlreiter's signs, tooth marking systems, instruments for dental hard tissue preparation
- Black classification, general rules of preparation, tooth preparation terminology (nomenclature), Preparation of Class I cavity -1st part
- Caries – definition, clinical characteristics, progression, histopathology, zones; Class I cavity preparation-2nd part
- Position of patient and practitioner during treatment, Class V cavity preparation
- Class II cavity preparation
- Midterm test I – cavity preparation, matrix systems and wedges,
- Isolation (relative and absolute)
- Minimal invasive preparation, preparation of foramen coecum
- Composite filling in the posterior region, steps of treatment (adhesive technique)
- Instruments and methods of finishing and polishing
- Midterm test II – making of filling, removing amalgam fillings, preparing modified conventional cavities, treatment of discoloured dental hard tissue
- Class III and Class IV cavities preparation
- Anterior matrices, composite filling preparation in anterior region, steps of treatment (adhesive technique)
- Treatment of root caries, temporary fillings: materials and application

Note: The maximum number of absences in a semester is 3.
During the semester 2 midterm examinations should be passed.
Practical course grade.

GENERAL DENTAL PRECLINICAL PRACTICE

Department of Preclinical Dentistry

Head: *Prof. Dr. Krisztina Márton D.M.D., Ph.D.*

Second Semester

Lectures (1 hour/week) **Practices** (3 hours/week)

The **Department of General Dental Preclinical Practice** is responsible for the preparation of dental students for the practical stages of the clinical practice requiring high precision and excellent manual skills. The aim of this special education is to provide the students with a professional preclinical conservative dentistry, prosthodontics, periodontology, oral surgery and orthodontics manual and theoretical training, which will be used in the clinical treatment procedures. It consists of the simulation of the clinical stages on phantom heads, but furthermore students also have the opportunity to study the basics of minimal- and micro invasive dentistry and the most important rules of infection control.

Theoretical lessons:

1. Dental Public Health Of Hungary At The First Decade Of The 21-St Century
2. Oral Diseases
3. Preparation Techniques In Dentistry: Conservative Dentistry And Endo-dontics
4. Morphology Of The Teeth. Guide-Planes And Cephalometric Landmarks
5. Role Of Dentistry In The Health Sciences. The Dental Team. Environmental aspects in dentistry.
6. Minimally Invasive And Micro-Invasive Dentistry.
7. Establishment And Instrumentation Of The Dental Clinic
8. Consequences of Loss of Teeth. Types of Prosthetic Appliances
9. Preparation Techniques In Dentistry: Prosthodontics
10. Contamination And Infection Control In Dentistry
11. Disinfection And Sterilization Methods In Dentistry
12. Operative Techniques In Dentistry: Periodontology
13. Operative Techniques In Dentistry: Oral And Maxillofacial Surgery
14. Operative Techniques In Dentistry: Paedodontics And Orthodontics

Practicals:

1. Pick-Up Of The Instruments. Instrumentation Of The Dental Clinic
2. Preparation Techniques In Dentistry. Practicing Cavity Preparation On Training-Plates
3. Preparation Techniques In Dentistry. Practicing Cavity Preparation On Training-Plates.
4. Preparation Techniques In Dentistry. Practicing Cavity Preparation On Training-Plates
5. Preparation Techniques In Dentistry. Practicing Cavity Preparation On Training-Plates
6. Minimally Invasive And Micro-Invasive Dentistry techniques.
7. Class 1 Cavity Preparation on the Artificial 36 Tooth
8. Preparation of Arteficial 46 Tooth for a Full Crown 1
9. Preparation of Arteficial 46 Tooth for a Full Crown 2, Digital impression taking with intraoral scanner.
10. Establishment And Instrumentation Of The Dental Clinic. Clinical Practical Introduction, Fluid Control, Four-Handed Dentistry In Practice. Contamination And Infection Control In The Dental Practice. Disinfection And Sterilization In Dentistry. Central Sterilization Unit Of The Teaching Centre.
11. Wax-modellation of the 46 tooth.
12. Periodontology Practice. Role Of Oral Hygiene In The Health Of The Oral Cavity. Oral Hygiene Techniques.
13. Oral Surgery Practice. The Oral Surgery Operation Unit. Basics Of The Dental Anaesthesia
14. Paedodontics And Orthodontics. Introduction Into The Orofacial Anomalies In Children.

Recommended textbook:

Field, James: PreClinical Dental Skills at a Glance, Blackwell Publishers (Wiley) ISBN13: 9781118766675

INTRODUCTION TO ODONTOTECHNOLOGY AND PROSTHODONTICS PRE-CLINICAL COURSE I-II

Department of Prosthodontics

Head of Department: **Prof. Dr. Péter Hermann**

Lecturer: Dr. Ida Barbara Kispélyi

Since the creation of an independent training, the Stomatological curriculum has put great emphasis on a preclinical foundation course, the Prosthodontics Propaedeutic course, the syllabus of which has also included mastery of dental techniques, indispensable for a dentist. Until the visit of the EU Committee in the late 90s, the course was structured in such a manner that in the first and second semester of the second academic year students had 3 hours of practices and one hour of lecture per week; during the first semester treatment of complete edentulousness was simulated through fabrication of complete dentures, while in the second semester students prepared 3-unit bridges and single crowns on partial edentulous mouldages. During both semesters, medical and dental laboratory steps followed each other just like in real life, and students performed alternatively medical work phases and dental laboratory tasks, for one week each. After the proposal of the EU Committee on the amendment of several courses (including the Prosthodontics Preclinical course), dental laboratory and medical work phases had to be separated sharply, while an independent Odontotechnology course had to be included in the curriculum. According to the request, this Odontotechnology course was built into the theoretical module in order to provide the earliest possible recognition and consolidation of the chosen profession.

Taken more than ten years of experience into account, while maintaining the values that undoubtedly resulted from these changes, we wish to modify those controversial points that in our opinion can be still improved. A sharp separation of the two disciplines (dental techniques and dentistry) rather confuses students, thus they fail to get a grip of the process, and it is the essence that is lost, since these processes are based each on the other. The essence of the new syllabus is the integration of the two courses that are currently taught separately, and thus new and crucial areas (not taught so far) can be emphasized, with concomitant reduction of teaching hours and credit points.

The curriculum of the course concludes with a comprehensive examination at the end of the first semester of the third academic year.

Timing of the Odontotechnology and Prosthodontics Preclinical course:

3rd, 4th and 5th Semester

Preliminary studies requested for the course of Odontotechnology and Prosthodontics Preclinical course module I:

General Dental Material Science, Macroscopic Anatomy II, General Dental Preclinical Practice

Preliminary studies requested for the course of Odontotechnology and Prosthodontics preclinical course module II:

Odontotechnology and Prosthodontics preclinical course module I, Macroscopic Anatomy II

Preliminary studies requested for the course of Odontotechnology and Prosthodontics Preclinical course module III:

Odontotechnology and Prosthodontics Preclinical course module II, Conservative Dentistry and Endodontics, Preclinical I, Molecular Cell Biology II

Odontotechnology and Prosthodontics preclinical course I

Topics of the lectures:

1. Primary impression, primary cast
2. Special trays
3. Labside and chairside steps of making complete denture
4. Types of casts, casting as a kind of information transfer
5. Secondary impression
6. The occlusal rim, centric occlusion
7. Articulators, jaw registration
8. Fabrication of the trial denture, and the try in procedure
9. Fitting of dentures, Short time and long time recall procedures.
10. Types of the prosthetic appliances
11. Gnatological aspects in making complete denture
12. Partial edentulousness, and partial dentures (RPD)
13. Labside and chairside steps of making partial and complex denture
14. Consultation

Topics of the Practices:

1. Introduction, Instrument Delivery
2. Impression Taking for Maxillary and Mandibular Complete Dentures
3. Impression Taking for Maxillary and Mandibular Complete Dentures
4. Outlining The Borders of The Special Trays,
5. Fabrication of Special Trays
6. Secondary Impressions. Fabrication of Maxillary and Mandibular Occlusal Rims
7. Fabrication of Maxillary and Mandibular Occlusal Rims
8. Jaw Registration
9. Mounting of Articulators
10. Setting Up Teeth
11. Setting Up Teeth
12. Setting Up Teeth
13. Processing Dentures, Insertion
14. Consultation

Odontotechnology and Prosthodontics Preclinical II

Topic of the lectures (weekly, numbered):

1. Types of the fixed dental restorations
2. Labside and chairside steps of making fixed appliances
3. Fundamentals of tooth preparation, periodontal aspects
4. Impression taking for fix appliances, sectional models, and dies
5. Fabrication of wax pattern, casting of fix appliances , trial of the metal framework of the fix appliances
6. Dowel core restorations
7. Tooth Shade Determination
8. Temporary Dental Restorations
9. Veneering of fixed appliances
10. Metal free fixed restauration, CAD/CAM technology
11. History of implant dentures, labside and chairside steps
12. Explanation of different kind of implant systems. Impression methods of implant cases
13. Dental cements
14. Consultation

Practical sessions

1. Handing out of the instruments introduction
2. Tooth preparation 24 and 27 for fixed partial denture
3. Tooth preparation 24 and 27 for fixed partial denture
4. Tooth preparation 24 and 27 for fixed partial denture
5. Tooth preparation 24 and 27 for fixed partial denture
6. Two-phase impression
7. Antagonistic impression, bite-registration
8. Preparation of the sectional model, mounting of the average value articulator
9. Waxing up of the four-unit bridge: Adapta deep drawing
10. Wax pattern fabrication of the four-unit bridge: outlining and shaping of the occlusal surface
11. Wax pattern fabrication of the four-unit bridge
12. Spruing of the wax pattern, preparation for investing
13. Wax pattern fabrication for a four-unit porcelain fused to metal four-unit bridge
14. Instrument collection, consultation

ELECTIVE SUBJECT for Dentistry 2nd year

Title: CULTURE IN MEDICINE, CULTURE OF MEDICINE – Popular Themes of Current Clinically Applied Medical Anthropology

Institute of Behavioral Sciences

Course Director: Prof. Dr. Ferenc Túry

Lecturer: Dr. László Lajtai

Prerequisite: Dental Psychology

Second Semester
Weekly topics of the seminars:

1. „We have never been modern?” – An initiation to critical approaches to evidence base in medicine – How to respond? - / - Discussion of the semester: Requirements and timescale.
2. Alternatives 1: Narratives and explanatory models – Confusions and the lay perspective
3. Alternatives 2: Complementary medicine – Competition at our doorstep
4. Alternatives 3: Healing and folk medicine – Wisdom or beliefs?
5. Alternatives 4: Biomedicine for anthropology, or the twist of perspectives
6. Challenges 1: Migrants, refugees and minorities
7. Challenges 2: Reproduction, sex, age, death and other trends in „western” medicalization
8. Challenges 3: Nutrition and taboos - biopower and social body
9. Challenges 4: Placebo, pharmaceuticals and the rule of pharmaceutical industry
10. Challenges 5: Public medicine, private medicine and the reproduction of inequities
11. Favourite themes 1: Alcohol, drug, and AIDS at crossroads of culture and law
12. Favourite themes 2: Shrinks and madness – CBS and the mirage of the normal
13. Fieldworks: Discussion 1.
14. Fieldworks: Discussion 2.
Recapitulation, feedback and evaluation.

LANGUAGE COURSE

Institute of Languages for specific purposes

Term 3 Hungarian for Dental Medical Purposes II - FOKONYE320_2A

Hungarian for Dental Medical Purposes II is a course for students who completed the course Hungarian for Dental Medical Purposes I. Course objectives are to extend the range of basic knowledge and skills, as well as to improve the ability to use what has been learnt so far. Students are introduced to dental language to ensure that they use it correctly in practice.

Attendance and absence:

A maximum of 7 absences is allowed; if the number of absences exceeds this, students may make up missed classes in another group (maximum two times) in agreement with the instructor. Students who miss more than 25% of the classes will not be allowed to get a signature.

Certifying absence:

For more than the allowed number of absences, a medical certificate of long-term illness or hospitalization is required.

Requirements:

Two oral tests in weeks 7 and 14

Topic: the material covered

Make-up and upgrade opportunities: to be arranged outside of class with the instructor.

Semester signature:

A maximum of 7 absences is allowed; if the number of absences exceeds this, students may make up missed classes in another class (maximum two times) in agreement with the instructor. Students who miss more than 25% of the classes will not be allowed to get a signature; attendance in classes; attendance in both oral tests.

Evaluation:

Students will receive a term grade based on the average of their oral tests and their class work. The second oral test is marked by two teachers on separate mark sheets and an average is calculated. An unsatisfactory oral answer must be repeated – the 'fail' (1) grade for these students will also count towards the end-of-term grade. Assessment of oral tests:

- 0-49% = fail (1)
- 50-59% = pass (2)
- 60-74% = fair (3)
- 75-89% = good (4)
- 90-100% = excellent (5)

Detailed course/lecture description:

Week	Topics
1.	Revision: internal medicine chart
2.	Revision: complaint, pain (location, timing, character, etc.)
3.	The tooth. Tooth material and parts Names of teeth What is DMF?
4.	Number of decayed, missing and filled teeth (listening and reading comprehension) Dialogues
5.	Tooth decay / Caries 1
6.	Tooth brushing
7.	Revision, oral test
8.	Basics of dentist-patient dialogues 1. Introduction, short history-taking
9.	Basics of dentist-patient dialogues 2. Instructions during examination, diagnosis
10.	Basics of dentist-patient dialogues 3. Treatment, saying goodbye
11.	Tasks and exercises in the topics above (e.g., comprehension) Revision: the tooth, tooth decay, tooth brushing
12.	Listening comprehension exercises in the topics above Improvised dialogues, vocabulary building based on possible answers, strategies to improve comprehension
13.	Revision
14.	Oral test

Textbooks

1. I. Gera: Angol-magyar fogorvosi szótár
2. M. Putz: Magyar fogorvosi szaknyelv I.

Teaching materials and audio recordings using authentic medical documentation, edited by the instructors of the Department of Languages for Specific Purposes.

Term 4 Hungarian for Dental Medical Purposes III - FOKONYE320_3A

Hungarian for Dental Medical Purposes III is a course for students who completed the course Hungarian for Dental Medical Purposes II. Course objectives are to extend the range of basic knowledge and skills, as well as to apply creatively what has been learnt so far. Students focus on professional communication and learn expressions of dental documentation.

Attendance and absence:

A maximum of 7 absences is allowed; if the number of absences exceeds this, students may make up missed classes in another group (maximum two times) in agreement with the instructor. Students who miss more than 25% of the classes will not be allowed to get a signature.

Certifying absence:

For more than the allowed number of absences, a medical certificate of long-term illness or hospitalization is required.

Requirements:

Two oral tests in weeks 7 and 14

Topic: the material covered

Make-up and upgrade opportunities: to be arranged outside of class with the instructor.

Semester signature:

A maximum of 7 absences is allowed; if the number of absences exceeds this, students may make up missed classes in another class (maximum two times) in agreement with the instructor. Students who miss more than 25% of the classes will not be allowed to get a signature; attendance in classes; attendance in both oral tests.

Evaluation:

Students will receive a term grade based on the average of their oral tests and their class work. The second oral test is marked by two teachers on separate mark sheets and an average is calculated. An unsatisfactory oral answer must be repeated – the 'fail' (1) grade for these students will also count towards the end-of-term grade. Assessment of oral tests:

0-49% = fail (1)

50-59% = pass (2)

60-74% = fair (3)

75-89% = good (4)

90-100% = excellent (5)

Library Informatics – AOVKPK088_1A

Lecturer: **Dr. Lívía Vasas PhD.** – Central Library
 Institute: Semmelweis University Central Library, 1088 Budapest
 Duration: One semester, 30×45 minutes (10×3 lessons)

SUGGESTED SEMESTER 5-10.

Exam-form	Practical mark
Credit-value	3 credit-points
Minimum/maximum group-size	8/200
The aim of the subject:	Teaching students how to use/search in literature sources of medicine, analyse the result of their work supporting the proper competencies.
Thematic:	Medical e-catalogues, e-books, e-libraries, databases, scientific resources of internet
Assistant lecturer:	Anna Berhidi, Edit Csajbók, Skultéti Attila, Szluca Péter
Student records officer:	
Application deadline:	September 4 -8, 2019
Precondition:	There isn't.
Introduction, technical details, VPN access, technical details, about the history of the Central Library's Homepage:	www.lib.semmelweis.hu and its facilities,
UpToDate, ClinicalKey, HS talks:	Biomedical & Lifesciences Collections, EBSCOhost, ProQuest, Pharmacopoeia, Turnitin
Dissertations:	Dart Europe, Open dissertations, OATD,
Catalogs:	books, online books
Semmelweis University catalog Hunteka:	http://hunteka.lib.semmelweis.hu/search Online book catalog: https://lib.semmelweis.hu/nav/ekonyvek National Library of Medicine (Bethesda, USA) NLM catalog: https://www.ncbi.nlm.nih.gov/nlmcatalog Worldcat: https://www.worldcat.org/ Copac: https://copac.jisc.ac.uk/ Books PPT
Scientific publishers and periodicals:	printed/electronic/open access
Browser and matching searching, archive and the newest editions Characterization of periodicals/reviews/journals, ISSN, DOI, Crossmark, Article metrics - Online attention	
Publishers: Springer, LWW, Wiley, video journal: JOVE	
Nature: https://www.nature.com/%0A	
BMC https://www.biomedcentral.com/	
PLOS https://www.plos.org/ , DOAJ https://doaj.org/ , etc.	

New routes: Open Science, Open Access

The dangers of publishing on Open Access https://lib.semmelweis.hu/nav/open_access_general_information Support for Open Access Communication at Semmelweis University https://lib.semmelweis.hu/nav/open_access_tamogatas

The Semmelweis repository <https://repo.lib.semmelweis.hu/>

The concept of plagiarism, its forms of appearance, Plagiarism Search: Turnitin, Copyright questions

NLM databases: history, Open: <https://openi.nlm.nih.gov/>

PubMed <https://www.ncbi.nlm.nih.gov/pubmed/>

value added services: registration, advances search.

MeSH, PMC, etc.

Dictionary: <https://www.merriam-webster.com/>

OVID databases, online books, electronic periodicals, Evidence Based Medicine databases: the role of the EBM in research, full text journals in Ovid databases MEDLINE, PsycINFO, subject heading systems, value-added services, access to the full text version, WHO <https://www.who.int/>

Bibliographic and citation databases, search engine: Web of Science platform, Google Scholar; citations, general searching in the databases, bibliographic and citation searching on keywords, using Boolean operators, value-added services

Scientometrics: quality of journals: Clarivate Analytics InCites JCR (Science Edition and Social Science Edition), IF: calculating Impact factor; SCImago: SJR

Reference Manager: EndNote, EndNote Online; the role of reference software in modern publishing, Literature searching: Importing and exporting records (from Web of Science, OVID Medline, PubMed) creating own records search facilities within our records and from PubMed; data handling: creating groups, filtering duplicates

Semmelweis Knowledgebase, Scientific Discovery of the Internet: find medical information you can trust, Building search strategies, Google Scholar, Medworm

Summary of the course, Test writing

Consultation, Retake the 1st/2nd test OR Renewal opportunity for each tests

Syllabus of Physical Education

Department of Physical Education

Subject: Physical Education III

Type of Subject: Obligatory

Code of Subject: FOKOTSI007_3A

Credit: 0

Name of the Lecturer: Várszegi Kornélia

The objectives of Physical Education:

One aim of the course is to improve the health status of medical students, maintaining and increasing physical performance, creating the conditions for better physical quality of life.

The syllabus (preferably a week and numbered):

2nd year, semester I:

1st Week:	General information Health and Safety, Fire and Environmental protection. The mid-year adoption requirements, the construction of the classes and the presentation of the university recreational and sports opportunities for extra – curricular activities. Heart rate measurement exercises. Ruffier test and evaluation of the results.
2nd Week:	Athletic Different athletic exercises like throwing, shot put. Preferably outdoors with the aim of learn how to execute the exercise with a proper form and breathing technique.
3rd Week:	Tennis Introducing and learning advanced technical elements (serve, volley) and game.
4th Week:	Agility ladder To perform different exercises to improve speed, balance and concentration. Preferably outdoors, on grass ground.
5th Week:	Relay race and competitive games To improve explosiveness, skills and experience good team spirit.
6th Week:	Football Practicing the technical elements of football in pairs and game situation.
7th Week:	Circuit training Functional exercises with bodyweight and exercises with basic equipment to improve general coordination skills.
8th Week:	Badminton Introducing the technical and tactical elements of doubles game. Game applying all the previously known rules.
9th Week:	Ruffier test Comparing the results with the previously recorded one to bring the importance of the health of the cardiovascular system to the attention.
10th Week:	Meta Reminders of the basic need to know about META. Learn tactical elements of the game and using them. Aim to improve ball skill development, reaction time, explosiveness and collective gaming experience.
11th Week:	Obstacle course To complete a built up obstacle course using different creeping- climbing, hovering, pulling, skipping, throwing techniques for general skill development.

- 12th Week: Mobilisation**
Dynamic stretching exercises with and without equipment to prevent the health of the joints by maintaining and developing the mobility of it.
- 13th Week: Skipping rope**
Skill developing exercises with skipping rope individually and in pairs, in place and in motion at different levels.
- 14th Week: Kettlebell**
Different kind of strengthening exercises with kettlebell.

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes! (2x90 mins./week sport training (competitive sport, for qualified only): cheer dance, cheerleader, men's football, handball, basketball, volleyball)

Requirements to participate in the sessions and the potential for absences:

Active participation in sport classes.

The method of proof for the workshops and the exam absence:

The absence cannot be proved, should make up for the lost lessons.

Requirements for signature at the end of semester (including the number of tasks to be solved learning outcomes and type):

Active participation in 10 classes (15 times for trainings) approved by the staff.

How to prove absence regarding the exam:

Absence must be retaken!

Subject: Physical Education IV.

Type of Subject: Obligatory

Code of Subject: FOKOTSI007_4A

Credit: 0

Name of the Lecturer: Várszegi Kornélia

The objectives of Physical Education:

One aim of the course is to improve the health status of medical students, maintaining and increasing physical performance, creating the conditions for better physical quality of life.

The syllabus (preferably a week and numbered):

2nd year, semester II:

- 1st week: General information**
Accident, fire and environmental knowledge. Requirement for acceptance of the semester system, the structure of the classes and the presentation of the university recreational sports opportunities for extra-curricular activities.
- 2nd week: Basketball**
Dribbling and shooting skill improving drills. Games: 1 on 1; 2 on 2; shooting contests, king of the court. Scrimmage.
- 3rd week: Wall-bar exercises**
Enhance strength and balance by climbing, declining, hanging, skipping, pulling, pushing etc. exercises.
- 4th week: Circuit training**
A chain of compete drills in a certain time period with and without equipment. The aim is to improve the general level of strength and stamina.

5th week:	Floorball Passing and receiving skill improving drills. Exposing shots on goal (wrist- slap- and snapshots). Scrimmage.
6th week:	Drills in pairs Strength, agility, coordination and battling skill improving exercises with a partner incorporated.
7th week:	Volleyball Introducing the defensive elements of the game (receiving serves, blocks). Exposing unknown rules. Games.
8th week:	Game-day Introducing and practicing different kind of cohesion enhancing games (Tick-Tac-Toe, etc.)
9th week:	Ruffier test Comparing the results with the previously recorded one to bring the importance of the health of the cardiovascular system to the attention.
10th week:	Circuit training Specialized chain of drills for strengthen the shoulder, back, chest, arm and leg muscles, considering the fitness level of the Students.
11th week:	Tennis Introducing variations of ground strokes and grip types (slice, topspin, lobs etc.) Exposing the rules of doubles. Games (all around the world, etc.)
12th week:	Badminton Exposing the rules and the basic tactical elements of the doubles game. Scrimmage.
13th week:	Core exercises Body-weight exercises targeting to strengthen the muscles of the trunk thus develop a strong fascia to protect it from the harmful effects of overdose sitting (studying)
14th week:	Medicine-ball exercises Strength and coordination (complex) skill developing exercises by throwing, rolling, passing, lob, shot-put, etc. with a partner incorporated.

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes! (2x90 mins./week sport training (competitive sport, for qualified only): cheer dance, cheerleader, men's football, handball, basketball, volleyball)

Requirements to participate in the sessions and the potential for absences:

Active participation in sport classes.

The method of proof for the workshops and the exam absence:

The absence cannot be proved, should make up for the lost lessons.

Requirements for signature at the end of semester (including the number of tasks to be solved learning outcomes and type):

Active participation in 10 classes (15 times for trainings) approved by the staff.

How to prove absence regarding the exam:

Absence must be retaken!

PRE-CLINICAL MODULE

New curriculum to be introduced
Please, follow the updated version on the home page



Faculty of Dentistry
3rd year

STUDY PROGRAMME
PRE-CLINICAL MODULE

5th semester				
subjects code	subjects	credit code	examination	prerequisites
obligatory	Restorative Dentistry, Pre-clinical II.	C4L1P3	comprehensive examination	Medical and Dental Physiology II Restorative Dentistry Pre-clinical I Odontotechnology and Prosthodontics, Pre-clinical II
obligatory	General and Oral Pathophysiology	C3L2P2	comprehensive examination	General and Oral Microbiology Molecular Cell Biology II., Medical and Dental Physiology II.
obligatory	Hungarian for Dental Medical Purposes IV.	C1L0P4	term grade	Hungarian for Dental Medical Purposes III.
obligatory	Oral and Maxillofacial Surgery, Pre-clinical course	C2L0P2	term grade	General and Oral Microbiology, Molecular Cell Biology II., Medical and Dental Physiology II.
obligatory	Pathology	C4L3P2	comprehensive examination	Genetics and Genomics, Molecular Cell Biology II., Medical and Dental Physiology II.
obligatory	Preventive Dentistry I.	C3L1P2	examination	Restorative Dentistry, Pre-clinical I., Odontotechnology and Prosthodontics Pre-clinical II.
obligatory	Odontotechnology and Prosthodontics Preclinical Course III.	C3L0P3	comprehensive examination	Odontotechnology and Prosthodontics Pre-clinical II., Restorative Dentistry, Pre-clinical I., Molecular Cell Biology II.
obligatory	The Medical Basis of Disaster Management I.	C0L2 hours/sem	signature	
obligatory	Physical Education V.	C0L0P14	signature	
	Total Credit	22		

Explanation

15 credits should be gained from the **elective subjects** during the 5-year

The grade influences the qualification of the diploma

C = Credit point

L = Lecture (hours/week)

P = Practice (hours/week)

PRE-CLINICAL MODULE

6th semester				
subjects code	subjects	credit code	examination	prerequisites
obligatory	Endodontics, Pre-clinical	C43L1P3	examination#	Restorative Dentistry Pre-clinical II. Preventive Dentistry Odontotechnology and Prosthodontics Preclinical Course III.
obligatory	Oral and Maxillofacial Surgery I.	C4L1P3	Term grade	Oral and Maxillofacial Surgery, Pre-clinical course, Pathology, General and Oral Pathophysiology
obligatory	Restorative Dentistry and Endodontics I.	C3L0P3	Term grade	Restorative Dentistry, Pre-clinical II Odontotechnology and Prosthodontics, Pre-clinical III Preventive Dentistry
obligatory	Oral Biology	C4L2P2	examination	General and Oral Pathophysiology Public Health, Pathology
obligatory	Oral Pathology	C4L2P2	examination	Pathology, General and Oral Pathophysiology, Public Health
obligatory	Prosthodontics I.	C4S1P3	Term grade	Restorative Dentistry, Pre-clinical II., Odontotechnology and Prosthodontics Pre-clinical III., Preventive Dentistry
obligatory	Radiation protection	C2L1.5P1	examination	Biophysics II.
obligatory	Hungarian for Dental Medical Purposes V.	C1L0P4	comprehensive examination	Hungarian for Dental Medical Purposes IV.
obligatory	Oral Diagnostics	C3L1P2	examination	Restorative Dentistry, Pre-clinical I., Odontotechnology and Prosthodontics Pre-clinical II.
obligatory	The Medical Basis of Disaster Management II.	C0L2 hours/sem	signature	The Medical Basis of Disaster Management I.
obligatory	Physical Education VI.	C0L0P14	signature	
Criterion requirement	Dento-Alveolar practice (summer, minimum 1 week)	C0L0P30	signature	Oral and Maxillofacial Surgery I. prerequisite of registering to the 7th semester
	Total Credit	29		

The grade influences the qualification of the diploma

C = Credit point

L = Lecture (hours/week)

P = Practice (hours/week)

IMPORTANT NOTE: Signing up for Physical Education (PE) V. in the 1st semester and for PE VI. in the 2nd semester is obligatory.

LIST OF TEXTBOOKS (The list may change!)

- 1 McCracken's Removable Partial Prosthodontics (10/e) Glen P.McGivney-Alan B.Carr. Hardback Mosby, 1999. ISBN 0323006787
- 2 Schillinburg et al.: Fundamentals of Fixed Prosthodontics. Quintessence 4th ed. 1997. ISBN 93 13 86 500
- 3 Craig,R.G.: Restorative dental material. Mosby, 10th ed.
- 4 R.M.Basker-J.C.Davenport: Prosthetic Treatment of the Edentulous Patient. 5th ed. McMillan Press Ltd. ISBN 978-1405192613
- 5 C.M.Sturdevant: Operative Dentistry. Mosby. ISBN 0-80166366-0
- 6 A.Newbrun: Cariology Quintessence. ISBN 0-867152052
- 7 Walton, Torabinejad: Principles and Practice of Endodontics. W.B. Saunders Co. 2nd ed. 1996. ISBN 0-7216-4924-6
- 8 Primary Preventive Dentistry. Ed.by:Norman O.Harris, F.Garcia-Godoy. 5th ed. Appleton and Lange, Stamford. 1999. ISBN 0-8385-8129-3
- 9 Samaranayake et al.: Essential Microbiology for Dentistry. Edinburgh, Churchill Livingstone. ISBN: 0443049890
- 10 Sibernagl S.-Lang F.: Color Atlas of Pathophysiology. Thieme, Stuttgart, 2000. ISBN 0-86577-866-3(TNY) ISBN 3-13-116551-0 (GTV)
- 11 Ferguson D.B.:Oral Bioscience. Churchill Livingstone, 1999. (Harcourt Publ.Ltd.) ISBN 0-443-05373-1
- 12 Heckner F: Practical Microscopic Hematology. 4th ed. Williams and Wilkins Trada Bldh. 1993. ISBN 0-8121-1711-5
- 13 Robbins: Basic Pathology, 2008. V. Kumar, A. K. Abbas, N. Fausto, R. Mitchell Saunders; 8 edition
- 14 Szende B.-Suba Zs: Introduction to histopathology. Bp. Medicina. 1999.
- 15 Szabó Gy: Oral and Maxillofacial Surgery. Bp. Semmelweis Publ. 2001.
- 16 Koesner K.R.:Manual of Minor Oral Surgery for the General Dentist. Blackwell Munsgaard, 2008
- 17 Worthington-Lang-LaVelle: Osseointegration in Dentistry. An Introduction. Quintessence, Chicago, 1994.
- 18 Sethi, A.-Kaus, Th: Practical implant dentistry. Quintessence, London. 2005.
- 19 Andreoli,T.E.-Bennett,J.C.-Carpenter,C.C.J.-Plum,F.: Cecil Essentials of Medicine. 4th ed. W.B. Saunders Co. 2000.
- 20 Medical Genetics and Genomics (e-book)
- 21 KUBY Immunology • W. H. Freeman and Company • New York • 2013
- 22 Immunology seminars (e-book)

Recommended textbooks:

- 1 Nikiforuk: Understanding Dental Caries.(1-2) Karger.
- 2 Murray, J.J.: The Prevention of Oral Disease. 3rd ed. Oxford Univ. Press 1996. ISBN 0 19 2624563 (Hbk) ISBN 0 19 2624571 (Pbk)
- 3 Fluoride in Dentistry. 2nd Ed.: Fejerskov,O.-Ekstrand,J.-Burt,B.A. Munksgaard, 1996. ISBN 87-16-11282-2
- 4 Preventív fogászat. Szerk. Bánóczy J.-Nyárasdy I. Bp. Medicina. 1999. ISBN 963-242-003-9
- 5 Pathophysiology and Disease. An Introduction to Clinical Medicine. Lange Medical Book. Prentice-Hall International Inc. ISBN 0-8385-8095-5
- 6 Jansen van Rensburg B.G: Oral Biology. Quintessence Publishing Co. Inc. 1995. ISBN 0-86715-271-0
- 7 Goldschlager N.:Principles of Clinical Electrocardiography. 3rd ed. Appleton and Lange, 1989. ISBN 0-8385-7951-5
- 8 Marsh, Ph.-Martin, M.V: Oral Microbiology. Oxford, Wright. ISBN: 0723610517
- 9 D.Tóth F.: Microbiology for Dentistry. Vol.I-II. University of Debrecen, 2002.
- 10 E.C.Combe: Notes on dental materials. Univ.Manchester, 1986.
- 11 J.F.McCabe: Applied dental materials. Univ. Newcastle, 1990.
- 12 Howe: A Minor Oral Surgery. Wright. 1987. ISBN 723608237.
- 13 Howe: The Extraction of Teeth. Wright. 1990. ISBN 723622310.
- 14 Seward et al.: An Outline of Oral Surgery. Wright. 1998. ISBN 0-7236-0735-4 és -0407-x
- 15 Hupp JR et al.: Contemporary Oral and Maxillofacial Surgery. Mosby, 2014
- 16 Peterson: Principles of Oral and Maxillofacial Surgery. Decker, 2004.
- 17 Robinson, Howe: Tooth Extraction. A Practical Guide. Oxford, 2000.
- 18 Harrison's Principles of Internal Medicine, Petersdorf, Adams, Braunwald, Isselbacher, Martin, Wilson, McGraw-Hill Book Company. 15th ed.
- 19 Ward Booth, Hausamen, Schendel: Maxillofacial Surgery, C.Livingston Elsevier, 2007
- 20 Neil-Nairne: Complete Denture Prosthetics. Wright. ISBN 72 36 20 636
- 21 Neil-Walter: Partial Dentures. ISBN 06 32 08 025 8
- 22 Moor UJ: Principles of Oral and Maxillofacial Surgery, 6th Edition, Wiley-Blackwell 2011.
- 23 Hermann Péter, Szentpétery András: Gnatológia (Semmelweis Kiadó, 2018)

GENERAL AND ORAL PATHOPHYSIOLOGY

Department of Oral Biology

Lecturer: *Dr. Ákos Zsembery*

Tutor: *Dr. Kristóf Kádár*

First Semester

Lectures (2 hours per week):

1. Pathophysiology of respiratory diseases
2. Acute and chronic heart failure
3. Causes and consequences of hypertension, effects of long-lasting antihypertensive therapy, atherosclerosis
4. Pathophysiology of circulatory shock
5. Acute and chronic kidney failures
6. Diseases of the esophagus and the stomach
7. Intestinal and pancreatic disorders
8. Acute and chronic disturbance of liver functions and bile secretion
9. Endocrine disorders
10. Diabetes mellitus
11. Symptoms and consequences of diabetes mellitus
12. Causes and symptoms of the most common neurological and psychiatric diseases
13. Pathophysiology of pain. Pain relief methods
14. Disorders of energy balance

Practicals (2 hours per week):

1. ECG 1 - Basics of ECG analysis
2. ECG 2 - Signs of excitation and conduction abnormalities in ECG
3. ECG 3 - Signs of ischemic heart diseases in ECG
4. Cardiology - case discussion
5. Asthma - case discussion
6. Laboratory test of salt-water/acid-base homeostasis
7. Urine analysis
8. Investigation of the GI tract
9. Gastroenterology - case discussion
10. Diagnostic tests of liver- & bile function
11. Endocrine laboratory diagnostics I.
12. Endocrine laboratory diagnostics II.
13. Diabetes mellitus - case discussion
14. Diagnostic methods of neuropsychiatric disorders
15. Laboratory tests of autoimmune diseases

Note: The maximum number of absences in a semester is 3 (practices)
 More than 3 absences invalidate the semester
 Midterm test from the material of the lectures in the 11th week (1-9 lectures material)
 Midterm is the qualification for the Competition (in the 14th week)

PATHOLOGY

Department of Pathology and Experimental Cancer Research

Course director and tutor: *Dr. Botond Timár*

First Semester

Lectures

General introduction. Place and role of pathology in the medicine.
 Structure of pathology and methods of investigation.
 Reversible damages and adaptation tissue reactions. Atrophy.
 Hypertrophy. Hyperplasia. Metaplasia. Obesity.
 Irreversible tissue damages. Apoptosis. Necrosis I.
 Irreversible tissue damages. Necrosis II.
 Diseases of genetic background. Malformations.
 Pathology of the inflammation. I. (acute)
 Pathology of the inflammation. II. (chronic)
 Active and passive hyperemias. Shock.
 Hemorrhages and anemias.
 Regeneration, wound healing. Stone formations.
 Thrombosis and embolism.
 Edema formation and forms.
 Hypersensitivity reactions and related diseases
 Autoimmune diseases.
 Arteriosclerosis and complications.
 Pathology of hypertension. Cardiomyopathies.
 Vitium. Cor pulmonale. Infectious endocarditis.
 Etiology and genetic background of neoplasms.
 Classification and morphology of neoplasms.
 Growth and metastasis of neoplasms.

Detailed pathology of neoplasms I.
 Detailed pathology of neoplasms II.
 Detailed pathology of neoplasms III.
 Detailed pathology of neoplasms IV.
 Detailed pathology of neoplasms V. and diabetes
 Smoking-related pathological disorders
 Pathology of alcoholism

Practices

Histopathological Practices:

Practice I. – Adaptation, necrosis
 Practice II. – Inflammation, circulatory pathology
 Practice III. – Neoplasms I.
 Practice IV. – Neoplasms II.
 Specimen practice I. - Adaptation, necrosis, inflammation
 Specimen practice II. - Neoplasms I.
 Specimen practice III. - Neoplasms II.

Clinicopathology Cases

Autopsy Practices

EXAMINATION (FINAL)

The semifinal examination at the end of the first semester will be a written test. Three different times for the test writing can be chosen. Students are requested to announce the time they have chosen to the tutor of the 1st Institute of Pathology and Experimental Cancer Research until mid – December. Students who have failed the exam on one occasion can retake the exam on the next test-writing day, at least one week from the first trial.

Note: Lectures will be held in the lecture hall of the 1st Institute of Pathology and Experimental Cancer Research.

Autopsy and Histopathology practices will be held in the 1st Institute of Pathology and Experimental Cancer Research.
 During the histopathology exercises 100 slides will be studied.
 The list of slides will be available at the beginning of the semester.

The maximum number of absences in a semester is 3.
 More than 3 absences invalidate the semester.
 During the semester two midterm examinations should be passed.

ORAL PATHOLOGY

Department of Pathology and Experimental Cancer Research

Course director and tutor: *Dr. Botond Timár*

Second Semester

Lectures

Oral pathological sampling and processing.
Orofacial malformations
Pathology of the head and neck region. Esophageal diseases. Gingiva pathology
Intraoral lesions, neoplasms, preneoplastic
Conditions
Orofacial inflammatory diseases.
Pathology of the tongue
Pathology of the nose, paranasal sinuses, larynx
Manifestation of hematologic diseases in the head and neck and oral regions.
Endocrine pathology
Pathology of the salivary glands.
Odontogenic tumors
Pathology of the jaw
Pathology of caries. Periodontal diseases.
Orofacial manifestations of systemic diseases
Differential diagnostics of the orofacial lesions

Note: The maximum number of absences in a semester is 3. More than 3 absences invalidate the semester

RESTORATIVE DENTISTRY, PRE-CLINICAL II**Department of Conservative Dentistry**Head of Department: *János Vág DMD, PhD***First semester****Lectures** (1 hour per week):

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Classification (inlay/onlay/overlay/endocrown/veneer/table-top) and materials for indirect restorations. Indications, contraindications, materials, and clinical steps for metal inlays 2. Aesthetic (composite, ceramic, hybrid) indirect restorations. Dome concept 3. Application of liner, base, and temporary fillings. Polishing, removal, and toxicology of amalgam fillings 4. Glass ionomer cements and other polymeric materials (composition, indication, and application) 5. Analog and digital impression technique for single restorations. Indication and application of sulcus retraction. Chair-side CAD/CAM technology. Basics of design and milling. 6. Fundamental concepts of the adhesive technique | <ol style="list-style-type: none"> 7. Composites - material science (composition, classification, properties) 8. Practical considerations for the clinical use of composites and adhesive technique 9. Materials and cementation of indirect aesthetic restorations (material science of adhesive cement, surface treatments of the tooth and the restoration, clinical steps of cementation) 10. The concept, localization, and progression of caries in the anatomical crown 11. Caries diagnostic tools 12. Cervical lesion and its complex treatment 13. Patient admission and treatment plan (general rehabilitation and sequence of restorative and endodontic dental treatments) 14. The order of clinical practices, compilation of student case presentations, basic knowledge of dental photography |
|---|---|

Manual training (3 hours/week):

Theoretical, practical steps of preparing inlays, onlays, overlays; steps of preparing them in the dental laboratory; use of the CAD/CAM systems; use of oral scanners; digital workflow of single restoration.

List of textbooks:

- 1 Sturdevant's Art And Science Of Operative Dentistry. Edited by T. Roberson, H. Heymann and E. Swift. Mosby, St Louis, 2006. ISBN 978-0-323-03009-0
- 3 Newbrun A.: Cariology Quintessence. ISBN 0867152052

Note:

Attendance at the practices is obligatory, and absences at any one practice may not exceed 25% of the total number of practices (the maximum number of absences is 3). Three delay of less than 15 minutes will be considered as one absence. Delay of more than 15 minutes from the practice will also be considered as absence. There is no possibility to make up the practice. More than 3 absences invalidate the semester. During the semester two midterm tests must be passed. The work done in the practicals is continuously monitored and evaluated by the practical supervisors. Completely missing a specific assignment/task will result in a refusal to sign the end-of-semester.

Final oral exam:

Comprise theoretical and practical parts with five partial marks. Based on random generation, two questions should be chosen and answered (two partial marks). The grades given for each theoretical topic must separately reach grade 2.0. In addition, correctly identifying an extracted human tooth (one partial mark), the instrument recognition&application (e.g., matrix placement) (one partial mark), and making rubber dam isolation (one partial mark) must also reach an average of 2.0, separately.

ENDODONTICS, PRE-CLINICAL

Department of Restorative Dentistry and Endodontics

Head of Department: *János Vág DMD, PhD*

Tutor: *Beáta Kerémi DMD, PhD*

Second semester

Lectures (1 hour per week):

1. Anatomy of the root apex. Preoperative radiography. Determination of working length by radiographic method and electronic measuring instruments.
2. Pulpal and periapical pathology
3. Concept, purpose, indication, contraindication, and limitation of root canal therapy. Emergency procedures in endodontics
4. Endodontic diagnostics
5. Preventive endodontics: the importance of pulp protection. Vital pulp therapy
6. Microbiological aspects of endodontics. Antiseptic solutions, drugs and their use in root canal treatment.
7. Procedural errors during root canal preparation. Hand and rotary root canal preparation techniques (beyond the step-back).
8. Evaluation of endodontic outcome. The revision of root canal treatment
9. Root canal obturation techniques (cold and warm gutta-percha techniques)
10. Aesthetic and functional restoration of root canal treated teeth (post and core buildup, single crown, endocrown, indirect restorations)
11. Endodontic treatment of accidentally damaged teeth; Resorption; Vertical root fracture
12. Surgical interventions in restorative dentistry and endodontics (crown lengthening, drainage, apicectomy, hemisection, bicuspidation, amputation)
13. Restorative and endodontic treatment for patients requiring special care. Odontogenic focal infection
14. Indications, contraindications and methods of tooth whitening. Possible side effects and their prevention.

Manual training (3 hours per week).

Anatomy of roots, root canals and periapical space; theoretical basics of endodontics; symptoms, diagnosis and therapy of pulpal diseases and their consequences; access openings of the pulp chamber, root canal preparation and obturation on plastic endodontic practice blocks and endodontic training tooth

Note:

Attendance at the practices is obligatory, and absences at any one practice may not exceed 25% of the total number of practices (the maximum number of absences is 3). Three delay of less than 15 minutes will be considered as one absence. The delay of more than 15 minutes from the practices will be considered as absence. There is no possibility to make up the practice. The work done in the practicals is continuously monitored and evaluated by the practical supervisors. Throughout the semester the students must complete weekly small tests. During the semester two midterm exam must be passed. Semifinal oral exam: questions from two topic groups and identification of an extracted human tooth and endodontic instruments.

RESTORATIVE DENTISTRY AND ENDODONTICS I.

Department of Restorative Dentistry and Endodontics

Head of Department: *Dr. János Vág DMD, PhD*

Second semester

The subject is taught with three practical hours per week, there is no lecture.

Objectives of the exercises: thorough patient examination, taking of medical and dental history, stomato-oncological screening, establishing the diagnosis, preparing a treatment plan, removing calculus, routine application of isolation procedures, preparation, and restoration of simple cavities. Caries lesion treated with fillings. Learning the basic skills for dental assisting.

Method of checking acquired knowledge during the study period :

Students must arrive prepared for the practice, which is regularly checked and evaluated orally and/or in writing by the supervisor. The work carried out on the practices will be monitored and assessed by the practice leaders at each stage. The results of the evaluations are included in the semester rating.

Requirements of an accepted semester (signature of the lecturer):

A minimum of 75% attendance is required at the practices, and absence may not exceed 25% of the practices regardless of the reason. The signature of the semester, a sufficient level of continuous and consistent theoretical preparation, and a sufficient level of practical performance are required. The average grade of the theoretical part and the average grade of the practical part must separately reach the 2.0-grade. By week 13, a photo-documented case report of the student's work must be submitted to the practice leader.

Type of the exam: Practice mark

List of textbooks, lecture notes and recommended textbooks:

Ritter AV, Boushell LW, Walter R: Sturdevant's Art and Science of Operative Dentistry. 7th ed. St. Louis, Mosby, 2018. 2. Torabinejad M, Walton RE, Fouad AF: Endodontics. Principles and Practice. 5th ed. St. Louis, Missouri, Saunders/Elsevier 2014 3. Hargreaves KM, Berman LH: Cohen's Pathways of the Pulp. 11th ed. St. Louis, Missouri, Mosby/Elsevier 2015

PREVENTIVE DENTISTRY

Department of Restorative Dentistry and Endodontics

Head of Department: *Dr. János Vág DMD, PhD*

Tutor: *Dr. Eszter Molnár DMD, PhD*

First semester, Lectures 2 hours/week, Practices/Seminars 2 hours/week

Detailed course/lecture description[i]: *(to facilitate credit recognition in other institutions)*

Lectures:

Week	Title	Lecturer
1.	Preventive dentistry- introduction	Molnár E.
	Dental caries, Etiology of caries. Dental plaque	
2.	Caries Epidemiology. Caries indices. Risk factors	Molnár E.
	Caries incipient and remineralisation	
3.	The Role of diet in the caries prevention	Molnár E.
	Cervical sensitivity, dentinal hypersensitivity and erosion	
4.	Fluorides in the cariesprevention	Molnár E.
	Toxicology of fluorides	
5.	Oral hygiene - Toothpaste	Molnár E.
	Oral hygiene - Toothbrush	
6.	Prevention in pregnancy and from the intrauterine life to the age of three	Németh F.
	Dental treatment and prevention in case of elderly patients	
7.	Gingivitis and periodontal disease. Epidemiological characteristics. Pathogenesis and diagnosis	Gera I.
	Strategy for prevention of periodontal diseases	Dobos A.
8.	Integrated preventive dentistry – prosthodontics	Szántai B.
	Integrated preventive dentistry – gnathology	Jász M.
9.	Integrated preventive dentistry – conservative dentistry	Lohinai Zs.
	Possibilities in prevention of orthodontic anomalies	Németh F.
10.	Oral cancer	Németh Zs.
11.	Environmental and iatrogenic damaging factors in dentistry	Daubner R.
	Infection control	
12.	Fissure-sealing	Molnár E.
	The role of dental hygienists in the dental practice	Németh R.
13.	Environmental protection.	Demeter T.
14.	Group-prophylaxis, Design, Organisation	Németh R.
	Profilaxis in the school	

Practices/Seminars:

1.	Clinical workplace (Seminar)
2.	Clinical workplace (practice)
3.	Dental status, medical/dental history (Seminar)
4.	Medical history, Dental status (practice)
5.	Dental status, Cariesdiagnostic (practice)
6.	DMF number/index, methods of Cariesdiagnostic (practice)
7.	Oral hygiene (Seminar)
8.	Oral hygiene indices (Seminar)
9.	Oral hygiene indices (practice)
10.	Plaque staining (practice)
11.	Periodontal Indexes, scaling, polishing (practice)
12.	Periodontal Indexes, scaling, polishing (practice)
13.	Caries Risk Test, Model tooth fissure sealing (practice)
14.	Consultation (Seminar)

PROSTHODONTICS I.

Second Semester

The theme of the seminars:

1. Introduction to the subject, introductory seminar
2. Online moodle learning module: Features of an elderly patient, gerostomatological considerations and the first visit. The importance of documentation.
3. Seminar material which requires personal attendance: Features of an elderly patient, gerostomatological considerations and the first visit. The importance of documentation.
4. Online moodle learning module: Clinical and laboratorial steps of the fabrication of complete dentures. How is a complete denture stabilized?
5. Seminar material which requires personal attendance: Clinical and laboratorial steps of the fabrication of complete dentures. How is a complete denture stabilized?.
6. Online moodle learning module: Impressions for complete dentures (anatomical landmarks, their features, advantages and disadvantages)
7. Seminar material which requires personal attendance: Impressions for complete dentures (anatomical landmarks, their features, advantages and disadvantages)
8. Online moodle learning module: Jaw relation recording in complete edentulousness, the properties of the trial dentures
9. Seminar material which requires personal attendance: Jaw relation recording in complete edentulousness, the properties of the trial dentures
10. Online moodle learning module: Processing of the final denture. Fitting and recalls.
11. Seminar material which requires personal attendance: Processing of the final denture. Fitting and recalls.
12. Online moodle learning module: Implant prosthodontics in the completely edentulous. Maxillofacial prosthodontics.
13. Seminar material which requires personal attendance: Implant prosthodontics in the completely edentulous. Maxillofacial prosthodontics.
14. Consultation

Note: The maximum number of absences in a semester is 3. More than 3 absences invalidate the semester. During the semester two midterm examinations should be passed. Practical course grade.

INTRODUCTION TO ODONTOTECHNOLOGY AND PROSTHODONTICS PRE-CLINICAL COURSE III.

Department of Prosthodontics

Head of Department: **Prof. Dr. Péter Hermann**

Lecturer: Dr. Ida Barbara Kispélyi

Since the creation of an independent training, the Stomatological curriculum has put great emphasis on a preclinical foundation course, the Prosthodontics Propaedeutic course, the syllabus of which has also included mastery of dental techniques, indispensable for a dentist. Until the visit of the EU Committee in the late 90s, the course was structured in such a manner that in the first and second semester of the second academic year students had 3 hours of practices and one hour of lecture per week; during the first semester treatment of complete edentulousness was simulated through fabrication of complete dentures, while in the second semester students prepared 3-unit bridges and single crowns on partial edentulous mouldages. During both semesters, medical and dental laboratory steps followed each other just like in real life, and students performed alternatively medical work phases and dental laboratory tasks, for one week each. After the proposal of the EU Committee on the amendment of several courses (including the Prosthodontics Preclinical course), dental laboratory and medical work phases had to be separated sharply, while an independent Odontotechnology course had to be included in the curriculum. According to the request, this Odontotechnology course was built into the theoretical module in order to provide the earliest possible recognition and consolidation of the chosen profession.

Taken more than ten years of experience into account, while maintaining the values that undoubtedly resulted from these changes, we wish to modify those controversial points that in our opinion can be still improved. A sharp separation of the two disciplines (dental techniques and dentistry) rather confuses students, thus they fail to get a grip of the process, and it is the essence that is lost, since these processes are based each on the other. The essence of the new syllabus is the integration of the two courses that are currently taught separately, and thus new and crucial areas (not taught so far) can be emphasized, with concomitant reduction of teaching hours and credit points.

The curriculum of the course concludes with a comprehensive examination at the end of the first semester of the third academic year.

Timing of the Odontotechnology and Prosthodontics Preclinical course:
2nd, 3rd Semester

Preliminary studies requested for the course of Odontotechnology and Prosthodontics Preclinical course module I:
General Dental Materials, Macroscopic anatomy and embryology II.

Preliminary studies requested for the course of Odontotechnology and Prosthodontics preclinical course module II:
Macroscopic anatomy and embryology II., Odontotechnology and Prosthodontics Pre-clinical I.

Preliminary studies requested for the course of Odontotechnology and Prosthodontics Preclinical course module III:
Odontotechnology and Prosthodontics Pre-clinical II., Restorative Dentistry, Pre-clinical I., Molecular Cell Biology II.

ODONTOTECHNOLOGY AND PROSTHODONTICS PRECLINICAL COURSE – practices**First Semester**

Odontotechnology and Prosthodontics Preclinical III.

Topics of the practices:

1. week: Delivering of the instruments, Removable partial dentures.
2. week: Steps of constructing metal based removable partial dentures. Wax pattern fabrication for a mandibular metal base plate. Grading
3. week: Steps of constructing metal based removable partial dentures. Wax pattern fabrication for a maxillar metal base plate. Grading
4. week: Combined fixed-removable prosthodontic restoration paralelometer milling machine presentation
5. week: MIDTERM, Tooth preparation for porcelain veneer, tooth 21, Grading
6. week: Fabrication of a direct veneer, tooth 21 Grading
7. week: Impression for temporary replacement, Tooth preparation for solo crown, tooth 13
8. week: Tooth preparation for solo crown, tooth 13, Fabrication of temporary crown, tooth 13, Grading
9. week: Finishing and polishing of the temporary crown made for the 13 tooth, Grading
10. week: MIDTERM , Steps of making an implant retained dental prosthesis. Impression taking for an implant retained prosthesis (open special tray method)
11. week: RETAKE, Steps of making an implant retained dental prosthesis. Impression taking for an implant retained prosthesis (open special tray method), Grading
12. week: RETAKE, Consultation. Repetition of dental workflows.
13. week: RETAKE, Consultation. Repetition of dental workflows.
14. week: Practical final examination

ORAL AND MAXILLOFACIAL SURGERY, PRE-CLINICAL COURSE

Tutor: *Dr. Kinga Körmöczy*

First Semester

Practices

1. Introductory lecture: requirements of the course. Topic list. Surgical instruments I.
2. Surgical instruments II. Practice: instruments
3. Routes of drug administration, syringes, needles. Principles of local anaesthesia. The 'geometry' of local anaesthesia. Practice: instruments
4. History of oral surgery, surgical-medical diseases, features of oral surgery. Types of different personalities. Practice: instruments
5. Asepsis - antisepsis. Disinfection, sterilization. Steps of tooth removal (video)
6. The operating theatre. Behaviour in the operating theatre. Practice: extraction on dental phantom head
7. Surgical anatomy of the maxillary nerve. Practice: extraction on dental phantom head
8. Surgical anatomy of the mandibular nerve. Practice: extraction on dental phantom head
9. Anamnesis, patient examination, communication, diagnosis. Diagnostic algorithm. Practice: extraction on dental phantom head
10. Practice: extraction on dental phantom head
11. Demonstration (written). Practice: extraction on dental phantom head
12. Diagnostic and therapeutic protocols. Informed consent. Documentation. Suture materials, types and instruments.
13. Semester closing midterm (oral, practical)

ORAL AND MAXILLOFACIAL SURGERY I.**Second Semester****Lectures**

- Clinical examination, symptoms and diagnostics in oral surgery. Dentist-patient relationship.
- Local anaesthesia I. The history of local anaesthesia. Physiological and psychological aspects of pain. Technical possibilities.
- Local anaesthesia II. The pharmacological properties of local anaesthetic drugs. The mode of action of local anaesthetics. The composition of local anaesthetic preparations. Indications, contraindications.
- Local anaesthesia III. The technique of local anaesthesia. Generally used techniques for terminal (infiltrative) and block anaesthesia.
- Local anaesthesia IV. Special techniques for local anaesthesia. Ganglion blockade. Intraligamental anaesthesia. Anaesthesia of inflamed tissues.
- Local anaesthesia V. Complications of local anaesthesia. Active agent induced complications. Technical complications.
- Pathology and special aspects of wound healing in the oral cavity. Characteristics of bone and soft tissue wound healing.
- Operation technique in dentoalveolar surgery. (surgical tools, flaps, sutures)
- Written midterm.
- The operative technique of tooth removal I. Indications and contraindications of tooth removal. Biomechanical basis and surgical technique of tooth extraction.
- The operative technique of tooth removal II. Surgical removal of teeth and roots.
- The operative technique of tooth removal III. Complications.
- The importance of various risk factors during the tooth extraction (radiotherapy, antiresorptive therapy, haemostats).

Practices

- 1-5. week: Review of theoretical background. The theoretical background of local anaesthesia.
6. week: Oral test.
- 7-14. weeks: Anaesthesia, simple tooth removals (with forceps). Discussing the topics of the lectures. Continuous tracking of the students' progress (written and oral tests).

Note: Lectures will be held in the lecture hall of the Department of Maxillofacial Surgery and Dentistry.
 The maximum number of absences in a semester is 3. More than 3 absences invalidate the semester.
 During the semester three midterm examinations should be passed.
 Practical course grade (five-scale).

ORAL BIOLOGY

Lecturer: **Dr. Ákos Zsembery**

Tutor: **Dr. Kristóf Kádár**

Second Semester

Lectures (2 hours per week):

1. **Matrix of mineralised tissues. Anorganic components, mineralisation and bioapatites**
2. **Osteogenesis, bone resorption**
3. **Development of the tooth germ**
4. **Dentinogenesis, cementogenesis. Dentin permeability**
5. **Amelogenesis**
6. **Hemopoietic stem cell transplantation**
7. **Bleeding disorders. Pathophysiology and its relevance in everyday dentistry**
8. **Morphology and function of salivary glands. Saliva, disorders of salivary secretion**
9. **Tooth eruption and tooth movement**
10. **Tumor formation in the oral cavity**
11. **Oral sensation, olfaction, deglutition**
12. **Morphology and functional properties of the pulp, circulation of the oral cavity. Pulpitis and dental pain**
13. **Inflammation - general features, pathomechanism, types**
14. **Wound healing. Ionizing radiation, oral consequences of therapeutic irradiation**

Practices (2 hours per week):

1. **Calcium homeostasis**
2. **Chewing**
3. **Hard tissue - fluoride**
4. **Hematology I.**
5. **Hematology II.**
6. **Hematology III.**
7. **Hemostasis**
8. **Measurement of salivary flow and salivary diagnostics**
9. **Dental plaque**
10. **Oral defence**
11. **Case presentation – periodontal diseases and systemic conditions**
12. **Oral clearance**
13. **Gingival sulcus and the crevicular fluid**
14. **Molecular diagnostics in dentistry, gene polymorphisms**

The maximum number of absences from practice in a semester is 3!

More than 3 absences invalidate the semester.

Midterm from the material of the lectures in the 12th week (1- 10 lectures material)

Midterm is the qualification for the Competition (in the 14th week)

RADIATION PROTECTION

Department of Oral Diagnostics

Address: Bp. VIII., Szentkirályi u. 47. 1088

Phone: 459-1500/59161, 317-1044

Lecturer: **Dr. Bence Tamás Szabó**

E-mail: oralis.diagnozstika@dent.semmelweis-univ.hu

Third year second semester

Lectures (1,5 hours per week)

1. Atomic structure, radioactivity, ionizing radiations.
2. Interaction of ionizing radiations with materials, dosimetry, physical dose concepts
3. Principles of radiation protection, dose limits
4. Public exposure
5. Biological effects of the radiation
6. Radiation protection of the patients
7. Radiation protection in dentistry
8. X-ray equipments
9. Radiation protection regulation aspects
10. Radiation protection legalisation in Hungary
11. General rules of ionizing radiation applications
12. Nuclear and radiological accidents. Prevention, emergency plan
13. Medical exposure
14. Consultation, written pre-test

Practices (1 hour per week)

1. Possible tools and methods of basic nuclear measurements.
2. Measurement of X-ray radiation dose and dose performance on phantom.
3. Measurement X-rays absorption
4. Measurements of half-value layer
5. Describing the use of ionization chamber
6. Describing the use of G-M Tube
7. Describing the use of scintillation detector
8. Describing the use of thermoluminescent dosimeter
9. Personal dosimetry
10. Describing isotope diagnostics – contamination measurements
11. Record and physical protection of radiation sources. 190/2011 Governmental Decree and 11/2010. KHEM Decree. Defence-in-depth concept and its levels.
12. Technical parameters that affect the quality of x-rays
13. The application of X-ray films in dental radiology
14. Tools of reducing the patients' radiation exposure and their application

Notes: Students must attend on the practices.
The signature will be refused, if the student was absent in more than 25% of the duration of the practices.
closing semi-final

ORAL DIAGNOSTICS

Department of Oral Diagnostics

Address: Bp. VIII., Szentkirályi u. 47. 1088

Phone: 459-1500/59161, 317-1044

Lecturer: **Dr. Péter Vályi**

E-mail: oralis.diagnosztika@dent.semmelweis-univ.hu

Third year 2nd semester

Lectures (1 hour per week)

1. Introduction to Oral Diagnostics. Importance and rules of dental diagnostics and dental record.
2. Patient history. Risk patients
3. Extraoral and intraoral examination Stomato-oncological screening.
4. Detection and diagnosis of the carious lesions. Non-carious lesions of the tooth.
5. Principles of endodontic diagnostics.
6. Examination methods in the periodontology
7. Diagnosis and treatment of temporomandibular disorders
8. Evaluation of the edentulous patient. Fundamental principles of prosthetic therapy
9. Orthodontic diagnostics
10. Physiology and diagnostics of salivary glands. Diagnostic procedures of halitosis
11. Laboratory tests for the dental office (microbiological, haematological, clinical chemistry, immunological, histopathological, genetic)
12. Oral diagnostic evaluation of the elderly patient.
13. Pain assessment in the oral diagnostics
14. Influence of oral inflammatory diseases on the systemic conditions

Practices (2 hours per week)

1. Guiding of the patient, infection control
2. Communication with the patient
3. Position of patient and doctor, correct use of examination equipments, correct use of protective equipments
4. Patient examination and case description
5. Anamnesis, analysis of systemic diseases and medications influencing dental treatment
6. Periodontal Indices, Overview of Angle Classes
7. Fábíán-Fejérdy's classification
8. Recording the dental status
9. Additional tests: sensitivity tests, Diagnodent, Diagnosticscam
10. Additional examinations: ordering an X-ray, referring the patient to another department or place of care
11. Care for high-risk patients
12. Examination of the oral mucosa, primary and secondary lesions
13. Care of infectious patients
14. Focal infection examination

Notes: Students must attend on the practices.

The signature will be refused, if the student was absent in more than 25% of the duration of the practices.
closing semi-final

Textbook:

1. Bricker, Langlais, Miller: Oral Diagnosis, Oral Medicine and Treatment Planning (second edition) 2 BC Decker Inc Hamilton London 2002.

Recommended books:

- 1 Bengel, Veltman, Loevy, Taschini: Differential Diagnosis of Diseases of the Oral Mucosa Quintessence Publishing Co. Inc. Chicago, Illinois 1989
- 2 Manfred Strassburg/Gerdt Knolle : Diseases of the Oral Mucosa A Color Atlas (Second Edition) Quintessence Publishing Co. Inc. Carol Stream Illinois 1994 3 "hand-outs" will be prepared and presented for the students by the lecturers

ORAL MEDICINE I.

Department of Oral Diagnostics

Address: Bp. VIII., Szentkirályi u. 47. 1088

Phone: 459-1500/59161, 317-1044

Lecturer: **Prof. Dr. Csaba Dobó Nagy**

E-mail: oralis.diagnosztika@dent.semmelweis-univ.hu

Third year 2nd semester

Practices (1 hour per week)

1. Stomato-oncological screening
2. Developmental disorders
3. Physical, chemical and iatrogenic harms
4. Bacterial diseases
5. Viral diseases
6. Fungal pathogens
7. Diseases of the lips
8. Diseases of the tongue
9. Diseases of the immune system
10. Vesicobullosus and granulomatous oral diseases
11. Oral manifestations of diseases of organs and organ systems
12. Precancerous lesions and conditions
13. Benign tumors
14. Malignant tumors

Notes: Students must attend on the practices.

The signature will be refused, if the student was absent in more than 25% of the duration of the practices.

During the practices, the students' performance is assessed on a five-point scale at each practice occasion. The arithmetic mean of the obtained grades determines the practical mark.

Textbook:

1. Bricker, Langlais, Miller: Oral Diagnosis, Oral Medicine and Treatment Planning (second edition), BC Decker Inc Hamilton London 2002.

Recommended books:

- 1 M. Glick, MS. Greenberg, PB. Lockhart, SJ Challacombe: Burket's Oral Medicine (thirteenth edition) Hoboken, NJ : Wiley-Blackwell 2021.

MEDICAL ASPECTS OF DISASTER PREPAREDNESS AND RESPONSE I-II.

Directorate for Safety Technology
Department for Disaster Management and Education

Supervisor: *Simon Mátyás*

Lecturer: *Csaba Csendes*

Type of Course: indispensable

Credit value: 0

First and Second Semester**Purpose of the lecture:**

The goal of the subject is to provide basic knowledge of the definition, mission, reasons and circumstances of establishment of civil protection/disaster management, on its place and role in the country's defense/protection system; to provide information on the types of disasters and their features. Based on experience gained in real incidents, to provide information on the peculiarities of disaster management and the tasks of medical authorities in this context.

The syllabus:

5th semester, 2 teaching hours: (M1) Concept, mission, tasks and establishment of civil protection and disaster management in Hungary. Types and features of disasters, the disaster vulnerability of Hungary, the organizational system of the protection against disasters, command and control of protection, the role of medical authorities.

6th semester, 2 teaching hours: (M2) The early warning system and signals of disaster management. The elimination of the consequences of disasters, the staff work applied during protection. Features and activities of Hungarian disaster management organizations and authorities, international possibilities of disaster management and the lessons learnt, demonstrated by examples.

Requirements and the potential for absences to participate in the sessions:

The subject consists of 4 modules. Module 1 does not have any prerequisites; module 2 anticipates the fulfillment of module 1.

Students must register to attend the course announced as required. Those who are unable to fulfill module 1 or 2 (do not attend), may participate in a supplementary lesson in the 1st semester of the following year.

The method of certificate for the workshops and the exam absences:

Certificate of absence: medical, official – court of justice, local government, Students' Union, etc.

The mid-term controls' (reports, midterm) number, topic and date, replacements and repairs:

Method of making up for the absence justified by certificate: participation in a supplementary lesson.

Requirements for the signature:

Students must participate in the lesson announced to acquire signature, or in case of absence justified by certificate, in a supplementary lesson. Only registered students may participate in a supplementary lesson announced.

The method of grading: signature

Type of examination: none

Requirements: none, students must fulfill the obligation to attend the lessons.

Application for exam: none

Changing procedure for exam application: none

Absence from the examination: none

Notes, textbooks, study aids and literature list:

László Major PhD, Ronald Barham PhD, Dr. György Orgován PhD: Medical Aspects of Disaster Preparedness & Response

ELECTIVE SUBJECTS

Modern research methods in dentistry

Leader of the course: **Prof. Gábor Varga**

1st semester –2 credits

Wednesdays at 17.00-18.30 (2x45minutes)

Topics to be covered:

1. Stem cells and scaffolds
2. Gingival blood circulation and inflammation – Laser Doppler Flowmetry
3. Isolation, maintenance, differentiation and in vitro functional assays of oral stem cells and progenitors
4. CAD/CAM techniques and LASCA
5. Care for children having cleft lip and palate
6. Patch clamp electrophysiology technique
7. Investigation of epithelial transport
8. Investigation methods of implant stability
9. Psychosomatics - examination of saliva samples

10. Clinical periodontal research
11. Dental epidemiological studies, saliva as a diagnostic factor
12. Structural studies of non-decalcified hard tissues
13. Micro CT investigations
14. Real time 3D rendering of oral tissues

Requirements:

1. Participation in the course obligatory, absences do not exceed 25% of the total number of hours.
2. The tasks to be fulfilled during the semester:
3. create a professional interview (3-5 pages, word doc) with one of the lecturer on the course

Challenges in modern dental research

Leader of the course: **Prof. Gábor Varga**

2nd semester – 2 credits

Wednesdays at 17.00-18.30 (2x45minutes)

Topics to be covered:

1. Artificial organs and tissues; artificial salivary glands - biological regeneration of the human glands
2. Anesthesia in dentistry
3. Saliva as diagnostic factor
4. Informatics – biology – dental research – practice dentistry
5. Gene therapy in dentistry
6. Laboratory animals for dental research - possible alternative methods; animal studies - pros and cons
7. Homeopathy in dentistry
8. Medical and dental use of stem cells; isolation and possible use of tooth-derived stem cells in craniofacial regeneration
9. **Gene polymorphism – SNP – dental genomics – what is the use?**
10. **Bone loss – bone augmentation – craniofacial tissue regeneration – new directions**
11. **Smile design – aesthetics and dental/medical ethics**
12. **GERD and dental erosion**
13. **Implantology**
14. **Biodentin and alternatives in dentistry**

Requirements:

1. Participation in the course obligatory, absences do not exceed 25% of the total number of hours.
2. PowerPoint presentation, lecture and leading related discussion
3. critical written review of one Researcher Student Conference presentation

LANGUAGE COURSE

Institute for specific purposes

1st semester: Hungarian Dental Terminology IV.

Topics of the course

1. Week Revision: tooth, tooth brushing, tooth decay, fillings, DMF, questions during case historytaking, questions on pain, complaint (...)
2. Week Revision: sentences required by the Faculty of Dentistry, which were studied so far (Part 15)
3. Week Revision: General Health Questionnaire (Directed) situational game for developing speech comprehension, new strategies
Sentences required by the Faculty of Dentistry 6. (vocabulary of taking dental impression, ...)
4. Week Situation games, dentist-patient dialogues
Sentences required by the Faculty of Dentistry 7. (filling change, light curing resin ...)
5. Week Dialogues based on X-ray findings (eg. filling wearing down, etc.)
Sentences required by the Faculty of Dentistry 8. (tooth extraction, I am removing the suture ...)
6. Week Sentences required by the Faculty of Dentistry 9-10. (tooth colour, loose dental prosthesis, oral lesions caused by ill-fitting dentures...)
Revision: clinical course, steps of medical treatment
7. Week Summary, 1st written test – “sample final” based on Sentences required by the Faculty of Dentistry 1-10.
8. Week Sentences required by the Faculty of Dentistry, 11-12.: presentation of items needed for care (saliva extractor, mask, Lidocain with short / long needle, upper left molar forceps, saliva scarf, coffer-dam, clasp, etc.)
Asking for dental instruments: Sentences with I would like a ... (“Szeretnék egy...-t!”).
New topic: dental calculus
9. week Sentences required by the Faculty of Dentistry, 13-14.
Revision of previous topics (cleaning teeth, tooth decay, fillings, gingivitis)
New topic: root canal treatment (what does it mean, what are its steps, what does the dentist use, etc.)
10. week Sentences of the Conservative Dentistry Final
New topic: orthodontics.
11. week Sentences required by the Faculty of Dentistry: „please + imperative” sentences, with grammatical explanations (eg. Please keep..., please help, please mix...).
12. week Filling out a questionnaire based on a listening task + DMF (Repetition)
Revision: topics of the final, Sentences accounted for by the Faculty of Dentistry, case history and treatment
13. week Summary, 2nd written test
14. week Oral test

Requirements

Attendance of lessons is obligatory. Students are allowed to have maximum 7 absences a semester. In case of more absences, the teacher may deny giving the signature. Students who miss a class, can make up for it (max. two times a semester).
Students have to reach more than 50 % of the score from the 2 written tests and the oral exam.

Textbooks

Teaching material based on authentic dental documentation, compiled by the instructors of the Institute of Languages for Specific Purposes

I. Gera: Doctor – Patient, Doctor – Assistant Communication, compiled by Prof. Dr. I. Gera

I. Gera: Angol-magyar fogorvosi szótár

M. Putz: *Magyar fogorvosi szaknyelv I.*

A. Weidinger: Magyar fogorvosi szaknyelv ED III. (Kurzusjegyzet)

A. Weidinger: Nyelvtan

2nd semester: Hungarian Dental Terminology V.

Topics of the course

1. week Revision: Final topics covered in previous semesters, sentences required by the Faculty of Dentistry
2. week Prosthodontics, taking dental impression
3. week Gingivitis
4. week Dental calculus, removal of calculus
5. week Oral hygiene, dental care
6. week Tooth decay
7. week Filling, filling replacement
8. week 1st test, Case reports based on clinical practice
9. week Root canal treatment
10. week Tooth extraction
11. week Teeth whitening, Orthodontics
12. week Dental implants
13. week X-ray
14. week week Sample final exam – oral interview

Requirements for signature: Attendance of lessons is obligatory. Students are allowed to have maximum 7 absences a semester. In case of more absences, the teacher may deny giving the signature. Students who miss a class, can make up for it (max. two times a semester).

Final: The comprehensive exam takes place during the exam period and is comprised of a listening comprehension test and an oral test; min. 50% must be achieved in both parts. Neither part can be failed. For the oral part, two teachers will assess the student's performance on separate marking sheets and an average will be calculated.

Textbooks

Teaching material based on authentic dental documentation, compiled by the instructors of the Institute of Languages for Specific Purposes

I. Gera: Doctor – Patient, Doctor – Assistant Communication, compiled by Prof. Dr. I. Gera

I. Gera: Angol-magyar fogorvosi szótár

M. Putz: *Magyar fogorvosi szaknyelv I.*

A. Weidinger: Magyar fogorvosi szaknyelv ED III. (Kurzusjegyzet)

A. Weidinger: Nyelvtan

Obligatory SUMMER PRACTICE

MINIMUM 1-WEEK (30 hours) – MAXIMUM 4-WEEK PROGRAM IN DENTO-ALVEOLAR SURGERY

Practicing tooth extractions
Practicing local anesthesia
Assisting at minor oral surgical procedures
Practicing post-surgical patients' management
Carrying out surgical tooth extraction under supervision
Carrying out minor dento-alveolar surgical procedures under supervision
Students should work at the assigned hospital or dental clinic 6 hours a day, five days a week.

Important note: Document certifying the completion of the practice must be handed in at registration! Registration to the next year is not allowed without it!

PUBLIC HEALTH

Institute of Preventive Medicine and Public Health

1089 Budapest, Nagyvárad tér 4. 13. em.

Tutor: **Dr. András Terebessy** **Dr. Ferenc Horváth**
horvath.ferenc@semmelweis.hu

English Dental

Topics of theoretical classes (pro week):

- Week 1: History of Hungarian medicine/public health. Definition of health, levels of prevention. Theoretical foundations of health promotion. The concept and functioning of public health
- Week 2: Health determinants. Health status of the Hungarian population. Health determinants in Hungary. Principles of health policy
- Week 3: Epidemiology and prevention of smoking and smoking-related diseases
- Week 4: Epidemiology and prevention of cardiovascular diseases. Epidemiology and prevention of cancer
- Week 5: Epidemiology and prevention of respiratory diseases. Thyroid diseases. Vulnerable groups
- Week 6: Mental health. Ageing
- Week 7: Obesitas//Diabetes. Physical activity
- Week 8: Epidemiology of communicable diseases. Vaccinations
- Week 9: Infection control. Nosocomial infections
- Week 10: Nutritional status and dietary habits of the Hungarian population. Food safety
- Week 11: Environmental health: climate change, environmental health effects of air. Environmental health: soil, water
- Week 12: Chemical safety and toxicology. Ionising radiation, types, effects, limits
- Week 13: Occupational health. Maternal, infant, child and adolescent health, health inspector network and school health
- Week 14: Structure, financing and administration of health and public health in Hungary. Health policy. Quality assurance and quality improvement in health care

Topics of practical classes (pro week):

- Week 1: Introduction. Demography
- Week 2: Epidemiology. Morbidity measurement (incidence, prevalence). Risk and causality (risk indicators). Epidemiological study types (descriptive studies, analytical studies: cross-sectional, cohort, case-control)
- Week 3: Screening tests (population) for public health purposes. Evaluation of screening tests (sensitivity, specificity, predictive values, ROC curve)
- Week 4: Interventional studies (RCTs). Meta-analyses. Critical reading
- Week 5: Design, organisation and evaluation of health promotion programmes.
- Week 6: Smoking and minimal intervention
- Week 7: Alcohol SBI (screening and brief intervention)
- Week 8: Physical activity/movement recommendations.
- Week 9: Mental health, mental hygiene. Prevention of illicit drug use
- Week 10: Preparing an individual health plan
- Week 11: Epidemiological concepts. Epidemiology system. Epidemiological investigation
- Week 12: Practical knowledge of vaccination
- Week 13: Case studies in environmental and occupational health
- Week 14: Practical exam

Physical Education V.

Lessons (in hours): 14 lectures: 0 practicals: 14 seminars: 0

Lecturer of the course: Várszegi, Kornélia

Contact: Testnevelési és Sportközpont

Phone: +36-1/ 264-1408

Detailed course/lecture description*: *(to facilitate credit recognition in other institutions)*

Within the framework of obligatory regular physical activity, the requirements of the subject can be fulfilled as free of charge and self-financed student as well. The former is available during classes and courses organized by the Semmelweis University's Centre for Physical Education and Sports (TSK), and the latter is available at SE-TSK accredited partner locations.

Free of charge:

60 minute classes held at the same time on a weekly basis, on the premises of the TSK facilities and other locations.
1107 Bp, Zágrábi utca 14.

1x60 min./week sessions:

Aerobics, BlessYou Gym, boulder, functional circuit training, golf, beginner Yoga, advanced Yoga, male football, salsa, step aerobics, badminton, beginner ultimate Frisbee, advanced ultimate Frisbee, Zumba

1x90 mins./week sessions:

women's football, ice hockey, beginner tennis, beginner tennis 2,

4x3 hrs. and 1x2 hrs. session packages:

Hiking 1, Hiking 2.

2x90 mins./week sport training (competitive sport, for qualified only):

cheer dance, cheerleader, men's football, handball, basketball, volleyball

Fee-based:

at the sports venues specified on www.semmelweis.hu/sportkozpont, which will also be advertised on the Neptun system. The list of these locations may vary per school year.

The number of active participations for physical education classes is 10 (once a week), regardless of the number of school breaks, which is to be completed during the hours assigned to the group. Two hours can be recovered in the first week of the exam period, on two separate days. Lessons missed do not need to be certified; however, catching up is mandatory. The days of study breaks do not qualify as automatic attendance. Practice leaders follow an online presence registration at the beginning and end of the lessons, which can be individually tracked on semmelweis.hu/sportkozpont homepage.

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes!

Important note: Document certifying the completion of the practice must be handed in at registration! Registration to the next year is not allowed without it!

*Detailed and numbered for each week of theoretical and practical lessons one by one, indicating the names of lecturers and instructors

Physical Education VI.

Lessons (in hours): 14 lectures: 0 practicals: 14 seminars: 0

Lecturer of the course: Várszegi, Kornélia

Contact: Testnevelési és Sportközpont

Phone: +36-1/ 264-1408

Detailed course/lecture description*: *(to facilitate credit recognition in other institutions)*

Within the framework of obligatory regular physical activity, the requirements of the subject can be fulfilled as free of charge and self-financed student as well. The former is available during classes and courses organized by the Semmelweis University's Centre for Physical Education and Sports (TSK), and the latter is available at SE-TSK accredited partner locations.

Free of charge:

60 minute classes held at the same time on a weekly basis, on the premises of the TSK facilities and other locations.
1107 Bp, Zágrábi utca 14.

1x60 min./week sessions:

Aerobics, BlessYou Gym, boulder, functional circuit training, golf, beginner Yoga, advanced Yoga, male football, salsa, step aerobics, badminton, beginner ultimate Frisbee, advanced ultimate Frisbee, Zumba

1x90 mins./week sessions:

women's football, ice hockey, beginner tennis, beginner tennis 2,

4x3 hrs. and 1x2 hrs. session packages:

Hiking 1, Hiking 2.

2x90 mins./week sport training (competitive sport, for qualified only):

cheer dance, cheerleader, men's football, handball, basketball, volleyball

Fee-based:

at the sports venues specified on www.semmelweis.hu/sportkozpont, which will also be advertised on the Neptun system. The list of these locations may vary per school year.

The number of active participations for physical education classes is 10 (once a week), regardless of the number of school breaks, which is to be completed during the hours assigned to the group. Two hours can be recovered in the first week of the exam period, on two separate days. Lessons missed do not need to be certified; however, catching up is mandatory. The days of study breaks do not qualify as automatic attendance. Practice leaders follow an online presence registration at the beginning and end of the lessons, which can be individually tracked on semmelweis.hu/sportkozpont homepage.

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes!

Important note: Document certifying the completion of the practice must be handed in at registration! Registration to the next year is not allowed without it!

*Detailed and numbered for each week of theoretical and practical lessons one by one, indicating the names of lecturers and instructors

CLINICAL MODULE

New curriculum to be introduced

Please, follow the updated version on the home page



Faculty of Dentistry
4th year

STUDY PROGRAMME
CLINICAL MODULE

7th semester				
subjects code	subjects	credit code	examination	prerequisites
obligatory	General and Dental Radiology I.	C3L1P2	comprehensive exam	Radiation protection
obligatory	Conservative Dentistry and Endodontics II.	C3L0P3	term grade	Restorative Dentistry and Endodontics I., Prosthodontics I., Endodontics, Pre-clinical
obligatory	Internal Medicine I.	C3L1P2	term grade	General and Oral Pathophysiology, Public Health, Pathology
obligatory	Oral and Maxillofacial Surgery II.	C4L1P3	examination	Oral and Maxillofacial Surgery I., Oral Pathology, Radiation protection
obligatory	Periodontology I.	C2L1,P0,5	examination	Oral Biology, Oral Pathology, Oral and Maxillofacial Surgery I.
obligatory	Pharmacology I.	C4L2P2	examination	Pathology, Dental Biochemistry II. Medical and Dental Physiology II.
obligatory	Prosthodontics II.	C6LS1P6	examination	Restorative Dentistry and Endodontics I., Prosthodontics I., Radiation protection
optional	Neurology	C1L1P0	examination	Macroscopic anatomy and embryology I.-II.
optional	Psychiatry	C1L1P0	examination	Oral Biology, Oral Medicine I.
optional	Dental Ethics	C1L2P0	examination	Pathology, Oral Pathology
obligatory	Gnathology	C3S1P2	examination#	Restorative Dentistry and Endodontics I., Prosthodontics I., Oral Diagnostics
obligatory	Emergency Dentistry I.	C0L1P1.5	signature	Oral Pathology
obligatory	Physical Education VII.	C0L0P14	signature	
obligatory	The Medical Basis of Disaster Management III.	C0L2/ semester	signature	The Medical Basis of Disaster Management II.
	Total Credit	31		

The grade influences the qualification of the diploma

C = Credit point

L = Lecture (hours/week)

P = Practice (hours/week)

CLINICAL MODULE

8th semester				
subjects code	subjects	credit code	examination	prerequisites
obligatory	General and Dental Radiology II.	C1L0P1	comprehensive exam	General and Dental Radiology I.
obligatory	Restorative Dentistry and Endodontics III.	C3L0P4	term grade	Restorative Dentistry and Endodontics II., Prosthodontics II., General and Dental Radiology I.
obligatory	Orthodontics Pre-Clinical	C1L0P1	term grade	General and Dental Radiology I.
obligatory	Internal Medicine II.	C2S1P1	comprehensive exam	Internal Medicine I., Pharmacology I.
obligatory	Oral and Maxillofacial Surgery III.	C4L1P3	term grade	General and Dental Radiology I., Oral and maxillofacial surgery II., Periodontology I.
obligatory	Periodontology II.	C4L1S1P2	examination	Periodontology I., General and Dental Radiology I., Oral and Maxillofacial Surgery II.
obligatory	Pharmacology II.	C4L2P2	comprehensive exam	Pharmacology I, Internal Medicine I.
obligatory	Prosthodontics III.	C4S1P4	term grade	Restorative Dentistry and Endodontics II., Prosthodontics II., General and Dental Radiology I.
optional	Surgery	C2L1P1	examination*	Pathology, Macroscopic anatomy and embryology II.
obligatory	Implantology I.	C2L1P1	examination	General and dental radiology II., Periodontology I., Oral and Maxillofacial Surgery II.
obligatory	Emergency Dentistry II.	C0L0P1	signature	General and Dental Radiology I., Emergency Dentistry I.
optional	Ophthalmology	C1L1P0.5	comprehensive exam	Internal Medicine I., Pharmacology I.
obligatory elective	Otorhinolaryngology	C1L1P0.5	examination*	Pathology, Oral Pathology
obligatory	General Dentistry practice (summer, 4 weeks)	C0L0P30	signature	Prosthodontics III., Periodontology II., Restorative Dentistry and Endodontics III prerequisite of registering to the 9th semester
obligatory	Physical Education VIII.	C0L0P14	signature	
obligatory	The Medical Basis of Disaster Management IV.	C0L2/semester	signature	The Medical Basis of Disaster Management III.
obligatory elective	Pediatrics	C1S0.5L0.5P0.5	examination	Pathology, Oral Pathology
	Total Credit	30		
elective	Basic Restorative Digital Dentistry	C1L1P0	examination	–

Explanation

15 credits should be gained from the **elective subjects** during the 5-year studies – see the elective list after the 3rd year study program

The grade influences the qualification of the diploma

C = Credit point

L = Lecture (hours/week)

P = Practice (hours/week)

IMPORTANT NOTE: Signing up for Physical Education (PE) VI. in the 1st semester and for PE VIII. in the 2nd semester is obligatory.

LIST OF TEXTBOOKS (The list may change!)

- 1 Basic and Clinical Pharmacology (Ed. B. G. Katzung), 15th edition, McGraw-Hill Education, 2021. ISBN 978-1 260 45231 0
- 2 Peter, E.S. Freund-Meredith B. McGuire.: Health, Illness and the Social Body. (A Critical Sociology.) Prentice Hall, Upper Saddle River, New Jersey.
- 3 Conrad Fischer-Caterina Oneto (2009): USMLE Medical Ethics: The 100 cases you are most likely to see on the exam (Second edition) New York: Kaplan Publishing ISBN: 9781419553141
- 4 Mumenthaler: Neurology. Georg Thieme Verlag 1990. ISBN 3 13 523 909 3
- 5 Kaplan & Sadock's Synopsis of Psychiatry. Tenth Edition. Eds: B.J. Sadock V.A. Sadock, Lippincott Williams, 2007
- 6 Fuller G.: Neurological Examination Made Easy. 3rd ed. Churchill Livingstone. 2004. ISBN 0443074208
- 7 Rajna Péter: Ideg- és elmegyógyászati szakkifejezések
- 8 Hoag, Pawlak: Essentials of Periodontics. Mosby. ISBN 80162228x.
- 9 Goaz, White: Oral Radiology. Mosby. ISBN 801618738.
- 10 T.G. Wilson-K.S. Kornman: Fundamentals of Periodontics Quintessence. 1996. ISBN 0-86715-303-2
- 11 The Washington Manual of Surgery. 3rd ed. 2002. Lippincott Williams & Wilkins. ISBN 0-7817-3389-8
- 12 Worthington-Lang-LaVelle: Osseointegration in Dentistry. An Introduction. Quintessence, Chicago, 1994.
- 13 Sethi, A.-Kaus, Th: Practical implant dentistry. Quintessence, London, 2013.
- 14 Bricker, S.L.-Langlais, R.P.-Miller, C: Oral Diagnosis, Oral Medicine and Treatment planning. 2nd ed. 2002. B.C. Decker Inc. Hamilton London
- 15 Essentials of Kumar and Clark's Clinical Medicine, Ed. Zammit, Sandilars. Elsevier, 7th ed., 2021. ISBN: 978070208280116
- 16 The New Public Health: An Introduction for the 21st Century. By: T. Tulchinsky, E.A. Varavikova. 2000. ISBN 0-12-703350-5
- 17 Gerry Humphris, Margaret S. Ling: Behavioural Sciences for Dentistry. Churchill Livingstone, London, 2005
Handouts for the lectures in Dentsoc will be accessible on the homepage of the Institute of behavioural Sciences: www.magtud.sote.hu.
- 18 McCracken's Removable Partial Prosthodontics (10/e) Glen P. McGivney-Alan B. Carr. Hardback, Mosby, 1999. ISBN 0323006787
- 19 Schillingburg et al.: Fundamentals of Fixed Prosthodontics. Quintessence 4th ed. 2012. ISBN 93 13 86 500
- 20 R.M. Basker-J.C. Davenport: Prosthetic Treatment of the Edentulous Patient. 5th ed. McMillan Press Ltd. ISBN 978-1405192613
- 21 Mohl, Zarb, Carlsson, Rugh. A Textbook of Occlusion. Quintessence. Chicago, 1988.
- 22 McNeill: Science and Practice of Occlusion. Quintessence. Chicago, 1997.
- 23 Niklaus P. Lang, Jan Lindhe (ed.): Clinical Periodontology and Implant Dentistry (Wiley Blackwell, 2015)
- 24 Proffit WR, Fields Jr HW, Sarver DM: Contemporary Orthodontics 5th Edition, 2012; Elsevier Saunders, ISBN: 978032083171
- 25 Casamassimo PS, Fields HW, McTigue DJ, Nowak AJ: Pediatric Dentistry, Infancy through Adolescence 5th Edition, 2012, Elsevier Saunders, ISBN: 9780323085465.
26. Sethi A., Kaus Th. Practical Implant Dentistry: The Science and Art, Second Edition Quintessence, London 2013

Recommended textbooks:

- 1 Bengel, Veltman, Loevy, Taschini: Differential Diagnosis of Diseases of the Oral Mucosa. Quintessence Publishing Co. Inc. Chicago, Illinois 1989.
- 2 Manfred Strassburg/Gerd Knolle: Diseases of the Oral Mucosa A Color Atlas 2nd ed. Quintessence Publ. Co. Inc. Carol Stream Illinois 1994.
- 3 Coleman, G.C.-Nelson, J.F.: Principles of Oral Diagnosis. Mosby-Year Book, Inc. St. Louis, Missouri, USA 1993. "hand-outs" will be prepared and presented for the students by the lecturers
- 4 Forrai J.-Ballér P.: Chrestomathy on the History of Medicine. Bp. SOTE. 1992.
- 5 Behavioral dentistry. Mostofsky DI, Forgione AG, Giddon DB (eds.), Blackwell Munksgaard, 2006.
- 6 Behavior & Medicine. 4th Edition, Danny Wedding, Hogrefe & Huber Publishers, Seattle, 2006.
- 7 Fadem B: Behavioral Science, Lippincott Williams & Wilkins, 5th ed., 2008.
- 8 Sarafino E.P.: Health Psychology. Biopsychosocial interactions. 6th ed., New York, Wiley, 2008.
- 9 Kopp M. - Skrabski Á.: Behavioral Sciences Applied in a Changing Society, Corvina, 1996.
- 10 Alan Stoudemire: Human Behaviour: An Introduction for Medical Students. Lippincott Company, 1994. ISBN 0-397-51337-2.
- 11 Gatchel R.J., Baum A., Krantz D.S.: An Introduction of Health Psychology. McGraw-Hill 1989. ISBN 0-07-100729-6
- 12 Principles of Oral Diagnosis. Ed.: Coleman, G.C.-Nelson, J.F. Mosby-Year Book, Inc. St. Louis, Missouri. 1993. ISBN 0-8016-1005-2
- 13 Rose, L.F.-Kaye, D.: Internal Medicine for Dentistry. 2nd ed. Mosby. 1990.

- 14 Surgery – Basic Science and Clinical Evidence. Ed. Norton, J.A. 1st ed. 2000. Springer. ISBN 0-387-9844-X
- 15 Baehr, M.M.D- Frotscher, M.M.D: Duus's Topical Diagnosis in Neurology: Anatomy, Physiology, Signs, Symptoms. Thieme. Medical Publ. 2005. ISBN 3136128044
- 16 Lindsay K.-Bone I.-Callender R.: Neurology and Neurosurgery. Illustrated. 4th ed. Churchill Livingstone, 2004. ISBN 0443070563
- 17 Szirmai I.-Kamondi A.-Arányi Zs.-Kovács T: Neurological examination. Bp. Semmelweis Publ. 2006. ISBN 963 9656062
- 18 J. Okeson: Management of Temporomandibular Disorders and Occlusion, 7th ed. 2012, Mosby
- 19 Neil-Walter: Partial Dentures. ISBN 06 32 08 025 8, 1984.
- 20 Neil-Nairne: Complete Denture Prosthetics. Wright. ISBN 72 36 20 636
21. Ward Booth, Hausamen, Schendel: Maxillofacial Surgery, C.Livingston Elsevier, 2007
22. DDS, MS, PhD Radi Masri, DMD Carl F. Driscoll (szerk.): Clinical Applications of Digital Dental Technology (2015 John Wiley & Sons Inc, Print ISBN:9781118655795 IOnline ISBN:9781119045564)
23. Alessandro Agnini, Andrea Agnini, Christian Coachman (szerk.): Digital Dental Revolution – The Learning Curve (Quintessence Publishing, Italy, 2015, ISBN 978-88-7492-017-4)
24. Hermann Péter, Szentpétery András: Gnatológia (Semmelweis Kiadó, 2018)

PHARMACOLOGY I-II.**Department of Pharmacology and Pharmacotherapy****Obligatory****Credit:** 4 (7th semester), 4 (8th semester)**Lecturer:** *Pál Riba*, MD, PhD, Associate Professor

Pharmacology deals with the effects, mechanisms of actions, adverse effects, interactions and clinical administration of drugs used in the clinical practice as well as with their fate in the body. It also specifies the rules of prescription writing. It is based on and synthesizes the knowledge of basic, pre-clinical and clinical subjects such as physiology, biochemistry, oral pathology and internal medicine.

Thematics**First Semester****1st week**

Lecture: Introduction to Pharmacology. (development, pharmacogenomics, basics of toxicology)

Practice: Pharmacodynamics I (drug receptors, receptor theories, drug-receptor interactions).

2nd week

Lecture: Basics of Pharmacokinetics (absorption, distribution, metabolism, excretion).

Practice: Pharmacodynamics II (quantal dose-response curves, therapeutic indices, tolerance, drug interactions).

3rd week

Lecture: Pharmacology of the cholinergic and adrenergic systems

Practice: Parasympathomimetics and parasympatholytics, centrally acting anticholinergic drugs

4th week

Lecture: Pharmacology of the skeletal muscles.

Practice: Sympathomimetics and sympatholytics

5th week

Lecture: Non-steroidal anti-inflammatory drugs (NSAIDs). Minor analgesics.

Practice: Drugs affecting uric acid metabolism. Drugs for headache syndromes. 1st midterm

6th week

Lecture: Drugs acting on opioid receptors

Practice: 1st midterm. The Summary of Product Characteristics

7th week

Lecture: Local anesthetics

Practice: Basic principles of prescription writing

8th week

Lecture: Antipsychotics

Practice: Sedative-hypnotics, anxiolytics

9th week

Lecture: Drugs acting on the extrapyramidal motoric system. Nootropic agents

Practice: Antidepressants, drugs against mania, mood stabilizers

10th week

Lecture: General anesthetics

Practice: Anticonvulsants (antiepileptics)

11th week

Lecture: Antiviral drugs

Practice: Cell wall synthesis inhibitor antibiotics. 2nd midterm

12th week

Lecture: Antifungal drugs. Antimycobacterial drugs.

Practice: Protein synthesis inhibitor antibiotics

13th week

Lecture: Anthelmintic and antiprotozoal agents. Antiparasitic drugs.

Practice: Inhibitors of nucleic acid synthesis and antibiotics with other mechanisms of action. Disinfectants, antiseptics.

14th week

Lecture: Biological Drugs. Orphan Drugs. Advanced Therapy Medicines

Practice: Nutrients, traditional plant medicines, vitamins, anorectic drugs.

2nd semester**1st week**

Lecture: Anticoagulants, inhibitors of platelet aggregation

Practice: Fibrinolytics, drugs against bleeding, drugs acting on blood cell production.

2nd week

Lecture: Drugs influencing cardiac electrophysiology

Practice: Positive inotropic agents.

3rd week

Lecture: Diuretics, antidiuretics.

Practice: Drugs influencing blood pressure (sympatholytics, nitrates, Ca-channel blockers and other vasodilators. Pharmacology of RAAS.)

4th week

Lecture: Drugs acting on blood glucose control.

Practice: Drugs influencing the oxygen demand and oxygen supply of the heart. Drugs improving microcirculation.

5th week

Lecture: Drugs affecting lipid metabolism (1 study hour). Bronchodilators and drugs inhibiting the bronchial inflammatory processes (1 study hour).

Practice: Expectorants (secretomotorics, secretolytics, mucolytics), antitussive drugs. Histamine, antihistamines. Drugs acting on smooth muscles

6th week

Lecture: Corticosteroids and their antagonists. Drugs inhibiting steroid hormone synthesis

Practice: Pharmacology of pituitary hormones. Hypothalamic hormones, hormonanalogs and antagonists. Pharmacology of thyroid gland (thyroid hormones and antithyroid drugs). 3rd midterm

7th week

Lecture: Pharmacology of female sexual hormones. Contraceptive medications

Practice: Androgens, antiandrogens, anabolic steroids, drugs influencing sexual activity.

8th week

Lecture: Basics of toxicology

Practice: Drugs affecting bone mineral homeostasis.

9th week

Lecture: Drugs influencing gastric acid secretion, drugs protecting gastric mucosa

Practice: Appetizers, drugs promoting digestion, antiemetics, prokinetic agents. Laxatives, drugs against diarrhea. Pharmacology of liver and bile.

10th week

Lecture: Immunopharmacology (cytotoxic agents, inhibitors of intracellular signaling, cytokine and cytokine receptor inhibitors)

Practice: Cytotoxic anticancer drugs.

11th week

Lecture: Small molecule signal transmission inhibitor anticancer drugs. Anticancer drugs with hormonal mechanisms

Practice: Toxicology I. 4th midterm

12th week

Lecture: Anticancer antibodies. Immunostimulant anticancer agents.

Practice: Toxicology II.

13th week

Lecture: Pharmacodynamic and pharmacokinetic basics of drug interactions

Practice: Drugs and pregnancy Toxicology exam

14th week

Lecture: Pharmacogenomics, personalized medicine, drugs for orphan disease. Special aspects of pharmacology in children and elderly

Practice: Contrast agents. Consultation

Prescription writing continuously during the whole semester.

Maximum number of absences is 25 percent of the number of practices in the semester. In the case of absence, the student can attend another class the same week.

During the first semester, two obligatory midterm tests will be organized in weeks 6 and 11. These can be made up in weeks 7 and 12. Improvement attempt of the midterm tests (both) will be possible in week 13.

The course material for the first midterm test (study material from week 1 to 5): General Pharmacology. Pharmacology of cholinergic and adrenergic transmission. Skeletal muscle relaxants.

Second midterm test (study material from week 6 to 10): NSAIDs, Opioids, Neuropsychopharmacology

The midterm tests will count towards the semester semifinal exam results:

1. 5% of the students in the top 5% of the whole year will be awarded an excellent mark (5) and 5% of the students in the second top

5% will be awarded a good mark, provided that they achieve at least 2x75% in the midterm tests. If the number of these students is less than 10% of the whole year, only they will be offered a mark, if more than 10%, the top 10% will be offered a mark.

2. If the student scores better than 60% in both midterm tests, the drug recognition question will be waived and in case of a doubtful grade, the better one will be awarded.

If the student fails both midterm tests (even at the time of a retake), or fails to achieve 33% in either midterm test with a correction, the student will receive a grade penalty on the semifinal exam.

During the first semester, two obligatory midterm tests will be organized in weeks 6 and 11. These can be made up in weeks 7 and 12. Improvement attempt of the midterm tests (both) will be possible in week 13. The correction may only be a verbal demonstration. The first semester midterms cannot be improved in the second semester.

The course material for the first midterm test (study material from week 1 to 4): General Pharmacology (Pharmacodynamics, Pharmacokinetics). Pharmacology of cholinergic and adrenergic transmission. Skeletal muscle relaxants.

Second midterm test (study material from week 5 to 10): NSAIDs, Drugs affecting uric acid metabolism, Drugs affecting headaches, Local anaesthetics, Opioids, Neuropsychopharmacology (Prescribing and the Summary of Product Characteristics are not included in the midterm test.)

The midterm tests will count towards the semester semifinal exam results:

1. 10% of the students in the top of the whole year will be awarded an excellent mark (5) and further 10% of the students in the second top 10% will be awarded a good mark, provided that they achieve at least 2x75% in the midterm tests. If the number of these students is less than 20% of the whole year, only they will be offered a mark, if more than 20%, the top 10% will be offered a mark. Only the results of the first attempts count towards the offered semifinal mark, not the improved midterms.
2. If the student scores better than 60% in both midterm tests, the drug recognition question will be waived and in case of a doubtful grade, the better one will be awarded. There is no exemption from the Core Concept topics.
3. If the student fails both midterm tests (even at the time of a retake), or fails to achieve 33% in either midterm test with a correction, the student will receive a grade penalty on the semifinal exam.
4. In the case of a repeated exam after a failure, the negative and, in the case of an improvement exam, both the positive and the negative modifications are cancelled.

During the second semester, two obligatory midterm tests will be organized in weeks 6 and 11. These can be made up in weeks 7 and 12. Improvement attempt of the midterm tests (both) will be possible in week 13. The correction may only be a verbal demonstration. The first semester midterms cannot be improved in the second semester.

The course material for the third midterm test (study material from week 1 to 4 and the half of the 5th week lecture): Pharmacology of the cardiovascular system. Drugs acting on lipid metabolism. Drug acting on blood glucose level.

Fourth midterm test (seminar topics of the 5th week, half of the 5th week lecture and study material from week 6 to 10): Endocrine pharmacology. Pharmacology of the respiratory system. Pharmacology of the gastrointestinal system. Histamine and antihistamines. Drugs acting on smooth muscles. Immunopharmacology.

The midterm tests will count towards the final exam results:

1. If the student scores better than 60% in all four midterm tests during the whole year, the drug recognition question will be waived and in case of a doubtful grade, the better one will be awarded. There is no exemption from the Core Concept topics.
2. If the student achieves at least 80% score of all four midterm tests one final exam topic will be waived as well as the drug recognition question. The waived topic will be chosen by the examiner.
3. At the competition at the end of the year, the student who has at least one midterm of 80% and none of his/her demonstrations is worse than 33%, depending on the result of the competition, will be rewarded: between scores 90-100% the students will choose one of the three topics, between 80-89% the students will choose which one he/she will drop, between 70-79% the examiner will choose one topic to be dropped. The drug recognition question will be waived.
4. If the student fails both midterm tests of the second semester (even at the time of a retake), or fails to achieve 33% in either midterm test with a correction, the student will receive a grade penalty on the final exam.
5. In the case of a repeated exam after a failure, the negative and, in the case of an improvement exam, both the positive and the negative modifications are cancelled. The first semester midterms, if their results were worse than 30%, will not be counted for the final exam.

Exam:

Examination (7th semester):

In the oral semifinal exam, at first 5 active substances selected from the obligatory list of active substances must be identified and their mechanism of action explained. If the student does not recognize at least 3 of the active substances, he/she will not be allowed to continue and will receive a fail mark. After successful completion of one core-concept question and two topics of two lists of topics (one from each), an acceptable level of knowledge of pharmacology must be demonstrated. If the student fails at any parts of the exam, the evaluation (grade) of the whole exam is "failed".

Final exam (8th semester): To apply for the oral examination, the student must pass the toxicology exam before the examination period starts. The grade in the toxicology exam counts towards the final grade. In the oral final exam, at first 5 active substances selected from the obligatory list of active substances must be identified and their mechanism of action explained. If the student does not recognize at least 3 of the active substances, he/she will not be allowed to continue and will receive a fail mark. After successful completion of one core-concept question and three topics of three lists of topics (one from each), an acceptable level of knowledge of pharmacology must be demonstrated.

If the student fails at any parts of the exam, the evaluation (grade) of the whole exam is "failed".

Registration:

In the NEPTUN system.

Modifying:

In the NEPTUN system, according to the Examination and Studies Regulations.

Certifying the absence from the exams:

According to the Examination and Studies Regulations.

Textbook:

Basic and Clinical Pharmacology (Ed. B. G. Katzung), 15th edition, McGraw-Hill Education, 2021. ISBN 978-1 260 45231 0

Further study material:

Materials discussed during lectures and seminars: Moodle (<https://itc.semmelweis.hu>)

INTERNAL MEDICINE I.

Department of Internal Medicine and Oncology, 2/a Korányi S. u., Budapest, H-1083

Course director: *prof. István Takács*

Course coordinator: *dr. Péter Studinger*

Credits: 3

Lectures: 1 hour / week

Practices: 2 hours / week

Exam: No formal exam, signature and evaluation based on activity during practices: excellent (kiválóan megfelelt), pass (megfelelt) or fail (nem felelt meg).

Objective of the course: Primary objective of the course is to have the student to acquire the basic skills of obtaining a proper medical history, learn the bases of physical examination and other methods of patient evaluation, establishing diagnosis and treatment plan. Diseases of the endocrine, gastrointestinal and urogenital system will be reviewed, with special emphasis on their dental significance.

Lectures:

1. Medical patient interview, comprehensive health history, techniques of physical examination. Alterations of the skin.
2. Assessment of vital signs. Role of physical examination in emergency situations. Examination of a patient in shock, sudden dyspnea.
3. Examination of the chest, common abnormal findings.
4. Examination of the abdomen, common abnormal findings.
5. Diagnosis treatment of thyroid diseases and their relevance to dentistry.
6. Types, diagnosis and treatment of diabetes mellitus, relevance to dentistry.
7. Diseases of the calcium metabolism, diseases with altered bone composition.
8. Diseases of the upper gastrointestinal tract, malabsorption and their relevance to dentistry.
9. Diseases of the lower gastrointestinal tract, gastrointestinal neoplasms.
10. Diseases of the liver and biliary tract, their relation to dental diseases.
11. Acute diseases of the urogenital system, electrolyte disturbances.
12. Causes and management of chronic kidney disease.
13. Causes of hypertension, treatment options. Management of hypertensive emergency.
14. Diagnosis and management of the most common intoxications.

INTERNAL MEDICINE II.1st Department of Internal Medicine**First Semester****Lectures** (2 hours per week) **Practices** (1 hour per week)

15. Immunologic principles. Lymphocytic system.
16. Immunoglobulins. Types of immunologic reactions.
17. Polycythemia. Agranulocytosis. The leukemias.
18. Hodgkin's disease and non-Hodgkin's lymphoma.
19. Introduction to anemia and approach to patients with anemia. Iron deficiency anemia. Megaloblastic anemia. Aplastic anemia.
20. Hemolytic anemias.
21. Plasma cell disorders. Multiple myeloma.
22. Waldenström's macroglobulinemia.
23. Heavy-chain disease. Amyloidosis.
24. Hemostatic disorders. Thrombocytopenia.
25. Thrombocytosis. Vascular purpuras. Disorders of the coagulation mechanism.
26. Autoimmunity. Systemic lupus erythematosus.
27. Sjögren's syndrome.
28. Atopic diseases. Allergic rhinitis. Asthma of allergic etiology. Urticaria and angioedema. Serum sickness.
29. Drug allergy. Contact dermatitis.
30. Immunodeficiency diseases.
31. Rheumatoid arthritis. Juvenile rheumatoid arthritis.
32. Reiter's syndrome. Bechet's syndrome.
33. Systemic sclerosis. Polymyositis and dermatomyositis. Wegener's granulomatosis.
34. Hypothalamic and pituitary disorders. Hyperpituitary syndromes. Anterior pituitary insufficiency.
35. Diabetes insipidus. The adrenal cortex.
36. Cushing's syndrome. Addison's disease.
37. Diabetes mellitus. Diagnosis and classification of diabetes mellitus. Complication and treatment of diabetes mellitus. Gout.
38. Diabetes mellitus. Diagnosis and classification of diabetes mellitus. Complication and treatment of diabetes mellitus. Gout.
39. The thyroid gland. Hypothyroidism. Hyperthyroidism.
40. Thyroiditis. Hypoparathyroidism. Hyperparathyroidism.
41. Viral diseases. Herpes simplex. Varicella-zoster virus.
42. Cytomegalovirus. Epstein-Barr virus. Influenza. AIDS.
43. Bacterial disorders. Tuberculosis. Diseases caused by fungi. Salmonellosis. Shigellosis.

Note: The maximum number of absences in a semester is 3
More than 3 absences invalidate the semester examination

OPHTHALMOLOGY

Dept. of Ophthalmology

Program director: *Dr. Zsuzsa Récsán*

Tutor: *Dr. Zsófia Hargitai*

First Semester

Lectures (1 hour/week)

Introduction. History of ophthalmology.

Conjunctivitis ("red eye").

Keratitis ("red eye").

Uveitis ("red eye"). Differential diagnostic approach of the "red eye".

Basics of optics.

Diseases of the crystalline lens. Cataract surgery. Diseases of the retina. Intraocular tumours.

Glaucoma (pathomechanismus).

Glaucoma (conservative and surgical treatment).

Diseases of the eyelids. Ocular injuries. Sudden visual loss. First aid in ophthalmology.

Practical guide (0,5 hour/week)

Anatomy of the eye. Patient's history.

Objective and subjective symptoms of eye-diseases.

Eyelids and lacrimal system.

Examination of the anterior segment of the eye (focal light, slit lamp).

Refractive errors. Checking of visual acuity.

Basics of orthoptics.

Examination of the refractive media and retina. (Ophthalmoscope)

Diagnosis of glaucoma (perimetry, checking of intraocular pressure, gonioscopy.)

Treatment of glaucoma.

First aid in cases of ocular injuries.

First aid in sudden visual loss.

Differential diagnostic approach of the "red eye".

Differential diagnostic approach of the "painful" eye.

Consultation.

The Medical Basis of Disaster Management III.-IV.

Semmelweis University, Faculty of Dentistry – single, long-cycle medical training programme

Name of the host institution (and any contributing institutions):

Department of Military-, Disaster- and Order Enforcement Medicine

Name of the subject: A katasztrófa-felszámolás egészségügyi alapjai

in English: The Medical Basis of Disaster Management

in German: Medizin Grundlagen der Beseitigung von Katastrophen

Credit value: 0 credit

Semester: VII. – VIII.

Total number of classes per week: lectures: 2x45'

practical lessons: –

seminars: –

Type of subject: obligatory / optional elective

Academic year: 2024/2025.

Language of instruction, for optional or elective subjects: english

Course code: FOKOHT160

Course coordinator: *Dr. János Gál*, university professor

Place of work, phone number: HKROT; +36 (20) 825 90 60

Position: department director

Date and number of habilitation: 2007.01.30. (1/2007/habil)

Objectives of the course and its place in the medical curriculum:

The primary aim of the subject is to provide basic level knowledge regarding civilian and disaster protection and resolution as they relate to medical students, healthcare, and citizens. Its objective is to empower students to creatively use their hereby gained knowledge and skills to recognize, and to participate in the resolution of emergency situations, disaster alerts and disaster resolving procedures in both their professional careers and their personal lives.

It also provides opportunities for various levels of specialization in the education and practice of potentially required medical duties in the prevention and resolution of disasters.

Place of instruction (address of lecture hall or seminar room etc.):

*Nagyvárad téri Elméleti Tömb – Issekutz Béla or Selye János lecture hall
Budapest, Nagyvárad tér 4, 1089*

Competencies acquired through the completion of the course:

The student is able to determine the requirements of health care according to the operation and the health situation of the emergency normal system, to get to know the procedures, the health and safety administration in these situations and the tasks arising at the different levels of the care system.

Prerequisites for course registration and completion:

Completing modules 1 and 2 are necessary for module 3 application. Participating in module 4 requires the completion of modules 1, 2 and 3. Application for the course must be done in accordance to corresponding regulations. Due to consisting of two 45-minute sessions per module, in the case of absence the completion of the course can only be credited to the student following attendance of a posterior lecture, or with the specific permission of the dean to take a test and successfully pass the exercise. Without either of these options being met, the course will be considered failed and no signature will be given. **For transferred students however, the following may be applied: In the first uneven semester it is permitted to apply for the uneven modules (I and III), and in the first even semester it is permitted to apply for even modules (II, IV).**

Conditions for concurrent course registration and permission thereof in the case of a multi-semester subject: –

Student headcount conditions for starting the course (minimum, maximum) and method of student selection:

maximum 250 student/course

Detailed course description:

7th semester: 2 lectures: (3M) Subject and objectives of Disaster Medicine. Medical trade-offs: Possible solutions to the disproportionalities between the capacity of the providing service and patients requiring treatment.(Dr. László Liptay)

8th semester: 2 lectures: (4M) The importance of preventive medicine in disaster situations. Application of preventive medicine methods in disaster circumstances. Implementation of medical compromise principles during disasters. Surgical principals and their application during disaster situations. The principles of medical attendance during disasters.
(Dr. Levente Várhelyi Ph.D.)

Related subjects due to interdisciplinary fields (both obligatory and elective) and potential overlaps between subjects: -

Attendance requirements; conditions under which students can make up for absences and the method of absence justification:

Accepted forms of certification: medical, formal – judicial, governmental, workplace, student governmental, etc.

Form of assessment in the study period: signature.

Number and type of assignments for individual work and the deadline for submission: none.

Requirements to obtain the teacher's signature:

Students are required to attend the seminars to gain complete the course and they must leave their own handwritten signature. Absence for acceptable reasons can be redeemed by participating on a posterior lecture or the successful completion of a test exercise following the permission of the dean. Only students who have initially applied for the course can participate on the posterior lecture. **Previously completed modules may be accepted in a separate procedure, subject to permission and approval.**

Type of assessment: (*comprehensive examination, end-term examination, term-grade, term-grade on a three-grade rating scale, coursework project, no examination*)

Examination requirements: none, only the participation requirement on the course is to be met.

Method and type of grading: signature

List of course books, textbooks, study aids and literature facilitating the acquisition of knowledge to complete the course and included in the assessment, precisely indicating which requirement each item is related to (e.g., topic by topic) as well as a list of important technical and other applicable study aids:

Dr. György Orgován Ph.D., Dr. László Liptay, Dr. László Major Ph.D.: *Medical aspects of disaster preparedness and response*

Signature of habilitated instructor (course coordinator) announcing the course:

Signature of the director of the host institution:

Date of submission:

RESTORATIVE DENTISTRY AND ENDODONTICS II.

Department of Restorative Dentistry and Endodontics

Head of Department: *János Vág DMD, PhD*

First semester

Clinical practice (3 hours per week).

The subject is taught three practical hours per week, with no lectures. During the practices, clinical care is provided for patients requiring conservative dental care under the supervision of an instructor. The students work in pairs and take turns to assist each other.

The objective of the subject and its place in the medical curriculum:

More confident implementation of the following activities: Thorough patient examination, taking of medical and dental history, stomato-oncological screening, establishing the diagnosis, preparing of a treatment plan, removal of calculus, routine application of isolation procedures, preparation and restoration of simple and complex cavities, root canal treatment of single-rooted teeth and learning dental assistance.

Method of checking acquired knowledge during the study period:

Students must arrive prepared for the practice, which is regularly checked and evaluated orally and/or in writing by the supervisor. Students during the semester frequently write „small tests“ to give proof of their theoretical knowledge. There is no possibility to retake the missed tests or to correct a test. The students will write midterm exam on restorative dentistry based on the knowledge gained from lectures, practices, and textbooks in restorative dentistry. It is written at a particular time announced at the beginning of the year (preferable on week 10). If a student does not achieve a passing score on an exam the first time, the candidate can retake the exam in two weeks. A maximum of two additional attempts for the retake will be provided. It will be assessed in accordance with the procedure laid down in the Study and Examination Regulations of Semmelweis University. The work carried out on the practices will be monitored and assessed by the practice leaders at each stage. The results of the evaluations are included in the semester rating.

Requirements of an accepted semester (signature of the lecturer):

A minimum of 75% attendance is required at the practices, and absence may not exceed 25% of the practices regardless of the reason. The signature of the semester, a sufficient level of continuous and consistent theoretical preparation, the passed demonstration, and a sufficient level of practical performance are required. The average grade of the theoretical part and the average grade of the practical part must separately reach the 2.0-grade. By week 13, a photo-documented case report of the student's work must be submitted to the practice leader.

Type of the exam: Practice mark

List of textbooks, lecture notes and recommended textbooks:

1. Ritter AV, Boushell LW, Walter R: Sturdevant's Art and Science of Operative Dentistry. 7th ed. St. Louis, Mosby, 2018. 2. Torabinejad M, Walton RE, Fouad AF: Endodontics. Principles and Practice. 5th ed. St. Louis, Missouri, Saunders/Elsevier 2014 3. Hargreaves KM, Berman LH: Cohen's Pathways of the Pulp. 11th ed. St. Louis, Missouri, Mosby/Elsevier 2015

OTORHINOLARYNGOLOGY AND HEAD AND NECK SURGERY

Lecturer: **Prof. Dr. László Tamás**

Tutor: **Dr. Beáta Bencsik**

Second Semester

Obligatory elective

credit code: C1LIP0.5

credit: 1

lecture: 1

practice: 0.5

Prerequisite(s): Pathology, Oral Pathology examination

Lectures (1 hour per week) Practices (0,5 hour week)

Tematic of lectures:

1. Examination is ORL. The role of otorhinolaryngology in dentistry and medicine.
2. Ear diseases. Acute and chronic otitis media Diseases of the external ear. Etiology, diagnosis, complications and therapy.
3. Audiology, hearing aids, implanted devices. Fundamental audiological diagnostic methods. Surgical management of hearing losses. Otosclerosis and cochlear implant.
4. Headache, otoneurology, facial nerve. Diagnosis and treatment of dizziness and facial nerve palsy.
5. Rhinitis, nasal septum. Clinical anatomy and physiology of the nose and paranasal sinuses. Nasal obstruction. Epistaxis.
6. Sinusitis, FESS. Infections and tumors of the nose and paranasal sinuses. Therapeutical possibilities. Borderlines and related aspects between the oral surgery and ENT.
7. Benign cervical masses. Diseases of the neck. Diseases of the salivary glands
8. OSAS. Diagnosis and treatment of sleep apnoe.
9. Inflammation of the pharynx. Clinical aspects of diseases of the mouth and pharynx. Peritonsillar abscess. Diseases of the oral and laryngeal mucosa.
10. Swallowing and speech disorders. Anatomy and physiology of the larynx. Disorders of the voice.
11. Head and neck benign and malignant tumors, epidemiology, pathology and diagnosis.
12. Nonsurgical therapy of head and neck cancers.
13. Head and neck cancers, surgical therapy. Neck dissections.
14. Emergency in ORL. Emergency management of suffocation. Conicotomy and tracheotomy. Foreign bodies in the trachea and oesophagus.

Tematic of practices:

Routine clinical examinations in practice.

Ear diseases. Evaluation of different types of perforations of the tympanic membrane. Video demonstration. Routine audiology. Pure tone audiometry.

Pharynx infections. Peritonsillar abscess and therapy. Indications and dangers of the tonsillectomy. Adenotomy. Basis of conservative of the mouth and pharynx treatment of disease.

Anterior and posterior rhinoscopy, endoscopy. X-ray and CT of the paranasal sinuses. Clinical management of epistaxis.

Investigation of mesopharynx tumors. Direct and indirect laryngoscopy. Benign tumors of the mesopharynx and larynx.

Videostroboscopy and fiberoscopy. Malignancy in the mesopharynx.

Malignancy in the larynx. Imaging. Video demonstration.

PEDIATRICS

2nd Department of Pediatrics

Tutor: *Dr. Judit Müller*

First Semester

Lectures (1 hour per week) **Practices** (0,5-hour week)

Development and Growth
Childhood Nutrition and its Disorders
Fluid and Electrolyte Disorders
Newborn Infant: Diseases and Disorders
Genetic Disorders
Congenital Heart Diseases
Respiratory Diseases
Neurologic and Muscular Disorders
Endocrine Disorders
Infectious Diseases, Immunization
Gastrointestinal Tract Disorders
Hematologic Disorders
Malignant Diseases in Childhood
Kidney and Urinary Tract Diseases
Allergic Diseases

RESTORATIVE DENTISTRY AND ENDODONTICS III.

Department of Conservative Dentistry Restorative Dentistry and Endodontics

Head of Department: *János Vág DMD, PhD*

Second semester

Clinical practice (4 hours per week).

The subject is taught four practical hours per week, with no lectures. During the practices, clinical care is provided for patients requiring conservative dental care under the supervision of an instructor. The students work in pairs and take turns to assist each other.

The objective of the subject and its place in the medical curriculum: Thorough patient examination, taking of medical and dental history, stomato-oncological screening, establishing the diagnosis, preparing a treatment plan, removing calculus, routine application of isolation procedures, preparation and restoration of simple and complex cavities, root canal treatment of single and multi-rooted teeth, and learning dental assistance.

Requirements of an accepted semester (signature of the lecturer):

A minimum of 75% attendance is required at the practices, and absence may not exceed 25% of the practices regardless of the reason. The signature of the semester, a sufficient level of continuous and consistent theoretical preparation, the passed demonstration, and a sufficient level of practical performance are required. The average grade of the theoretical part and the average grade of the practical part must separately reach the 2.0-grade. By week 13, a photo-documented case report of the student's work must be submitted to the practice leader.

Type of the exam: Practice mark

List of textbooks, lecture notes and recommended textbooks:

1. Ritter AV, Boushell LW, Walter R: Sturdevant's Art and Science of Operative Dentistry. 7th ed. St. Louis, Mosby, 2018. 2. Torabinejad M, Walton RE, Fouad AF: Endodontics. Principles and Practice. 5th ed. St. Louis, Missouri, Saunders/Elsevier 2014 3. Hargreaves KM, Berman LH: Cohen's Pathways of the Pulp. 11th ed. St. Louis, Missouri, Mosby/Elsevier 2015

Prosthodontics II.

First Semester

The theme of the seminars:

1. Introduction to the subject, introductory seminar
2. Online moodle learning module: General informations about making of fixed and removable dentures I: photodocumentation, tooth shade determination, magnification, isolation, smile design
3. Seminar material which requires personal attendance: General informations about making of fixed and removable dentures I: photodocumentation, tooth shade determination, magnification, isolation, smile design
4. Online moodle learning module: General informations about making of fixed and removable dentures II.: impression taking, luting
5. Seminar material which requires personal attendance: General informations about making of fixed and removable dentures II.: impression taking, luting
6. Online moodle learning module: Types of fixed dentures (veneers, post and cores, crowns, bridges, minimally invasive dentures) and tooth preparation
7. Seminar material which requires personal attendance: Types of fixed dentures (veneers, post and cores, crowns, bridges, minimally invasive dentures) and tooth preparation.
8. Online moodle learning module: Removeable partial dentures I.: definitions; parts, types and tasks of parts.
9. Seminar material which requires personal attendance: Removeable partial dentures I.: definitions; parts, types and tasks of parts
10. Online moodle learning module: Removeable partial dentures II.: support and retention
11. Seminar material which requires personal attendance: Removeable partial dentures II.: support and retention
12. Online moodle learning module: Clinical and laboratory steps of dental restorations; temporary dentures and repair of dentures
13. Seminar material which requires personal attendance: Clinical and laboratory steps of dental restorations; temporary dentures and repair of dentures
14. Consultation

Prosthodontics III.

Second Semester

The theme of the seminars:

1. Introduction to the subject, introductory seminar
2. Online moodle learning module: Treatment planning guidelines – Fábíán and Fejérdy classification (modifying factors of the treatment plan)
3. Seminar material which requires personal attendance: Treatment planning guidelines – Fábíán and Fejérdy classification (modifying factors of the treatment plan)
4. Online moodle learning module: Implant prosthetics I.: temporary dentures and fixed dentures
5. Seminar material which requires personal attendance: Implant prosthetics I.: temporary dentures and fixed dentures
6. Online moodle learning module: Implant prosthetics II.: hybrid prostheses and impression taking
7. Seminar material which requires personal attendance: Implant prosthetics II.: hybrid prostheses and impression taking
8. Online moodle learning module: Digital dentistry I.: impression taking
9. Seminar material which requires personal attendance: Digital dentistry I.: impression taking
10. Online moodle learning module: Digital dentistry II.: digital workflows
11. Seminar material which requires personal attendance: Digital dentistry II.: digital workflows
12. Online moodle learning module: Gnathological guidelines of the full mouth rehabilitation, rehabilitation of occlusal problems, bite elevation, splints
13. Seminar material which requires personal attendance: Gnathological guidelines of the full mouth rehabilitation, rehabilitation of occlusal problems, bite elevation, splints
14. Consultation

SURGERY**I. Department of Surgery Department Section of Surgery****Second Semester**

Lectures (2 hours per week)

Surgery of the neck. Thyroid and parathyroid
 Surgical treatment of the chest wall, breast, pleura, lung and mediastinum
 Oesophageal surgery (injuries, diverticula, malignant diseases)
 Gastric and duodenal surgery (benign diseases)
 Gastric and duodenal surgery (malignant diseases)
 Surgery of gall-bladder and extrahepatic biliary system
 Surgery of the small intestines and colorectum (benign and malignant diseases)
 Appendicitis
 Surgery of the liver, pancreas and spleen. (injuries, inflammatory diseases and tumors)
 Bowel obstructions
 Hernias
 Basic principles in vascular surgery
 Shock. Cardiopulmonary resuscitation. intensive therapy
 General principles of traumatology.
 First aid.
 Traumatological management of catastrophes.
 Burned patients.
 Urology Consultation

Practices (1 hour per week)

Visiting patients' ward
 Visiting operating theater
 Visiting patients' ward
 Visiting patients' ward
 Visiting operating theater
 Visiting operating theater
 Visiting patients' ward
 Visiting patients' ward
 Visiting operating theater
 Visiting patients' ward
 Visiting patients' ward
 Visiting patients' ward
 Visiting operating theater
 Visiting operating theater
 Visiting patients' ward

Note: The maximum number of absences in a semester is 3.
 More than 3 absences invalidate the semester
 Practical course grade
 Final examination

ORAL AND MAXILLOFACIAL SURGERY II.

Department of Oro-Maxillofacial Surgery and Stomatology

Tutor: *Dr. Kinga Körmöczi*

First Semester

Lectures (1 hour per week)

- Odontogenic inflammation I. Pathology, pathophysiology, and microbiology of pyogenic inflammation. Work safety protection training.
- Odontogenic inflammation II. Clinical features, diagnosis, therapy. The question of dental foci.
- Odontogenic inflammation III. Maxillofacial inflammation.
- Odontogenic cysts I. Clinical classification of odontogenic cysts, the pathomechanism of their formation. Diagnosis, differential diagnosis.
- Odontogenic cysts II. The surgery of odontogenic cysts. Cystectomy, cystostomy, decompression methods.
- Non-odontogenic cysts. Developmental cysts. Pseudocysts. Soft tissue cysts.
- Endodontic surgery. Indications and operative technique of apicectomy. Retrograde root filling. The hemisection of teeth.
- Written midterm.
- The surgery of impacted teeth I. Disorders of the eruption of third molars. Clinical aspects of the prognosis of third molars. Diagnostics of mandibular third molars.
- The surgery of impacted teeth II. Surgical technique of the removal of mandibular third molars. Post-operative follow-up treatment of mandibular third molars, complications of their removal. Clinical features of maxillary third molars.
- The surgery of impacted teeth III. Disorders of the eruption of upper canines. Prognosis, diagnosis and surgical treatment. Clinical features of other impacted and supernumerary teeth.
- Special needs dentistry.
- Emergency medicine in dental surgery. Emergencies in the dental practice. Management of “high risk” patients.

Practices (3 hours per week) Practising minor oral surgery

Note: The maximum number of absences in a semester is 3. More than 3 absences invalidate the semester. During the semester three midterm examinations should be passed.

Recommended literature:

1. Michael Miloro, G. E. Ghali, Peter E. Larsen, Peter Waite, Peterson's Principles of Oral and Maxillofacial Surgery, Springer, 2022
2. James R. Hupp, Myron R. Tucker, Ellis, Edward, III, DDS, MS, Contemporary Oral and Maxillofacial Surgery, Elsevier Books, 2018
3. Peter A. Brennan (Author), Henning Prof Dr Schliephake (Author), G.E. Dr. Ghali DDS MD FACS (Author), Maxillofacial Surgery, 3rd Edition, Churchill Livingstone 2017

ORAL AND MAXILLOFACIAL SURGERY III.

Department of Oro-Maxillofacial Surgery and Stomatology

Second Semester

Lectures (1 hour per week)

- Developmental anomalies I. Complex therapy of cleft lip and palate. Craniofacial malformations.
- Developmental anomalies II. Surgical management of dysgnathia.
- Preprosthetic surgery I. Basic principles.
- Preprosthetic surgery II. Edentulous jaws. Osteoplasty. Corrections of soft tissues.
- Salivary gland diseases. Diagnostics and therapy.
- Oral surgical aspects of maxillary sinus I. (pathology, diagnostics)
- Oral surgical aspects of maxillary sinus II. (sinus apertus)
- Dentoalveolar trauma. Injuries of neighbouring soft tissues, principles of management. Clinical aspects of tooth replantation: indication, technique, prognosis.
- Written midterm.
- Oral surgical aspects of antiresorptive therapy and irradiation.
- Diseases of the temporomandibular joint (diagnosis and management).
- Facial pain. The origin of different facial pain. Diagnosis and differential diagnosis of facial pain. Neuralgia.
- Laser surgery. Physical properties of laser. Laser devices. Possibilities of laser surgery.

Practices (3 hours per week)

Practising minor oral surgery

Note: The maximum number of absences in a semester is 3. More than 3 absences invalidate the semester. During the semester three midterm examinations should be passed
Practical course grade

Recommended literature:

1. Michael Miloro, G. E. Ghali, Peter E. Larsen, Peter Waite, Peterson's Principles of Oral and Maxillofacial Surgery Springer, 2022
2. James R. Hupp, Myron R. Tucker, Ellis, Edward, III, DDS, MS, Contemporary Oral and Maxillofacial Surgery, Elsevier Books, 2018
3. Peter A. Brennan (Author), Henning Prof Dr Schliephake (Author), G.E. Dr. Ghali DDS MD FACS (Author), Maxillofacial Surgery, 3rd Edition, Churchill Livingstone 2017

ORTHODONTICS PRE-CLINICAL

Department of Orthodontics and Pediatric Dentistry

Head of Department: *Dr. Noémi Katinka Rózsa D.M.D., Ph.D.*

tel: (1)-4591500/ 59268

E-mail: noemirozsa65@gmail.com

Tutor: *Dr. László Miklós Kaán D.M.D., Ph.D.*

Phone: (1)-4591500 / 59270

E-mail: kaanm@dent.semmelweis-univ.hu

First semester

The aim of training

Preparing the dental students for the practical education of orthodontic health care, focusing primarily on the development of the manual skills.

Training form and time frame

Practical education: 1 hour/week

Form of examination: practical mark based on the practical performance

Comment: The practical education takes place in 7x2 hours. Training starts in the spring semesters only.

The minimal conditions of participation

Successful final examination of oral biology subject

The used method

According to the detailed syllabus, presentation of the current appliance types on a sample, and/or with multimedia methods. The activation of the appliances, wire- and arch bending practiced individually. Individual practice of bracket bonding with the help of typodonts and phantoms. The students are working under the supervision and management of the instructor.

Detailed syllabus

1. The categorization of appliances, the basic principles of their functions, basics of the orthodontic biomechanics
2. The function of the discernible appliances, their activation, elements, wire bending practice
3. The characteristics of metallic alloys used in orthodontics, their usability, wire bending practice
4. The activation of the appliances, their elements, accessories, bracket bonding systems
5. The operation principle of the typodont, its application, the use of the ligatures
6. Arch bending on a model, using typodont
7. Friction-proof systems, loop bending methods

GENERAL AND DENTAL RADIOLOGY I.

Department of Oral Diagnostics

Address: Bp. VIII., Szentkirályi u. 47. 1088

Phone: 459-1500/59161, 317-1044

Lecturer: **Prof. Dr. Csaba Dobó Nagy**

E-mail: oralis.diagnosztika@dent.semmelweis-univ.hu

First Semester

Lectures (1 hour per week)

1. Normal anatomy of the teeth
2. Normal anatomy of the jaws, development of the teeth
3. Interpretation of radiographs
4. Caries, pulp cavity; Extraction of the teeth
5. Periapical lesions; Root canal filling
6. Periodontal disease
7. Cysts of the jaws; Resorption of the teeth
8. Hypercementosis, tumors, anomalies
9. Extraoral techniques
10. Panoramic radiography
11. Cone-beam CT
12. Digital imaging systems
13. Imaging of the temporomandibular joint
14. Paranasal sinuses.

Practices (2 hour per week)

1. Tooth anatomy
2. Anatomical landmarks. Part one
3. Anatomical landmarks. Part two
4. Caries
5. Development of the teeth, extraction
6. Periapical lesions
7. Periodontal disease
8. Cysts
9. Hypercementosis, tumors, resection
10. Anomalies, Midterm
11. Complex practice, selected X-ray images
12. Practicing bisecting technique
13. Practicing parallel technique
14. Analyzing the intraoral X-ray images of the exam

Note: Students must attend on the practices.

The signature will be refused, if the student was absent in more than 25% of the duration of the practices. Successful completion of the midterm („satisfactory“ mark at least) and attendance on the practices according to the Study and Examination Policy.

GENERAL AND DENTAL RADIOLOGY II.

Department of Oral Diagnostics

Address: Bp. VIII., Szentkirályi u. 47. 1088

Phone: 459-1500/59161, 317-1044

Lecturer: **Prof. Dr. Csaba Dobó Nagy**

E-mail: oralis.diagnosztika@dent.semmelweis-univ.hu

Second Semester

Practices (1 hour per week)

1. Panoramic anatomy of hard and soft tissues I.
2. Panoramic anatomy of hard and soft tissues II.
3. Interpretation of panoramic imaging, errors on panoramic radiographs.
4. Anomalies and developmental disorders
5. Periapical lesions and periodontal diseases 1. Midterm
6. Odontogenic and non-odontogenic cysts
7. Dysplasia, hypercementosis, regressive alterations of teeth 2. Midterm
8. Tumors
9. TMJ pathology
10. Pathologic disorders of paranasal sinuses
11. Fractures in the dentomaxillofacial region 3. Midterm
12. Radiologic signs of certain treatments
13. Incidental findings on panoramic X-ray images
14. Analyzing the X-ray images of the final exam

Note: Students must attend on the practices.
 The signature will be refused, if the student was absent in more than 25% of the duration of the practices.
 Successful completion of the midterm („satisfactory” mark at least) and attendance on the practices according to the Study and Examination Policy.
 Final exam

PSYCHIATRY

Tutor: *Dr. János Réthelyi*

Department of Psychiatry and Psychotherapy

Lectures: 1/week

Textbook:

Kaplan&Sadock's Synopsis of Psychiatry. Tenth Edition. Eds: B.J. Sadock V.A. Sadock, Lippincott Williams, 2007

Schedule

- Subject of psychiatry, classification of disorders, diagnostic methods
- Case demonstration (psychiatric interview, signs and symptoms)
- Affective disorders
- Case demonstration (depression)
- Anxiety, anxiety disorders, somatoform disorders
- Case demonstration (anxiety disorder)
- Organic psychiatry
- Case demonstration (dementia)
- Substance related disorders
- Case demonstration (alcohol abuse)
- Schizophrenia and associated disorders
- Case demonstration (schizophrenia)
- Emergency in psychiatry, legal aspects
- Case demonstration, consultation

Note: The maximum number of absences in a semester is 2 of the case demonstrations. More than 2 absences invalidate the semester.

Exam: written exam (multiple choice)

NEUROLOGY

Tutor: *Dr. Dániel Bereczki*

First Semester

Classroom lectures:

- Cranial nerves and the brainstem
- The motor system
- The sensory system, pain syndromes
- Altered consciousness. Emergency in neurology
- Diagnosis and treatment of cerebrovascular disorders
- Epilepsy and sudden loss of consciousness
- Movement disorders
- Inflammatory disorders and tumors of the nervous system

Bedside practice, patient demonstration

- Recognition of neurological symptoms – examination of cranial nerves
- Examination of the motor system
- Evaluation of neurological symptoms
- Emergency in neurology
- Demonstration of cerebrovascular patients
- Diagnosis of epilepsies
- Special investigation of patients with movement disorders

Requirements:

- Attendance at the lectures is optional, but recommended, as the end-of-semester colloquium questions are closely based on the information presented in the lectures.
- The type of the exam: colloquium. Topic: the material of the lectures given during the semester. All students are required to take a written test, which is passed if they pass 60 %. Students who have attended 75 % (it should be documented) of the lectures can choose between an oral and a written colloquium exam.

Basic reading:

- 1 *Fuller G.* Neurological Examination Made Easy (3rd edition) Churchill Livingstone, Published April 2004. ISBN 0443074208

Suggested reading:

- 1 *Lindsay K., Bone I., Callender R.:* Neurology and Neurosurgery Illustrated., 4th edition Churchill Livingstone – Published February 2004. ISBN 0443070563

PERIODONTOLOGY I, II.

Department of Periodontology

First Semester

Course Director: **Prof. Dr. Péter Windisch**

Lectures (1.5 hours per week)

Practices (0.5 hour per week)

Credit 2

Lectures:

- Introduction to Periodontology
- Etiology of periodontal disease
- Anatomy and morphogenesis of periodontal tissues
- Periodontal microbiology
- Local factors, dental plaque, biofilm
- Periodontal epidemiology. Incides
- Pathomechanism of periodontal disease I. Immunological considerations
- Pathomechanism of periodontal disease II.

- Clinical and radiological diagnostics
- Individualised oral hygiene
- Local risk factors
- General risk factors
- Treatment phases of comprehensive periodontal treatment
- Written exam

Goal of practices: Students will practice on dental mouldages the basic preiodontal diagnostical features as well the most common non-surgical periodontla therapies. The importnace of individual oral hygiene will be also highlighted.

Second Semester

Lectures (1 hour per week)

Practices (2 hours per week)

Seminars (1 hour per week)

Credit: 4

Lectures:

- Treatment of acute periodontal diseases
- The importance and steps of the periodontal cause related therapy
- Cause related therapy. Professional mechanical plaque control
- Elimination of plaque retentive factors
- Splinting techniques in periodontology
- Chemical plaque control and antibiotics

- General aspects of classifications. The new of classification of periodontal diseases
- Classification of periodontal diseases I. Gingival diseases
- Classification of periodontal diseases II. Attachment apparatus
- Non-plaque related periodontal conditions. Gingival recession
- Differential diagnosis and therapy of endoperiodontal lesions
- Periodontal disease as a focal disease. Periodontal medicine + cardiovascular disease
- Reassessment of the initial phase. Periodontal maintenance

Goal of practices: Students will be able to diagnose the diseases of the gum and the attachment apparatus, diagnose the clinical manifestations of systemic diseases, provide oral prophylaxis, non surgical pocket therapy

Note: The maximum number of absences in a semester is 3.

More than 3 absences invalidate the semester.

During the semester two midterm demonstrations should be passed.

DENTAL ETHICS

First Semester

Bioethics

Course Syllabus.

Institute of Behavioral Sciences

Course Director: **Prof. Dr. József Kovács**
(28 hours)

Course objectives:

- a. To enable students to recognize ethical issues when encountered in everyday clinical practice and research
- b. To provide students with a conceptual-logical system, which helps them to address ethical questions and to resolve ethical dilemmas in an efficient way
- c. To introduce students to a body of knowledge, which helps them to understand, respect and protect the rights of patient research subjects and fellow health care professionals
- d. To help the would be health care professional to understand the responsibility of the individual, of the health care system and of the society as a whole in maintaining health

Lectures

1. week

Basic concepts of ethics.

Descriptive ethics, normative ethics, metaethics.

General ethics and applied ethics.

Bioethics, medical ethics, health care ethics. Similarities and differences.

The role of bioethics in a pluralistic society.

The relationship between law and ethics.

Reasoning in ethics. The most common mistakes.

2. week

Normative theories of ethics.

Deontological theories of ethics. (The Golden Rule, Kant and the categorical imperative, the principle of double effect, W.D. Ross and the prima facie duties.)

Teleological theories of ethics. (Act and rule utilitarianism.)

Theories of natural law.

Contractarian theories of ethics. (The theory of justice of John Rawls)

3. week

The basic principles of dental ethics.

The principle of respect for autonomy.

The principle of non-maleficence.

The principle of beneficence.

The principle of justice.

Arguments against „principalism“.

4. week

The concept of health and disease.

Naturalistic definitions of health.

The medical model of defining health.

Normativist definitions of health.

Some questions of psychiatric ethics.

5. week

Informed consent.

Simple consent and paternalism in medicine.

The emergence of the doctrine of informed consent.

Standards for information disclosure for patients.

When is informed consent not necessary?

Standards of competence and incompetence.

The right to refuse medical treatment.

Some psychological and communicational aspects of informed consent.

6. week

Information disclosure to terminally ill patients. Telling the truth to patients.

The history of information disclosure to terminally ill patients.

Pros and cons for lying to terminally ill patients.

The weaknesses of the arguments in favour of lying.

The dying process according to E. Kübler-Ross.

How to communicate the bad news to terminally ill patients.

The physician's relationship with the relatives of the deceased patient.

7. week**Justice in Health Care I. Ethical questions of macroallocation.**

Higher and lower level macroallocational problems.

The role of personal responsibility in maintaining health.

The principles and practice of rationing in contemporary health care systems. (Soft and hard rationing.)

Medical ethics and medical economics. Ethical questions of cost-benefit and cost effectiveness analysis. The QALY.

The problem of right to health care. (The libertarian, the liberal and the socialist views about the right to health care.)

The role of the market and that of the state in the health care system.

Ethical problems of financing health care. (Fee-for-service, capitation, fixed salary, DRG-system, etc.)

Setting health care priorities in Oregon.

Attempts to define a just health care system.

8. week**Ethical questions of reproductive medicine.**

Abortion.

Artificial insemination from donor.

In vitro fertilization, surrogate motherhood.

Ethical questions of genetic counseling.

Ethical questions of embryo experimentation.

9. week**Justice in Health Care II. Ethical questions of microallocation.****Moral dilemmas in the allocation of scarce medical resources.**

The concept of microallocation.

Ethical analysis of various selection criteria. (Medical benefit, psychological ability, supportive environment, social value criterion, resources required criterion, age, ability to pay, random selection, personal responsibility for the illness, etc.)

10. week**Ethical questions of animal experimentation.**

History of the thinking about the moral status of animals.

The philosophical significance of the Darwinian conception of nature.

The views of Peter Singer: antispeciesism.

The views of Tom Regan: animal rights.

Ethical questions of experimentation on animals on the basis of a moderate animal protectionist's view.

Critical anthropomorphism.

Alternatives to animal experimentation.

11. week**Euthanasia and the withholding of life-sustaining treatment**

Definitions.

The sanctity of life versus the quality of life doctrine.

Is there any difference between active and passive euthanasia?

The practice of active euthanasia in the Netherlands. The Rummelink Report.

Refusal of life sustaining treatment by competent and incompetent patients.

Possibilities to extend the autonomy of patients: living will, durable power of attorney, substituted judgement, etc.

The concept of medically futile treatment.

Ethical problems of the treatment of handicapped newborns. (The debate about the treatment of spina bifida babies, the Baby Doe case, the legal situation, etc.)

12. week**Ethical questions of human experimentation.**

Possible forms of experimentation on humans.

Contradiction between the two roles of the physician. (Healer and scientist.)

The ethics of Randomized Controlled Clinical Trials. (RCT)

Randomization and prerandomization.

13. week**Ethical questions of organ- and tissue transplantation.**

Some problems of justice concerning kidney transplantation and chronic haemodialysis.

Ethical questions of transplantation from living kidney donors.

The concept of death.

Ethical questions of organ harvesting from the dead.

The debate about the market of organs.

Ethical questions of using embryo- or foetal tissue in human therapy.

Ethical problems of using anencephal newborns as organ donors.

14. week**The rights of patients.**

The role of patient's rights in the transformation of the paternalistic physician-patient relationship.

Moral versus legal rights.

A list of basic rights of patients.

Mechanisms to ensure the realizations of patient's rights. (Patient's rights advocates, ombudsman, hospital ethics committees, institutional review boards, arbitration, etc.)

Course Faculty:

Prof. József Kovács, MD, PhD, (Head of the Department of Bioethics), 210-2930/56350;

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Ágnes Dósa, MD, JD, PhD e-mail: dosaagi@yahoo.com

Imre Szabik, MD, PhD e-mail: szabimre@net.sote.hu

Jeno Lorincz, MD, JD e-mail: lorjen@net.sote.hu

Department:**Institute of Behavioral Sciences****Department of Bioethics**

NET Building, 19th, 20th floor

1089. Budapest, Nagyvárad tér 4.

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Secretary: NET Building, 20th floor, Room-2005

List of questions

1. Deontological theories of ethics.
2. Utilitarian theories of ethics.
3. The principles of dental ethics
4. Justice and dental ethics: the allocation of scarce medical resources.
5. Paternalism in dental practice
6. Informed consent
7. Information disclosure for terminally ill patients
8. Advance Directives
9. Experimentation on human subjects
10. Objection to Transplantation of Organs and Counterarguments
11. Ethical problems of live organ donation
12. Organ donation from brain-dead donors: the system of donor cards.
13. Organ donation from brain-dead donors: presumed consent
14. Active and Passive Euthanasia
15. Withdrawing and withholding life sustaining treatment.
16. Models of the dentist-patient relationship
17. Ethical issues related to treating patients with partially compromised capacity
18. Professional norms and bad outcomes
19. Ethical questions raised by HIV and AIDS in dental practice
20. Confidentiality issues in dental practice
21. Moral issues related to the HIV positive dentist
22. Possible criteria for distributing the society's resources
23. Social justice – the free market view of justice
24. Ethical issues in advertising dental services
25. Professional obligations in dentistry

Textbook:

Conrad Fischer—Caterina Oneto (2016): Medical Ethics for the Boards. (Third edition) New York: McGraw-Hill Education.
 ISBN: 978-1-259-64121-3
 MHID 1-25-964121-X

Important:

To participate on at least 75% of the total number of lessons is a prerequisite of getting the signature. Doctor's certificate is required to justify absence from the lessons and the exam.
 Sign up for the exam: through the Neptun system.

GNATHOLOGY – lectures and practices

Department of Prosthodontics

Lecturer: *Prof. Dr. Péter Hermann*

First Semester

Lecture (1 hour/week)

Practice (2 hours/week)

The theme of the seminars:

1. Introduction to the subject, introductory seminar
2. Online moodle learning module: Introduction into the Anatomy and Physiology of the Stomatognathic System. Mandibular Positions: Rest Position, ICP, CR, CO
3. Seminar material which requires personal attendance: Introduction into the Anatomy and Physiology of the Stomatognathic System. Mandibular Positions: Rest Position, ICP, CR, CO
4. Online moodle learning module: Mandibular Movements: Rotation and Translation Opening and Closing, Protrusion-retrusion, Eccentric Movements and Border Movements
5. Seminar material which requires personal attendance: Mandibular Movements: Rotation and Translation Opening and Closing, Protrusion-retrusion, Eccentric Movements and Border Movements
6. Online moodle learning module: Simple Hinge, Average Value Articulators, Fully Adjustable Articulators
Mounting with the Bonwill Triangle. Individual mounting, the Use of Face-bow.
7. Seminar material which requires personal attendance: Simple Hinge, Average Value Articulators, Fully Adjustable Articulators
Mounting with the Bonwill Triangle. Individual mounting, the Use of Face-bow.
8. Online moodle learning module: Registration of Maxillomandibular relationships
9. Seminar material which requires personal attendance: Registration of Maxillomandibular relationships
10. Online moodle learning module: Adjustment of the Articulator
11. Seminar material which requires personal attendance: Adjustment of the Articulator
12. Online moodle learning module: Gnatological Aspects in the Manufacturing of Prosthetic Appliances. Axiography, Digital Analysis of Movements and the Arcus Digma System. Temporomandibular dysfunction, orofacial pain
13. Seminar material which requires personal attendance: Gnatological Aspects in the Manufacturing of Prosthetic Appliances. Axiography, Digital Analysis of Movements and the Arcus Digma System. Temporomandibular dysfunction, orofacial pain
14. Consultation

IMPLANTOLOGY I. – lecture

Department of Oro-Maxillofacial Surgery and Stomatology

Lecture: 1 hour/week

Course Syllabus:

- Introduction. History of oral implantology. The classification of oral implants, according to the anatomic site. Endosteal implants.
- The indications, contraindications of implant treatment.
- Diagnostics and treatment planning.
- General considerations of implant surgery.
- Special considerations of implant surgery. The time of implant placement.
- The fundamental biomechanics of oral implants.
- The role of surface chemistry and topography in the osseointegration
- The essential conditions of success of the implant therapy I. Biocompatibility. Osseointegration.
- The essential conditions of success of the implant therapy II. Gingival seal. Progressive osseointegration.
- The essential conditions of success of the implant therapy III. The factors influencing the masticatory load transmission through implants.
- The fundamentals of implant prosthodontics I. Implant abutments, impression techniques.
- The fundamentals of implant prosthodontics II. Prosthetic options on implants.
- Implant failures. Biological, mechanical complications and their management.

Practice: 1 hour/week

Practice of Implantology complements and deepens the knowledge obtained during the theoretical course

- Diagnostics – X-ray diagnostics, CBCT analysis, introduction of X-ray and surgical template
- Introduction of the implant surgery through the system of the Straumann – emphasize on the unique properties of the system (surface, comparison of 1-stage / 2-stage surgical method
- Introduction of the implant prosthodontics through the SIC system – emphasize on the unique properties of the system, prosthetics of the SIC system. Practicing the steps of the prosthetics on a model, cad-cam based prosthetic abutment, safe on four concepts, platform switching, Balance healing screws and and abutments
- Guided bone regeneration through the products of Geistlich company – introduction of the methods of bone augmentation techniques, sinus-liftig, lateral bone augmentation practicing on models
- Introduction of the guided implant surgery Nobel Biocare Guide System overview – emphasize on the unique properties of the system
- Introduction of the failures of implantology and their solutions through the Osstem system – emphasize on the unique properties of the system, practicing on models

EMERGENCY DENTISTRY

Department of Community Dentistry

Head of department and lecturer: **Dr. Orsolya Németh**

1st semester: lecture, seminar, and practice

2nd semester: only practice

lectures: a total of 3 (only in the first three weeks)

seminars: weekly 1 (from the fourth week)

practice: 1,5 hours/week

The purpose of the subject is that the dental student would be able to recognize and cope with the possible daily emergency cases at the dental practice.

In the 21st century dental emergency does not mean only extractions. It also includes Conservative Dentistry, Prosthetics, Pedodontics, Orthodontics as well as Peridodontal aspects.

In the first three weeks of the semester, we define Emergency care in three lectures.

At the seminars in smaller groups, the theoretical background of the practices is presented through case reports.

The formation of the groups in the practices enables the “shadowing” system, where a maximum of two students work next to one supervisor.

The curriculum of the Emergency Dentistry is an integral part of the other subjects, but it is necessary to teach this special field of dentistry separately. Department of Community Dentistry is responsible for all Budapest and Pest region dental care and, therefore can provide a sufficient number of patients for practical education.

Obligatory SUMMER PRACTICE

4-weeks (120 hours) at a Dental Office

(Conservative Dentistry of Periodontology)

The student has to practice whole-scale comprehensive dental treatment including: Oral Prophylaxis, Restorations, Root Canal Therapy and Minor Prosthodontics as well as Er. Management.

Important note: Document certifying the completion of the practice must be handed in at registration! Registration to the next year is not allowed without it!

Physical Education VII-VIII.

Lessons (in hours): 14 lectures: 0 practicals: 14 seminars: 0

Lecturer of the course: Várszegi, Kornélia

Contact: Testnevelési és Sportközpont

Phone: +36-1/ 264-1408

Detailed course/lecture description*: *(to facilitate credit recognition in other institutions)*

Within the framework of obligatory regular physical activity, the requirements of the subject can be fulfilled as free of charge and self-financed student as well. The former is available during classes and courses organized by the Semmelweis University's Centre for Physical Education and Sports (TSK), and the latter is available at SE-TSK accredited partner locations.

Free of charge:

60 minute classes held at the same time on a weekly basis, on the premises of the TSK facilities and other locations.
1107 Bp, Zágrábi utca 14.

1×60 min./week sessions:

Aerobics, BlessYou Gym, boulder, functional circuit training, golf, beginner Yoga, advanced Yoga, male football, salsa, step aerobics, badminton, beginner ultimate Frisbee, advanced ultimate Frisbee, Zumba

1×90 mins./week sessions:

women's football, ice hockey, beginner tennis, beginner tennis 2,

4×3 hrs. and 1×2 hrs. session packages:

Hiking 1, Hiking 2.

2×90 mins./week sport training (competitive sport, for qualified only):

cheerdance, cheerleader, men's football, handball, basketball, volleyball

Fee-based:

at the sports venues specified on www.semmelweis.hu/sportkozpont, which will also be advertised on the Neptun system. The list of these locations may vary per school year.

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes!

Important note: Document certifying the completion of the practice must be handed in at registration! Registration to the next year is not allowed without it!

* Detailed and numbered for each week of theoretical and practical lessons one by one, indicating the names of lecturers and instructors

CLINICAL MODULE

New curriculum to be introduced
Please, follow the updated version on the home page



Faculty of Dentistry
5th year

STUDY PROGRAMME
CLINICAL MODULE

9th semester				
subjects code	subjects	credit code	examination	prerequisites
obligatory	Clinical Dentistry I.*	C2L0P5	term grade	Restorative Dentistry and Endodontics III., Prosthodontics III.
obligatory	Restorative Dentistry and Endodontics IV.	C3L0P4	term grade	Restorative Dentistry and Endodontics III., Prosthodontics III.
optional	Forensic Dentistry	C1L1P0	examination	Pharmacology II., Internal Medicine II, Pathology
obligatory	Oral and Maxillofacial Surgery IV.	C5L1P5	term grade	Implantology I., Periodontology II., Oral and Maxillofacial Surgery III.
obligatory	Implantology II.	C1L1P0	comprehensive examination	Implantology I., Periodontology II., Oral and Maxillofacial Surgery III.
obligatory	Orthodontics I.	C5L1P4	term grade	Orthodontics Pre-clinical, Prosthodontics III., Restorative Dentistry and Endodontics III.
obligatory	Pedodontics I.	C5L1P4	term grade	Orthodontics Pre-clinical, Prosthodontics III., Restorative Dentistry and Endodontics III.
obligatory	Periodontology III.	C3L1P2	term grade	Periodontology II., Implantology I., Oral and Maxillofacial Surgery III.
optional	Prehospital Emergency Medicine	C1L1P0	examination	Internal Medicine II., First Aid, Pharmacology II.
obligatory	Prosthodontics IV.	C3L0P4	term grade	Restorative Dentistry and Endodontics III., Prosthodontics III.
obligatory	Oral Medicine II.	C1L1P0	comprehensive examination	Oral Medicine I., Oral Diagnostics, Oral and Maxillofacial Surgery III.
	Total Credit	30		

*at the Dept. of Prosthodontics or at the Dept. of Conservative Dentistry

#The grade influences the qualification of the diploma.

15 credits should be gained from the elective subjects during th 5-year studies.

C = Credit point

L = Lecture (hours/week)

P = Practice (hours/week)

CLINICAL MODULE				
10th semester				
subjects code	subjects	credit code	prerequisites code	prerequisites
obligatory	Clinical Dentistry II.*	C2L0P5	term grade	Clinical Dentistry I., Restorative Dentistry and Endodontics IV., Prosthodontics IV.
obligatory	Restorative Dentistry and Endodontics V.	C3L0P3	comprehensive examination	Restorative Dentistry and Endodontics IV., Prosthodontics IV.
optional	Dermatology	C1L1P0.5	examination *	Pharmacology II., Internal Medicine II.
obligatory	Gerostomatology	C2L1P1	examination *	Gnathology, Prosthodontics IV., Oral Medicine II.
optional	Obstetrics and Family Planning	C1L1P0	examination	Internal Medicine II., Pharmacology II.
obligatory	Oral and Maxillofacial Surgery V.	C4L1P3	comprehensive examination	Implantology II., Oral and Maxillofacial Surgery IV., Periodontology III.
obligatory	Orthodontics II.	C65L1P5	comprehensive examination	Orthodontics I.
obligatory	Pedodontics II.	C65L1P5	comprehensive examination	Pedodontics I.
obligatory	Periodontology IV.	C3L1.5P2	comprehensive examination	Periodontology III.
obligatory	Prosthodontics V.	C3L0P3	comprehensive examination	Restorative Dentistry and Endodontics IV., Prosthodontics IV.
	Total Credit	29		
	Diploma work	C20		

Important note: Signing up for Physical Education (PE) IX. in the 1st semester and for PE X. in the 2nd semester is obligatory.

Explanation

15 credits should be gained from the **elective subjects** during the 5-year studies – see the elective list after the 3rd year study program

The grade influences the qualification of the diploma

C = Credit point

L = Lecture (hours/week)

P = Practice (hours/week)

*Semmelweis Symposium only for 3rd or 4th year students

LIST OF TEXTBOOKS (The list may change!)

- 1 Becker W.-Naumann H.- Pfaltz R.: Ear, Nose and Throat Diseases. Thieme. Stuttgart, 1994. ISBN 3-13671202-1.
- 2 Répássy,G.: Otolaryngology. Eger, Radó Ny. 2000.
- 3 Current Pediatric Diagnosis and Treatment. 13th ed. W.E.Hathaway, W.W.Hay. Appleton and Lange Medical Book. ISBN 0838514006, ISSN 0093-8556
- 4 Lecture Notes of Forensic Medicine (Bp.) 1994.
- 5 Gerhard K. Lang: Ophthalmology / a Pocket Textbook Atlas. Thieme / 2000. ISBN 3-13-126161-7 (GTV) ISBN 0-86577-936-8 (TNY) 1 2 3 4 5
- 6 Dénes J.-Gábris K.-Hidasi Gy.-Tarján I.: Pedodontics. Bp. SOTE 1995.
- 7 Andlaw, R.J.-Rock,W.P.: A Manual of Pediatric Dentistry. 1998. ISBN 0443053723
- 8 T.G.Wilson-K.S.Kornman: Fundamentals of Periodontics Quintessence. 1996. ISBN 0-86715-303-2
- 9 R.A.Cawson-E.W.Odell: Essentials of Oral Pathology and Oral Medicine. Churchill Livingstone, 1998. ISBN 0-443-06121-1
- 10 Szabó Gy.: Oral and Maxillofacial Surgery. Bp. Semmelweis Publ. 2001.
- 11 Bricker,S.L.-Langlais,R.P.-Miller,C: Oral Diagnosis, Oral Medicine and Treatment planning. 2nd ed. 2002. B.C.Decker Inc. Hamilton London 2002.
- 12 McCracken's Removable Partial Prosthodontics (10/e) Glen P. McGivney-Alan B. Carr. Hardback, Mosby, 1999. ISBN 0323006787
- 13 Schillinburg et al.: Fundamentals of Fixed Prosthodontics. Quintessence 4th ed. 2012. ISBN 93 13
- 14 R.M. Basker-J.C. Davenport: Prosthetic Treatment of the Edentulous Patient. 5th ed. McMillan Press Ltd. ISBN 978-1405192613, 2011.
- 15 C.M.Sturdevant: Operative Dentistry. Mosby. ISBN 0-80166366-0
- 16 Walton: Principles and Practice of Endodontics.
- 17 Niklaus P. Lang, Jan Lindhe (ed.): Clinical Periodontology and Implant Dentistry (Wiley Blackwell, 2015)
18. Proffit, WR, Fields, DW, Larson, B, Sarver, DM.: Contemporary Orthodontics 6 th ed., Mosby, 2018.
19. Mitchell, L.: An introduction to orthodontics, Oxford Publishing, 2011.

Recommended textbooks:

- 1 J Hunter, J Savin, M Dahl: Clinical Dermatology, 4th ed. Blackwell Publishing, 2007, Paperback, ISBN 9781405146630
- 2 J Bologna, J Jorizzo, R Rapini: Dermatology, 2nd ed. Elsevier, 2007. Hardback, ISBN 9781416029991
- 3 DJ Gawkrödger: Dermatology. An illustrated colour text, 4th ed. Churchill Livingstone Elsevier, 2007, Paperback, ISBN 9780443104213
- 4 JE Fitzpatrick et al: Dermatology Secrets in Color with Student Consult Access. 3rd ed. Hanley & Belfus, 2006. ISBN 1560536160
- 5 R. Graham-Brown, J Bourke: Mosby's Color Atlas and Text of Dermatology. 2nd ed. Elsevier Mosby, 2006. ISBN 072343364X
- 6 M Leibold et al: Treatment of Skin Disease, 2nd ed. Elsevier Mosby, 2005, ISBN 0-32-3036031
- 7 M Leibold, W Heymann, J Berth-Jones, I Coulson: Treatment of Skin Disease. Comprehensive Therapeutic Strategies, Expert Consult – Online and Print Hardbound, 2009, ISBN: 0702031216
- 8 Online: www.lib.sote.hu – Adatbázisok, adattárak – OVID – Books@OVID – Dermatology – Fitzpatrick's Dermatology in General Medicine
- 9 Burkit's Oral Medicine: Lynch,A.M.& Malcom,A. Lippincott. 1996. ISBN 0-397-51242-2
- 10 European federation of Preiodontology – efp.org
International Team for Implantology –iti.org
ITI Treatment Guide – iti.org/ITI-Treatment-Guide
- 11 McDonald, F.-Ireland, A.J.: Diagnosis of the Orthodontic Patient. Oxford Univ. Press. 1998. ISBN 0-19-262889-5
- 12 Graber,T.M.-Vanarsdall,R.L.: Orthodontics. Current Principles and Technics. Mosby Year Book, Inc. 1994. 2nd ed. ISBN 0-8016-6590-6
- 13 D.Hull-D.I.Johnston: Essential Paediatrics. 3rd ed. Churchill Livingstone. 1994. ISBN 0-443-04782-0.
- 14 Hollwich, F: Pocket Atlas of Ophthalmology. Thieme Verl. 2nd Rev. Ed. Stuttgart, 1986. ISBN 0-86577 244 4
- 15 Knight's Forensic Pathology. 3rd ed. 2004. Arnold.
- 16 Manual of Emergency Medicine. 5th ed. By Jon L.Jenkins, G.R.Braen. 2004 Lippincott Williams and Wilkins. Product nr. 479531-1019
- 17 Neil-Walter: Partial Dentures. ISBN 06 32 08 025 8, 1986.
- 18 Neil-Nairne: Complete Denture Prosthetics. Wright. ISBN 72 36 20 636
- 19 Nikiforuk: Understanding Dental Caries.(1-2) Karger.
- 20 Hermann Péter, Szentpétery András: Gnatológia (Semmelweis Kiadó, 2018)

GEROSTOMATOLOGY

Department of Community Dentistry

Head of department: **Dr. Orsolya Németh**

Lecturer: **Dr. Péter Kivovics**

lecture: 1 hour/week

practice: 1 hour/week

Introduction of the concepts of Gerontology and Gerostomatology. Detailed description of dental and epidemiological characteristics of the elderly. Emphasis on psychological features.

In developed countries, the number of older people is increasing year by year. This is largely due to disease control, adequate nutrition, widespread basic health care and relatively long periods without war.

The majority of patients appearing in the dental office are considered elderly. Our course aims to provide an opportunity to gain a deeper understanding of the theoretical and practical knowledge of dental and oral surgery for elderly patients.

CLINICAL DENTISTRY I.-II.

There is no lecture on the subject of Clinical Dentistry, at the beginning of the practices the previously acquired theoretical curriculum from conservative dentistry and prosthodontics will be repeated in the form of a mandatory consultation, in weekly shifts.

PROSTHODONTICS IV-V.

First Semester

- Clinical practices, Integrated practices
- Treatment of partial edentulousness, fixed and removable dentures.
- No lectures.

Second Semester

Clinical practices integrated with the conservative dentistry. Complex treatment of different cases.
No lectures.

Restorative Dentistry and Endodontics IV.

Department of Restorative Dentistry and Endodontics

Head of Department: *Dr. János Vág DMD, PhD*

First semester

The subject is taught with four practical hours per week, there is no lecture.

During the exercises the students deal with root canal treatments and revisions within the framework of clinical care under the supervision of practice leader.

Attendance requirements and the possibility of making up for absences: Attendance at the practices is obligatory, and absences at any one practice may not exceed 25% of the total number of practices. Arriving late to the practices less than 15 minutes results in one absence after three times. Arriving late to the practices of more than 15 minutes counts as an absence. There is no possibility to make up a missed practice. No certificate is necessary in case of absence.

Signature requirements for the semester: A minimum of 75% attendance is required at the practices, and absence may not exceed 25% of the practices regardless of the reason. The signature of the semester, a sufficient level of continuous and consistent theoretical preparation, the passed demonstration, and a sufficient level of practical performance are required. The average grade of the theoretical part and the average grade of the practical part must separately reach the 2.0-grade. By week 13, a photo-documented report about an endodontic treatment made by the student must be submitted to the practice leader.

Type of the exam: Practice mark

Restorative DENTISTRY AND ENDODONTICS V.

Department of Restorative Dentistry and Endodontics

Head of Department: *Dr. János Vág DMD, PhD*

Second semester

Detailed course/lecture description:

Detailed weekly curriculum:

The subject is taught with three practical hours per week, there is no lecture.

During the exercises the students more independently and widely deal with the activities of the field of conservative dental care in the framework of clinical care under the supervision of the practice leader.

List of textbooks, lecture notes and recommended textbooks:

1. Ritter AV, Boushell LW, Walter R: Sturdevant's Art and Science of Operative Dentistry. 7th ed. St. Louis, Mosby, 2018.
2. Torabinejad M, Walton RE, Fouad AF: Endodontics. Principles and Practice. 5th ed. St.Louis, Missouri, Saunders/Elsevier 2014
3. Hargreaves KM, Berman LH: Cohen's Pathways of the Pulp. 11th ed. St. Louis, Missouri, Mosby/Elsevier 2015

Note: Attendance at the practices is obligatory, and absences at any one practice may not exceed 25% of the total number of practices (the maximum number of absences is 3)..During the semester one documented clinical case must be presented to validate the semester by earning the signature.

Type of the exam: Final exam

Requirements of the exam : The final exam consists of three parts. 1. Students draw one from each of the three questions. Each question is evaluated by a mark (3 marks, 20-20-20% of the final mark). 2. Students presents three photo-documented clinical treatments of their own works, which they had carried out during the five semesters of Restorative Dentistry and Endodontics, or during the two semesters of clinical dentistry, or during the summer internship at the Department of Conservative Dentistry. Each case is evaluated by a mark (3 marks, 10-10-10 % of the final mark). The three treatments to be presented are: - Multi-surface composite filling - a CAD/ CAM inlay or crown - Completed root canal treatment of a single or multi-rooted tooth 3. The third component of the final exam is the analysis of an intraoral radiograph. The student must determine what teeth are visible, what diagnosis can be made and what treatment is required (1 mark, 10% of the final mark). If any part of the examination failes (does not reach 2.0), the final exam fails as well. Exam questions are available on the Moodle interface.

List of final exam items:

Questions A:

1. Concept, localization, and progression of caries on the anatomical crown
2. Histology of caries (enamel, dentin, and root caries)
3. Manual and mechanically powered preparation equipments and instruments (micromotor, turbine, burs)
4. Isolation of teeth, methods and tools
5. Classification of cavities by Black, the basis of classification. Cavity design methods, nomenclature
6. Rules and steps of cavity design for aesthetic direct restoration
7. Class I cavity preparation for a composite filling
8. Class II cavity preparation for a composite filling
9. Class III cavity preparation for a composite filling
10. Class IV cavity preparation for a composite filling. Treatment of crown fractures of anterior teeth.
11. Class V cavity preparation and cavities prepared for cervical lesions for filling
12. Purpose and type of the fillings. Requirements for filling materials. Classification of filling materials.
13. Application of liners, bases and temporary filling. Polishing, removal and toxicology of amalgam fillings
14. Glass-ionomer cement and other polymeric materials (composition, indication and application)
15. Composites - materials science (composition, classification, properties)
16. Theory and clinical application of the adhesive technique
17. Matrices and matrix systems
18. Clinical technique for the preparation of class III and IV composite direct restoration
19. Clinical technique for the preparation of class I and V composite direct restoration
20. Clinical technique for the preparation of class II composite direct restoration

Questions B

1. Classification (inlay/onlay/overlay/endocrown/veneer/tabletop) and materials for indirect restorations.
2. Cavity preparation for direct and indirect restorations. Similarities and differences.
3. Indications, contraindications, materials and clinical steps for preparing metal inlays
4. Indications, contraindications, materials and clinical steps for preparing aesthetic (composite, ceramic, hybrid) indirect restorations. Dome concept
5. Digital and analogue impression technique for indirect restorations. Indication and application of sulcus retraction.
6. Chairside CAD/CAM technology. Basics of design and milling
7. Cementation of aesthetic indirect restorations (material science of adhesive cement, surface treatments of the tooth and the restoration, clinical steps of cementation)
8. Patient admission and treatment plan (general rehabilitation and sequence of restorative and endodontic dental treatments)
9. Equipment in the dental surgery, ergonomics, four-handed treatment, infection control

10. Caries diagnostic tools
11. Indications, contraindications and methods of tooth whitening. Possible side effects and their prevention.
12. Endodontic treatment of accidentally damaged teeth
13. Restorative and endodontic treatment for patients requiring special care. Odontogenic focal infection.
14. Surgical interventions in restorative dentistry and endodontics (crown lengthening, drainage, resection, hemisection, bicuspidation, amputation).
15. Aesthetic and functional restoration of root canal treated teeth (post and core buildup, single crown, endocrown, indirect restorations)
16. Evaluation of endodontic outcome, revision of unsuccessfully treated teeth.
17. Orthograde retreatment of failed root canal treatments.

Questions C

1. History taking, patient examination and treatment plan in endodontics
2. Tools for diagnosis in endodontics
3. Anatomy and histology of the pulp. Description of the pulp chamber.
4. Anatomy of the root apex and the periapex.
5. Pulpal and periapical diseases: diagnostic terminology, pathogenesis and microbiology
6. Differential diagnosis of pulpal and periapical diseases
7. Pathology, symptoms, diagnosis and therapy of pulpal diseases
8. Pathology, symptoms, diagnosis and therapy of acute (symptomatic) and chronic (asymptomatic) apical periodontitis and condensing osteitis
9. Pathophysiology, symptoms, diagnosis and therapy of acute and chronic apical abscess.
10. Concept, purpose, indication, contraindication and limitation of root canal therapy.
11. Preventive endodontics: the importance of pulp protection. Vital pulp therapies.
12. Emergency procedures in endodontics
13. Manual and mechanical instruments used in root canal treatment
14. Microbiological aspects of endodontics. Antiseptic solutions, drugs and their use in root canal treatment.
15. Access openings (trepanation) and pulp extirpation
16. Importance and methods of working length determination
17. Endodontic hand instruments and their use. Orifice opening and shaping
18. Preparation of the root canal using the step-back technique. Apical stop/apical seal.
19. Purpose, protocol and technique of root canal irrigation and local medication in endodontic treatment
20. Other manual and mechanical root canal preparation techniques (beyond the step-back)
21. Procedural errors during root canal preparation
22. Root canal obturation techniques (cold and warm guttapercha techniques)
23. Lateral condensation/compaction.

ORAL AND MAXILLOFACIAL SURGERY IV.

Tutor: *Dr. Kinga Körmöczy*

First Semester

Lectures

- The evolution of modern oral surgery in Hungary
- Current issues of anticoagulation
- Praecancerous lesions and conditions in the max.facial region. Screening and its importance.
- Benign tumors in the head and neck region.
- Malignant tumors in the head and neck region I. (Diagnosis, pathology)
- Malignant tumors in the head and neck region II. (complex treatment, surgical procedure)
- Reconstructive surgery in the maxillofacial region.
- Written midterm
- The modern diagnosis and therapy of maxillofacial traumatology
- Biological principles of bone healing and regeneration.
- Decision making in conservative and surgical orthognathia.
- The role of autologous blood products in regenerative surgery.
- General anesthesia in oral surgery and outpatient surgery.

Practices

A. Outpatient treatments:

Practicing simple and complex tooth extractions. Removal of teeth, roots and retained teeth. Practicing minor soft tissue surgeries. Assistance in various dentoalveolar surgical operations. Discussing the topics of the lecture. Regularly checking of the acquired theory.

B. Inpatient class practice:

1 week practice at in-patient ward. Getting insight in to the work of the Maxillofacial department. Surgical assistance in head and neck surgeries.

Note: The maximum number of absences in a semester is 3.
 More than 3 absences invalidate the semester.
 During the semester three midterm examinations should be passed.
 Practical course grade

ORAL AND MAXILLOFACIAL SURGERY V.**Second Semester**

Lectures (1 hour / week) **Practices** (3 hours / week)

- Diseases of the temporomandibular joint Part I. (Pathology, diagnostics)
- Diseases of the temporomandibular joint Part II. (Therapy)
- Peripheral nerve disorders in the head and neck region. Rehabilitation after the paresis of the Facial nerve
- Antibiotic treatment in dental surgery
- Maxillofacial reconstructive surgery Part I. (Reconstruction of soft tissues and bone by local flaps)
- (Reconstruction by microvascular grafts)
- Modern diagnostic methods in oral and maxillofacial surgery
- Systematic diseases in the head and neck region
- The promotion of the osteogenesis by distraction methods
- Biomaterials in the maxillofacial surgery
- Guest speaker
- Consultation

Practice 1 week practice at in-patient ward.
Getting insight in to the work of the Maxillofacial department.
Surgical assistance in head and neck surgeries.

Note: The maximum number of absences in a semester is 3.
More than 3 absences invalidate the semester.
During the semester three midterm examinations should be passed.

PEDODONTICS I.**Department of Orthodontics and Pediatric Dentistry****Head of Department: Dr. Noémi Katinka Rózsa** D.M.D., Ph.D.

Phone: (1)-4591500 / 59268

E-mail: noemirozsa65@gmail.com

Tutor: Dr. László Miklós Kaán D.M.D., PhD.

Phone: (1)-4591500 / 59270

E-mail: kaanm@dent.semmelweis-univ.hu

First Semester**Lectures** (1 hour/week)

1. The subject, signification and interactions of paediatric dentistry
2. Tooth development, anatomy and dentition of primary teeth
3. Developmental disturbances of permanent and primary teeth
4. Caries of primary teeth. Treatment possibilities
5. Consecutive illnesses of caries in primary dentition
6. Mechanism of second dentition. Physiological and pathological significance
7. Caries and treatment of permanent teeth
8. Consecutive illnesses of caries in permanent dentition
9. Psychological aspects of dental treatment during childhood
10. Filling materials in Paediatric Dentistry
11. Dental radiology in Paediatric dentistry
12. Dental anomalies in syndromes
13. Root-canal treatment of immature teeth, apexogenesis, apexification
14. Special aspects of prevention in paediatric dentistry and orthodontics

Practice (4 hours/week)

Treatment of patients.

Type of evaluation: Practical grade (1-5 grading system)

PEDODONTICS II.**Second Semester**

Week **Lectures** (1 hour/week)

1. Pain control and anaesthesia during childhood
2. Traumatic injuries of primary teeth
3. Traumatic injuries of permanent teeth, complex therapy solutions
4. Non- and minimally invasive dentistry
5. Prosthetics in Paediatric dentistry
6. Periodontology and oral diseases during childhood
7. Dental attendance of children suffering from general diseases
8. The management of children with special needs
9. Aetiology and treatment methods of hard tissue discoloration
10. Administration of medicine in pedodontics
11. Oral surgery during childhood
12. Non- and minimal invasive interventions in paediatric dentistry
13. Molar-Incisor-Hypomineralisation Syndrom (MIH)
14. Consultation Courses (obligatory and elective) which in part or entirely overlap

Practice (5 hours/week)

Treatment of patients.

Types of evaluation:

Practical grade (1-5 grading system)

Final examination. Evaluation of the whole subject matter.
(1-5 grading system).

ORTHODONTICS I.**Department of Orthodontics and Pediatric Dentistry****Head of Department: Dr. Noémi Katinka Rózsa** D.M.D., Ph.D.

tel: (1)-4591500/ 59268

E-mail: noemirozsa65@gmail.com

Tutor: Dr. László Miklós Kaán D.M.D., PhD.

Phone: (1)-4591500 / 59270

E-mail: kaanm@dent.semmelweis-univ.hu

First Semester**Lectures** (1 hour/week)

1. The subject, significance of orthodontics, its relation to caries and periodontal diseases
2. Historical survey of orthodontics. Classification and terminology of malocclusion
3. Diagnosis of malocclusions I.
4. Diagnosis of malocclusions II. X-ray diagnosis
5. Aetiology; hereditary and acquired anomalies. Functional anomalies.
6. The timing of the orthodontic treatment
7. Biomechanical principles of orthodontics. Possibilities of tooth movement.
8. Removable appliances I. Simple orthodontic appliances.
9. Removable appliances II. Functional appliances
10. Space gaining in orthodontics. Arch expansion and molar distalization
11. Elements of multiband/multibond appliances. Multibond technics I.
12. Multibond techniques II. Orthodontic wires and the phases of orthodontic treatment
13. Modern techniques in orthodontics: splint appliances 1
14. Aesthetics in orthodontics

Practice (4 hours/week)

Treatment of patients.

Type of evaluation: Practical grade (1-5 grading system)

ORTHODONTICS II.**Second Semester**

Week Lectures (1 hour/week)

1. Possibilities of orthodontic prevention. Early treatment in orthodontics.
2. Normooclusion. Local and general anomalies.
3. Treatment of distoocclusion.
4. Treatment of mesioocclusion
5. Extraction in orthodontics.
6. Complex treatment of orthodontic anomalies combined with missing teeth
7. Surgical-orthodontic treatments
8. Complex therapy of cleft lip and palate
9. Retention and relapse.
10. Side effects and complications of orthodontic treatment.
11. Adult orthodontic treatment.
12. Interdisciplinary aspects of orthodontic treatment.
13. Digital techniques and workflow in orthodontics
14. Consultation

Practice (5 hours/week)

Treatment of patients.

Types of evaluation:

Practical grade (1-5 grading system)

Final examination. Evaluation of the whole subject matter (1-5 grading system).

PERIODONTOLOGY III.**Department of Periodontology**Course Director: *Prof. Dr. Péter Windisch***First Semester**

Lectures (1 hour/week)**Practices** (2 hours/week)**Seminars** (0,5 hours/week)

1. Correlation between periodontology and orthodontics
2. Periodontal aspects of prosthetic rehabilitation
3. Morphology of periodontal defects. Indications of periodontal surgery
4. Periodontal surgery I. General introduction
5. Periodontal surgery II. Surgical correction of gingival enlargement
6. Periodontal surgery III. Periodontal resective/repairative surgery
7. Biology of periodontal tissue. Basics of regenerative techniques
8. Clinical application of periodontal regenerative techniques I.
9. Clinical application of periodontal regenerative techniques II.
10. Treatments of furcation defects
11. Biological mediators in periodontal surgery
12. Mucogingival surgery I.
13. Mucogingival surgery II. / Written exam
Alveolar ridge preservation techniques

Goal of practices: Students will be able to diagnose the diseases of the gum and the attachment apparatus, diagnose the clinical manifestations of systemic diseases, provide oral prophylaxis, non surgical pocket therapy

Note: The maximum number of absences in a semester is 3.
More than 3 absences invalidate the semester.
During the semester two midterm demonstrations should be passed.
Practical course grade

PERIODONTOLOGY IV.

Second Semester

Course Director: **Prof. Dr. Péter Windisch**

Lectures (1 hours / week)

Practices (2 hours/week)

Week **Lectures** (Part One)

1. Biology of periodontal and periimplant tissues
2. Periodontal aspects of implantology, augmentations I.
3. Periodontal aspects of implantology, augmentations II.
4. Is periodontitis a risk factor in implant dentistry?
5. Periimplantitis. Background and management
6. Comprehensive case presentations I. (perio-prot direct/indirect, surg)
7. Comprehensive case presentations II. (perio/plastic surg - impl)
8. Comprehensive case presentations III. (perio-non-surg/surg - impl)
9. Comprehensive case presentations IV. (perio- (reg)/ortho/prostho)
10. Supportive therapy in periodontology and implant dentistry
11. Periodontal diagnostic consultation
12. Written exam

Goal of practices: Students will spend the practices in blocks including three whole days in the Department when they will get a glimpse into ambulatory patient care, surgical assistance and differential diagnosis.

Note: The maximum number of absences in a semester is 3.
 More than 3 absences invalidate the semester.
 During the semester two midterm demonstrations should be passed.
 Practical course grade and **final** exam

ORAL MEDICINE II.**Department of Oral Diagnostics**

Address: Bp. VIII., Szentkirályi u. 47. 1088

Phone: 459-1500/59161, 317-1044

Lecturer: **Prof. Dr. Csaba Dobó Nagy**

E-mail: oralis.diagnosztika@dent.semmelweis-univ.hu

First Semester**Lectures (1 hour per week)**

1. Introduction. The aim and importance of Oral Medicine. Examination of the patient. Basic signs of the diseases on the oral mucosa.
2. Oral infections I.
3. Oral infections II.
4. Oral praecancerous lesions and conditions. Differential diagnostics of red and white oral lesions.
5. Dental aspects of systemic diseases and their treatments.
6. Diseases of the salivary glands. Diagnosis and treatment.
7. The aim of molecular oncology in the success of diagnosis and therapy of oral tumors.
8. Oral diseases affected by immune system I. (Vesiculo-bullous diseases, Oral lichen)
9. Oral diseases affected by immune system II. (Aphthae and other ulcers)
10. Differential diagnosis of the head and neck pain.
11. Risk patients in dental practice.
12. The aim of focal infections in dentistry.
13. Interactive differentialdiagnostics I.
14. Interactive differentialdiagnostics II.

Note: Final exam

Textbook:

1. Bricker, Langlais, Miller: Oral Diagnosis, Oral Medicine and Treatment Planning (second edition), BC Decker Inc Hamilton London 2002.

Recommended books:

- 1 M. Glick, MS. Greenberg, PB. Lockhart, SJ Challacombe: Burket's Oral Medicine (thirteenth edition) Hoboken, NJ : Wiley-Blackwell 2021.

IMPLANTOLOGY II.

Department of Oro-Maxillofacial Surgery and Stomatology

Lecturer: *Dr. Árpád Joób-Fancsaly*

Lectures (1 hour/week)

Course Syllabus:

- Bone replacement I. Osteoconduction. Osteoinduction. Bone grafting materials. Guided Bone Regeneration (GBR). Bone grafting procedures in the outpatient surgery.
- Bone replacement II. The sinus-lift procedure. Indications, contraindications, surgical techniques.
- The possibility of PRF application in oral implantology.
- The periodontal aspects of implant therapy.
- Esthetic considerations in implant surgery. Surgical management of soft tissues.
- The possibility of periimplant soft tissue management.
- The influencing factors of periimplant tissue stability.
- Bone replacement III. Osteogenesis, bone transplantation. Distraction osteogenesis.
- Guided surgery in oral implantology.
- Immediate implantation and reconstruction of the buccal bone wall.
- Implant prosthodontics I. Crowns on implants.
- Implant prosthodontics II. Fixed dental prosthesis on implants.
- Implant prosthodontics III. Mesio-structures, combined (fixed-removable) prosthesis on implants

Practice: No practice only lecture according to the new curriculum

Final exam

Practice of Implantology complements and deepens the knowledge obtained during the theoretical course

- Diagnostics – X-ray diagnostics, CBCT analysis, introduction of X-ray and surgical template
- Introduction of the Straumann system – emphasize on the unique properties of the system (surface, comparison of 1-stage / 2-stage surgical method, Implant Surgery overview through the system)
- Introduction of the SIC system – emphasize on the unique properties of the system, Prosthetics of the SIC system. Practicing the steps of the prosthetics on a model, cad-cam based prosthetic abutment, safe on four concepts, platform switching, Balance healing screws and abutments
- Guided bone regeneration through the products of Geistlich company – introduction of the methods of bone augmentation techniques, sinus-liftig, lateral bone augmentation practicing on models
- Smart Guide System overview – emphasize on the unique properties of the system, introduction of the guided implant surgery
- Osstem system overview – emphasize on the unique properties of the system, introduction of the failures of implantology and their solutions, practicing on models

PREHOSPITAL EMERGENCY MEDICINE

National Ambulance Service

Program Director: *Dr. Gábor Göbl*

Tutor: *Dr. László Gorove*

First Semester

Topics

- The principles of emergency medicine.
- The field assessment.
- Patient assessment.
- BLS – AED
- Prehospital care of the injured patient
- Analgesia, in the emergency care
- Unconsciousness, confused states
- Acute chest syndromes. ACS
- Acute cardiac failure.
- Evaluation and in field management of shock conditions.
- Stroke syndromes. Hypertensive emergencies.
- Acute dyspnea.
- Acute abdominal syndromes
- Toxicology in the emergency care

Note: participation at 75% of lessons is necessary. Compensation is possible using the notes of the lectures and the recommended book.
 Mode of certifying absences: Oral in case of absence from lectures, written in case of absence from examination within 3 working days.
 Requirement of the semester signature in the lecture book: Participation at the lectures in 75% of cases.
 It will be tested, whether the student is able to recognize and manage emergencies.

DERMATOLOGY

Lecturer: **Dr. Bernadett Hidvégi**

Tutor: **Dr. Bernadett Hidvégi**

Department of Dermatology, Venerology and Dermatoooncology

1085 Budapest, Mária u. 41.

Titkarság email: titkarsag.bor@semmelweis.hu

Oktatás email: oktatás.bor@semmelweis.hu

Second Semester

Credit value: 1

Lessons (in hours in the whole semester): 18 from this,

lectures: 6

practicals: 12

seminars: 0

Type of the course: obligatory elective

Lectures (0.5 hour per week)

Practices (1 hour week)

Detailed course/lecture description*: (to facilitate credit recognition in other institutions) every 2nd week 45'

1. Introduction to Dermatology. Diagnostic procedures, anatomy, functions of skin comparing to oral mucosa. Elementary lesions. Bacterial infections in Dermatology
2. Skin tumors. Malignant melanoma, basal cell carcinoma, squamous cell carcinoma. Benign tumors, paraneoplastic syndromes
3. Psoriasis, urticaria Cutaneous and oral manifestations of internal diseases
4. Atopic dermatitis, Seborrhoeic dermatitis, acne. Allergic skin diseases, drug allergy. Dermatitis, eczema, implication for dentist
5. Sexually transmitted diseases (syphilis, gonorrhoea, NGU). AIDS, HPV, herpes virus infections
6. Autoimmune bullous diseases Autoimmune diseases (LE, dermatomyositis, scleroderma) Dermatological treatment

Practises: every week 45', with patients of indoor and outdoor department

Participation in practices is mandatory. 25% missing is acceptable

Final examination

Oral exam, 2 theoretical and practical questions

* Detailed and numbered for each week of theoretical and practical lessons one by one, indicating the names of lecturers and instructors

OBSTETRICS AND FAMILY PLANNING

Dept. of Obstetrics and Gynecology

Head of Department: *Prof. Dr. Nándor Ács*

Second Semester

Lectures (1 hour/week)

Anatomy and physiology of the genital organs. The menstrual cycle.
 Conception.
 Prenatal care, diagnosis of pregnancy.
 Normal pregnancy and development of the fetus.
 Changes in maternal anatomy and physiology during pregnancy.
 Spontaneous abortion. Ectopic pregnancy.
 EPHgestosis. Hyperemesis.
 Medical complications during pregnancy. Gestational diabetes.
 Infections in obstetrics and gynecology.
 Normal labour and delivery.
 Abnormalities of labour and delivery.
 Normal and abnormal puerperium.
 Neonatology.
 Gyn. endocrinology. Family planning.
 Sterility, infertility.
 Genetic counseling, fetal anomalies.

FORENSIC DENTISTRY

Department of Forensic Medicine

Tutor: *Dr. Zoltán Szőlősi*

First Semester

Lectures (1 hour/week)

- The discipline of forensic medicine, relation to law, the legal aspects of dentistry
- Injuries
- Asphyxia
- Identification
- Toxicology I.
- Toxicology II.
- Alcohol and narcotics
- The legal aspects of clinical medicine I.
- The legal aspects of clinical medicine II.
- Facial and cranial injuries
- Sudden death, SIDS
- Risk and malpractice in dentistry
- Forensic psychiatry
- Autopsy demonstration
- Autopsy demonstration

Physical Education IX-X.

Lessons (*in hours*): 14 lectures: 0 practicals: 14 seminars: 0

Lecturer of the course: Várszegi, Kornélia

Contact: Testnevelési és Sportközpont

Phone: +36-1/ 264-1408

Detailed course/lecture description: *(to facilitate credit recognition in other institutions)*

Within the framework of obligatory regular physical activity, the requirements of the subject can be fulfilled as free of charge and self-financed student as well. The former is available during classes and courses organized by the Semmelweis University's Centre for Physical Education and Sports (TSK), and the latter is available at SE-TSK accredited partner locations. During the academic year, students can also choose the „Other” course category, where they record their weekly physical activity independently.

Students who cannot choose anything from the sports offer or who are forced to fulfill the conditions of participation on their own due to a lack of space can register for the “independent sports activity” course as part of the Physical Education course in the Neptune system.

In cases, a questionnaire is sent to the students through the Neptune system:

- The questionnaire can be filled in from Monday to Sunday in a semester (no entries can be made in advance or afterwards).
- Students must assure themselves that they have completed the questionnaire truthfully.
- It is a minimum requirement for the signature that a training of 1x60 minutes per week is completed and this is recorded in the questionnaire.

Free of charge:

2x90 mins./week sport training (competitive sport, for qualified only): cheerleader, men's football, handball, basketball, volleyball

Fee-based:

at the sports venues specified on www.semmelweis.hu/sportkozpont, which will also be advertised on the Neptune system. The list of these locations may vary per school year.

ELECTIVE SUBJECTS FOR Dentistry 3rd, 4th and 5th year

PREVENTION AND CLINICAL SCREENING OF ORAL MALIGNANCIES

Department of Oral Diagnostics

(Orális Diagnosztikai Osztály, Bp. VIII., Szentkirályi u. 40. 1088

Phone: 317-6600; 317-0951; fax: 317-9199)

Tutor: **Prof. Dr. Gábor Nagy D.M.D., Ph.D**

I. Theoretical background

Incidence of intraoral tumours is very high, and Hungary has a leading position in Europe. Among men this is the third in ranking the causes of death, and regarding the whole population it has the seventh place.

The two main risk factors are smoking and alcohol consumption, the combination of these multiple the risk rate. Nowadays it is noteworthy that the frequency of oral cancers is increasing in younger age groups and among women lacking the before mentioned risk factors.

II. Methods of oral cancer screening

1. *Population based methods* – large number of people invited to take part in a cancer screening, which could be combined with a general dental health assessment.
2. *Opportunistic screening*

This means the comprehensive dental examination of a particular patient attending a dental service. This screening is not only concentrating on detection of oral premalignancies oral malignancies, but also other developmental and inflammatory lesions.

Basic investigative methods of head and neck region
 detailed case history (with special aspects on tumors, life style, persistent, non-healing lesions)
 Precise extra- and intraoral physical examination
 Novel visual examination procedures (e.g. Veloscope)

Conclusion

Screening for oral malignancies is a very important part of dental examination. Lesions, persisting two weeks after eliminating any irritating factor a special clinical examination including histology is needed. In this way the survival possibilities of oral cancer patients could be enhanced largely.

This shows the extreme importance of this subject in dental and medical education as well.

THEMATICS

Contemporary diagnostics of oral premalignancies and cancers

1. Importance of oral malignancies
Epidemiology, morbidities and mortality data
2. Etiological factor and pathomechanismus of oral tumors
3. Rate and efficacy of different screening methods (screen or not to screen)
4. Basic clinical signs and symptoms of oral malignancies and premalignancies I.
5. Basic clinical signs and symptoms of oral malignancies and premalignancies II.
6. Consultation
7. Possibilities of early detection and prevention
8. Diagnostic process of oral malignancies I. Traditional physical examination
9. Diagnostic process of oral malignancies II. Traditional physical examination
10. Diagnostic process of oral malignancies novel Procedures (e.g. lightningdevices)
11. Contemporary diagnostically possibilities and a multidisciplinary cooperation
12. Social and dental rehabilitation after the treatment of oral cancer
13. Consultation /Examination

PEDODONTIC AND ORTHDONTIC PREVENTION – for the 4th year, 7th semester**ORTHODONTIC DIAGNOSIS I-II. – both for the 4th year, 7th and 8th semester**

Department of Pedodontics and Orthodontics

1 lecture / week

1 credit point

DIGITAL ORTHODONTICS – for the 5th year, 9th semester

Department of Pedodontics and Orthodontics

1 lecture / week

1 credit point

PEDODONTIC AND ORTHDONTIC PREVENTION**ORTHODONTIC DIAGNOSIS I-II. – both for the 5th year**

Department of Pedodontics and Orthodontics

1 lecture / week

1 credit point

DIRECT AESTHETIC DENTISTRY 4th year

Department of Conservative Dentistry

Head of the Department: *Dr. Zsuzsanna Tóth*

Tutor: *Dr. Kamil Al-Katib, Dr. Zsolt Döbrentey*

Durations: 1 lecture and 3 practice

Every class: 3h (4x45 min)

Credit value: 1 credit point

Maximum group size: 50

Direct Aesthetic Dentistry I. (basic course) – 1st semester (autumn)

This elective course is for dental students having finished successfully Conservative Dentistry III.

1st week: theory

Advanced caries diagnostic and adequate treatment alternatives. The development of adhesive technology, and its potential in the light of direct restorations. Material science of composites. Stratification techniques, polymerization stress reduction. Minimally invasive and advanced preparation methods (tunnel-, sandwich- technique). Isolation techniques. Using photopolymerization devices. Practical possibilities in recontouring of tooth shapes. Theory and practice of anatomical layering technique Tooth anatomy and basic skills of Gnathology. Tooth color: hue, value, chroma, translucency, fluorescence, metamerism, opalescence, intensives. Dental photography.

2nd week: practice

Anterior wax-up. Proper design of cervico - oro – vestibular - incisal dimensions. Perikymata, grooves, character lines, and its effect on the visual dimension of the tooth.

3rd week: practice

Restorations in the front region. Preparation of a standardized full composite first incisor using the anatomical stratification technique.

4th week: practice

Medium size restoration in the molar region. Creation of appropriate cusps-fissure relation.

Direct Aesthetic Dentistry II. (advanced course) – 2nd semester (spring)

This elective course is for dental students having finished successfully Direct Aesthetic Dentistry I.

1st week: theory

Diagnostic criteria of aesthetic dentistry. The division between direct and indirect techniques. Color theory in the light of different composite materials. Physical, chemical properties and biocompatibility of materials used. Anatomical layering technique on complex and difficult cases: fluorotic spots, transparency, halo effect, discolored cracks, fissure staining. Advanced tooth anatomy: macro and micro-morphology. Smile design. Connection between aesthetics, function and durability. The adhesive technology frontier areas. Based on the use of composite Biomimetic principles. Special instruments. Documentation, dental photography and basics of presentation.

2nd time: practice

Direct veneer for randomized middle-aged „patients

3rd time: practice

Rebuilding the veneer for elderly patient.

4th time: practice

Large restoration in the molar region. Creation of appropriate cusp- fissure relation, using stain technique for making the restoration more life-like.

POSTGRADUATE COURSES

Head of Secretariat: **Dr. János Gerle**
Address: Budapest, district 8., Szentkirályi u. 47.
(7th floor., room no. 751.)
E-mail: szkepz@dent.semmelweis-univ.hu
E-mail: gerle.janos@dent.semmelweis-univ.hu
Phone: 266-7006
Fax: 266-4715

Administrators:

Ms. Erika Sviderszky Blahó

Office hours: Monday, Tuesday 13.30-15.30, Wednesday, Thursday 9.00-12.00
Phone: 266-7006, fax: 266-4715, e-mail: szkepz@dent.semmelweis-univ.hu

Ms. Veronika Gecse

Office hours: Monday, Tuesday 13.30-15.30, Wednesday, Thursday 9.00-12.00
Phone: 266-7006, fax: 266-4715, e-mail: szkepz@dent.semmelweis-univ.hu

Postgraduate courses are available at the Faculty of Dentistry at Semmelweis University, ending with a specialty exam in the following fields:

1. **Pedodontics**
2. **Orthodontics**
3. **Periodontology**
4. **Dentoalveolar Surgery**
5. **Prosthetic Dentistry**
6. **Endodontics**

The language of the postgraduate courses and the specialty exams is Hungarian. The courses convey theoretical knowledge and practical skills.

If you wish to take a specialty exam you must meet the following requirements:

you can take a specialty exam after 36 months of professional practice fulfilled as an employee, according to Hungarian law. To complete this practice, therefore, you must obtain a work permission.

professional practice includes theory and treating patients. You will need a good command of the Hungarian language to understand theory, and be able to communicate with patients

Non-European citizens must have their degree nostrified

FACULTY OF PHARMACEUTICAL SCIENCES

**Curriculum of the credit-based training for first year students
in the 2024/2025 academic year**



Pharmaceutical Sciences
1st year

1. SEMESTER

Subject	Lecture (hour/week)	Practice (hour/week)	Credit	Prerequisites	Exam type
General and Inorganic Chemistry I. GYKASK266E1A	3	4	7		semi-final
Informatics GYKDEI107G1A	–	2	2		practical mark
Physical basics of Biophysics GYKFIZ267E1A	1	–	1		semi-final
Biophysics I. GYKFIZ268E1A	1.5	2,5	4		examination
Biology GYKGEN269E1A	2	2	4		semi-final
First Aid	0,3	0,7	1		practical mark
The Latin basics of pharmaceutical terminology GYKNYE111G1A	–	2	2		practical mark
Mathematics for Pharmacists (practice) GYKEGY112G1A	–	2	2		practical mark
Mathematics for Pharmacists GYKGYH271G1A	2	–2	4		practical mark
Introduction to Pharmaceutical Studies (methodology, law) GYKEGY113E1A	1	–	1		semi-final
History of Pharmaceutics and Propedeutics GYKFMG153E1A	2	–	2		semi-final
Principles of Professional Ethics I. GYKGTO071E1A	–	–	–		signature
Physical Education I. GYKTSI116G1A	–	1	–		signature
Hungarian Pharmaceutical Terminology I. GYKNYE306G1A	–	2	0		signature
Elective or obligatory elective subjects	–	–	–		examination or practical mark
Total:	11.5	18.5	27		

General and Inorganic Chemistry (theory) I., General and Inorganic Chemistry (practice) I.

For details on this subject please contact the department or visit their website.

Informatics (practice)

Complete name of the course: Informatika (gyakorlat)

Program: Undivided program (pharmaceutical)

Schedule: full-time

Short name of the subject: Informatics (practice)

English name of the subject: Informatics (practice)

German name of the subject: Informatik (Praktikum)

Neptun-Code: GYKDEI107G1A

Type of registration: obligatory

Responsible Department: Institute of Digital Health Sciences of the Faculty of Health and Public Services of Semmelweis University

Responsible tutor/lecturer: *Dr. Szócska Miklós* PhD, PhD, professor
E-Mail: titkarsag.dei@semmelweis-univ.hu

Further tutors: *Sándor Zoltán* PhD, associate professor
Tamus Ádám PhD, PhD, senior lecturer
Tóth Tamás associate professor PhD

Class /week: 2

Credit points: 2

Professional content, intent of acquirement and it's function in order to implement the goals of the program:

The goal of the course is to introduce the students to the applications of health information technology, especially the sources, organization, analysis and presentation of health information and knowledge. To improve the basic computer skills of students, including the use of office software tools, digital data storage and analysis methods. Acquisition and practical application of IT tools and methods required for later studies (e.g. preparation of a dissertation)

Short description of the subject:

Knowledge of basic MS Office tools

Sources of health information and knowledge, online scientific databases and the basics of evidence-based medicine

Course data

Recommended semester of completing the course	Lecture (contact hrs/ week)	Practice (contact hrs/ week)	Seminar (contact hrs/ week)	Individual lecture	Total number of contact hours/ semester	Semester	Consultation
1	–	2	–	–	28	autumn	–

Semester program

Practice topics/week:

1. MS Excel – basics of data storage
2. MS Excel – processing of data 1
3. MS Excel – processing of data 2
4. MS Excel – data representation, diagrams
5. MS Excel – advanced level exercises
6. Practice, preparation for the test
7. 1. test (Excel exercises, computer test)
8. Theoretical basics of databases
9. Creation of a simple database with Ms Access
10. Data extraction from databases, performing queries
11. Online health information sources
12. Presentation tools
13. Visualisation of medical data: Infographics, word clouds
14. 2. test (Access exercises and information searching, computer-based test)

Order of consultations: by agreement

Prerequisites: –

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Attendance of at least 75% of the practices, at least 50% result of both tests

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results

Mid-term test on week 7 (topic: Excel)

Mid-term test on week 14 (topics: Access, online information sources)

Replacement test: 2 times in the first week of the exam period

Requirements of the signature at the end of the semester:

Attendance of at least 75% of the practices, at least 50% result of both tests

Type of the semester-end examination: practical grade

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Form of the semester-end examination: written

Scientific, course related researches, publications, assays:

Recommended literature:

Meskó Bertalan: The Guide to the Future of Medicine, Webicina 2014 ISBN 9789631200072

Microsoft Office Help and Training Center: <https://support.office.com/>

The educational materials are available in the Moodle system.

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: no

The course description was prepared by:

Dr. Tóth Tamás

Biophysics I.

Complete name of the course: Biofizika I.

Name of the Programme: Undivided program (pharmaceutical)

Abbreviated name of the course: Biophysics I.

English name of the course: Biophysics I.

German name of the subject: Biophysik I.

Neptun-Code: GYKFIZ268E1A
Type of registration: obligatory
Institute: Department of Biophysics and Radiation Biology

Responsible tutor: *Dr. Levente Herényi*
 Phone: +36 1 4591–500/60222
 E-Mail: herenyi.levente@med.semmelweis-univ.hu

Further tutors: *Dr. Gergely Agócs* senior lecturer, PhD
Dr. Tamás Bozó senior lecturer, PhD
Dr. Rita Galántai teacher, PhD
Dr. Nikoletta Kósa assistant lecturer
Dr. Ádám Orosz senior lecturer PhD
Dr. Gusztáv Schay senior lecturer, PhD
Dr. László Smeller professor DSc
Dr. István Voszka associate professor, PhD
Dr. Ádám Zolcsák PhD student

Number of classes /week: 1.5 hours lecture
 2.5 hours practice

Credit points: 4

Professional content, intent of acquirement and it's function in order to implement the goals of the program:

Our teaching program is evolving continuously. Today's students will be the pharmacists of the oncoming decades. In selecting and highlighting topics of study, the first viewpoint is scientific foresight: the knowledge should be conveyed which must be pertinent to ensure first-class professional competence while keeping abreast of the most recent development in the field of study.

Short description of the subject:

Our aim is not only the teaching of a specific body of knowledge but also the development of the exact scientific method and concrete problem-solving abilities

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lecture	Total number of contact hours/semester	Semester	Consultation
1. semester	21	35	–	–	56	Autumn semester	–

Semester program

Topics of theoretical classes (pro week):

1. week: Introduction; Basic mathematics
2. week: Basic general physics
3. week: Geometrical optics; Fermat principle; Applications of geometrical optics.
4. week: Wave optics; Applications of wave optics;
5. week: Radiations; Law of attenuation of intensity of radiation.
6. week: Radiations; Law of attenuation of intensity of radiation.
7. week: Structure of matter; atom, electron.
8. week: Atomic and molecular interactions. Applications
9. week: Light emission, scattering, absorption; Thermal radiation.
10. week: Luminescence; Light sources; Lasers
11. week: Liquid crystals; biological and artificial membranes.
12. week: Structural organization of living systems: water, nucleid acids, proteins.
13. week: Radioactive isotopes and radiation.
14. week: X-ray and its absorption

Topics of practical classes (pro week):

1. week: Laboratory safety rules
2. week: Microscope
3. week: Measuring devices
4. week: Refractometer
5. week: Light emission
6. week: Resonance measurement
7. week: Special microscopes
8. week: Light absorption
9. week: Optics of the eye
10. week: Nuclear medicine
11. week: Polarimeter
12. week: Skin impedance
13. week: Gamma absorption
14. week: Summary, repetition

Schedule of consultations: every week in the exam period

Prerequisites: –

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Participation in the practical lessons is obligatory. No more than three absences from practices are allowed for any reason, otherwise the semester will not be credited. Missed sessions must be reported to the teacher the week after. The missed measurements should be done with another group if possible.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results*:** It will be announced on the homepage of the department during the first week of the semester

Knowledge testing during the semester: Midterm tests on the 6th and 11th weeks. Retake is possible on the 13th week.

Requirements of the signature at the end of the semester:

Participation at least on 75 % of laboratory practices and all the lab reports should be accepted by the teacher of the group

Number and type of projects students have to perform independently during the semester and their deadlines: Lab. report should be written about each measurement. Deadline: one week after the measurement.

Type of the semester-end examination: semi-final

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Form of the semester-end examination: oral

Scientific, course related researches, publications, assays: see the homepage of the department and the MOODLE

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: no

We do not allow to take Biophysics II. without passing Biophysics I.

The course description was prepared by:

Dr. Levente Herényi and Dr. István Voszka

Biology I.

Full (Hungarian) name of the course: **Biológia I.**

Name of the Programme: **Pharmacy Basic Education**

Abbreviated name of the subject: **Biól I.**

English name of the subject: **Biology I.**

German name of the subject: **Biologie I**

Neptun-Code: GYKGEN269E1A

Institute: Department of Genetics, Cell- and Immunobiology Semmelweis University, Faculty of Medicine

Name of the tutor/lecturer: **Prof. Dr. Edit Buzás** DSc
 coordinator:
Dr. Orsolya Láng PhD
 Phone: 2102940/56251
 E-Mail: lang.orsolya@med.semmelweis-univ.hu

Further tutors: **Dr. András Kristóf Fülöp** Associate Professor, CSc
Dr. Hargita Hegyesi Associate Professor, PhD
Dr. László Kóhidai Associate Professor, CSc
Dr. Eszter Lajkó Research Fellow, PhD
Dr. Marianna Csilla Holub Associate Professor, PhD
Dr. Zoltán Wiener Associate Professor, PhD
Dr. Tamás Visnovitz Assistant Professor, PhD
Dr. Pálma Porrogi Assistant Professor, PhD
András Försönits Research Assistant

Class per week: Lecture 2hrs Practice 2hrs

Credit points: 4

Professional content, intent of acquirement and it's function in order to implement the goals of the program:

The basics of classical and molecular cell biology and techniques applied in the field of modern cell biology are discussed. The subject provides the theoretical background for Biochemistry, Physiology, and Anatomy.

Short description of the subject:

The subject Biology I. discusses the close relation of the function and structure of the eukaryotic cells. It discusses the most significant phenomena of cell compartmentalization, function, aging and cell death. In practices the following topics are studied: light- and electron-microscopy and histotechniques, relevant techniques of cell biology applied to detect basic cell physiological activities.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lecture	Total number of contact hours/ semester	Semester	Consultation
1 semester	28	28	–	–	56	Autumn semester	6 (exam period)

Program of semester

Topics of theoretical classes (pro week):

1. week: The cell membrane: structure and function
2. week: Structure and function of nucleus I.
3. week: Structure and function of nucleus II.
4. week: Endoplasmic reticulum and the ribosome
5. week: Golgi complex, secretion and protein transport
6. week: Lysosomes, endocytosis, vesicular transport
7. week: Structure and function of mitochondria and peroxisomes
8. week: The cytoskeleton and cellular movement
9. week: Cell adhesion, cell junction
10. week: Extracellular regulation of the cells, signal transduction I.
11. week: Extracellular regulation of the cells, signal transduction II.
12. week: Cell cycle and its regulation I.
13. week: Cellular aging and programmed cell death
14. week: Stem Cells and differentiation

(The order of lectures may vary.)

Topics of practical classes (pro week):

1. week: The light microscope in use
2. week: General view of the cell; Light microscopic microtechnique
3. week: Plasma membrane; Electronmicroscopic microtechnique
4. week: Cell nucleus; Cyto(histo)chemistry
5. week: Endoplasmic reticulum
6. week: Midterm I.
7. week: Immunohistochemistry and super-resolution microscopy
8. week: Secretion
9. week: Endocytosis; Cellular digestion;
10. week: Cell and tissue culture
11. week: Store and supply of energy; Mitochondria; Peroxisome
12. week: Cell surface differentiation, ultrastructure of cellular junctions. Enzyme-histochemistry.
13. week: Cellular aging and programmed cell death
14. week: Stem Cells and differentiation

(The order of lectures may vary.)

COURSE REQUIREMENTS

Prerequisites: -

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Student must visit 75% of the practice classes. More than three absences from the practice invalidate the semester, no signature is given. There are no extra practices.

Number, topics, and dates of tests during the semester, opportunities of makeup and improvement of results:

The ability to set a light microscope for sample examination is controlled by the practice teacher.

Students will write two Midterm tests (Moodle tests) during the semester. Writing the tests is not obligatory. Students who achieve 75% of the total score, in case of a successful examination (obtain more than 50% of the total score in the exam), will get one better mark. This option is only available until the end of the regular examination period, and cannot be transferred to the extended exam period, CV, and FM courses.

Requirements of the signature at the end of the semester: Less than three absences from the practice class.

Number and type of projects students have to perform independently during the semester and their deadlines: -

Type of the semester-end examination: semi-final

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Written test in MOODLE

Form of the semester-end examination: written

The possibility and conditions for offering grades: -

Scientific, course-related researches, publications, assays:

The Department of Genetics, Cell- and Immunobiology (DGCI) activity includes teaching, research, and diagnostics. Our scientific work focuses on a broad scale in the fields of immunology, cell biology and genomics. The main research groups of the Department: National Heart Program, Extracellular Vesicle; Medical Genomics; Chemotaxis; Experimental Translational Immunology and Molecular Cancer Biology. The applied methodologies include cell- and molecular biological, immunological, genomic, and bioinformatic techniques and procedures.

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: on and individual assesment basis

First Aid (practice)

Full name of the subject:: Elsősegélynyújtás

Program: Undivided program (pharmaceutical)

Schedule: full-time

Name of the Programme: Pharmacy Basic Education

Short name of the subject: First Aid

English name of the course: First Aid

German name of the subject: Erste Hilfe

Neptun-Code: GYKOXI270G1A

Type of registration: obligatory

Institute: Department of Oximology and Emergency Care

Name of the tutor/lecturer: *Dr. Hornyák István senior lecturer*

Phone: 486 5840

E-Mail: hornyaki@se-etk.hu

Name of the persons responsible for the teaching of the subject:

Dr. Hornyák István PhD

Number of classes /week: 0,3 theory 0,7 practical

Credit points: 1

Professional content, intent of acquirement and it's function in order to implement the goals of the program:

The students are acquainted with the international Guidelines of First Aid. They learn the assessment of an emergency case. In the analysis of the victim the use of ABCDE approach. Introduce into the serious emergency situation, airway management unconsciousness, BLS for adult or baby, bleeding control.

Short description of the subject:

Assessment on the scene. The ABCDE approach in the first aid practice. Identification of the dangers. Airway management for non-injured and injured unconscious victim. Basic Life Support. The use of AED with CPR. CPR for Baby. Types of injuries. Bleeding control. Wound care, bandages. Chest pain, myocardial infarction, Stroke. Anaphylaxis. Environmental emergencies.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Semester	Consultation
1. semester	4,2	9,8	–	14	-	Autumn	–

Topics of theoretical classes (per week):

1.-2. Lessons: the importance of the first aid. The current international Guideline of first aid. The content of the ABCDE approach. The importance of the scene in the emergency cases. Conscious – unconsciousness. Airway management. The care of the airway obstruction in adult and baby. The signs of stroke and the care. Sudden cardiac arrest, Basic Life Support. Chest pain, signs of myocardial infarction.

3.-4. Lessons: The art of injuries. The type of wounds. Burned wound. Bleeding control, without tools, with tourniquet. Wound care and bandages. Anaphylaxis. Immersion. Heatstroke, hyperthermia. Hypothermia.

Topics of practical classes (pro week):

1-5. Lessons: Assessment in different situation, with the ABCDE method. Recovery position. HAINES position. Adult BLS, Baby BLS.
6.-10. Bleeding control with more solution. Woundcare. Bandages: press-, hard-, neck-, joint-, handbandage. Repet of the BLS

Schedule of consultations: -

Course requirements

Prerequisites: -

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:-

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:-

Requirements of signature:

The student have to take part of practice lessons.

25% of absence confirm with official dokument

25%-50% absence have to retake in other time

over 50% no signature

Number and type of projects students have to perform independently during the semester and their deadlines:-

Type of the semester-end examination: practical grade

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Mathematics for Pharmacists

Complete name of the course: Matematika gyógyszerészeknek

Program: Undivided program (pharmaceutical)

Schedule: full-time

English name of the subject: Mathematics for Pharmacists

German name of the subject: Mathematik für Pharmazeuten

Short name of the subject: Math

Neptun-Code: GYKGYH271G1A

Type of registration: obligatory

Institute: Semmelweis University Pharmacy Department Of Pharmacy Administration

Name of the tutor/lecturer: *László Tóthfalusi* professor,D.Sc.

Phone: (+36-1) 476-3600

E-Mail: totlasz@net.sote.hu

Number of classes /week: Lectures: 2 hours Seminars: 2 hours

Credit points: 4

Professional content, intent of acquirement and it's function in order to implement the goals of the program:

Acquisition of basic pharmacological numeracy skills, review of mathematical apparatus used in other subjects, introduction of computer bases of modeling techniques useful in scientific research

Short description of the subject:

The course aims to provide a comprehensive overview of the mathematical tools used in the pharmaceutical sciences. From a mathematical point of view, it covers the following subjects: Elementary and linear algebra, mathematical analysis and numerical methods. During the exercises, the goal is to develop the numerical skills used in basic pharmacy practice, and to get to know the computer options used for mathematical calculations.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Semester	Consultation
1 semester	2	–	–	–	28	Autumn	–

Semester program**Topics of theoretical classes (pro week):**

Week 1: Pharmacy calculations
 Week 2: Sets, relations
 Week 3: Functions I
 Week 4: Functions II
 Week 5: Linear algebra I
 Week 6: Linear Algebra II
 Week 7: Sequences, Limits
 Week 8: Differentiation
 Week 9: Applications of differentiation
 Week 10: Integration
 Week 11: Differential equations
 Week 12: Two-variable functions, concept of partial derivative
 Week 13: System of differential equations
 Week 14: Computer applications

Topics of practical classes (pro week):

Week 1: Pharmacological calculations I. Algebraic problems
 Week 2: Use of the R programming environment to solve mathematical problems I.
 Week 3: Representation and transformation of functions
 Week 4: The R programming environment to solve mathematical problems II.
 Week 5: Solving linear equations
 Week 6: Linear regression
 Week 7: Application of series and sequences
 Week 8: Midterm 1
 Week 9: Calculation of limit values. Differential calculus
 Week 10: Application of differential calculus
 Week 11: Applications of integral calculus
 Week 12: Solving differential equations
 Week 13: Midterm 2
 Week 14: Retake midterm

COURSE REQUIREMENTS

Schedule of consultations: Consultation is possible during the seminars

Prerequisites: –

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Granting credit might be refused if more than 3 seminars are missed.

Absences can be made up in the class of another group.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

There will be two midterms in the 8th and 13th weeks and also a short quiz at each seminar. Results of the latter is aggregated at the end of the semester.

The grade is calculated based on the average of the three percentile results as follows:

< 50% – failed
 50-70% – 2
 71-80% – 3
 81-90% – 4
 >90% – 5

In the 14th week, there will be a retake opportunity for those students whose average result below 60%.

Requirements of signature:

Participation in at least 75% of the practice sessions is mandatory. The retake quiz on the last week of the semester is needed if the average score is below 60%.

Number and type of projects students have to perform independently during the semester and their deadlines: -

Type of the semester-end examination: none

Examination requirements: not applicable

The possibility and conditions for offering grades: not applicable

Individual activity of the student during the semester (protocol, etc.): Solving practice exercises

Performance control in the examination period (final, examination): Examination

Performance control in the examination period (written, oral, written and oral): Written

Prescribed external practice: None

Recommended textbook: Joel Kilty, Alex McAllister. Mathematical Modeling and Applied Calculus, Oxford University Press, 2018

Introduction to Pharmaceutical Studies

For details on this subject please contact the department or visit their website.

History of Pharmaceutics and Propedeutics

Program:: undivided program (pharmaceutical)

Schedule: full-time

Schedule: full-time: History and Propedeutics

English name of the course: History of Pharmaceutics and Propedeutics

German name of the subject: Pharmaziegeschichte und Propädeutik

Neptun-Code: GYKFMG153E1A
Type of registration: obligatory
Institute: Department of Pharmacognosy

Name of the tutor/lecturer: *Dr. Eszter Riethmüller* assistant professor, Ph.D.
 Phone: +361-459-1500/55404
 E-Mail: riethmuller.eszter@pharma.semmelweis-univ.hu

Number of classes /week: 2
Credit points: 2

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The main aim of the subject is to highlight the importance of life-long learning in pharmaceutical profession by giving students and understanding of the way in which the notion of pharmaceutical science changes by time.

The subject also imparts general knowledge of drugs, pharmacies, pharmaceutical literature, and international organizations of healthcare.

Short description of the subject:

The course aims to show how the history of pharmaceutics is bond up with the development of many different sciences. It gives and understanding of the way in which the notion of pharmaceutical science changes as its methods evolve and scientific knowledge progresses. Therefore, the subject can give students a new relation to the scientific knowledge they possess and that they will gain in the following years of their studies.

The purpose of Propaedeutics is to impart general knowledge of drugs including classification, naming, doses, utilization, pharmacopoeias, preparation of drugs, organization of drug supply. It also puts special emphasis on current global health issues and the role of the pharmacist and the international organizations in overcoming them.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Semester	Consultation
1 st semester	28	–	–	–	28	Autumn semester	–

Program of semester**Topics of theoretical classes (pro week):**

1. week: Introduction. The place of the subject in the curriculum. The multidisciplinary nature of pharmacy.
2. week: The role and importance of history of science in understanding the notion and development of science. The structure of scientific revolutions. Distinction between science and pseudoscience.
3. week: The endless evolution of medical science and medical technology: from prehistoric times to present day and beyond I.
4. week: The endless evolution of medical science and medical technology: from prehistoric times to present day and beyond II.
5. week: The impact of the development of natural sciences on drug therapy: what has changed over time and what has not.
6. week: How new medicines are born: evolution of drug discovery, drug discovery today.
7. week: Drugs on the market today: classification based on the origin, pharmaceutical action, way of application, and formulation
8. week: Drugs and doses. Introduction to pharmacokinetics.
9. week: Introduction to pharmaceutical quality assurance. The impact of technological development on the quality and safety of medicines.
10. week: Pharmacies in Hungary: premises, personnel, ordering of drug preparations, pharmaceutical literature.
11. week: Pharmacy practice around the world.
12. week: Global health issues I.:
The role of international organizations of healthcare: historical and current issues, future challenges.
13. week: Global health issues II.:
Prevention of drug abuse. Narcotic controls.
14. week: Consultation

II. Practice topics/week –**COURSE REQUIREMENTS****Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:**

Based on the current Study and Exam requirements

Requirements of the signature: –

Type of the semester-end examination: semi-final

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Form of the semester-end examination: combined-examination

The possibility and conditions for offering grades: -

Scientific, course related research, publications, essays: -

Hand-outs of lectures

David L. Cowen, William H. Helfand: Pharmacy, an illustrated history. Harry N. Abrams., Publishers, New York. (1998)

List of course materials: Lecture hall projection

Scientific, course related researches, publications/essays: –

Principles of Professional Ethics I.

Complete name of the course: Hivatásetikai alapok I.

Name of the Programme: Pharmacy Basic Education

Abbreviated name of the course: Principles of Prof. Ethics

English name of the course: Principles of Professional Ethics I.

Neptun-Code: GYKGTO071E1A

Type of registration: obligatory

Number of classes /week: –

Credit points: –

Newly enrolled students have to take an oath at the Opening Ceremony.

Physical Education I.

Full (Hungarian) name of the subject: **Testnevelés I.**

Program: **Undivided program (pharmaceutical)**

Schedule: **Full-time**

Short name of the subject: **P.E.**

English name of the subject: **Physical Education I.**

German name of the subject: **Sport I.**

Neptun Code: GYKTSI116G1A
Type of registration: obligatory
Institute: Semmelweis University's Centre for Physical Education and Sports Centre

Name of the tutor/lecturer: E-Mail: sportkozpont@semmelweis-univ.hu

Further tutors:
Doharné Buczkó, Anikó P.E. teacher
Kalmus, Dániel P.E. teacher
Lehel, Zsolt P.E. teacher
Sótonyiné Hrehuss, Nóra P.E. teacher
Várszegi, Kornélia P.E. teacher
Weisz, Miklós P.E. teacher
Dominika Farkas P.E. teacher

Number of classes /week: 1 hour practise
Credit points: 0 credit

Course principles:

The short-term goal of the course is to maintain and improve the students' current state of health, to create the physical conditions for a better quality of life by learning and practicing (new) branches of sports that can be practiced after graduation as well. The long-term goal is to improve the quality of life and life prospects of future physicians, and to provide students with credible preventive attitudes and lifestyle advice – so that they can represent those in their later practice, through their own health-promoting behavior.

Brief course summary:

One aim of the course is to improve the health status of medical students, maintaining and increasing physical performance, creating the conditions for better physical quality of life.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Semester	Consultation
1 st semester	–	14	–	–	14	Autumn semester	–

Program of semester

Topics of theoretical classes (pro week): -

Topics of practical classes (pro week):

- 1st Week: General information**
Health and Safety, Fire and Environmental protection. The mid-year adoption requirements, the construction of the classes and the presentation of the university recreational and sports opportunities for extra-curricular activities. Heart rate measurements, Ruffier test and evaluation of the results.
- 2nd Week: Athletic**
Exercises to improve stamina. Preferably outdoors, on grass ground running, with the aim of developing good running and breathing techniques.
- 3rd Week: Flying disc**
Introduction the basic of frisbee rules and practicing the basic technical elements in pairs and game situation.
- 4th Week: Tennis**
Introducing the basis technical elements of tennis (forehand and backhand shot), improving hand–eye coordination.
- 5th Week: Agility ladder**
Introducing different running, skipping techniques using agility ladder.
- 6th Week: Football**
Introducing the basic technical elements of football. Single exercises and exercises in pairs to improve the ball skill development.
- 7th Week: Badminton**
Introducing the basic technical and tactical elements of badminton. Introducing the basic rules and game.
- 8th Week: Circuit training**
Bodyweight exercises and exercises with basic equipment to learn the correct functional movement pattern.
- 9th Week: Ruffier test and ball skill developing exercises**
Compare the results with the previous test to bring the importance of the health of the cardiovascular system to the attention.
- 10th Week: Meta**
Introducing the game and the basic rules. Aim to improve the ball skill development, improve reaction time, speed and explosiveness.
- 11th Week: Obstacle course**
To complete a built up obstacle course using differend creepping-climbing, hovering, pulling, skipping, throwing techniques for general skill developement.
- 12th Week: Core traning**
Postural correction exercises using the own bodyweight especially to strenghten the core muscles to prevent the health of the vertebrae.
- 13th Week: Skipping rope**
Endurance and coordination developing exercises at different levels using skipping rope.
- 14th Week: Dumbbell exercises**
Strengthening exercises with dumbbells.

COURSE REQUIREMENTS**Order of consultations:** –**Prerequisites:** –**Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:**

The number of active participations for physical education classes is 10, regardless of the number of school breaks, which is to be completed during the hours assigned to the group. Two hours can be recovered in the first week of the exam period, on two separate days. Lessons missed do not need to be certified; however, catching up is mandatory. The days of study breaks do not qualify as automatic attendance. Practice leaders follow an online presence registration at the beginning and end of the lessons, which can be individually tracked on semmelweis.hu/sportkozpont homepage.

Requirements of the signature at the end of the semester:

Active participation in practice classes 10 times (once a week) under the conditions described above.

Type of the semester-end examination: signature**The possibility and conditions for offering grades:**

Active participation in practice classes 10 times under the conditions described above.

May be exempted from attending classes the student who

1. whose diagnosis and the opinion of the sports doctor do not allow to exercise, and submits a certificate
- or
2. does sports regularly and submits a certificate of association and federation in the neptun system during the exemption period at the beginning of the semester.

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: yes

If you have not completed the course you may be readmitted in the 1. semester of the following academic year.

The course description was prepared by: Kornélia Várszegi

Hungarian Pharmaceutical Terminology I.

Full name of the subject: Magyar gyógyszerészeti szaknyelv I.

Name of the Programme: Undivided program (pharmaceutical)

Schedule: full-time

Abbreviated name of the course: Hungarian Pharmaceutical Terminology I.

German name of the subject: Ungarische pharmazeutische Terminologie (Praktikum) I

English name of the course: Hungarian Pharmaceutical Terminology (practice) I.

Neptun-Code: GYKNYE306G1A
 Type of registration: obligatory
 Institute: Department of Languages for Specific Purposes

Name of the tutor/lecturer: *Katalin Fogarasi PhD, habil.*

Further tutors:
Borda Szandra language teacher
Nagyné Górász Judit language teacher
Tick Vera language teacher
Zsófia Egedi language teacher
Lili Szöllősi language teacher

Number of lectures /week: 2

Credit points: 0

Course principles:

The role of this subject is to help students acquire the basic vocabulary, grammar and language skills they need for the effective communication in the language they use during their field practice both in their everyday life /'survival language/' and in their academic studies.

Brief course summary:

The first semester is dedicated to learning basic general vocabulary and grammar. Students acquire basic structures and the vocabulary for everyday topics / e.g. shopping, food, housing etc./. The course places special emphasis on phrases essential for everyday communication, e.g. introductions, greetings, getting/giving information etc. and on phrases needed in basic communication at a pharmacy.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Semester	Consultation
1	–	2	–	–	28	autumn	–

Program of semester**I. Lecture topics/week: –****II. Practice topics/week:**

Week 1	The Hungarian alphabet
Week 2	Greetings
Week 3	Basic pharmacy vocabulary
Week 4	Numbers
Week 5	Descriptions (nouns and adjectives)
Week 6	Ordering foods and drinks (accusative case)
Week 7	Asking for medications (accusative case)
Week 8	Test (oral)
Week 8-9	Locatives
Week 10-11	Activities – verbs
Week 12	Explaining what can be found in a pharmacy
Week 13	Final test (oral)
Week 14	Oral interview

COURSE REQUIREMENTS

Order of consultations: Individual consultations by email or in person on meeting formerly agreed upon with the teacher via email.

Prerequisites: – There is no prerequisite for the first semester.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

A maximum of 3 absences is allowed (3x90 minutes); if the number of absences exceeds this, the student may make up missed classes in another group (maximum two times) in agreement with the instructor.

A student who misses more than 25% of the practical classes will not be allowed to get a signature (Study and Examination Regulations §29). For more than the allowed number of absences, a medical certificate of long-term illness or hospitalization is required.

According to the Study and Examination Regulations (§ 28), three tardies count as one absence. Arriving 15 minutes later than the start of the lesson is considered tardiness.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

Hungarian Pharmaceutical Terminology I (signature)

an oral interview, week 14

Topic: the material covered

Make-up and upgrade opportunities: to be arranged outside of class with the instructor, at the latest by the end of the first week of the examination period.

Semester acceptance conditions:

An attendance of 75% is required to get the signature.

Knowledge testing during the semester:

The instructors may evaluate the students' performance with the help of short tests.

Requirements of the signature at the end of the semester:

An attendance of 75% minimum and taking the two oral tests.

Examination requirements:

As published by the education-research department on the MOODLE interface by the start of the academic term.

Signature

Performance control in the examination period (final, semi-final): –

Performance control in the examination period (written, oral, written and oral): –

List of teaching materials: Teaching materials and audio recordings containing authentic texts compiled by the instructors of the Institute.

Prescribed external practice: –

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: on an individual assesment basis

List of course materials: –

Scientific, course related research material, publications/essays: –

2. SEMESTER

Subject	Lecture (hour/week)	Practice (hour/week)	Credit	Prerequisites	Exam type
General and Inorganic Chemistry II. GYKASK266E2A	3	–	3	Gen. and Inorg. Chemistry I.	semi-final
Analytical Chemistry I. GYKASK273G1A	2	4	6	Gen. and Inorg. Chemistry I., Intro. to Pharm. Studies, Mathematics for Pharm.	practical mark
Anatomy GYKANT272E1A	–	2	–	Biology I., Pharm. Terminology,	semi-final
Biophysics II. GYKFIZ108G2A	–	2.5	2	Biophysics I.	practical mark
Biophysics (theory) II. GYKFIZ268E2A	1.5	2,5	2	Biophysics I. Physical basis of Biophysics	final*
Biology II. GYKGEN109G2A	–	2	2	Biology I.	practical mark
Biology (theory) II. GYKGEN269E2A	2	2	4	Biology I.	final*
Pharmaceutical and medical terminology GYKNYE119G1A	–	2	1	The Latin basics of pharmaceutical terminology	practical mark
Communication and Information Networks GYKMAG120G1A	1	1	2	Intro. to Pharm. Studies	practical mark
Basics of Economics (theory) GYKEGY247E1A	1	–	1	Mathematics for Pharm., Intro. to Pharm. Studies	semi-final
Physical Chemistry for Pharmacists GYKGY1122G1A	2	2	4	Gen. and Inorg. Chemistry I., Mathematics for Pharm.	practical mark
Organic Chemistry I. (theory + practice) GYKSZK337E1A	4	4,5	8	Gen. and Inorg. Chemistry I.	semi-final examination
Hungarian Pharmaceutical Terminology II. GYKNYE306G2A	–	2	0	Hungarian Pharmaceutical Terminology I.	signature
Physical Education II. GYKTSI116G2A	–	1	–		signature
Elective or obligatory elective subjects	–	–	–		examination or practical mark
Total:	14.5	16.5	26		

General and Inorganic Chemistry (theory) II.

For details on this subject please contact the department or visit their website.

Analytical Chemistry I.

Full (Hungarian) name of the subject: **Analitikai kémia I.**

Program: **Undivided program (pharmaceutical)**

Schedule: full time

Abbreviated name of the course: **Anal. Chem.**

English name of the course: **Analytical Chemistry I.**

German name of the subject: **Analytische Chemie I**

Neptun-Code: GYKASK273G1A
Institute: ELTE TTK, Department of Analytical Chemistry

Name of the tutor/lecturer: **Dr. Krisztina Kurin–Csörgei** associate professor, PhD, Dr. Habil
Phone: (+36)1-372-2500/1241
E-Mail: krisztina.kurin@ttk.elte.hu
Dr. Béni Szabolcs head of institute, associate professor, PhD, Dr. Habil
Phone: 476-3600 / 55304
E-mail: beni.szabolcs@pharma.semmelweis-univ.hu

Further tutors: **Krisztina Kurin–Csörgei** (lecture) assistant professor head of department, associate professor, PhD, Dr. Habil.
Norbert Szoboszlai (lecture and practice)
Anikó Vasanits assistant professor
István Molnár assistant professor
Edina Kiss assistant professor PhD students
PhD students (practice)

Number of lectures /week: 2 lectures + 4 practices
Credit points: 6

Professional content, intent of acquirement and it's function in order to implement the goals of the program:

Theoretical knowledge and practical application of analytical chemistry methods, the formation of the analytical approach in the qualitative and quantitative determination of the composition of the substances. The development of the student logical thinking ability, the complex application of their theoretical and practical knowledge to the qualitative and quantitative analysis of inorganic materials

Brief course summary:

The aim of analytical chemistry is to obtain qualitative and quantitative information about the chemical composition and structure of materials. Quantitative Analytical Chemistry is based on the determination of quantity of the components using different chemical and instrumental methods.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/semester	Semester	Consultation
2 nd semester	28	56	–	–	84	Spring semester	–

Program of semester

Topics of theoretical classes (pro week):

1. week: Introduction. Analytical Chemistry: definition, aim, methods and brief history.
2. week: Theoretical basis of qualitative analytical ionic reactions. Qualitative analytical chemistry: definition, classification of the reactions (analytical parameters, group reagents, group reactions, Fresenius-system)
3. week: Group reagents for qualitative analysis of cations. Identifications reactions for cations.
4. week: Group reagents for qualitative analysis of anions. Identifications reactions for anions.
5. week: Qualitative analysis of complex solution and solid sample. Instrumental analytical methods in inorganic qualitative analysis.
6. week: Test I. Types of interactions in analytical chemistry. Quantitative analysis and its important methods. Steps of chemical analysis.
7. week: Preparation of sample for analysis (sampling, storage and dissolving of the sample, fusion).
8. week: Acid–base equilibria in aqueous solution. Calculation of pH (strong and weak acids/bases, salts, buffer solutions).
9. week: Neutralization analysis: aim, standard solutions and standardization.
10. week: Possibilities for end point detection (chemical and instrumental). Acid–base indicators.
11. week: Change of pH during the acid–base titration (calculation of titration curves for the reaction of strong acid/base with strong base/acid, weak acid/base with strong base/acid, polyprotic acid with strong base). Indicator error.
12. week: The main possibilities of determination in acidimetry and alkalimetry. (measurement of strong/weak acids, strong/weak bases, salts, „specific“ determinations, with examples).
13. week: Test II. Reactions in nonaqueous solutions. Classification of solvents. Advantages and disadvantages of using non-aqueous solvents.
14. week: Nonaqueous titrations: standard solutions, end point detection, applications.

II. Practice topics/week

1. week: Taking over laboratory bench and equipments; Safety and order in the laboratory; The schedule of the semester; Practical and theoretical requirements in the semester. Reactions of Group I of cations. Reactions of As(III). Analysis of simple unknown.
2. week: Reactions of Group III of cations. Analysis of complex unknown (I. – III.).
3. week: Reactions of Group IV and V of cations. Analysis of simple unknown (I. – V.)
4. week: Reactions of the most important anions. Analysis of complex unknown.
5. week: Analysis of a solid sample (salt mixture).
6. week: Test I. Practicing of use the laboratory tools; Neutralization analysis: Determination of sulfuric acid.
7. week: Neutralization analysis: Determination of sulfuric acid.
8. week: Neutralization analysis: Standardization of $\approx 0.1N$ hydrochloric acid. Retake Test I.
9. week: Neutralization analysis: Continuation of previous week's measurements; Determination of lactic acid.
10. week: Acidy–Alkalimetry: Determination of sodium tetraborate and boric acid in the presence of each other.
11. week: Neutralization analysis: Determination of NaOH and Na₂CO₃ in the presence of each other.
12. week: Acidy–Alkalimetry: Indirect determination of sodium thiosulfate; Determination of "Lidocaine" in nonaqueous solution.
13. week: Test II. Nonaqueous titration of a pharmaceutical.
14. week: Retake II. Supplements; Closing

COURSE REQUIREMENTS

Schedule of consultations: at the request of students (in the period prior to the tests; etc.)

Prerequisites: General and Inorganic Chemistry I., Introduction to Pharm. Studies, Mathematics for Pharmacists

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

The student should be present – at least – in 75% of the total number of laboratory practices scheduled during the semester (it means maximum 3 absences are allowed). It is obligatory to show up in time. Delay by more than 15 minutes means to be absent from the practice. All exercises or measurements must be performed according to the time table. In case of absences the measurements must be completed in an “extra lab”; or – in justified cases – at the end of the semester

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

A satisfactory knowledge of the theoretical aspects of the analytical chemistry (including knowledge of the subject-matter of analytical chemistry lectures and laboratory practices, writing/balancing equations, experience in stoichiometric and equilibrium calculations, familiarity with the principles of the measurements, etc). The students should write 2 major test_papers from two different parts of the subject during the semester in a time announced in advance.

The major tests cover all measurements performed in the laboratory practices and/or discussed during the lecture, the theoretical background and numerical problem solving. After each test we provide the opportunity for correction of the mark in the form of “retake test” and the marks of the supplementary tests are taken into account when determining the final grade. Shorter oral or written questionings related to the laboratory training can occur during the entire semester. All written tests and oral answers will be evaluated according to a five-scale grading system. Minimum 50% of performance is required for passing the tests.

The students are allowed to use their own non-programmable calculator. The use of mobile phone, smart watch, tablet, etc. is forbidden. If the students use any kind of illegal helps when he/she takes oral or written tests, his/her practical mark is automatically “unsatisfactory”.

Requirements of the signature at the end of the semester:

The final grade of the laboratory training on analytical chemistry will be established from considering the accomplishments of both theoretical and practical requirements. The theoretical requirement for passing the semester is that the average of two marks obtained by the two major tests (or retake tests) should reach a minimum value of 2.0 and the very last mark is not “unsatisfactory” (i.e. higher than 1.).

The practical requirements: all exercises or measurements must be performed according to the time table. The individual measurements are evaluated and at least 75% of the exercises must successfully be performed (it means – in most cases – to reach an accuracy of $\pm 4\%$ in the quantitative determinations). The unsuccessful measurements can be repeated once during the “Supplements” time

If the average of all marks obtained for the individual measurements is between:

- 2.51 – 2.99 the final mark for the measurements 2;
- 3.00 – 3.49 3;
- 3.50 – 3.99 4;
- 4.00 – 5.00 5.

The practical requirements are fulfilled if the final mark for the measurements is minimum 2.

The final practical grade is determined by considering the grades obtained for the tests and the final mark of the measurements.

If the average of marks is between:

- 2,00 – 2,50 the final practical mark 2;
- 2,51 – 3,50 3;
- 3,51 – 4,50 4;
- 4,51 – 5,00 5.

Number and type of projects students have to perform independently during the semester and their deadlines:

A written report should be prepared about the completion of each laboratory exercise. The results of the measurements should be presented for evaluation to the supervising teacher within a week after completion of the exercises. In default of doing so the measurements are marked as “unsatisfactory” and it should be repeated during the time of “Supplements”

Type of the semester-end examination: practical grade

Examination requirements: as published by the education-research department on the MOODLE interface at the start of the academic term.

Performance control in the examination period (final, examination): signature/practical grade

Performance control in the examination period (written, oral, written and oral): –

Prescribed external practice: –

Scientific, course related researches, publications, essays:

Materials of the lectures and practices and additional notes (solved calculation problems, videos, etc.) can be downloaded from Moodle E-learning interface. List of teaching materials: (List of textbooks, hand-outs, scripts, etc.)

Buvári-Barcza: Quantitative Analytical Chemistry. Bp. (SE)

Lásztity-Gyimesi: Qualitative Inorganic Analysis. Bp. (SE)

Skoog, West, Holler: Fundamentals of Analytical Chemistry. Saunders College Publishing

Materials of the lectures and practices can be downloaded from Moodle E-learning system

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: no

Anatomy

Full Hungarian name of the subject: **Anatómia**
 Program: **Undivided program (pharmaceutical)**
 Schedule: **full-time**
 Short name of the subject: **Anatomy**
 English name of the course: **Anatomy**
 German name of the subject: **Grundlagen der Anatomie**

Neptun-Code: GYKANT272E1A
Type of registration: obligatory
Institute: Department of Anatomy, Histology and Embryology

Name of the tutor/lecturer: **Dr. Csáki Ágnes** associated professor, Ph.D.
 Phone: 215 6920 / 53652 ext
 E-Mail: csaki.agnes@med.semmelweis-univ.hu

Further tutors: **Dr. Herberth–Minkó Krisztina** assistant professor, Ph.D.
Szászné Dr. Kocsis Katalin assistant professor, Ph.D.
Dr. Puskár Zita senior research fellow, Ph.D.

Number of classes /week: 2 lecture(s) 2 practice(s)
Credit points: 2

Professional content, intent of acquirement and it's function in order to implement the goals of the program:

Course principles:

Principles:

- to teach the terminology of the human anatomy to the future pharmacists
- to discuss those special anatomical and physiological conditions, which may influence the therapeutical considerations;
- to discuss those anatomical conditions, which are necessary for the understanding of the further medical subjects of the pharmacists' studies;
- to teach the terminology (Latin and English) of human body parts (at a gross and microscopical anatomical level) necessary for the understanding of the medical language during the communication between the pharmacists and the doctors.

Special attention is required concerning the anatomy of the central nervous system and the digestive tract, the absorption of medicines and their mechanism of action.

Short description of the subject:

The lectures include all topics of anatomy, histology and embryology. Locomotor system, internal organs, nervous system, general and detailed histology, general embryology and development of organs are the topics of the lectures.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Semester	Consultation
2 nd semester	28	28	–	–	56	Spring semester	–

Program of semester**Topics of theoretical classes (pro week):**

1. week: 1. Introduction, Locomotor System
2. Skull, vertebral column, head, neck muscles
2. week: 3. Basic tissues I
4. Basic tissues II, Skin
3. week: 5. The Immune System, the Lymphoid Organs
6. Blood, hematopoiesis
4. week: 7. Heart, the Vascular System
8. The Respiratory System, the Mechanics of Breathing
5. week: 9. The Digestive System I, abdominal cavity
10. The Digestive System II
6. week: 11. The Liver, the Pancreas
12. Peritoneum, abdominal cavity
7. week: 13. The Female Reproductive Organs, cycle The Kidneys and the Urinary tract I.
14. The Kidneys and the Urinary tract II.
8. week: 15. The Female Reproductive Organs, cycle
16. The Male Reproductive Organs, Pelvis
9. week: 17. Nervous System introduction (synapses, neurotransmitters) Spinal cord, spinal nerves
18. Central Nervous System, meninges, blood supply, CSF, Encephalon, Spinal cord, Spinal nerves
10. week: 19. Motor system, Sensory system, Limbic system
20. Cranial nerves, The Autonomic Nervous System
11. week: 21. The Eyeball and Visual system
22. The Organ of Hearing and Equilibrium.
12. week: 23. Hypothalamus, the Endocrine Organs I
24. The Endocrine Organs II

13. week: 25. Germ cells, Fertilization, Development of the fetus, Placenta,
26. Teratology
14. week: 27. Development of the Digestive System and Reproductive organs
28. Malformations

Topics of practical classes (pro week):

1. week: Introduction, upper and lower limbs
2. week: basic tissues, skin
3. week: skull, vertebral column, head, neck muscles
4. week: histology of the blood, vessels and the lymphoid organs
5. week: respiratory tract, thoracic cavity, heart, large vessels
6. week: respiratory tract histology, gastrointestinal tract histology
7. week: gastrointestinal tract, abdominal cavity
8. week: kidney and urinary tract histology genital organs histology
9. week: abdominal cavity urogenital system, pelvis
10. week: 1st Midterm - locomotor system, internal organs (not obligatory);
nervous system histology
11. week: pelvis sensory organs histology
12. week: nervous system: brain, spinal cord, cranial nerves, spinal nerves, main vessels and nerves on limbs, sensory organs
13. week: endocrine organs, placenta
14. week: 2nd Midterm - nervous system, endocrine organs, general embryology (not obligatory), revision

COURSE REQUIREMENTS**Schedule of consultations: –**

Prerequisites: Biology I. (GYKGEN109E1A), Pharmaceutical Terminology, First Aid (GYKNYSE111G1A)

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Attendance of a minimum of 75% of practices is necessary for the end-term signatures. There is no makeup opportunity.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

Midterms: 10th week and 14th week Midterms are “non-obligatory assessment”, from the topics “locomotor system, internal organs” and “nervous system, sensory organs, endocrine organs, general embryology”, respectively. Its form is identical with the one of the semifinal exam (electronic, Moodle test). Successful (at least 50%) midterm provides the student with the exemption of the corresponding part of the examination, and if accepted, it is counted into the result of the semifinal exam.

The Midterms are not obligatory, there is no make-up possibility.

Exam: In the end of the semester written semi-final exam defines the exam grade. The exam is electronic, via the Moodle system, including multiple choice question types, and “drag and drop” question types (requiring identification). In the case of the written (electronic Moodle) test, 50% of the maximum score available must be achieved for a successful (at least satisfactory grade) test result. The written test consists of two main parts: 75% of the questions are from topics belonging to “locomotor system, internal organs”, 25% of the questions are from the topics of “nervous system, sensory organs, endocrine organs, general embryology”.

Requirements of the signature:

Attendance of a minimum of 75% lectures and a minimum of 75% of the practices is necessary for the end-term signature. There is no make-up possibility.

Type of the semester-end examination: semifinal exam

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Form of the semester-end examination: written

The possibility and conditions for offering grades:

Midterms: 10th week and 14th week Midterms are “non-obligatory assessment”, from the topics “locomotor system, internal organs” and “nervous system, sensory organs, endocrine organs, general embryology”, respectively. Its form is identical with the one of the semifinal exam (electronic, Moodle test). Successful (at least 50%) midterm provides the student with the exemption of the corresponding part of the examination, and if accepted, it is counted into the result of the semifinal exam.

Scientific, course related researches, publications, assays:

List of teaching materials: (List of textbooks, hand-outs, scripts, etc.):

Faller, A, Schuenke, M.: The Human Body: An Introduction to Structure and Function (Flexibook) 2004., Thieme, Stuttgart

Biophysics II.

Full (Hun) name of the subject: **Biofizika II.**

Program: **Undivided program (pharmaceutical)**

Schedule: **full-time**

Short name of the subject: **Biophysics II.**

English name of the course: **Biophysics II.**

German name of the subject: **Biophysik II.**

Neptun-Code: GYKFIZ268E2A
Type of registration: obligatory
Institute: Department of Biophysics and Radiation Biology

Name of the tutor/lecturer: *Dr. Levente Herényi* associate professor, PhD
 Phone: +36 1 4591-500/60222
 E-Mail: herenyi.levente@med.semmelweis-univ.hu

Further tutors: *Dr. Gergely Agócs* senior lecturer, PhD
Dr. Tamás Bozó senior lecturer, PhD
Dr. Rita Galántai teacher, PhD
Dr. Nikoletta Kósa assistant lecturer
Dr. Ádám Orosz senior lecturer PhD
Dr. Gusztáv Schay senior lecturer, PhD
Dr. László Smeller professor DSc
Dr. István Voszka associate professor, PhD
Dr. Ádám Zolcsák PhD student

Number of classes /week: 1.5 hours theory, 2.5 hours practice

Credit points: 4

Professional content, intent of acquirement and it's function in order to implement the goals of the program:

Our teaching program is evolving continuously. Today's students will be the pharmacists of the oncoming decades. In selecting and highlighting topics of study, the first viewpoint is scientific foresight: the knowledge should be conveyed which must be pertinent to ensure first-class professional competence while keeping abreast of the most recent development in the field of study.

Short description of the subject:

Our aim is not only the teaching of a specific body of knowledge but also the development of the exact scientific method and concrete problem-solving abilities

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Semester	Consultation
2 nd semester	21	35	–	–	56	Spring semester	–

Program of semester

Topics of theoretical classes (pro week):

1. week: Basic electronic units and circuits
2. week: Signal processing, Detectors, Displays
3. week: Sound, ultrasound.
4. week: Bases of radioisotope diagnostic methods
5. week: Transport phenomena, flow of fluids and gases
6. week: Diffusion, osmosis
7. week: Thermodynamic aspects of transport processes
8. week: Membrane potential, Action potential
9. week: Sensory phenomena, Laws of sensation
10. week: High frequency heat therapy; pulse generators bases of electric diagnostic and therapeutic methods
11. week: Optical spectroscopic techniques
12. week: Sedimentation and electrophoretic methods
13. week: Radio spectroscopy methods: (NMR, ESR, MRI)
14. week: Microscope techniques, Other physical methods

Topics of practical classes (pro week):

1. week: Dosimetry
2. week: Coulter counter
3. week: Amplifier
4. week: X-ray
5. week: Gamma-energy
6. week: ECG
7. week: Pulse generators
8. week: Audiometry
9. week: Isotope diagnostics
10. week: Diffusion
11. week: Sensor
12. week: Fluid flow
13. week: CAT-scan
14. week: Summary, repetition

COURSE REQUIREMENTS

Schedule of consultations: every week in the exam period

Prerequisites: Biophysics I. GYKFIZ268E1A, Physical bases of biophysics GYKFIZ267E1A

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup: Participation in the practical lessons is obligatory. No more than three absences from practices are allowed for any reason, otherwise the semester will not be credited. Missed sessions must be reported to the teacher the week after. The missed measurements should be done with another group if possible.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results*:** It will be announced on the homepage of the department during the first week of the semester

Requirements of the signature at the end of the semester:

Participation at least on 75 % of laboratory practices and all the lab reports should be accepted by the teacher of the group

Number and type of projects students have to perform independently during the semester and their deadlines: Lab. report should be written about each measurement. Deadline: one week after the measurement

Type of the semester-end examination: Final exam

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term. Examination requirements as published by the education-research department on the MOODLE interface by the start of the academic term.

Prescribed external practice: –

Scientific, course related researches, publications, assays:

Damjanovich–Fidy–Szöllősi (eds): Medical Biophysics (2009)
Medical biophysics practices (Semmelweis Publisher, 2015)

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: no

We do not allow to take biophysics II. without passing biophysics I.

The course description was prepared by:

Dr. Levente Herényi and Dr. István Voszka

Biology II.

Full (Hungarian) name of the subject: **Biológia II.**

Program: **Undivided program (pharmaceutical)**

Schedule: **full-time**

Short name of the subject: **Biol II.**

English name of the subject: **Biology II.**

German name of the subject: **Biologie II**

Type of registration: **obligatory**

Neptun-Code:

GYKGEN269E2A

Institute:

Department of Genetics, Cell- and Immunobiology Semmelweis University, Faculty of Medicine

Name of the tutor/lecturer:

Prof. Dr. Edit Buzás DSc

Course coordinator:

Dr. Orsolya Láng PhD Phone: 2102940/56251

Phone: 2102940/56251

E-Mail: lang.orsolya@med.semmelweis-univ.hu

Further tutors:

Dr. András Kristóf Fülöp Associate Professor

Dr. Hargita Hegyesi Associate Professor

Dr. László Kóhidai Associate Professor

Dr. Eszter Lajkó Research Fellow

Dr. Marianna Csilla Holub Associate Professor

Dr. Zoltán Wiener Associate Professor

Dr. Tamás Visnovitz Assistant professor

Dr. Pálma Porrogi Assistant Professor, PhD

András Försönits Research Assistant

Number of lectures /week:

Lecture :2 hrs Practice: 2 hrs

Credit points:

4

Professional content, intent of acquirement and it's function in order to implement the goals of the program:

Besides the basics of Mendelian genetics and cytogenetics, pharmacogenetics and genomics are discussed as well as the main molecular genetic techniques are presented. The subject provides the theoretical background for Microbiology and Immunology.

Description of the subject:

The subject Biology II. discusses Mendelian genetics, molecular genetics and genomics. The most significant characteristic of inheritance in human and the techniques applied in medical field are studied.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Semester	Consultation
2 nd semester	28	28	–	–	56	Spring semester	6 times in exam period

Program of semester

Topics of theoretical classes (pro week):

1. week	Transmission of the genetic information. Meiosis
2. week	Introduction to human genetics. The human genome.
3. week	Cytogenetics
4. week	Genetic variation I.
5. week	Genetic variation II.
6. week	Epigenetics
7. week	Autosomal inheritance I.
8. week	Autosomal inheritance II.
9. week	Role of sex in inheritance; Genetics of sex
10. week	Introduction to genomics; Methods in genomics
11. week	Genetics and genomics of complex trait and disorder
12. week	Pharmacogenetics and nutrigenomics
13. week	Genetics of biological processes (tumor biology)
14. week	Gene and genome manipulation (The order of lectures may vary.)

Topics of practical classes (pro week):

1. week	Mitosis
2. week	Meiosis and gametogenesis
3. week	Cytogenetics I.
4. week	Cytogenetics II.
5. week	Midterm I. Mutagenic tests
6. week	Study of monogenic inheritance; Pedigree analysis
7. week	Molecular genetics I.
8. week	Molecular genetics II.
9. week	Molecular genetics III.
10. week	Monodgenic inheritance I. (Autosomal Dominant)
11. week	Monodgenic inheritance II (Autosomal recessive)
12. week	Monodgenic inheritance III. (Sex linked)
13. week	Midterm II. Prenatal genetic testing
14. week	Complex inheritance (The order of lectures may vary.)

COURSE REQUIREMENTS

Schedule of consultations: weekly in the exam period

Prerequisites: Biology I.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Student must visit 75% of the lessons. More than three absences from the practice or more than four absences from the lecture invalidate the semester, no signature is given. There are no extra practices.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

Students will write two Midterm tests (Moodle tests) during the semester. Writing the tests is not obligatory. Students who achieve 75% of the total score, in case of a successful examination (obtain more than 50% of the total score in the exam), will get one better mark. This option is only available until the end of the regular examination period, and cannot be transferred to the extended exam period, CV, and FM courses

Requirements of the signature at the end of the semester:

Practice class attendance should be over 75%.

Type of the semester-end examination: final

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

The possibility and conditions for offering grades: no

Scientific, yourse related researches, publivations, assays:

The activity of the Department of Genetics, Cell- and Immunobiology (DGCI) includes teaching, research and diagnostics. Our scientific work focuses on a broad scale in the fields of immunology, cell biology and genomics. The main research groups of the Department: National Heart Program, Extracellular Vesicle; Medical Genomics; Chemotaxis; Experimental Translational Immunomics and Molecular Cancer Biology. The applied methodologies include: cell- and molecular biological, immunological, genomic and bioinformatic techniques and procedures.

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: on and individual assesment basis

Communication and Information Networks

Full name of the subject: Kommunikáció és információs hálózatok (elmélet+gyakorlat)

Program: undivided program (pharmaceutical)

Schedule: full-time

Short name of the subject: Communication

English name of the subject: Communication and Informational Networks (theory+practice)

Neptun-Code: GYKMAG120G1A
Type of registration: obligatory
Institute: Institute of Behavioural Sciences of Semmelweis University

Name of the tutor/lecturer: *Dr. Pilling János* PhD, Associate professor
 Phone: +36 (1) 2102930/56457
 E-Mail: pilling.janos@med.semmelweis-univ.hu
Dr. Hankó Balázs

Further tutors: *Kínga Babonits-Farkas* Psychologist, assigned lecturer
Zsuzsanna Papp Psychologist, assigned lecturer
Karolina Szabó Psychologist, assigned lecturer

Number of classes /week: 1 lecture(s), 1 seminar(s)

Credit points: 2

Professional content, intent of acquirement and it's function in order to implement the goals of the program:

Proper communication has an essential role in pharmaceutical practice. The main objectives of the course are the following:

- to teach basic skills to improve pharmacists' communicational techniques of information gathering, active listening and patient education
- introduction of pharmaceutical communication with the usage of digital and social media

Short description of the subject:

The education will be interactive and practical. In the first part of the semester (week 1-7), students will get familiar with the basic concepts of communication, online information sources and the pharmaceutical usage of modern information communication networks and social media. On the practices (week 7-14) basic communicational skills will be improved with a special focus on information delivery, patient education, healthy literacy, active listening, empathy and assertive communication.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Semester	Consultation
2 nd semester	14	14	–	–	28	Spring semester	–

Program of semester

Topics of theoretical classes (1.-7. week):

1. week: Role of communication and empathy in pharmaceutical practice.
2. week: Internet use, excessive internet use, telemedicine
3. week: Information gathering and patient information. Online information seeking. Basics of presenting.
4. week: Modern information networks in the pharmaceutical practice. Social media as the new pathway to information I.
5. week: Modern information networks in the pharmaceutical practice. Social media as the new pathway to information II.
6. week: New ways of improving health literacy
7. week: Conflict management and the role of assertive communication.

Topics of practical classes (8.-7. week):

8. week: Role of communication in the pharmaceutical practice.
9. week: Verbal and non-verbal communication. Information delivery.
10. week: Verbal and non-verbal techniques of empathy.
11. week: Patient information, information gathering, funnel method and persuasive communication.
12. week: Online human behaviour, mindful social networking. Communication in line with patient's health literacy.
13. week: Conflict management. Assertive communication.
14. week: Summary and written exam.

Schedule of consultations:

Seminars will ensure the possibility of ongoing consultation with the seminar leader.

COURSE REQUIREMENTS

Prerequisites: Introduction to Pharmaceutical Studies GYKEGY113E1A

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

The participation at a minimum of 75% of the practices is the prerequisite of the signature. Makeup is possible in other seminar group at the same week.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

Written examination at the end of the semester, on the last practice.

Requirements of the signature:

The participation at a minimum of 75% of the practices is the prerequisite of the signature.

Number and type of projects students have to perform independently during the semester and their deadlines:---

Type of the semester-end examination: semi-final

Form of the semester-end examination:

Written examination.

Below 50%: 1

50%-65%: 2

66%-75%: 3

76%-85%: 4

85%-100%: 5

The possibility and conditions for offering grades: –

List of teaching materials: (List of textbooks, hand-outs, scripts, etc.)

Pilling János: Medical Communication in practice. Medicina, Budapest, 2020.

Beardsley, RS. – Skrabal, MZ. – Kimberlin, CL: Communication Skills in Pharmacy Practice. Wolters Kluwer. Seventh edition. 2020.

The course description was prepared by: Dr. Mónika Ditta Tóth, Kinga Babonits-Farkas, Dr. Orsolya Szépe

Basics of Economics (theory)

Full (Hun) name of the subject:: Közgazdaságtani alapismeretek

Program: Undivided program (pharmaceutical)

Short name of the subject: Közg. Alapism.

English name of the course: Basics of Economics

German name of the subject: Grundkenntnisse der Wirtschaftswissenschaften

Neptun-Code: GYKEGY247E1A
Type of registration: obligatory
Institute: Health Services Management Training Centre of Semmelweis University

Responsible tutor Vilmos Ivády master instructor
 Phone: +36204808366
 Email: ivady.vilmos@emk.semmelweis.hu

Class per week: 1
Credit points: 1

Professional content, intent of acquirement and it's function in order to implement the goals of the program:

The goal of the subject is to help the attending students understand the basic terminology and principles of economics both in general and within the healthcare settings. By the end of the semester the students will comprehend the core economic question of how to utilize the limited resources available in order to maximize health outcomes at a population level. Beyond the theoretical background, the students will be also able to perform basic economic calculations by their own.

Short description of the course:

During the subject the students will hear about the various definitions and interpretations of economics and the reasons why health economics needs to be considered as a different discipline. The lectures will primarily focus on the theoretical nature of economics in general and within the healthcare settings; however, during the discussion of case studies and economic calculations the students will also have the opportunity to utilize the theoretical knowledge in practice.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/semester	Semester	Consultation
2 nd semester	14	–	–	–	14	Spring semester	–

Program of semester

Topics of theoretical classes (pro week):

- Week 1: Principles of Economics - Part 1 - What economics is all about?
- Week 2: Principles of Economics - Part 1 - About the role of economists
- Week 3: Principles of Economics - Part 1 - Scarcity: the basic economic problem
- Week 4: Principles of Economics - Part 2 - Economics in health-care
- Week 5: Principles of Economics - Part 2 - Health and the economy
- Week 6: Principles of Economics - Part 2 - Evaluation of decision
- Week 7: Understanding Basic Economic Terms - Problems of an economic organization
- Week 8: Understanding Basic Economic Terms - Scarcity and the alternatives to output of a society

- Week 9: Understanding Basic Economic Terms - Understanding utility in health care
- Week 10: Understanding Basic Economic Terms - Understanding all concepts for efficiency
- Week 11: Understanding Basic Economic Terms - Understanding equity
- Week 12: Economic Principles at Organizational Level - Financial statements used to evaluate business
- Week 13: Economic Principles at Organizational Level - Cost-revenue analysis
- Week 14: Semi-final exam

Topics of practical classes (pro week): Not applicable

Schedule of consultations: The lecturer is available for consultations on predetermined dates agreed on by the student and the lecturer.

COURSE REQUIREMENTS

Prerequisites: None

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

There are no conditions of attending the class. A student needs to attend at least 80% of the lectures. Those students who are absent more often will have the opportunity to work on a case study as a homework assignment.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

There is a semi-final test at the end of the semester, which consists all the topics learned during the subject.

Requirements of the signature: Attending lectures

Number and type of projects students have to perform independently during the semester and their deadlines:

There are no projects that the students need to perform outside the lectures.

Type of the semester-end examination: semi-final

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Form of the semester-end examination: written

The possibility and conditions for offering grades:

The grades are given based on the results of the written exam.

Scientific, your related researches, publications, assays:

Vilmos Ivády: Introduction - Whose debt is it anyway? [Beköszöntő - Mégis, kinek az adóssága?]. *IME*, 18(9):1, 2019. [in Hungarian]

Vilmos Ivády: On the methodological issues of evaluating hospital debt. [A kórházi adósság értékelésének módszertani kérdéseiről]. *IME*, 16(8):8-12, 2017. [in Hungarian]

Viktor Dombrádi, Klára Bíró, Jonitz Günther, Muir Gray, Anant Jani: Broadening the concept of patient safety culture through value-based healthcare. *Journal of Health Organization and Management*, 35(5):541-549, 2021.

Viktor Dombrádi, Erica Pitini, Carla G. van El, Anant Jani, Martina Cornel, Paolo Villari, Muir Gray, Klára Bíró: Value-based genomic screening: exploring genomic screening for chronic diseases using triple value principles. *BMC Health Services Research*, 19(1):823, 2019.

Physical Chemistry for Pharmacists (theory+practice)

For details on this subject please contact the department or visit their website.

Organic Chemistry I. (theory + practice)

Full name of the subject: Szerves kémia I.
Program: undivided program (pharmaceutical)
Schedule: full-time
Short name of the subject: Org Chem
English name of the subject: Organic Chemistry I.
German name of the subject: Organische Chemie I

Neptun code of the subject: GYKSZK337E1A
Type of registration: obligatory
Responsible Department: Semmelweis University, Institute of Organic Chemistry

Responsible tutor: *Dr. Petra Dunkel* assistant professor, PhD
 Phone: +36-1-476-3600/53006
 E-mail: dunkel.petra@semmelweis.hu

Name of the persons responsible for the teaching of the subject:
Dr. Balázs Balogh assistant professor, PhD
Dr. Dóra Bogdán assistant lecturer, PhD
Dr. Andrea Czompa assistant professor, PhD
Dr. Ruth Deme assistant lecturer, PhD
Dr. Petra Dunkel assistant professor, PhD
Dr. Zoltán Kaleta assistant professor, PhD
Dr. Róbert Ludmerczki assistant lecturer, PhD
Dr. Krisztina Süttőné Kaczeus research associate
Dr. Márton Ivánczi PhD student
Bence Kontra PhD student
Dr. László Piros PhD student
Patrik Pollák PhD student
Gergő Riszter PhD student

Classes per week: 4 lectures, 4 practices
Credit point(s): 8

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The course discusses the state-of-the-art knowledge of synthetic and structural organic chemistry subjects to develop problem-solving skills for organic chemistry and biomolecular sciences. Students will acquire the basics of organic chemistry, develop an organic chemistry perspective and acquire the theoretical, practical and material knowledge base for their future studies.

Short description of the subject:

The course in Organic Chemistry at the Faculty of Pharmaceutical Sciences has two main objectives:

- to provide a modern organic chemistry curriculum and to develop an organic chemistry approach, by presenting typical synthesis methods for the preparation of the different types of compounds and, with particular emphasis, by illustrating and interpreting their chemical reactivity. Introduction to and practical application of the main methods and tools of preparative organic chemistry.
- to provide a solid molecular, organic chemistry base for subsequent subjects in the curriculum of students at the Faculty of Pharmaceutical Sciences and, in particular, to strengthen the molecular approach necessary for biomedical disciplines.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/semester	Semester	Consultation
2 nd semester	4	6 (biweekly)	3 (biweekly)	–	56+36+20	Spring semester	upon demand

Program of semester

Topics of theoretical classes (pro week):

- | | |
|--|--|
| <p>1. week: Introduction to Organic Chemistry. MO theory 1. Atomic orbitals, LCAO-MO method, σ and π orbitals, molecular orbitals, delocalisation. MO theory 2. Hybridisation, Lewis-Langmuir theory of bonds, valence bond method, resonance. Conjugation: allyl system, pentadienyl system, electron system of butadiene and hexatriene. Classification of organic compounds. Isomers: constitutional and conformational isomers, stereoisomers. Enantiomers and diastereomers.</p> <p>2. week: Chirality, absolute configuration according to Cahn-Ingold-Prelog. Stereochemistry of organic compounds containing more than one center of chirality. Axial chirality, determination of absolute configuration. Tautomerism. Newman and Fischer-projection. Energy profile of reactions. Reaction mechanisms. Factors affecting reactivity. Electronegativity, reactivity of reagents: inductive, mesomeric and steric effects.</p> <p>3. week: Classification of reactions. Kinetic and thermodynamic control. Nomenclature of organic compounds I.</p> <p>4. week: Alkanes and cycloalkanes: physical and chemical properties, preparations, reactions. Mono- and disubstituted cyclohexanes. Alkenes: preparations, physical, chemical and biological properties. Cis-trans isomerization. Addition reactions. Markovnikov and anti-Markovnikov addition. Radical reactions and their mechanism. Addition vs substitution.</p> <p>5. week: Polymerisation. Dienes. Diels-Alder reaction. Pericyclic reactions. Woodward-Hoffmann rules. Alkynes: preparations, physical, chemical and biological properties. Nucleophilic addition reactions.</p> <p>6. week: Benzene and aromaticity. Extension of the aromatic system. Antiaromatic and non-aromatic structures. SEAr reactions of aromatic compounds. Activating and deactivating groups, direction rules. SNAr reactions of aromatic</p> | <p>compounds. Linear free energy relationships. Structure of halogenated hydrocarbons, physical, biological properties, preparations.</p> <p>7. week: Nucleophilic substitution reactions: SN1, SN2, SNi, elimination reactions: E1, E2, E1cB - factors influencing ratio of SN vs. E reactions: substrate, solvent, temperature effects, role of the base, of the leaving group, stereochemical consequences. Alcohols, phenols, ethers: preparations, physical, chemical and biological properties. Protecting groups. Acid-base theories. Acidity and basicity of organic compounds. Acid-base reactions.</p> <p>8. week: Organic sulfur compounds: structure, classification, reactivity, chirality, sulfonic acids, sulfonamides.</p> <p>9. week: Amines: preparations, physical, chemical and biological properties. Aromatic diazonium and nitro compounds, organophosphorus compounds: preparations, physical, chemical and biological properties.</p> <p>10. week: Nomenclature of organic compounds II. Oxo compounds: aldehydes and ketones - preparations, physical, chemical and biological properties. Addition to the carbonyl group. (Enolate chemistry I.)</p> <p>11. week: Carboxylic acids and their derivatives: preparation, reactivity, nucleophilic reactions at the acyl carbon atom, physical, chemical and biological properties. (Enolate chemistry II.)</p> <p>12. week: Substituted carboxylic acids, dicarboxylic acids and their derivatives. Synthetic applications of ethyl acetoacetate and diethyl malonate.</p> <p>13. week: Carbonic acid derivatives: classification, nomenclature, synthetic applications. Carbamates, polymers, protecting groups, transformations.</p> <p>14. week: Summary of organic chemical reactions, reaction mechanisms, synthesis planning.</p> |
|--|--|

Topics of practical classes (pro week):

- | | |
|---|---|
| <p>1. week: –</p> <p>2. week: <i>Mesomeric structures, hybridisation states. Type of π-electron systems. Classification of reagents: electrophilic, nucleophilic, radical. Reaction types: S_N1 and S_N2 mechanisms.</i></p> <p>3. week: Recrystallization of 4-bromoacetanilide, thin-layer chromatography.</p> | <p>4. week: <i>Identification of cis-trans stereoisomers, E/Z notation. Recognition of chirality (stereogenic) centres in molecules. Identify and draw the enantiomers. Identify the configuration of chirality centres (R/S notation). Identify the stereochemical relationship between two compounds. Recognition of diastereomeric and meso compounds. Determining configuration from Fischer projection, drawing Fischer projection. Conformation analysis using Newman projection. Cyclohexane conformers.</i></p> |
|---|---|

5. week: Preparation of acetanilide and acetylsalicylic acid.
6. week: *Aromatic, antiaromatic and non-aromatic systems. Synthesis of aromatic hydrocarbons, reactions of aromatic compounds.*
7. week: Preparation of 4- bromoacetanilide, column chromatography.
8. week: *Stereochemistry of S_N2 and S_E2 reactions and interpretation of the transition state. Aliphatic and aromatic hydroxy- and halogen compounds: basic properties of substitution and elimination reactions and their mechanism. Kinetic and thermodynamic control*
9. week: Preparation of 4-bromo-2-nitroacetanilide and β -naphtholorange.
10. week: *Preparations, applications, and reactions of quinones*
11. week: Purification of ethyl acetate with extraction and distillation.
12. week: *Aldehydes and ketones: nucleophilic addition reactions. Reactions of α -hydrogen of aldehydes and ketones.*
13. week: Introduction into cheminformatics.
14. week: Supplement. Inventory. *Reactivity of carboxylic acids and their derivatives (acylation), reactions involving α -hydrogen. Carbonic acid derivatives.*
- Schedule of consultations:** consultation upon request, at least 1 week before the date of consultation

COURSE REQUIREMENTS

Prerequisites: GYKASK266E1A General and inorganic chemistry I.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

If necessary, students may make up for a limited number of missed or failed preparative experiments after preliminary agreement with the leading instructor at the end of the semester. Without permission, the repetition of unsuccessful experiments is not allowed. Course material for the seminars (problem sets) are provided in advance to the students via Moodle. Students are expected to consult these materials before the respective seminars. These problem sets will form the basis of the discussion. Attendance is mandatory at the seminars. No more than one seminar absence per semester will be accepted without special consequences. A student who misses more seminar classes in their group may attend a seminar of another group (in the same week) if possible (only a limited number of students may be allowed to do so), always by notifying the seminar leaders in advance. If this is not possible, the student (who has more than 2 absences) will be briefly debriefed by the seminar leader on the relevant topics by the end of the semester (however, regular absences are not permitted). The Study and Examination Regulations also require attendance at 75% of the practical sessions and attendance at the seminars (which count as practical sessions) according to the above criteria in order to be signed off at the end of the semester.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

Theory: At the mid-term tests (one/semester) students have to answer in a written form questions on the subject-matter of the main lectures, the practicals and the seminars, the dates of which are fixed at the beginning of the semesters. The value of the midterm test can be either ranging 2-5 or failed. If the test is failed or the student did not attend it, the student must attend the following makeup test. If the makeup test is failed, a second makeup test should be written. If any of the makeup tests reach the passmark, then the midterm test is accepted. If also the second makeup test is failed, the student does not get signature for the semester, they are not allowed to sit in the semi-final examination. Grades for the main and makeup mid-term tests of the same topic are not averaged. Students who have a result of at least 90% in the mid-term test (excluding the retake tests) during the semester will have a 5-point advantage in the written exam.

Practice: at the beginning of each laboratory practical, students must write a short test on the theoretical and practical subject-matter of the experiment. These tests are immediately corrected by the leading instructor, and the practical work can be started only if the short test is accepted. If the test is failed, the experiment in question can be performed only at the end of the semester. Completing successfully the non-preparative practicals during the two semesters is also a condition of the signature and 75% of the maximum number of laboratory notebooks that can be submitted must be also approved.

Requirements of signature (as provided for in STUDY AND EXAMINATION REGULATIONS § 29):

mid-term test, obtaining a signature, attending practicals and seminars as specified above

Number and type of projects students have to perform independently during the semester and their deadlines: completion of the mid-term assessment, completion of practical work, attendance of a sufficient number of seminars (final deadline: last day of the semester)

Type of the semester-end examination: semi-final

Examination requirements: as published by the institute on the MOODLE course site by the start of the academic term

Form of the semester-end examination written

Scientific, course related research, publications, assays:

Materials of the lectures and practices can be downloaded from Moodle

P.C. Vollhardt; N.E. Schore: Organic Chemistry: Structure and Function, 8th Edition (W. H. Freeman)

D.R. Klein: Organic Chemistry, 3rd Edition (Wiley)

K.L. Williamson, K.M. Masters: Techniques Labs for Macroscale and Microscale Organic Experiments, 7th Edition (Cengage Learning)

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: individual assesment basis

The course description was prepared by:

Dr. Petra Dunkel (assistant professor, PhD)

Hungarian Pharmaceutical Terminology (practice) II.

Complete name of the course: Magyar gyógyszerészeti szaknyelv II.
Program: Pharmacy education, undivided program
Schedule: full-time
Abbreviated name of the course: Hungarian Pharmaceutical Terminology II.
English name of the course: Hungarian Pharmaceutical Terminology (practice) II.
German name of the subject: Ungarische pharmazeutische Terminologie (Praktikum) II

Neptun-Code: GYKNYSE306G2A
Type of registration: obligatory
Institute: Department of Languages for Specific Purposes
Name of the tutor/lecturer: *Alexandra Bakó* language teacher
Katalin Fogarasi PhD, habil. PhD, habil.

Further tutors: *Borda Szandra* language teacher
Nagyné Górász Judit language teacher
Zsófia Egedi language teacher
Lili Szöllösi language teacher

Number of classes /week: 2
Credit points: 0

Course principles:

The role of this subject is to help students acquire the basic vocabulary, grammar and language skills they need for the effective communication in the language they use during their field practice both in their everyday life /'survival language/' and in their academic studies.

Brief course summary:

The second semester is dedicated to learning basic general vocabulary and grammar. Students acquire basic structures and the vocabulary for everyday topics / e.g. shopping, food, housing etc./ The course places special emphasis on phrases essential for everyday communication, e.g. introductions, greetings, getting/giving information etc. and on phrases needed in basic communication at a pharmacy.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/semester	Semester	Consultation
2 nd semester	0	0	2	0	28	Spring semester	0

Program of semester

I. Lecture topics / week:---

Practice topics/week:

Week 1	Giving directions
Week 2	Locatives
Week 3	Asking about time
Week 4	When to take the medicine
Week 5	Body parts
Week 6	Basic verbs – talking about diseases

Week 7	Basic verbs – asking about symptoms
Week 8-9	How to take the medicine
Week 10	Warning about side effects
Week 11	Plural forms of nouns
Week 12–13	Serving clients at the pharmacy
Week 14	Oral interview

COURSE REQUIREMENTS

Order of consultations: Individual consultations by email or in person on meeting formerly agreed upon with the teacher via email.

Prerequisites: Hungarian Pharmaceutical Terminology I. GYKNYE306G1A

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

A maximum of 3 absences is allowed (3x90 minutes); if the number of absences exceeds this, the student may make up missed classes in another group (maximum two times) in agreement with the instructor.

A student who misses more than 25% of the practical classes will not be allowed to get a signature (Study and Examination Regulations §29). For more than the allowed number of absences, a medical certificate of long-term illness or hospitalization is required.

According to the Study and Examination Regulations (§ 28), three tardies count as one absence. Arriving 15 minutes later than the start of the lesson is considered tardiness.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results***:

Hungarian Pharmaceutical Terminology II (signature)
an oral interview, week 14

Topic: the material covered

Make-up and upgrade opportunities: to be arranged outside of class with the instructor, at the latest by the end of the first week of the examination period.

Semester acceptance conditions:

An attendance of 75% is required to get the signature.

Knowledge testing during the semester:

The instructors may evaluate the students' performance with the help of short tests.

Requirements of the signature at the end of the semester: An attendance of 75% is required to get the signature.

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.: Signature

The possibility and conditions for offering grades: ----

Individual activity of the student during the semester: Homework in the forms of language practice tasks.

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: on an individual assesment basis

List of teaching materials: (List of textbooks, hand-outs, scripts, etc.)

Teaching materials and audio recordings containing authentic texts compiled by the instructors of the Institute.

Physical Education II.

Complete name of the course: Testnevelés II.

Program: Undivided program (pharmaceutical)

Short name of the subject: P. E. II.

English name of the course: Physical Education II.

German name of the subject: Sport II.

Neptun-Code: GYKTSI116G2A
Type of registration: obligatory
Institute: Semmelweis University's Centre for Physical Education and Sports Centre

Name of the tutor/lecturer: *Várszegi, Kornélia* director P.E. teacher
 Phone: +36-20/825-0611
 E-Mail: varszegi.kornelia@semmelweis-univ.hu

Further tutors: *Doharné Buczkó, Anikó* P.E. teacher
Dominika Farkas P.E. teacher
Dániel Kalmus P.E. teacher
Zsolt Lehel P.E. teacher
Sótonyiné Hrehuss Nóra P.E. teacher
Kornélia Várszegi P.E. teacher
Miklós Weisz P.E. teacher

Number of classes /week: 1 hour practise
Credit points: 0 credit

Course principles:

The short-term goal of the course is to maintain and improve the students' current state of health, to create the physical conditions for a better quality of life by learning and practicing (new) branches of sports that can be practiced after graduation as well. The long-term goal is to improve the quality of life and life prospects of future physicians, and to provide students with credible preventive attitudes and life-style advice – so that they can represent those in their later practice, through their own health-promoting behavior.

Brief course summary:

One aim of the course is to improve the health status of medical students, maintaining and increasing physical performance, creating the conditions for better physical quality of life.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Semester	Consultation
2 nd semester	–	14	–	–	14	Spring semester	–

Program of semester

Topics of theoretical classes (pro week): -

Topics of practical classes (pro week):

- 1st week: **General information: Accident, fire and environmental knowledge. Requirement for acceptance of the semester system, the structure of the classes and the presentation of the university recreational sports opportunities for extra-curricular activities.**
- 2nd week: **Basketball: Dribbling, passing and shooting drills in order to improve fine motor skills.**
- 3rd week: **Bench exercises: Using the dimensions of the sport bench by running, skipping, jumping, lifting etc. exercises.**
- 4th week: **Rubber band exercises: Strength and coordination training by taking advantage of the elastic features of the object.**
- 5th week: **Floorball: Introducing the sport to the Students by exposing the major rules, proper technique of stick handling. Passing and shooting drills.**
- 6th week: **“Double-trouble”: Strength and stretch training in pairs by applying different starting positions. Functional movements executed in pairs.**
- 7th week: **Volleyball: Introducing the fundamental elements of the game (serves, hits, digs etc.) Exposing the major rules and techniques.**
- 8th week: **Frisbee: Taking the next step into the game by applying tactical elements in match situations. Passing and catching drills in different moving forms.**
- 9th week: **Ruffier test and ball skill developing exercises**
Compare the results with the previous test to bring the importance of the health of the cardiovascular system to the attention. Sport games on the side (Dodge-ball, King of the court etc.)
- 10th week: **Circuit training: General strengthening drills at each stations. Applying different intensity level, regarding the various conditions of the Students.**
- 11th week: **Tennis: Involving the new strokes into the learning process: form of serves, the volleys, the smash etc.**
- 12th week: **Badminton: Introducing the new technical and tactical elements of the game (drop shots, lobs, smash etc.) Exposing the rules of doubles.**
- 13th week: **Core exercises: Relative (own body) weight exercises applying different equipment (hand weights, rubber band etc.) with the aim of postural correction, by strengthening the core muscles in order to avoid spinal deformations.**
- 14th week: **Box exercises: Applying the sport box by jumping, lifting, slaloming, carrying (etc) it. By this enhance the level of strength and stamina.**

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes! (2x90 mins./week sport training (competitive sport, for qualified only): cheerdance, cheerleader, men’s football, handball, basketball, volleyball)

COURSE REQUIREMENTS

Order of consultations: –

Prerequisites: –

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

The number of active participations for physical education classes is 10 (once a week), regardless of the number of school breaks, which is to be completed during the hours assigned to the group. Two hours can be recovered in the first week of the exam period, on two separate days. Lessons missed do not need to be certified; however, catching up is mandatory. The days of study breaks do not qualify as automatic attendance. Practice leaders follow an online presence registration at the beginning and end of the lessons, which can be individually tracked on semmelweis.hu/sportkozpont homepage.

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes!

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results: -**Requirements of the signature at the end of the semester:**

Active participation in practice classes 10 times (once a week) (trainings 15 times) under the conditions described above.

May be exempted from attending classes the student who

1. whose diagnosis and the opinion of the sports doctor do not allow to exercise
or
2. does sports regularly and submits a certificate of association and federation

Type of the semester-end examination: signature

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

The possibility and conditions for offering grades:

Active participation in practice classes 10 times (trainings 15 times) under the conditions described above.

May be exempted from attending classes the student who

1. whose diagnosis and the opinion of the sports doctor do not allow to exercise, and submits a certificate
or
2. does sports regularly and submits a certificate of association and federation in the neptun system in the exemption period preceding the semester.

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: yes

If you have not completed the course you may be readmitted in the 2. semester of the following academic year.

FACULTY OF PHARMACEUTICAL SCIENCES

**Curriculum of the credit-based training
for second year students
in the 2024/2025 academic year**



*Pharmaceutical Sciences
2nd year*

3. SEMESTER

Subject	Lecture (hour/week)	Practice (hour/week)	Credit	Prerequisites	Exam type
Analytical Chemistry II. GYKGYK321E2A	4	4	8	Analytical chemistry I. General and Inorganic Chemistry II	final*
Colloid Chemistry GYKGYI072G1A	2	2	4	Physical Chemistry for Pharmacists Biophysics II.	practical mark
Organic Chemistry I. GYKSZK274E1A	4	4	8	General and Inorganic Chemistry II.	semi-final
Physiology I. GYKTLM275E1A	5	2	5	Anatomy, Biology II.	semi-final
Biochemistry I. GYKBMT276G1A	2.5	0.5	2	General and Inorganic Chemistry II. Biology II.	practical mark
Basic Immunology (theory) GYKGEN070E1A	2	–	2	Biology II.	semi-final
Hungarian Pharmaceutical Terminology III. GYKNYSE306G3A	–	2	1	Hungarian Pharmaceutical Terminology II.	practical mark
Physical Education III. GYKTSI116G3A	–	1	–		signature
Elective or obligatory elective subjects	–	–	–		examination or practical mark
Total:	19.5	15.5	30		

* Counts to the qualification of the diploma

Analytical Chemistry II.

Full name of the subject: Analitikai kémia II.
Program: undivided program (pharmaceutical)
Schedule: full-time
English name of the subject: Analytical Chemistry II.
German name of the subject: Analytische Chemie II
Neptun code of the subject: GYKGYK321E2A
Type of registration: obligatory
Responsible department: Department of Pharmaceutical Chemistry

Responsible tutor: *Prof. Dr. Balogh György Tibor*
 director, professor, DSc
 Semmelweis University address: H-1092 Budapest, Hőgyes Endre u. 9.
 phone: +36-1-217-0891
 e-mail: balogh.gyorgy.tibor@semmelweis.hu
Dr. Krisztina Kurin-Csörgei
 associate professor, Ph.D, Dr. Habil.
 Eötvös University
 address: H- 1117 Budapest, Pázmány P. sét. 1/a
 Phone: (+36)1-372-2500/1241
 E-Mail: krisztina.kurin@ttk.elte.hu

Name of the persons responsible for the teaching of the subject:
István Molnár research associate professor
Krisztina Kurin-Csörgei associate professor, PhD, Dr. Habil
Viktor Mihucz head of department, associate professor, Dsc
Anikó Vasanits associate professor, Ph.D,
Gergő Tóth assistant professor, Ph.D,
Lúcia Torma assistant professor, Ph.D,

Classes per week: 4 lectures, 4 practices
Credit point: 4+4

Professional content, intent of acquirement and its function in order to implement the goals of the program:

Analytical Chemistry is an essential field of science that develops and implements various strategies, methodologies, and instrumentation to derive insightful information about the composition and structure of matter in space and time. This course emphasizes the integration of theoretical knowledge with practical applications in analytical chemistry, fostering an analytical mindset in both qualitative and quantitative substance analysis. Students will be engaged in cultivating their logical thinking abilities, enabling them to apply their theoretical knowledge and practical skills cohesively to the qualitative and quantitative examination of inorganic (and organic) materials. The course will not only strengthen their foundation in analytical chemistry methods but also expand their horizon by infusing analytical thinking and problem-solving skills into their scientific journey.

Short description of the subject:

The principal objective of Analytical Chemistry is to glean both qualitative and quantitative insights into the chemical composition and structural framework of various materials. The course explores the classification and characterization of chemical reactions employed in qualitative analysis, as well as methodologies based on various chemical and basic instrumental (spectroscopy, chromatography, electroanalytical), employed in quantitative chemical analysis.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
3 semester	56	56	–	–	112	Autumn semester	–

Program of semester

Topics of theoretical classes (pro week):

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| <p>1. week: Introduction. Analytical Chemistry (Quantitative): definition, aim. Steps of chemical analysis. Chemical methods (continuation of the previous semester's material).</p> <p>2. week: Complex formation equilibria. Stepwise complex formation, stability constants. Effect of pH and auxiliary foreign ligands on the apparent (conditional) stability constant. Complex formation with monodentate and polydentate ligands. The chelate and entropy effect. Complexometric titrations with monodentate ligands. Chelatometric titration curves. Calculation of $p[M^{n+}]$ at different points and regions of the curve.</p> <p>3. week: Chelatometric titrations: standard solutions and standardization. Methods for end point detection at direct and back titrations. Metal ion indicators. Types and applicability of EDTA titrations.: direct, back, displacement and indirect titrations.</p> <p>4. week: Precipitation equilibria. The solubility product and the common ion effect. Effect of pH and complex formation on the solubility of precipitates (examples). Calculation of argentometric titration curves. Standard solutions and standardization. Possibilities of end point detection. The main methods of argentometric titrations (Mohr's Volhard's, Fayans', Schulek's method). Electrogravimetry.</p> <p>5. week: Redox reactions, oxidizing and reducing agents (examples). The redox potential and its calculation. Classification of redox titrations. Requirements for redox reaction to be used. The effect of pH, complex- and precipitate formation and electrolyte concentration on redox potentials (examples). Redox titration curves. Calculation of the redox potential at different points and regions of the curve.</p> <p>6. week: Permanganometry: standard solution, mechanism of $KMnO_4$ reduction. Titration in acidic, neutral and basic solutions. Chromatometry and cerimetry:</p> | <p>7. week: standard solutions, end point detection, applications. Reductometric titration methods. Bromatometry: methods, standard solutions, end point detection, determinations (examples for direct, back titrations). TEST I. Iodometric titrations: standard solutions, end point detection, pH-dependence of the titrations. Determination of reductants. Iodometry: direct and indirect determination of oxidants.</p> <p>8. week: Possibilities of instrumental end point detections (summary). Conductometry (principle and applications for the titration of strong and weak acids with different titrants). RETAKE TEST I.</p> <p>9. week: Potentiometry: potentiometric titrations and direct potentiometry (with examples). Amperometry (Dead stop titrations) and coulometry.</p> <p>10. week: Emission and absorption of electromagnetic radiation by atoms and molecules. Physical backgrounds of spectroscopy. Molecular absorption spectroscopy: theory and applications of UV-VIS spectrophotometry.</p> <p>11. week: Molecular emission spectroscopy: theory and applications of fluorescence analysis. Atomic emission and absorption spectroscopy. Additional spectroscopic methods.</p> <p>12. week: Separation techniques (summary). Separations by chromatography. Types of sorption. Chromatogram. Classical column chromatography. Gas chromatography (GC). Paper and thin layer chromatography.</p> <p>13. week: High-performance liquid chromatography (HPLC): theory and application. Parts of the instrument. Ion chromatography (IC). Parts of the instrument. Separation of cations and anions (examples). Additional chromatographic methods. TEST II.</p> <p>14. week: Evaluation of the measurement results. Random error and its calculation. Reliability limits. Regular error. Quality assurance. Literature of analytical chemistry. Summary. RETAKE TEST II.; RE-RETAKE TEST I., II.</p> |
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Topics of practical classes (pro week):

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| <p>1. week: Laboratory bench and equipment inventories; Safety and order in the laboratory; The schedule of the semester; Practical and theoretical requirements in the semester; Chelatometry (introduction); Determination of bismuth ions.</p> <p>2. week: Chelatometric determination of calcium and magnesium ions in the presence of each other (in mineral water). Determination of aluminium ions in "Aluminium acetum tartaricum solutum".</p> <p>3. week: Chelatometry: Determination of copper and zinc ions in the presence of each other. (1/2 group) Determination of mercury and zinc ions in the presence of each other (1/2 group)</p> | <p>4. week: Argentometry: Determination of bromide ions by Volhard's and Fajan's methods.</p> <p>5. week: Redox titrations; Permanganometry: Standardization of potassium permanganate standard solution; Determination of hydrogen peroxide content in tablet "Hyperol"; Determination of the total iron content by Zimmernann-Reinhardt method (1/2 group); Determination of bromide ions (Winkler' method).</p> <p>6. week: Chromatometry: Determination of Mohr salt; Cerimetry: Determination of amidazophene. (Aminophenazonum). (Supplementary lab)</p> <p>7. week: Bromatometry: Determination of ascorbic acid (Vitamin C) in tablets (e.g. VitC, Rutascorbin, Béres C); Determination of azophene.</p> <p>8. week: Bromatometry/Iodometry: Determination of phenol</p> |
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- in water / acetyl salicylic acid content in tablets (e.g. Aspirin, Kalmopyrin, Istopyrin) by Koppeschaar's method. Standardization of sodium-thiosulfate titrant; Iodometric determination of copper (II)-ions. Retake I.
9. week: Iodometry/Iodometry: Determination of iodide by Winkler's method; Determination of mannitol by Malaprade's reaction with periodate.
10. week: Potentiometric titration of acetic acid; Titration with automatic titrator, computer control; potentiometric measurement of Cl^- and I^- in the presence of each other; argentometric titration of bromide content of "Elixirium thymi composita"; Direct potentiometric determination of fluoride content. in tooth paste. (Supplementary lab).
11. week: Conductometric determination of Betaine hydrochloride; Conductometric determination of acid contents in red wine; Water determination by Karl Fischer' titration.
12. week: Spectrofluorencency: Determination of quinine in "Tonic"; Spectrophotometric determination of phosphate content in an eggshell.
13. week: HPLC measurement (theory, separation of medicine sample); Ion chromatographic measurement (theory and determination of anions in "Evian" water).
14. week: Supplements; Closing

Schedule of consultations: at the request of students (in the period prior to the tests; during the examination period, etc.)

Course requirements

Prerequisites: Analytical chemistry I., General and Inorganic Chemistry II.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Students must be present at minimum of 75% of the total number of laboratory practices scheduled during the semester (i.e. a maximum of 3 absences is allowed). Timeliness is mandatory. Arriving more than 15 minutes late will be considered equivalent to absence from the laboratory practice. All exercises and measurements listed in the schedule must be completed before the end of semester. A make up ("supplementary lab") to complete the measurements labs missed will be provided during the semester; and at the end of the semester for justified cases.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

In order to assess the mastery of the course material, two (2) major test-papers are administered during the semester scheduled for weeks 7. and 13. Each test will include a different set of topics on the theoretical background of measurements covered at the lectures or performed at laboratory practices, as well as numerical problems. Opportunities to correct the marks of each major test will be provided (retake), as well as an additional retake at the end of semester (re-retake). If written, the marks of the retakes will be used to determine the final grade. Shorter oral or written quizzes at the time of the laboratory practices can occur throughout the entire semester. All written tests and oral answers will be evaluated according to a five-scale grading system. Minimum of 50% of the total score is required for earning a passing mark (2) on the tests. A non-programmable calculator is required to complete the numerical problems in tests, calculators cannot be shared between students. Mobile phones, smart watches, tablets, etc. may not be utilized during tests under any circumstances. Students caught using any kind of forbidden aid during oral or written tests will automatically earn an "unsatisfactory" signature at the end of semester.

Requirements of signature:

A satisfactory knowledge of the theoretical aspects of the analytical chemistry (including knowledge of the subject-matter of analytical chemistry covered at lectures and laboratory practices, writing/balancing equations, proven knowledge of stoichiometric and equilibrium calculations, familiarity with the principles of the measurements, etc). The final grade (practical mark) of the laboratory training on analytical chemistry will be established by considering both the theoretical and practical requirements as set forth next.

The **theoretical requirement** for passing the semester is that both marks obtained on the major tests (or that of the retakes) must be at least passing (2).

Practical requirements: are fulfilled only if the number of absences did not exceed the permitted limit (see above) and all exercises or measurements must be performed as scheduled, and accepted with as satisfactory.

Requirement for allowing to take the final oral exam is to have the signature.

Number and type of projects students have to perform independently during the semester and their deadlines:

Each measurement is completed at satisfactory accuracy (at most $\pm 4\%$ error for quantitative determinations in most cases). Unsuccessful measurements can be repeated twice during the "supplementary lab" time.

A **written report** must be prepared upon the completion of each laboratory exercise. The calculated results of the measurements must be

presented for evaluation to the supervising teacher within a week after completion of the exercises. Failure to hand in lab reports on time will result in “unsatisfactory” mark for the corresponding measurement and therefore it must be repeated during the “supplementary lab” time.

Type of the semester-end examination: signature, , final

Form of the semester-end examination: oral

Examination requirements:

as published by the education-research department on the MOODLE interface at the start of the academic term.

The final examination consists of 3 parts (graded independently): 2 theoretical questions from the „topics of final examination” issued in advance, and numerical problems. The list topics can be downloaded from the Moodle E-learning interface. The numerical problems part include stoichiometric and equilibrium calculations (calculation of the result of analytical measurements, standardization, calculation of titration curves points of various kind etc.) as well as knowledge of principles of calculations related to the analytical measurements, balancing equation, etc. In order to pass the exam a passing mark (2) must be achieved in all three parts of the exam (two theoretical questions + problem solving).

The possibility and conditions for offering grades:

At the end of semester students have the opportunity to request the average of the two major tests (of those of the retakes) written during the semester as the grade for the problem-solving part of the final exam.

List of teaching materials (List of textbooks, hand-outs, scripts, etc.):

Buvári-Barcza: Quantitative Analytical Chemistry. Bp. (SE)

Skoog, West, Holler: Fundamentals of Analytical Chemistry. Saunders College Publishing

Materials of the lectures and laboratory practices and additional notes (solved calculation problems, videos, etc.) can be downloaded from Moodle E-learning interface.

According to the program of semester, the slides of the lectures, and materials required to complete the laboratory exercises, other documents, sample reports, etc. will be uploaded to the Moodle system no later than the week before a topic covered herein is discussed at the laboratory practices.

Additional material for the theoretical lectures and laboratory exercises (list of textbooks, handouts, scripts, etc.): Buvári-Barcza:

Quantitative Analytical Chemistry. Bp. (SE) Skoog, West, Holler: Fundamentals of Analytical Chemistry. Saunders College Publishing.

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: no

The course description was prepared by:

György Tibor Balogh, Krisztina Kurin-Csörgei

Organic Chemistry I.

Full name of the subject:	Szerves kémia I.
Program:	undivided program (pharmaceutical)
Schedule:	full-time
Short name of the subject:	Org Chem
English name of the subject:	Organic Chemistry I.
German name of the subject:	Organische Chemie I
Neptun code of the subject:	GYKSZK274E1A
Type of registration:	obligatory
Responsible Department:	Semmelweis University, Institute of Organic Chemistry
Responsible tutor:	Dr. Petra Dunkel assistant professor, PhD Phone: +36-1-476-3600/53006 E-mail: dunkel.petra@semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Dr. Balázs Balogh assistant professor, PhD
Dr. Dóra Bogdán assistant lecturer, PhD
Dr. Andrea Czompa assistant professor, PhD
Dr. Ruth Deme assistant lecturer, PhD
Dr. Petra Dunkel assistant professor, PhD
Dr. Zoltán Kaleta assistant professor, PhD
Dr. Róbert Ludmerczki assistant lecturer, PhD
Dr. Krisztina Süttőné Kaczeus research associate
Dr. Márton Ivánczi PhD student
Bence Kontra PhD student
Dr. László Piros PhD student
Patrik Pollák PhD student
Gergő Riszter PhD student

Classes per week:	4 lectures, 4 practices
Credit point(s):	4+4

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The course discusses the state-of-the-art knowledge of synthetic and structural organic chemistry subjects to develop problem-solving skills for organic chemistry and biomolecular sciences. Students will acquire the basics of organic chemistry, develop an organic chemistry perspective and acquire the theoretical, practical and material knowledge base for their future studies.

Short description of the subject:

The course in Organic Chemistry at the Faculty of Pharmaceutical Sciences has two main objectives:

- to provide a modern organic chemistry curriculum and to develop an organic chemistry approach, by presenting typical synthesis methods for the preparation of the different types of compounds and, with particular emphasis, by illustrating and interpreting their chemical reactivity. Introduction to and practical application of the main methods and tools of preparative organic chemistry.
- To provide a solid molecular, organic chemistry base for subsequent subjects in the curriculum of students at the Faculty of Pharmaceutical Sciences and, in particular, to strengthen the molecular approach necessary for biomedical disciplines.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/semester	Normal course offer	Consultations
3 semester	4	6 (biweekly)	3 (biweekly)	–	56+36 +20	Autumn semester	upon demand

Program of semester

Topics of theoretical classes (pro week):

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|---|---|
| <p>1. week: Introduction to Organic Chemistry. MO theory 1. Atomic orbitals, LCAO-MO method, σ and π orbitals, molecular orbitals, delocalisation. MO theory 2. Hybridisation, Lewis-Langmuir theory of bonds, valence bond method, resonance. Conjugation: allyl system, pentadienyl system, electron system of butadiene and hexatriene. Classification of organic compounds. Isomers: constitutional and conformational isomers, stereoisomers. Enantiomers and diastereomers.</p> <p>2. week: Chirality, absolute configuration according to Cahn-Ingold-Prelog. Stereochemistry of organic compounds containing more than one center of chirality. Axial chirality, determination of absolute configuration. Tautomerism. Newman and Fischer-projection. Energy profile of reactions. Reaction mechanisms. Factors affecting reactivity. Electronegativity, reactivity of reagents: inductive, mesomeric and steric effects.</p> <p>3. week: Classification of reactions. Kinetic and thermodynamic control. Nomenclature of organic compounds I.</p> <p>4. week: Alkanes and cycloalkanes: physical and chemical properties, preparations, reactions. Mono- and disubstituted cyclohexanes. Alkenes: preparations, physical, chemical and biological properties. Cis-trans isomerization. Addition reactions. Markovnikov and anti-Markovnikov addition. Radical reactions and their mechanism. Addition vs substitution.</p> <p>5. week: Polymerisation. Diolefins. Diels-Alder reaction. Pericyclic reactions. Woodward-Hoffmann rules. Alkynes: preparations, physical, chemical and biological properties. Nucleophilic addition reactions.</p> <p>6. week: Benzene and aromaticity. Extension of the aromatic system. Antiaromatic and non-aromatic structures. SEAr reactions of aromatic compounds. Activating and deactivating groups, direction rules. S_NAr reactions of</p> | <p>aromatic compounds. Linear free energy relationships. Structure of halogenated hydrocarbons, physical, biological properties, preparations.</p> <p>7. week: Nucleophilic substitution reactions: S_N1, S_N2, S_Ni, elimination reactions: E1, E2, E1cB - factors influencing ratio of S_N vs. E reactions: substrate, solvent, temperature effects, role of the base, of the leaving group, stereochemical consequences. Alcohols, phenols, ethers: preparations, physical, chemical and biological properties. Protecting groups. Acid-base theories. Acidity and basicity of organic compounds. Acid-base reactions.</p> <p>8. week: Organic sulfur compounds: structure, classification, reactivity, chirality, sulfonic acids, sulfonamides.</p> <p>9. week: Amines: preparations, physical, chemical and biological properties. Aromatic diazonium and nitro compounds, organophosphorus compounds: preparations, physical, chemical and biological properties.</p> <p>10. week: Nomenclature of organic compounds II. Oxo compounds: aldehydes and ketones - preparations, physical, chemical and biological properties. Addition to the carbonyl group. (Enolate chemistry I.)</p> <p>11. week: Carboxylic acids and their derivatives: preparation, reactivity, nucleophilic reactions at the acyl carbon atom, physical, chemical and biological properties. (Enolate chemistry II.)</p> <p>12. week: Substituted carboxylic acids, dicarboxylic acids and their derivatives. Synthetic applications of ethyl acetoacetate and diethyl malonate.</p> <p>13. week: Carbonic acid derivatives: classification, nomenclature, synthetic applications. Carbamates, polymers, protecting groups, transformations.</p> <p>14. week: Summary of organic chemical reactions, reaction mechanisms, synthesis planning.</p> |
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Topics of practical classes (pro week):

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| <p>1. week: –</p> <p>2. week: Mesomeric structures, hybridisation states. Type of π-electron systems. Classification of reagents: electrophilic, nucleophilic, radical. Reaction types: S_N1 and S_N2 mechanisms.</p> <p>3. week: Recrystallization of 4-bromoacetanilide, thin-layer chromatography.</p> <p>4. week: Identification of cis-trans stereoisomers, E/Z notation. Recognition of chirality (stereogenic) centres in molecules. Identify and draw the enantiomers. Identify the configuration of chirality centres (R/S notation). Identify the stereochemical relationship between two compounds. Recognition of diastereomeric and meso</p> | <p>compounds. Determining configuration from Fischer projection, drawing Fischer projection. Conformation analysis using Newman projection. Cyclohexane conformers.</p> <p>5. week: Preparation of acetanilide and acetylsalicylic acid.</p> <p>6. week: Aromatic, antiaromatic and non-aromatic systems. Synthesis of aromatic hydrocarbons, reactions of aromatic compounds.</p> <p>7. week: Preparation of 4-bromoacetanilide, column chromatography.</p> <p>8. week: Stereochemistry of S_N2 and S_E2 reactions and interpretation of the transition state. Aliphatic and aromatic hydroxy- and halogen compounds: basic</p> |
|--|--|

- properties of substitution and elimination reactions and their mechanism. Kinetic and thermodynamic control
9. week: Preparation of 4- bromo-2-nitroacetanilide and β -naphtholorange.
10. week: Preparations, applications, and reactions of quinones and ethers. Organic sulfur compounds, preparations of sulfonamides, reactions. Chemical properties of amines, basicity, preparations, reactions, diazotation.
11. week: Purification of ethyl acetate with extraction and distillation.
12. week: Aldehydes and ketones: nucleophilic addition reactions. Reactions of α -hydrogen of aldehydes and ketones.
13. week: Introduction into cheminformatics.
14. week: Supplement. Inventory. Reactivity of carboxylic acids and their derivatives (acylation), reactions involving α -hydrogen. Carbonic acid derivatives

Schedule of consultations: consultation upon request, at least 1 week before the date of consultation

COURSE REQUIREMENTS

Prerequisites: GYKASK266E2A General and inorganic chemistry II.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

If necessary, students may make up for a limited number of missed or unsuccessful experiments after preliminary agreement with the leading instructor at the end of the semester. Without permission, the repetition of unsuccessful experiments is not allowed. Course material for the seminars (problem sets) are provided in advance to the students via Moodle. Students are expected to consult these materials before the respective seminars. Attendance is mandatory at the seminars. No more than one seminar absence per semester will be accepted without special consequences. A student who misses more seminar classes in their group may attend a seminar of another group (in the same week) if possible (only a limited number of students may be allowed to do so), always by notifying the seminar leaders in advance. If this is not possible, the student (who has more than 2 absences) will be briefly debriefed by the seminar leader on the relevant topics by the end of the semester (however, regular absences are not permitted). The Study and Examination Regulations also require attendance at 75% of the practical sessions and attendance at the seminars (which count as practical sessions) according to the above criteria in order to be signed off at the end of the semester.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

Theory: At the mid-term tests (one/semester) students have to answer in a written form questions on the subject-matter of the main lectures, the practicals and the seminars, the dates of which are fixed at the beginning of the semesters. The value of the midterm test can be either ranging 2-5 or failed. If the test is failed or the student did not attend it, the student must attend the following makeup test. If the makeup test is failed, a second makeup test should be written. If any of the makeup tests reach the passmark, then the midterm test is accepted. If also the second makeup test is failed, the student does not get signature for the semester, they are not allowed to sit in the semi-final examination. Grades for the main and makeup mid-term tests of the same topic are not averaged. Students who have a result of at least 90% in the mid-term test (excluding the retake tests) during the semester will have a 5-point advantage in the written exam.

Practice: at the beginning of each laboratory practical, students must write a short test on the theoretical and practical subject-matter of the experiment. These tests are immediately corrected by the leading instructor, and the practical work can be started only if the short test is accepted. If the test is failed, the experiment in question can be performed only at the end of the semester. Completing successfully the non-preparative practicals during the two semesters is also a condition of the signature and 75% of the maximum number of laboratory notebooks that can be submitted must be also approved.

Requirements of signature (as provided for in STUDY AND EXAMINATION REGULATIONS § 29):

mid-term test, obtaining a signature, attending practicals and seminars as specified above

Number and type of projects students have to perform independently during the semester and their deadlines: completion of the mid-term assessment, completion of practical work, attendance of a sufficient number of seminars (final deadline: last day of the semester)

Type of the semester-end examination: semi-final

Examination requirements: as published by the institute on the MOODLE course site by the start of the academic term.

Form of the semester-end examination written

Scientific, course related research, publications, assays:

Materials of the lectures and practices can be downloaded from Moodle

P.C. Vollhardt; N.E. Schore: Organic Chemistry: Structure and Function, 8th Edition (W. H. Freeman)

D.R. Klein: Organic Chemistry, 3rd Edition (Wiley)

K.L. Williamson, K.M. Masters: Techniques Labs for Macroscale and Microscale Organic Experiments, 7th Edition (Cengage Learning)

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: individual assesment basis

The course description was prepared by:

Dr. Petra Dunkel (assistant professor, PhD)

Physiology I.

Full name of the subject:	Élettan I.
Program:	undivided program (pharmaceutical)
Schedule:	full-time
English name of the subject:	Physiology I.
German name of the subject:	Physiologie I.
Neptun code of the subject:	GYKTLM275E1A
Type of registration:	obligatory
Responsible department:	Semmelweis University, Institute of Translational Medicine
Responsible tutor:	Dr. Zoltán Benyó Director, professor, PhD, DSc Phone: 210-0306 E-Mail: benyo.zoltan@med.semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Dr. Zoltán Benyó Professor, PhD, DSc
Dr. Lea Danics Research fellow, PhD
Dr. Tamás Ivanics Associate professor, PhD
Dr. Margittai Éva Assistant professor, PhD
Dr. Éva Ruisanchez Assistant professor, PhD
Dr. Monori-Kiss Anna Assistant professor, PhD
Dr. Éva Pál Assistant lecturer, PhD
Dr. László Hricisák Assistant lecturer, PhD
Dr. Ákos Zsembery Associate professor, PhD
 Dr. Mátyás Szentiványi director (OGYÉI)

Classes per week:	5 hours lecture, 2 hours practice
Credit point(s):	5

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The goal is to teach physiological processes from subcellular, cellular and tissue-level processes all the way to complex regulation on the organism level, including studies in humans. Special emphasis is laid on the presentation of complex adaptation processes playing an important role in health preservation, and on studying how physiological regulatory processes respond to changes in the external or internal environment.

Short description of the subject:

Theoretical lectures and practices are held every week. Seminars/Practices are for discussion of ongoing new lecture material and performing relevant physiological measurements in small groups. Also, the theoretical knowledge of the students is tested systematically in a written form on the seminars. Students are required to take 6 written exams in each semester, and a lab exam at the end of the semester. Based on the results of the tests and the lab exam students get a lab work grade at the end of the semester. Students take a written theoretical examination in the exam period.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
3 rd semester	70	28	-	-	98	Autumn semester	-

Program of semester

Topics of theoretical classes (pro week):

1. week: Historic overview, concepts of physiological control, homeostasis. Cell membrane. Basics in cell physiology. Signal transduction. Secondary messenger mechanisms.
2. week: Ionic equilibria and resting membrane potentials, ion channels and gates. Action potentials. Synaptic transmission.
3. week: Muscle. Contractile mechanism. Skeletal, cardiac, and smooth muscles. Biomechanics, electrical properties, metabolism. Structure and general functional characteristics of the autonomic nervous system. Vegetative transmitters.
4. week: Functional organization of the cardiovascular system. Dynamics of blood flow. Physiological functions of the blood vessels, their significance in the healthy functioning of the organism.
5. week: Principles of hemodynamics. Rheology of blood. Pressure and flow in large vessels. Circulatory resistance. Measurement of pressure, flow and cardiac output. Physiology of the venous system. Microcirculation. Control of lymphatic flow and interstitial fluid volume.
6. week: Biomechanical basis of cardiac functions. Cardiac pump. Signal transduction in the cardiomyocyte. Cardiac cycle. Electrical activity of the heart.
7. week: Conduction in cardiac fibers, cardiac excitability, cardiac rhythmicity, electrocardiography.
8. week: Cardiovascular control mechanisms. Local control mechanisms. Systemic control mechanisms.
9. week: Control of cardiac output. Circulation through organs and special regions. Coronary circulation. Circulation of blood and cerebrospinal fluid in the brain.
10. week: Splanchnic circulation. Circulation through skeletal muscles. Circulation of the skin. Physiology of respiration. Structure and function of the respiratory system, pulmonary mechanics.
11. week: Gas transport between the lungs and the tissues. Types of hypoxia. Regulation of respiration. Neural and chemical control of respiration. Adaptation of cardiorespiratory system and skeletal muscle to physical exercise.
12. week: Formation and excretion of urine. Structures of the kidneys and the nephron. Renal circulation. Glomerular filtration. Tubular functions. Mechanisms adjusting the composition of urine.
13. week: Fluid compartments. Regulation of extracellular fluid composition and volume.
14. week: Role of the kidneys in the control of blood pressure. Micturition. Physiological aspects of different forms of circulatory shock.

Topics of practical classes (pro week):

II. Practice topics/week

Practices are held at every second week (4x45 min). At the beginning of the practice, theoretical knowledge of the ongoing lecture material will be discussed and systematically tested in written form. Then students are to perform out relevant physiological measurements in small (2-3 persons) groups on each other. Topics of the practices:

1st practice: introduction

2nd practice: Study of the electrical properties of the neurons in a simulatory setting (Sim Neuron), Electroneurography, measurement of the impulse conduction velocity of a motor nerve (test)

3rd practice: Electromyography (test)

4th practice: Blood pressure measurement (test)

5th practice: ECG (test)

6th practice: Spirometry (test)

7th practice: Lab exam

Schedule of consultations: -

COURSE REQUIREMENTS

Prerequisites: Anatomy; Biology II.

Practices are obligatory. Missing 25% of practice time (7x45 min) results in denial of admission to semifinal exam. A retake option is provided at the end of the semester when students can make up a missed practice with the corresponding test or improve the grade of a single test. Absence from a test results in a 0 point fail (1). Students are allowed to participate on the semifinal exam only if they performed on all 5 performing practice and test and passed on the lab exam.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

Students have to gather 50% of all available points at the tests (calculated as a summary of achieved points at all tests in percentage of the maximal points). Tests will be at practices 2, 3, 4, 5, and 6.

The summary of points will be calculated as percentage of the maximal points and translated to a grade as this scheme resulting the consultation grade:

<50% fail (1)

50-69.9% pass (2)

70-79% fair (3)

80-89% good (4)

90-100% honor (5)

Students can make up a single test and/or the corresponding practice at the end of the semester.

Students will perform on lab exam. In case of need, a retake lab exam will be organized. Their performance during the semester will influence the semifinal grade as the following: Lab grade = (consultation grade x 2 + lab exam grade) / 3 Semifinal grade = (lab grade + test A + test B) / 3 Successful exam requires a pass at each parts of the semifinal grade.

Requirements of signature:**Requirements of signature:**

Acceptable amount of missing. Students have to gather 50% of all available points at the tests (calculated as a summary of achieved points at all tests in percentage of the maximal points).

Students are allowed to participate on the semifinal exam only if they performed on all 5 performing practices and tests and passed on the lab exam.

Type of the semester-end examination: signature, semi-final

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Form of the semester-end examination: written (according to STUDY AND EXAMINATION REGULATIONS 30.§)

The possibility and conditions for offering grades: None.

Scientific, course related research, publications, assays:

Dee Unglaub Silverthorn: Human Physiology – An Integrated Approach, 8th edition (Pearson Education, 2019)

Guyton and Hall: Textbook of Medical Physiology 13th Edition (Elsevier, 2016)

Ganong's Review of Medical Physiology 26th Edition (McGraw-Hill & Lange, 2019)

A. Fonyó: Principles of Medical Physiology (Medicina Publishing House, 2002)

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: no

The course description was prepared by: Dr. Anna Monori-Kiss course coordinator

Biochemistry I.

Full name of the subject: **Biokémia I.**
Program: **undivided program (pharmaceutical)**
Schedule: **full-time**
Short name of the subject: **English name of the subject: Biochemistry I.**
German name of the subject: **Biochemie I**

Neptun code of the subject: GYKBMT276G1A
Type of registration: obligatory
Responsible department: Institute Biochemistry and Molecular Biology, Department of Biochemistry of Semmelweis University

Responsible tutor: **Dr. Attila Ambrus** D.Sc.
 Phone: 06 1 459-1500/60050
 E-mail: ambrus.attila@med.semmelweis-.hu

Name of the persons responsible for the teaching of the subject:
András Szöllösi Ph. D.
Zsófia Komáry Ph. D.
Olivér Ozohanics Ph. D.
Bálint Nagy Pharm. D.
Erzsébet Maróthy Tóth Pharm. D.

Classes per week: 2.5 contact hrs/week, 2*56 min/week lecture
 0.5 contact h/week, 45 min biweekly seminar
Credit point(s): 2

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The main goal of this course is to introduce students to the mechanisms of human biochemical processes at the molecular level. The program is designed to also provide a broader insight into physiological processes that enables students to connect all their previous studies to metabolic processes, and also provides them with the basic knowledge to understand mechanisms of drug action discussed later in Pharmacology. The skills and knowledge acquired in this program is inevitable for modern rational drug design.

Short description of the subject:

Protein structure, protein analysis. Characteristics, structure, kinetics, regulation of enzymes. Glycolysis and gluconeogenesis. PDH, citric acid cycle, oxidative phosphorylation. Digestion and absorption of carbohydrates. Metabolism of fructose and galactose. Pentose phosphate pathway. Glycogen metabolism. Degradation and synthesis of amino acids. Synthesis, degradation and salvage reactions of nucleotides.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
3 rd semester	2.5	–	0.5	–	35+7	Autumn semester	–

Program of semester**Topics of theoretical classes (pro week):**

- Week 1: Protein composition and structure, protein purification and analysis
- Week 2: Myoglobin and hemoglobin
- Week 3: Basic concepts and kinetics of enzymes
- Week 4: Enzyme kinetics, enzyme catalytic strategies
- Week 5: Enzyme regulatory strategies, compounds with high group-transfer potential
- Week 6: Compounds with high group-transfer potential 2, glycolysis, gluconeogenesis
- Week 7: Regulation of glycolysis and gluconeogenesis, PDH
- Week 8: Citric acid cycle: reactions, enzyme defects. Respiratory chain: components, operation
- Week 9: ATP synthase, shuttles, transporters. Digestion and absorption of carbohydrates
- Week 10: Fructose and galactose metabolism, pentose phosphate pathway
- Week 11: Glycogen metabolism
- Week 12: Amino acid degradation, urea cycle
- Week 13: Amino acid synthesis
- Week 14: Nucleotide metabolism

Topics of practical classes (pro week):

- Week 1: Amino acid titration graphs, pI and pK_a
- Week 3: Enzyme kinetics, the Michaelis-Menten model
- Week 5: Enzyme kinetics: inhibitory strategies
- Week 7: Enzyme kinetics: rate-limiting steps, midterm I: proteins
- Week 9: Lactic acidosis, midterm II: enzymes
- Week 11: Pyruvate dehydrogenase deficiency, midterm III: bioenergetics
- Week 13: Micronutrients (vitamins, dietary minerals)

Schedule of consultations: upon mutual agreement

COURSE REQUIREMENTS

Prerequisites: General and inorganic chemistry II. GYKASK106E2A, Biology II. GYKGEN109E2A

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Not more than two absences from the practice. Justification of absence is not required.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

three obligatory written midterm examinations with retakes

Requirements of signature(as provided for in STUDY AND EXAMINATION REGULATIONS § 29): all midterms to be successful

Type of the semester-end examination: practical grade

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Scientific, course related research, publications, assays:

Berg-Tymoczko-Stryer: Biochemistry 9th edition

The course description was prepared by:

dr. Attila Ambrus dr., Erzsébet Maróthy Tóth

Hungarian Pharmaceutical Terminology (practice) III.

Full name of the subject: Magyar gyógyszerészeti szaknyelv III.
Program: undivided program (pharmaceutical)
Schedule: full-time
Short name of the subject: Hung. Pharm. Term. III.
English name of the subject: Hungarian Pharmaceutical Terminology (practice) III.
German name of the subject: Pharmazeutische Fachsprache Ungarisch (Praktikum) III.

Neptun code of the subject: GYKNYE306G3A
Type of registration: obligatory
Institute: Department of Languages for Specific Purposes

Name of the tutor/lecturer: *Katalin Fogarasi PhD, habil.*

Name of the persons responsible for the teaching of the subject:

Classes per week: 2
Credit point: 1

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The role of this subject is to help students acquire the basic vocabulary, grammar and language skills they need for the effective communication in the language they use during their field practice both in their everyday life /'survival language'/ and in their academic studies.

Short description of the subject:

The third semester is dedicated to learning how to communicate with clients and colleagues at the pharmacy. Students acquire basic structures and the vocabulary for describing the characteristics of medicines. The course places special emphasis on functional language needed for obtaining and providing information, giving recommendations and instructions and on phrases needed in basic communication at a pharmacy. The semester also focuses on preparing students for the final exam (both written and oral) at the end of the 4th semester.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
3 rd semester	–	2	–	–	28	Autumn semester	–

Program of semester

Topics of practical classes (pro week):

Week 1	Types of medicines (forms of medicines, herbs)
Week 2	Symptoms and treatment of cold, flu, respiratory diseases
Week 3	Symptoms and treatment of cold, flu, respiratory diseases
Week 4	Instructions about specific forms of medicines
Week 5	Types of medicines 2. (Antibiotics)
Week 6	Types of medicines 2. (Antibiotics)
Week 7-8	Taking medication, instructions (verbs)
Week 9-10	Different symptoms and medicines
Week 11-12	Dermatological complaints
Week 13	Revision
Week 14	Oral interview

Schedule of consultations:

Individual consultations by email or in person on meeting formerly agreed upon with the teacher via email.

COURSE REQUIREMENTS

Prerequisites: GYKLEK155G2A Hungarian Pharmaceutical Terminology II.

Conditions of attending the classes, amount of acceptable absences, way of presentation of leave, opportunity for makeup:

A maximum of 3 absences is allowed (3x90 minutes); if the number of absences exceeds this, the student may make up missed classes in another group (maximum two times) in agreement with the instructor.

A student who misses more than 25% of the practical classes will not be allowed to get a signature (Study and Examination Regulations §29). For more than the allowed number of absences, a medical certificate of long-term illness or hospitalization is required.

According to the Study and Examination Regulations (§ 28), three tardies count as one absence. Arriving 15 minutes later than the start of the lesson is considered tardiness

The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments, (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their upgrading retake (as provided in §§ 25- 28 of the STUDY AND EXAMINATION REGULATIONS): There are no midterm assessments.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

Hungarian Pharmaceutical Terminology III (signature + practical mark)

an oral interview, week 14

Topic: the material covered

Make-up and upgrade opportunities: to be arranged outside of class with the instructor, at the latest by the end of the first week of the examination period.

Semester acceptance conditions: (signature + practical grade)

An attendance of 75% is required to get the signature.

The oral interview is the basis for the practical grade, which may be modified by the assessment of class work. A minimum of 50% (pass) must be achieved in the oral test. Tests for an upgrade may be completed by the end of the first week of the examination period at a time arranged with the instructor.

Assessment of the oral test:

0-49% = fail (1)

50-59% = pass (2)

60-74% = fair (3)

75-89% = good (4)

90-100% = excellent (5)

Knowledge testing during the semester:

The instructors may evaluate the students' performance with the help of short tests.

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Practical mark.

Requirements of the signature (as provided for in STUDY AND EXAMINATION REGULATIONS § 29): An attendance of 75% and taking the oral interview is required.

Individual activity of the student during the semester: Homework in the forms of language practice tasks.

Type of the semester-end examination: Practical mark

Form of the semester-end examination: oral (according to STUDY AND EXAMINATION REGULATIONS 30.§)

List of teaching materials (List of textbooks, hand-outs, scripts, etc.):

Teaching materials and audio recordings containing authentic texts compiled by the instructors of the Institute and uploaded in the Moodle-course. The uploaded teaching materials together form the basis of the oral interview / semester-end examination, where the student's skills of communication in a pharmacy environment are assessed.

The course description was prepared by:

Dr. Schmidtné Dr. Putz Mónika, senior lecturer

Physical Education III.

Full name of the subject:	Testnevelés III.
Program:	undivided program (pharmaceutical)
Schedule:	full-time
Short name of the subject:	P. E. III.
English name of the subject:	Physical Education III.
German name of the subject:	Sport III
Neptun code of the subject:	GYKTSI116G3A
Type of registration:	obligatory
Responsible department:	Semmelweis University, Physical Education and Sports Center

Responsible tutor: **Várszegi, Kornélia** director, P.E. teacher
 Phone: +36-20/825-0611
 E-Mail: varszegi.kornelia@semmelweis.hu,

Name of the persons responsible for the teaching of the subject:
Doharné Buczkó, Anikó P.E. teacher
Farkas, Dominika P.E. teacher
Kalmus, Dániel P.E. teacher
Lehel, Zsolt P.E. teacher
Sótonyiné Hrehuss, Nóra P.E. teacher
Várszegi, Kornélia P.E. teacher
Weisz, Miklós P.E. teacher

Classes per week: 1 hour practice
Credit point: 0

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The short-term goal of the course is to maintain and improve the students' current state of health, to create the physical conditions for a better quality of life by learning and practicing (new) branches of sports that can be practiced after graduation as well. The long-term goal is to improve the quality of life and life prospects of future physicians, and to provide students with credible preventive attitudes and lifestyle advice - so that they can represent those in their later practice, through their own health-promoting behavior.

Short description of the subject:

One aim of the course is to improve the health status of medical students, maintaining and increasing physical performance, creating the conditions for better physical quality of life.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
3 rd semester	0	14	–	–	14	Autumn semester	–

Program of semester

Topics of practical classes (pro week):

- 1st week: General information**
Health and Safety, Fire and Environmental protection. The mid-year adoption requirements, the construction of the classes and the presentation of the university recreational and sports opportunities for extra-curricular activities. Heart rate measurement exercises. Ruffier test and evaluation of the results.
- 2nd week: Athletic**
Differed athletic exercises like throwing, shot put. Preferably outdoors with the aim of learn how to execute the exercise with a proper form and breathing technique.
- 3rd week: Tennis**
Introducing and learning advanced technical elements (serve, volley) and game.
- 4th week: Agility ladder**
To perform different exercises to improve speed, balance and concentration. Preferably outdoors, on grass ground.
- 5th week: Relay race and competitive games**
To improve explosiveness, skills and experience good team spirit.
- 6th week: Football**
Practicing the technical elements of football in pairs and game situation.
- 7th week: Circuit training**
Functional exercises with bodyweight and exercises with basic equipment to improve general coordination skills.
- 8th week: Badminton**
Introducing the technical and tactical elements of doubles game. Game applying all the previously known rules.
- 9th week: Ruffier test**
Comparing the results with the previously recorded one to bring the importance of the health of the cardiovascular system to the attention.
- 10th week: Meta**
Reminders of the basic need to know about META. Learn tactical elements of the game and using them. Aim to improve ball skill development, reaction time, explosiveness and collective gaming experience.
- 11th week: Obstacle course**
To complete a built up obstacle course using different creeping- climbing, hovering, pulling, skipping, throwing techniques for general skill development.
- 12th week: Mobilisation**
Dynamic stretching exercises with and without equipment to prevent the health of the joints by maintaining and developing the mobility of it.
- 13th week: Skipping rope**
Skill developing exercises with skipping rope individually and in pairs, in place and in motion at different levels.
- 14th week: Kettlebell Different kind of strengthening exercises with kettlebell.**
Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes! (2x90 mins./week sport training (competitive sport, for qualified only): cheer dance, cheerleader, men's football, handball, basketball, volleyball)

Course requirements

Prerequisites: –

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

The number of active participations for physical education classes is 10 (once a week for trainings 15 times!), regardless of the number of school breaks, which is to be completed during the hours assigned to the group. Two hours can be recovered in the first week of the exam period, on two separate days. Lessons missed do not need to be certified; however, catching up is mandatory. The days of study breaks do not qualify as automatic attendance. Practice leaders follow an online presence registration at the beginning and end of the lessons, which can be individually tracked on semmelweis.hu/sportkozpont homepage.

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes!

Requirements of signature:

Active participation in practice classes 10 times (once a week) (trainings 15 times) under the conditions described above.

Type of the semester-end examination: signature

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

The possibility and conditions for offering grades:

Active participation in practice classes 10 times (trainings 15 times) under the conditions described above.

May be exempted from attending classes the student who

1. whose diagnosis and the opinion of the sports doctor do not allow to exercise, and submits a certificate or
2. does sports regularly and submits a certificate of association and federation in the neptun system in the exemption period preceding the semester.

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: yes

If you have not completed the course you may be readmitted in the 1. semester of the following academic year.

The course description was prepared by: Kornélia Várszeg

Basic Immunology (Theory)

Full name of the subject: : Immunológia alapjai

Program: Undivided program (pharmaceutical)

Schedule: full-time

Short name of the subject: Immunológia

English name of the subject: Basic Immunology (theory)

German name of the subject: Grundlagen der Immunologie

Neptun code of the subject: GYKGEN070E1A

Type of registration: obligatory

Responsible department: Department of Genetics, Cell- and Immunbiology

Responsible tutor: *Prof. Edit Buzas*, MD, DSc, Member of Hungarian Academy of Sciences

Phone: 06-30-7444918

E-Mail: buzas.edit@med.semmelweis-univ.hu

Name of the persons responsible for the teaching of the subject:

Edit Buzás, Professor, MD, DSc, Member of Hungarian Academy of Sciences

András Falus, Professor Emeritus, MD, DSc, Member of Hungarian Academy of Sciences

Marianna Holub, Associate Professor, PhD

Zsolt Komlósi, Associate Professor, PhD

Barbara Molnár-Érsek, Senior research associate, PhD

Éva Pállinger, Associate Professor, PhD

Classes per week: 2 lecture(s), 0 practice(s)

Credit point: 2

Professional content, intent of acquirement and its function in order to implement the goals of the program:

This course provides a basic knowledge of the structure and mechanisms of the immune system, immunological responses in health and disease, in order to understand the theoretical basis of the mechanisms of targeted biological therapies.

Short description of the subject:

The course discusses the construction of the human immune system: organs, cellular and molecular components involved in the immune response; the development of genetic diversity of antigen receptors, and the role of diversity in an efficient immune response. It introduces the processes of immunological regulation in healthy organism, including the immunology of pregnancy. It also discusses the course and alteration of immunological processes in certain pathological conditions, such as infections, tumors, hypersensitivity reactions, autoimmunity, immunodeficiency and transplantation.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/semester	Normal course offer	Consultations
3. semester	28	0	–	–	28	Autumn semester	7

Program of semester

Topics of practical classes (pro week):

Lectures 1.

1. The role, processes, organs and cells of the immune system
2. Principles of natural immunity
3. The complement system
4. Inflammation and acute phase reaction
5. Antigen presentation and MHCs
6. Antigen receptors and their formation
7. T lymphocytes and cell-mediated immune response
8. B lymphocytes and humoral immune response
9. Immune response in infections; immunodeficiencies
10. Hypersensitivity reactions
11. Immunological tolerance; natural and pathological autoimmunity
12. Antitumor and pregnancy immunity
13. Immunology of transplantation
14. Immunotherapies, Immunopharmacology

Schedule of consultations: 1 hour weekly in the examination period

Prerequisites: Biology II.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

No make-up for lectures.

The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their upgrading retake (as provided in §§ 25-28 of the STUDY AND EXAMINATION REGULATIONS):

For passing (Grade 2-5), students have to reach 50 % of the total scores. (Total scores 60 points).

Score table:

Scores/Points	Grade
0-29	1
30-39	2
40-46	3
47-53	4
54-60	5

Type of the semester-end examination: semi-final

Examination requirements:

as published by the education-research department on the MOODLE interface by the start of the academic term. The written exam score must reach a sufficient level (>50%) to obtain credit points. It is possible to earn bonus points at the lectures. Students who achieve the appropriate bonus points can take a simplified exam during the exam period.

Form of the semester-end examination: written (according to STUDY AND EXAMINATION REGULATIONS 30.S)*

List of teaching materials (List of textbooks, hand-outs, scripts, etc.):

Abbas, Lichtmann, Pillai, Basic Immunology 6th Edition, Elsevier, 2019 (A19) (For Students studied Basic Immunology before 2022: Abbas, Abul K., Basic immunology: functions and disorders of the immune system Fifth edition. 2016. ISBN 978-0-323-39082-8 (A16))
Immunology seminars (e-book): <http://gsi.semmelweis.hu/> (The user name and password is on course datasheet of the Neptun.)

<p>1. Introduction: The concept of immunity, Components (primary, secondary immune organs, cells, molecules) of the immune system. Principles of the immune response: antigen specificity, sensitivity, memory, clonal selection based operation. Features of innate and adaptive, cell-mediated and humoral, primary and secondary response. The immune homeostasis. Migration of immune cells and adhesion molecules; Cytokines and cytokine receptors. Chemokines and chemokine receptors.</p>	<p>ABBAS (Textbook) A19: Ch(apter) 1 pp 1-21 (A16: Ch(apter) 1 pp(pages) 1-21; 24- 25) and lecture pp and lecture ppt</p>
<p>2. The natural immunity: Fc-receptors; PAMP, DAMP, Pattern recognition receptors. Phagocytes and phagocytosis. Role of neutrophils, eosinophils and basophils/mast cells. Types and role of dendritic cells. Inflammasome/inflammasomopathies. Innate lymphoid cells.</p>	<p>A19: Ch 2: pp23-39, 45-46, 47-49 (A16: Ch 2 pp 27-43; 45-50; 53) and lecture ppt</p>
<p>3. The complement system: The activation pathways and the regulation of the complement system; Complement receptors; Complement genetics; the biological role of complement activation.</p>	<p>A19: Ch2 p 39; Ch8: pp164-172 (A16: Ch8, pp176- 184) and lecture ppt</p>
<p>4. Inflammation and the acute phase reaction The inflammation and the acute phase response, the provoking factors and mechanisms, periods; The acute phase plasma proteins.</p>	<p>A19: Ch2:41-45 (A16: Ch 2 pp 43-48) and lecture ppt</p>
<p>5. Antigen, antigen presentation, MHC: The major histocompatibility complex; The ways of antigen processing and presentation.</p>	<p>A19: Ch 3: pp51-72 (A16: Ch 3 pp 56-78)</p>
<p>6. Antigen receptors and their formation: Types and structures of antigen receptors; The immunoglobulin and TCR genes, the sources of antigen receptor diversity; Expression and production of antigen receptors.</p>	<p>A 19: Ch 4 pp73-78, 80-92 (A16: Ch 4 pp 79-102) and lecture ppt</p>
<p>7. T cells and the cell mediated immunity: Differentiation and activation of T cells, types of the T cells, the cell mediated immunity.</p>	<p>A19: Ch4: pp92-95; Ch5: pp96-106, 109- 113, 116-117; Ch6: 119-132, p136 (A16: Ch5, pp 103- 113; 117- 121; 126-127 Ch6, pp 129-143; 146) and lecture ppt</p>
<p>8. B cells and the humoral immunity: The activation and differentiation of B cells, types of the B-cells, the humoral immunity</p>	<p>A19: Ch4 p78, Ch7: pp137-157, Ch8: pp158-164, 174-176 (A16: Ch 7: pp 147- 168; Ch 8 pp 169- 176; 188-189) and lecture ppt</p>
<p>9. Immune response in infections Antimicrobial immune response.</p>	<p>A19: Ch2 pp46-47, Ch6: pp132-135, Ch8 p174 (A16: Ch6, pp143- 145; Ch1 pp21-24, Ch2, pp45-53; Ch8 p186) and lecture ppt</p>
<p>10. Hypersensitivity reactions Type 1-4 reactions (See also the practical presentations)</p>	<p>A19: Ch11 pp218- 234 (A16: Ch 11 pp231- 247) and lecture ppt</p>
<p>11. Immunology of transplantation Immunological background of transplantation and GVH.</p>	<p>A19: Ch10 p196, pp207-217 (A16: Ch10 pp219- 230) and lecture ppt</p>
<p>12. Immunological tolerance and autoimmunity Mechanisms of immune tolerance. The natural autoimmunity. Idiotype regulation and network. Pathological autoimmunity.</p>	<p>A19: Ch4 p92, Ch9 pp177-194 (A16: Ch9, pp191- 203, 203 -210) and lecture ppt</p>
<p>13. Immune deficiencies Primer and acquired immune deficiencies.</p>	<p>A19: Ch12 pp235- 250 (A16: Ch12 pp249- 250; Fig. 12-3. 12-4. 12-5; pp258-264; 265-266) and lecture ppt</p>
<p>14. Anti-tumor-immunity and pregnancy immunity Tumor antigens. Anti-tumor immunity. Escape strategies of tumor cells. Possibilities of anti-tumor immune-therapy. Neonatal immunity. Tolerance to fetal antigens.</p>	<p>A19: Ch10 pp 196- 207; Ch8 p173; 189; (A16: Ch10 pp 211- 219; 228-229) and lecture ppt</p>

The course description was prepared by:

Marianna Csilla Holub, PhD, Associate Professor, Course coordinator of Immunology

Colloid Chemistry

Full name of the subject: Kolloidika (elmélet+gyakorlat)

Program: Undivided program (pharmaceutical)

Schedule: full-time

Short name of the subject: Colloid Chemistry

English name of the subject: Colloid Chemistry (theory+practice)

German name of the subject: Kolloidik (Vorlesung+Praktikum)

Neptun code of the subject: GYKGYI072G1A

Type of registration: obligatory

Responsible department: Department of Pharmaceutics

Responsible tutor: **Angéla Jedlovszky-Hajdú**, associate professor, PhD
Laboratory of Nanochemistry, Department of Biophysics and Radiation Biology
Semmelweis University
phone: +36-20-666-30-40
email: hajdu.angela@semmelweis.hu

Krisztina Ludányi, associate professor, PhD
Department of Pharmaceutics,
Semmelweis University
phone: +36-20-666-33-38
email: ludanyi.krisztina@semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Dr. Angéla Jedlovszky-Hajdú, associate professor, PhD

Dr. Krisztina Ludányi, associate professor, PhD

Dr. István Antal, full professor, PhD

Dr. Andrea Kovács, assistant professor, PhD

Dr. Kristóf Molnár, assistant professor, PhD

Dr. Bálint Basa, PhD student

Dr. Livia Budai, associate professor, PhD

Dr. Budavári Bálint, PhD student

Halmóczy Sarolta, PhD student

Pálos Veronika, PhD student

Classes per week: 2 hours lectures, 2 hours practices

Credit point: 4 credits

Professional content, intent of acquirement and its function in order to implement the goals of the program:

In the lectures, pharmacy students learn about the basic physical and chemical properties, characteristic (intermolecular and interparticular) interactions of nanometer-sized colloidal particles (macromolecules, micelles and microphases), and the factors influencing the stability and structure of simple and complex colloidal systems.

Short description of the subject:

Colloidal particles, colloidal systems. Properties and stability characterization of macromolecular and association colloidal solutions, colloidal and coarse dispersions. Flocculation, stabilization. Characterization of interfaces, interfacial phenomena, wetting, surface activity. Determination of the size and shape of colloidal particles. Electrokinetic phenomena. Rheology of colloidal systems. Relationship of rheological properties to structure.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
3. semester	2	2	–	–	56	Autumn semester	up to the students requirement

Program of semester

Topics of theoretical classes (pro week):

1. Homogeneous, heterogeneous and colloidal systems: Classification of colloidal systems (lyophobic, lyophilic). Intermolecular and interparticle (electrostatic and steric) interactions. Colloidal dispersed and cohesive systems.
2. Macromolecular colloids: Macromolecular colloids: macromolecules of natural origin and synthetic macromolecular compounds. Solubility of macromolecules, thermodynamic basis of solution formation, determination of polymer molecular weight, size and shape of macromolecules, pharmaceutical relevance. Characterization and interactions of dissolved macromolecules. Polyelectrolytes. Their use from a pharmaceutical point of view.
3. Association colloids: Molecular structure and types of amphiphilic compounds. Equilibrium and thermodynamic conditions of micelle formation. Physicochemical properties of surfactant solutions. Solubilization. Properties of self-organizing systems (large micelles, vesicles).
4. Characterization of interfaces: Composition of boundary layers. Intermolecular forces, interfacial (excess) energy. Thermodynamic instability. Langmuir Blodgett technique nowadays. Capillarity. Wetting phenomena upon contact of condensed phases.
5. Adsorption: Energy changes of adsorption processes, thermodynamic driving force, adsorption enthalpies. Surface excess, adsorbed amount. Characterization, structural analysis and medical use of adsorbents.
6. Electrical properties of interfaces: The structure and potential of the electric double layer. Electrokinetic phenomena. The role of zeta potential in pharmaceutical applications.
7. Colloidal and coarse dispersions: Kinetic stability and particle aggregation. Preparation of dispersions by condensation. Control of the degree of dispersity. Preparation of coarse dispersions by dispersion. Mechanism of steric stabilization. Flocculation with electrolytes.
8. Principles of determining of the size and shape in case of colloidal particles: Diffusion, sedimentation. Influence of particle size distribution on the effectiveness of dosage forms. DLS (dynamic light scattering measurement), NTA (nanotracking analysis), DSC (differential centrifugal sedimentation).

9. Emulsions, microemulsions: Stability, regulation of distribution and coalescence constancy. Regularities of stabilization of emulsions and creams.
10. Suspensions: Properties, adhesion forces. Stability of suspensions.
11. Aerosols, gas dispersions, foams: Properties, examinations.
12. Rheology of colloidal systems: Basic rheological functions. Relationship of rheological properties to structure: ideally flexible, viscous and plastic materials. Flow curves of colloidal systems. Rheological properties of emulsions, suspensions, creams, gels, ointments. Determination and control of viscosity and limit of flow.
13. Modern Colloid Chemistry: Industrial Researches.
14. Written test

Topics of practical classes (pro week):

1. Introduction, methods. Aspects of evaluation of measurements, laboratory order
2. Determination of molecular weight of polymers with a capillary viscometer
3. Examination of silica gel, gelatin and agar swelling based on volume and mass increase, effect of pH on gelatin swelling
4. Determination of the critical micelle concentrations of surface active agents by stalagmometry and Donnan's pipette
5. Determination of the isoelectric point of gelatin with a capillary viscometer
6. Determination of critical micelle concentration by conductometric titration
7. Determination of the solubility of benzoic acid
8. Calculation, consultation
9. Written test
10. Preparation and investigation of monomolecular films (Pockels' experiment), Determination of contact angle based on a photograph
11. Preparation of AgI sol and determination of critical coagulant concentration in the presence of NaCl
12. Study of type and conversion of oil-water emulsion
13. Rotational and oscillatory rheometric measurements
14. Retake practice, consultation, Correction/replacement of written tests

Other subjects (both obligatory and optional) relating to the transversal issues of the subject. Possible overlaps between subjects:

Physical Chemistry for Pharmacists, Nanotechnology There is no overlap

Schedule of consultations: According to individual student demand, at an agreed time.

Prerequisites: Physical Chemistry for Pharmacists Biophysics II.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Absences can be accepted according to the Examination and Studies Regulation. Up to 25% of the practices (3 practices) can be missed, in the event of an additional absence, the head of the institute/head of subject determines the conditions of signing and the order of replacement.

The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments, (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their upgrading retake (as provided in §§ 25-28 of the STUDY AND EXAMINATION REGULATIONS):

The 2 test written during the semester is based on the lectures and on the practice materials: the first written test must be completed on practice during the week 9th and the second test on lecture on week 14th. Each student completes the first written test in their own practice time.

We provide two options per test to replace/improve the written tests. In the case of a correction, the result of the correction overwrites the result of the previous score.

Completing the practices and uploading the reports to the Moodle system:

- Detailed theoretical background of the practices is presented in the lectures.
- It is not mandatory to complete all the practices, but the uncompleted practices (max. 3 practices) will be evaluated with 0% and will be included in the percentage of the average of practices. The Department provides an opportunity to make up the missing practices at the end of the semester, during the retake practice.
- The student must arrive for the practice with a pre-prepared report that corresponds to the issued form (address, date, name, principle of measurement in 2-5 sentences). - In the practices, the measurement data must be entered in the reports.
- The practice will be completed when the student has completed the experimental work, entered the measurement data in the report and the instructor confirmed this with a signature and date. Without the signature, the reports cannot be accepted. - The lab report is an individual work.
- Reports are evaluated with % (0-100%).
- The report containing the title, date, name and group of the student, theoretical background of the practice, measurement data, calculations, results, diagrams, conclusions must be uploaded to the Moodle system by the end of the week following the completion of the practice (Sunday: 24:00) in PDF format. An additional week (with a 30% reduction) is available for uploading reports overdue (Sunday: 24:00). The results of the reports uploaded after that moment will be evaluated 0% (the completion of the practice is accepted, but the result is 0%). There is no way to improve practices and reports.

Requirements of signature (as provided for in STUDY AND EXAMINATION REGULATIONS § 29):

At the end of the semester, the subject is completed with a practical mark with at least a sufficient qualification, for which the following conditions must be met:

- the practical reports must be uploaded to Moodle (to the correct group and practice) with the evaluation of the results, at least 50% of the average percentages obtained for the reports must be reached).
- the two written tests must be completed. The result for each test can be worse than 50%, but a minimum of 50% of the average of the two tests must be achieved.

At the end of the semester, the grade is determined as follows:

the percentage result of the two written reports with a double multiplier + the average value obtained for the reports [(2 x percentage of the 1st test + 2 x percentage of the 2nd test + percentage of the average of the reports) / 5].

Mark % of average

very good/excellent (5):	90.00-100%
good (4):	80.00-89.99%
fair (3):	63.00-79.99%
sufficient (2):	50.00-62.99%
insufficient (1):	0-49.99%

Number and type of projects students have to perform independently during the semester and their deadlines:

Upload laboratory records to the Moodle system on a weekly basis during the semester. The report prepared from the given practice must be uploaded by the end of the following week.

Type of the semester-end examination: practical grade

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

The topics of the lectures and practices is the required curriculum.

The possibility and conditions for offering grades: There is no offering grades.

List of teaching materials (List of textbooks, hand-outs, scripts, etc.):

The lectures are presented in slides in an extracted form, which contain the most important theoretical knowledge.

All material for carrying out the lab experiments and preparing the lab reports would be available on Moodle: protocol template in editable form, sample protocol, lab manuals for the lab practices, including a brief summary of the theoretical background of the experiments, the procedure of the measurements, equations and formulae for calculating the results.

Recommended literature

Hunter, R.J.: Foundations of Colloid Science, Oxford Univ. Press (2001)

-Shaw, D.J.: Introduction to Colloid and Surface Chemistry (1992)

The course description was prepared by:

Angela Jedlovsky-Hajdu (associate professor, PhD) and Krisztina Ludányi (associate professor, PhD)

4. SEMESTER

Subject	Lecture (hour/week)	Practice (hour/week)	Credit	Prerequisites	Exam type
Biochemistry (theory+practice) II. GYKBM069E2A	3	–	3	Biochemistry I., Organic Chemistry I.	final*
Organic Chemistry (practice) II. GYKSZK123G2A	–	4	4	Organic Chemistry I.	practical mark
Organic Chemistry (theory) II. GYKSZK123E2A	4	–	4		examination
Physiological Pharmaceutics and Pharmaceutical dosage forms GYKGYI248G1A	2	2	4	Physiology I., Physic. Chem. for Pharm., History of Pharm. and Prop.	practical mark
Physiology (practice) II. GYKTLM124G2A	–	2	1	Physiology I., Biochemistry I.	practical mark
Physiology (theory) II. GYKTLM124E2A	5	–	6		final*
Nanotechnology (theory+practice) GYKGYI078G1A	2	2	4	Colloid Chemistry	practical mark
Pharmacy Practice I. GYKANG238G1A	–	20/semester	–	Physic. Chem. for Pharm. Pharmaceutical Terminology	signature
Hungarian Pharmaceutical Terminology (practice) IV. GYKNYE306G4A	–	2	3	Hungarian Pharmaceutical Terminology III.	final
Physical Education IV. GYKTSI116G4A	–	1	–		signature
Summer Practice I. GYSSZG234G4A	–	40/week (4 weeks)	4	Colloid Chemistry, Physiology I.	practical mark elective subject
Elective or obligatory elective subjects	–	–	–		examination or practical mark
Total:	16	13 +20/semester	33		

Biochemistry II.

Full name of the subject:	Biokémia II.
Program:	undivided program (pharmaceutical)
Schedule:	full-time
Short name of the subject:	Biochemistry II.
English name of the subject:	Biochemistry (theory) II.
German name of the subject:	Biochemie (Vorlesung) II
Neptun code of the subject:	GYKBMT276E2A
Type of registration:	obligatory
Responsible department:	Department of Biochemistry of Semmelweis University
Responsible tutor:	Dr. Attila Ambrus D.Sc. E-mail: ambrus.attila@med.semmelweis-univ.hu

Name of the persons responsible for the teaching of the subject:	Dr. Jordan Jordanov Ph. D. Dr. István Léránt Ph. D. Dr. Dóra Ravasz Ph. D. Dr. László Tretter Ph. D., D. Sc. Dr. Krasimir Kolev , D. Sc. Olivér Ozohanics Ph. D. Bálint Nagy Pharm. D. Erzsébet Maróthy Tóth Pharm. D.
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Classes per week:	1 lecture/week (2 hours/week)
Credit point:	3

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The main goal of this course is to introduce students to the mechanisms of human biochemical processes at the molecular level. The program is designed to also provide a broader insight into physiological processes that enables students to connect all their previous studies to metabolic processes, and also provides them with the basic knowledge to understand mechanisms of drug action discussed later in Pharmacology. The skills and knowledge acquired in this program is inevitable for modern rational drug design.

Short description of the subject:

Metabolism of lipids. Regulation of the biochemical pathways. Enzyme defects. Pharmacological targets. Integration of metabolism between the organs. Synthesis and degradation of neurotransmitters. Hemostasis, blood coagulation and fibrinolysis.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/semester	Normal course offer	Consultations
4th	2	1	no	no	35+7	Spring semester	on demand

Program of semester

Topics of theoretical classes (pro week):

- Week 1: Degradation of saturated, unsaturated, even- and odd-C-chained fatty acids, metabolism of ketone bodies.
- Week 2: Synthesis of fatty acids, regulation, elongation and desaturation of fatty acids, synthesis of eicosanoids.
- Week 3: Digestion of lipids, degradation and synthesis of triglycerides and phospholipids, fatty acid transporters, the role of lipids in signal transduction.
- Week 4: Synthesis of cholesterol, regulation, transport of cholesterol, pharmacological targets, synthesis of bile acids, enterohepatic circulation.
- Week 5: Metabolism of lipoproteins, hyperlipoproteinaemias
- Week 6: Synthesis of steroid hormones
- Week 7: Metabolic integration: red blood cell, adipocyte, heart, skeletal muscle
- Week 8: Metabolic integration: brain, kidney, intestine
- Week 9: Metabolic integration: liver in well-fed and fasting states
- Week 10: Synthesis and degradation of neurotransmitters: Ach, NA, DA, 5-HT

- Week 11: Synthesis and degradation of neurotransmitters, receptor types: Glu, GABA, Gly
- Week 12: Hemostasis: blood coagulation, role of thrombocytes, pharmacological targets
- Week 13: Hemostasis: fibrinolysis, pharmacological targets
- Week 14: Hemostasis: role of endothelium and liver, pharmacological targets

Topics of practical classes (pro week):

- Week 1-2: Purification of trypsin with affinity chromatography
- Week 3-4: Detection of LDH isoenzymes by PAGE
- Week 5-6: Determination of blood sugar level
- Week 7-8: Determination of TAG and cholesterol levels in serum, 1st midterm
- Week 9-10: Determination of ASAT and ALAT activities in serum
- Week 11-12: Seminar on liver failure, 2nd midterm
- Week 13-14: Determination of prothrombin time, activated partial thromboplastin time

COURSE REQUIREMENTS

Schedule of consultations: on demand

Prerequisites: Biochemistry I. GYKBMT276E1A, Organic chemistry I. GYKSZK274E2A

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup: Not more than two absences from the practice. Justification of absence is not required. **The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments, (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their upgrading retake (as provided in §§ 25-28 of the STUDY AND EXAMINATION REGULATIONS):**

Grading of the final exam:

0-49%: fail, 50-61%: pass, 62-74%: fair, 75-87%: good, 88-100%: excellent

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

Two midterm exams will be held in the Moodle system. The first midterm exam will take place on week 7 5-6, the material is lipid metabolism discussed on week 1-4. The second midterm will take place on week 13 11-12, the material is the steroid hormones and nucleotide metabolism, metabolic integration. Students who do not write the mid-term paper in the normal time can make up for it after each paper and in the last week.

Requirements of signature (as provided for in STUDY AND EXAMINATION REGULATIONS § 29): all midterms to be successful, not more than two absences from the practice

Type of the semester-end examination: final

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Form of the semester-end examination: combined examination (according to STUDY AND EXAMINATION REGULATIONS 30.§)

The possibility and conditions for offering grades: Offering grades is not possible.

Scientific, course related research, publications, assays:

Berg-Tymoczko-Stryer: Biochemistry 9th edition
Lecture slides and the syllabus uploaded in the Moodle system.

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: no

The course description was prepared by:
dr. Attila Ambrus dr. Erzsébet Maróthy Tóth

Organic Chemistry II.

Full name of the subject:	Szerves kémia II.
Program:	undivided program (pharmaceutical)
Schedule:	full-time
Short name of the subject:	Org Chem II.
English name of the subject:	Organic Chemistry II.
German name of the subject:	Organische Chemie II
Neptun code of the subject:	GYKSZK274E2A
Type of registration:	obligatory
Responsible Department:	Semmelweis University, Institute of Organic Chemistry
Responsible tutor:	Dr. Petra Dunkel assistant professor, PhD Phone: +36-1-476-3600/53006 E-mail: dunkel.petra@pharma.semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Dr. Balázs Balogh assistant professor, PhD
Dr. Dóra Bogdán assistant lecturer, PhD
Dr. Andrea Czompa assistant professor, PhD
Dr. Ruth Deme assistant lecturer, PhD
Dr. Petra Dunkel assistant professor, PhD
Dr. Zoltán Kaleta assistant professor, PhD
Dr. Róbert Ludmerczki assistant lecturer, PhD
Dr. Krisztina Süttőné Kaczeus research associate
Dr. Márton Ivánczi PhD student
Bence Kontra PhD student
Dr. László Piros PhD student
Patrik Pollák PhD student
Gergő Riszter PhD student

Classes per week:	4 lectures, 4 practices
Credit point(s):	8

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The course includes and discusses state-of-the-art synthetic and structural organic chemistry subjects to develop problem-solving skills for organic chemistry and biomolecular sciences. Students will acquire the basics of organic chemistry, develop an organic chemistry perspective and acquire the theoretical, practical and material knowledge base for their future studies.

Short description of the subject:

The course in Organic Chemistry at the Faculty of Pharmaceutical Sciences has two main objectives:

- to provide a modern organic chemistry curriculum and to develop an organic chemistry approach, by presenting typical synthesis methods for the preparation of the different types of compounds and, with particular emphasis, by illustrating and interpreting their chemical reactivity. Introduction to and practical application of the main methods and tools of preparative organic chemistry.
- to provide a solid molecular, organic chemical basis for subsequent subjects in the curriculum of students at the Faculty of Pharmaceutical Sciences, and, in particular, to strengthen the molecular approach necessary for biomedical disciplines.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/semester	Normal course offer	Consultations
3 rd semester	4	6 (biweekly)	3 (biweekly)	–	56+36+20	Spring semester	upon demand

Program of semester

Topics of theoretical classes (pro week):

1. week: Chemistry literature and databases. Carbon-carbon bond forming reaction with palladium catalysis, organo-metallic compounds of zinc and magnesium. Inter- and intramolecular reactions.
2. week: Heterocyclic nomenclature. Heterocyclic and heteroaromatic compounds.
3. week: π - Excessive aromatic heterocyclic compounds I.
4. week: π - Excessive aromatic heterocyclic compounds II.
5. week: π - Excessive aromatic heterocyclic compounds III.
6. week: π - Excessive aromatic heterocyclic compounds IV.
7. week: π -Excessive aromatic heterocyclic compounds V. π - Deficient aromatic heterocyclic compounds I.
8. week: π - Deficient aromatic heterocyclic compounds II. Heterocyclic polyenes.
9. week: π -Deficient aromatic heterocyclic compounds III. Organic polymers.
10. week: Amino acids, peptides, proteins. Carbohydrates I
11. week: Carbohydrates II.
12. week: Nucleosides, nucleotides and nucleic acids. Natural compounds: terpenes, steroids, representatives of the classes, further natural products I.
13. week: Natural compounds: terpenes, steroids, representatives of the classes, further natural products II. Alkaloids I.
14. week: Natural compounds: alkaloids II. Summary of organic chemical reactions, reaction mechanisms, synthesis planning.

Topics of practical classes (pro week):

1. week: –
2. week: Nomenclature examples from semester I-II, nomenclature of heterocyclic compounds.
3. week: Chemical bibliography and databases.
4. week: Heterocyclic compounds – advanced synthetic routes and reaction pathways. 3-, 4- and 5-membered heterocycles and possible benzologues.
5. week: 4-Nitrobenzoic acid and phthalimide.
6. week: *Heterocyclic compounds – advanced synthetic routes and reaction pathways. 6-, 7- and 8-membered heterocycles and possible benzologues.*
7. week: Ethyl-4-nitrobenzoate (from own 4-nitrobenzoic acid) and cyclohexanone oxime.
8. week: *Amino acids, peptides, proteins.*
9. week: Ethyl-4-aminobenzoate (from own ethyl-4-nitrobenzoate) and *N,N'*-ethylenebis(salicylimine)
10. week: *Carbohydrates. General properties and applications of polymers.*
11. week: *(E,E)*-1,5-Diphenylpenta-1,4-dien-3-one and students' presentations.
12. week: *Solving of stereochemical organic chemistry problems. Alkaloids: chemistry, structure, preparations. Some examples for drug synthesis.*
13. week: Diethyl 3,5-dimethylpyrrole-2,4-dicarboxylate.
14. week: Supplement. Inventory. *Solving of organic chemistry problems from semester I-II. Steroids, isoprenoids: chemistry, structure, preparations.*

Schedule of consultations:

consultation upon request, at least 1 week before the date of consultation

COURSE REQUIREMENTS

Prerequisites: GYKSZK274E1A Organic chemistry (theory) I.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

If necessary, students may make up for a limited number of missed or unsuccessful experiments after preliminary agreement with the leading instructor at the end of the semester. Without permission, the repetition of unsuccessful experiments is not allowed. Course material for the seminars (problem sets) are provided in advance to the students via Moodle. Students are expected to consult these materials before the respective seminars. These problem sets will form the basis of the discussion. No more than one seminar absence per semester will be accepted without special consequences. A student who misses more seminar classes in their group may attend a seminar of another group (in the same week) if possible (only a limited number of students may be allowed to do so), always by notifying the seminar leaders in advance. If this is not possible, the student (who has more than 2 absences) will be briefly debriefed by the seminar leader on the relevant topics by the end of the semester (however, regular absences are not permitted). The Study and Examination Regulations also require attendance at 75% of the practical sessions and attendance at the seminars (which count as practical sessions) according to the above criteria in order to be signed off at the end of the semester.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

Theory: At the mid-term tests (one/semester) students have to answer in a written form questions on the subject-matter of the main lectures, the practicals and the seminars, the dates of which are fixed at the beginning of the semesters. The value of the midterm test can be either ranging 2-5 or failed. If the test is failed or the student did not attend it, the student must attend the following makeup test. If the makeup test is failed, a second makeup test should be written. If any of the makeup tests reach the passmark, then the midterm test is accepted. If also the second makeup test is failed, the student does not get signature for the semester, they are not allowed to sit in the semi-final examination. Grades for the main and makeup mid-term tests of the same topic are not averaged. Students who have a result of at least 90% in the mid-term test (excluding the retake tests) during the semester will have a 5-point advantage in the written exam.

Practical: at the beginning of each laboratory practical, students must write a short test on the theoretical and practical subject-matter of the experiment. These tests are immediately corrected by the leading instructor, and the practical work can be started only if the short test is accepted. If the test is failed, the experiment in question can be performed only at the end of the semester.

Completing successfully the non-preparative practicals during the two semesters is also a condition of the signature and 75% of the maximum number of laboratory notebooks that can be submitted must be also approved.

Requirements of signaturee (as provided for in STUDY AND EXAMINATION REGULATIONS § 29):

mid-term test, obtaining a signature, attending practicals and seminars as specified above

Number and type of projects students have to perform independently during the semester and their deadlines: completion of the mid-term assessment, completion of practical work, attendance of a sufficient number of seminars (final deadline: last day of the semester)

Type of the semester-end examination: final

Examination requirements: as published by the institute on the MOODLE course site by the start of the academic term.

Form of the semester-end examination: written (according to STUDY AND EXAMINATION REGULATIONS 30.§)

The possibility and conditions for offering grades: -

Scientific, course related research, publications, assays:

1. Materials of the lectures and practices can be downloaded from Moodle
2. P.C. Vollhardt; N.E. Schore: Organic Chemistry: Structure and Function, 8th Edition (W. H. Freeman)
3. D.R. Klein: Organic Chemistry, 3rd Edition (Wiley)
4. K.L. Williamson, K.M. Masters: Techniques Labs for Macroscale and Microscale Organic Experiments, 7th Edition (Cengage Learning)
5. **Necessary equipment:** personal protective equipment for the laboratory practicals
6. **In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission:** on and individual assesment basis
7. **The course description was prepared by:** Dr. Petra Dunkel (assistant professor, PhD)

Physiology II.

Full name of the subject:	Élettan II.
Program:	undivided program (pharmaceutical)
Schedule:	full-time
English name of the subject:	Physiology II.
German name of the subject:	Physiologie II.
Neptun code of the subject:	GYKTLM275E2A
Type of registration:	obligatory
Responsible department:	Semmelweis University, Institute of Translational Medicine
Responsible tutor:	Dr. Zoltán Benyó Director, professor, PhD, DSc Phone: 210-0306 E-Mail: benyo.zoltan@med.semmelweis-univ.hu

Name of the persons responsible for the teaching of the subject:

Dr. Zoltán Benyó Professor, PhD, DSc
Dr. Lea Danics Research fellow, PhD
Dr. Tamás Ivanics Associate professor, PhD
Dr. Ákos Lukáts Associate professor, PhD
Dr. Margittai Éva Assistant professor, PhD
Dr. Éva Ruisanchez Assistant professor, PhD
Dr. Monori-Kiss Anna Assistant professor, PhD
Dr. Éva Pál Assistant lecturer, PhD
Dr. László Hricisák Assistant lecturer, PhD
Dr. Ákos Zsembery Associate professor, PhD
Dr. Mátyás Szentiványi director (OGYÉI)

Classes per week:	5 hours lectures, 2 hours practices
Credit point(s):	5

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The goal is to teach physiological processes from subcellular, cellular and tissue-level processes all the way to complex regulation on the organism level, including studies in humans. Special emphasis is laid on the presentation of complex adaptation processes playing an important role in health preservation, and on studying how physiological regulatory processes respond to changes in the external or internal environment.

Short description of the subject:

Theoretical lectures and practices are held every week. Practices are for discussion of ongoing new lecture material and performing relevant physiological measurements in small groups. Also, the theoretical knowledge of the students is tested systematically in a written form on the seminars. Students are required to take 6 written exams in each semester, and a lab exam at the end of the semester. Based on the results of the tests and the lab exam students get a lab work grade at the end of the semester. Students take a written theoretical examination in the exam period.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/semester	Normal course offer	Consultations
4 th semester	70	28	–	–	98	Spring semester	–

Program of semester

Topics of theoretical classes (pro week):

I. Lecture topics/week

1. week: Buffer systems of the blood. Other buffer systems of the body. Principles of acid-base balance. Regulation of acid-base balance in the body.
2. week: Production of blood cells. Blood groups. Blood coagulation. Anemias and pathophysiological conditions.
3. week: Gastrointestinal motility and secretions. Innervation of the GI tract. GI hormones. Regulation of GI motility. Regulation of GI secretion: Salivary secretion; Gastric secretion; Exocrine pancreas. Liver and biliary system.
4. week: Digestion and Absorption. Carbohydrates, lipids and proteins. Absorption of water and electrolytes. Absorption of vitamins and minerals.
5. week: General principles of endocrine physiology. The pituitary gland. Anterior lobe hormones. Growth hormone and physiology of growth. Posterior lobe hormones.
6. week: The adrenal cortex. Structure, blood supply and its control. Innervation. Structure and biosynthesis of adrenocortical hormones. Effects of glucocorticoids and control of their secretion. Effects of mineralocorticoids and control of their secretion. Effects of adrenal androgens and estrogens. Endocrine regulation of calcium metabolism and the physiology of bone.
7. week: The thyroid gland. Formation and secretion of thyroid hormones. Control of synthesis and secretion. Transport and metabolism of thyroid hormones. Effects of thyroid hormones. Clinical correlates. Endocrine functions of the pancreas and the regulation of carbohydrate metabolism.
8. week: Hormonal control of intermediary metabolism. Whole body metabolism. Regulation of feeding and body mass. Starvation and obesity. The reproductive glands. Development and function of the reproductive system. The female reproductive system. Pregnancy. Lactation. The male reproductive system. Endocrine function of the testes.
9. week: The autonomic nervous system and its central control. Adrenal medulla. Sympathetic and parasympathetic tone. Principles of sensory systems. Sensory receptors. Electrical and ionic events in receptors. "Coding" of sensory information.
10. week: Somatosensory functions. Cutaneous, deep and visceral sensation; sensory pathways. Inflammation and pain sensation.
11. week: Arousal mechanisms, sleep and the electrical activity of the brain. The reticular formation and the reticular activating system. The thalamus and the cerebral cortex. Evoked cortical potentials and the EEG. Physiologic basis of consciousness and sleep. Regulation of circadian rhythm.
12. week: Spinal organization of motor function. Monosynaptic reflexes. Polysynaptic reflexes. Spinal reflexes. Spinal and supraspinal control of muscular tone. Spinal shock. Control of posture and movement. The vestibular system. Basal ganglia. Cerebellum. Role of the function in motor coordination. Spinal integration, medullary, midbrain and cortical components.
13. week: The visual system. The image-forming mechanism. The photoreceptor mechanism. Responses in the visual pathways and cortex. Color vision. Eye movements. The auditory system. Chemical senses. Physiology of olfaction. Physiology of taste.
14. week: Neural basis of instinctual behavior. Physiology of the hypothalamus. Regulation of body temperature. Fever. Limbic functions. Motivation. Emotion. Higher cerebrocortical functions. Conditioned reflexes, learning and memory. Integrative functions of the neocortex.

Topics of practical classes (pro week):

II. Practice topics/week

Practices are held at every second week (4x45 min). At the beginning of the practice, theoretical knowledge of the ongoing lecture material will be discussed and systematically tested in written form. Then students are to perform relevant physiological measurement in small, 2-3 person group on each other. Topics of the practices:

- 1st practice: Studying the circulatory and respiratory adaptation responses during physical exercise
- 2nd practice: Acid-base disorders in the clinical practice (test)
- 3rd practice: Measurement of pulse wave velocity (test)
- 4th practice: Clinical case studies (test)
- 5th practice: Blood glucose measurement and oral glucose tolerance test (test)
- 6th practice: Examination of motor reflexes and vestibular function, EOG (test)
- 7th practice: Lab exam

Schedule of consultations: –

COURSE REQUIREMENTS

Prerequisites: Physiology I. ; Biochemistry I.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Practices are obligatory. Missing 25% of practice time (7x45 min) results in denial of admission to final exam. A retake option is provided at the end of the semester when students can make up a missed practice with the corresponding test or improve the grade of a single test. Absence from a test results in a 0 point fail (1). Students are allowed to participate on the final exam only if they performed on all 5 performing practice and test and passed on the lab exam.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

Students have to gather 50% of all available points at the tests (calculated as a summary of achieved points at all tests in percentage of the maximal points). Tests will be at practices 2, 3, 4, 5, and 6.

The summary of points will be calculated as percentage of the maximal points and translated to a grade as this scheme resulting the consultation grade:

<50%	fail (1)
50-69.9%	pass (2)
70-79%	fair (3)
80-89%	good (4)
90-100%	honor (5)

Students can make up a single test and/or the corresponding practice at the end of the semester.

Students will perform on lab exam. In case of need, a retake lab exam will be organized. Their performance during the semester will influence the final grade as the following:

Lab grade = (consultation grade x 2 + lab exam grade) / 3

Final grade = (lab grade + test A + test B + test C) / 4

Successful exam requires a pass at each parts of the final grade.

Requirements of signature:

Acceptable amount of missing. Students have to gather 50% of all available points at the tests (calculated as a summary of achieved points at all tests in percentage of the maximal points).

Students are allowed to participate on the semifinal exam only if they performed on all 5 performing practice and test and passed on the lab exam.

Number and type of projects students have to perform independently during the semester and their deadlines: None.

Type of the semester-end examination: signaturefinal

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Form of the semester-end examination: written

Scientific, course related research, publications, assays:

Dee Unglaub Silverthorn: Human Physiology – An Integrated Approach, 8th edition (Pearson Education, 2019)

Guyton and Hall: Textbook of Medical Physiology 13th Edition (Elsevier, 2016)

Ganong's Review of Medical Physiology 26th Edition (McGraw-Hill & Lange, 2019)

A. Fonyó: Principles of Medical Physiology (Medicina Publishing House, 2002)

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: no

The course description was prepared by:

Dr. Anna Monori-Kiss course coordinator

Hungarian Pharmaceutical Terminology (practice) IV.

Full name of the subject:	Magyar gyógyszerészeti szaknyelv IV.
Program:	undivided program (pharmaceutical)
Schedule:	full-time
Short name of the subject:	Hung. Pharm. Term. IV.
English name of the subject:	Hungarian Pharmaceutical Terminology (practice) IV.
German name of the subject:	Pharmazeutische Fachsprache Ungarisch (Praktikum) IV
Neptun code of the subject:	GYKNYE306G4A
Type of registration:	obligatory elective
Responsible department:	Semmelweis University, Department of Languages for Specific Purposes

Responsible tutor: *Katalin Fogarasi* PhD, habil.

Name of the persons responsible for the teaching of the subject:

Szandra Borda, language teacher

Zsófia Egedi, language teacher

Judit Nagyné Górácz, language teacher

Classes per week: 2

Credit point: 3

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The role of this subject is to help students acquire the basic vocabulary, grammar and language skills they need for the effective communication in the language they use during their field practice both in their everyday life /'survival language/' and in their academic studies.

Short description of the subject:

The fourth semester is dedicated to learning how to communicate with clients and colleagues at the pharmacy. Students acquire basic structures and the vocabulary for describing the characteristics of medicines. The course places special emphasis on functional language needed for obtaining and providing information, giving recommendations and instructions and on phrases needed in basic communication at a pharmacy. The semester also focuses on preparing students for the final exam (both written and oral) at the end of the semester.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
4 th semester	0	2	–	–	28	Spring semester	-

Program of semester

Topics of practical classes (pro week):

Week 1	Revision
Week 2	Home medicine cabinet
Week 3	Herbs
Week 4	Vitamins and minerals
Week 5	Gastrointestinal complaints
Week 6	Stress and sleep disorders
Week 7	Cardiovascular complaints
Week 8	Form and application of medicines
Week 9	Effect of medicines
Week 10	Side effects of medicines
Week 11	Contraindications of medicines
Week 12	Patient Information Leaflets: Reading Comprehension Practice
Week 13	Revision
Week 14	Mock-exam (oral interview)

COURSE REQUIREMENTS

Schedule of consultations: Individual consultations by email or in person on meeting formerly agreed upon with the teacher via email.

Prerequisites: GYKNYE306G3A Hungarian Pharmaceutical Terminology III.

Conditions of attending the classes, amount of acceptable absences, way of presentation of leave, opportunity for makeup: A maximum of 3 absences is allowed (3x90 minutes); if the number of absences exceeds this, the student may make up missed classes in another group (maximum two times) in agreement with the instructor.

A student who misses more than 25% of the practical classes will not be allowed to get a signature (Study and Examination Regulations §29). For more than the allowed number of absences, a medical certificate of long-term illness or hospitalization is required.

According to the Study and Examination Regulations (§ 28), three tardies count as one absence. Arriving 15 minutes later than the start of the lesson is considered tardiness.

The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments, (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their upgrading retake (as provided in §§ 25- 28 of the STUDY AND EXAMINATION REGULATIONS): There are no midterm assessments.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

Hungarian Pharmaceutical Terminology IV (signature + final exam - oral interview)

a mock-exam, week 14

Topic: the material covered

Make-up and upgrade opportunities: according to the Study and Examination Regulations

Semester acceptance conditions:

An attendance of 75% and taking part in the mock exam is required to get the signature.

Knowledge testing during the semester:

The teacher may evaluate the students' performance with the help of short tests.

Requirements of signature (as provided for in STUDY AND EXAMINATION REGULATIONS): An attendance of 75% minimum and taking the final test.

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Final exam – oral interview

A detailed sample exam is provided in the study material, which students can download from the moodle interface.

The possibility and conditions for offering grades: -

Individual activity of the student during the semester: Homework in the forms of language practice tasks.

Performance control in the examination period: final exam (oral interview)

Prescribed external practice: -

List of teaching materials (List of textbooks, hand-outs, scripts, etc.):

Teaching materials and audio recordings containing authentic texts compiled by the instructors of the Institute.

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: on an individual assesment basis

The course description was prepared by: dr. Schmidtné dr. Putz Mónika, senior lecturer

Physical Education IV.

Full name of the subject:	Testnevelés IV.
Program:	undivided program (pharmaceutical)
Schedule:	full-time
Short name of the subject:	PE IV.
English name of the subject:	Physical Education IV.
German name of the subject:	Sport IV
Neptun code of the subject:	GYKTSI116G4A
Type of registration:	obligatory
Responsible department:	Semmelweis University, Physical Education and Sports Center

Responsible tutor: *Várszegi, Kornélia* director, P.E. teacher

Name of the persons responsible for the teaching of the subject:
Doharné Buczkó, Anikó P.E. teacher
Farkas, Dominika P.E. teacher
Kalmus, Dániel P.E. teacher
Lehel, Zsolt P.E. teacher
Sótonyiné Hrehuss, Nóra P.E. teacher
Várszegi, Kornélia P.E. teacher
Weisz, Miklós P.E. teacher

Classes per week: 1 hour practice
 Credit point(s): 0

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The short-term goal of the course is to maintain and improve the students' current state of health, to create the physical conditions for a better quality of life by learning and practicing (new) branches of sports that can be practiced after graduation as well. The long-term goal is to improve the quality of life and life prospects of future physicians, and to provide students with credible preventive attitudes and lifestyle advice – so that they can represent those in their later practice, through their own health-promoting behavior.

Short description of the subject:

One aim of the course is to improve the health status of medical students, maintaining and increasing physical performance, creating the conditions for better physical quality of life.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
4 th semester	0	14			14	Spring semester	

Program of semester

Topics of practical classes (pro week):

- 1st. week: General information**
Accident, fire and environmental knowledge. Requirement for acceptance of the semester system, the structure of the classes and the presentation of the university recreational sports opportunities for extra-curricular activities.
- 2nd. week: Basketball**
Dribbling and shooting skill improving drills. Games: 1 on 1; 2 on 2; shooting contests, king of the court. Scrimmage.
- 3rd. week: Wall-bar exercises**
Enhance strength and balance by climbing, declining, hanging, skipping, pulling, pushing etc. exercises.
- 4th. week: Circuit training**
A chain of compete drills in a certain time period with and without equipment. The aim is to improve the general level of strength and stamina.
- 5th. week: Floorball**
Passing and receiving skill improving drills. Exposing shots on goal (wrist- slap- and snapshots). Scrimmage.
- 6th. week: Drills in pairs**
Strength, agility, coordination and battling skill improving exercises with a partner incorporated.
- 7th. week: Volleyball**
Introducing the defensive elements of the game (receiving serves, blocks). Exposing unknown rules. Games.
- 8th. week: Game-day**
Introducing and practicing different kind of cohesion enhancing games (Tick-Tac-Toe, etc.)
- 9th. week: Ruffier test**
Comparing the results with the previously recorded one to bring the importance of the health of the cardiovascular system to the attention.
- 10th. week: Circuit training**
Specialized chain of drills for strengthen the shoulder, back, chest, arm and leg muscles, considering the fitness level of the Students.
- 11th. week: Tennis**
Introducing variations of ground strokes and grip types (slice, topspin, lobs etc.) Exposing the rules of doubles. Games (all around the world, etc.)
- 12th. week: Badminton**
Exposing the rules and the basic tactical elements of the doubles game. Scrimmage.
- 13th. week: Core exercises**
Body-weight exercises targeting to strengthen the muscles of the trunk thus develop a strong fascia to protect it from the harmful effects of overdose sitting (studying)
- 14th week: Medicine-ball exercises**
Strength and coordination (complex) skill developing exercises by throwing, rolling, passing, lob, shot-put, etc. with a partner incorporated.
- Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes! (2x90 mins./week sport training (competitive sport, for qualified only): cheer dance, cheerleader, men's football, handball, basket-ball, volleyball)

COURSE REQUIREMENTS**Prerequisites: –****Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:**

The number of active participations for physical education classes is 10 (once a week), regardless of the number of school breaks, which is to be completed during the hours assigned to the group. Two hours can be recovered in the first week of the exam period, on two separate days. Lessons missed do not need to be certified; however, catching up is mandatory. The days of study breaks do not qualify as automatic attendance. Practice leaders follow an online presence registration at the beginning and end of the lessons, which can be individually tracked on semmelweis.hu/sportkozpont homepage.

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes!

Requirements of signature(as provided for in STUDY AND EXAMINATION REGULATIONS § 29):

Active participation in practice classes 10 times (once a week) (trainings 15 times) under the conditions described above.

Type of the semester-end examination: signature

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

The possibility and conditions for offering grades:

Active participation in practice classes 10 times (trainings 15 times) under the conditions described above.

May be exempted from attending classes the student who

1. whose diagnosis and the opinion of the sports doctor do not allow to exercise, and submits a certificate or
2. does sports regularly and submits a certificate of association and federation in the neptun system in the exemption period preceding the semester.

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: yes

If you have not completed the course you may be readmitted in the 2. semester of the following academic year.

The course description was prepared by: Kornélia Várszegi

Nanotechnology (theory+practice)

Full name of the subject:	Nanotechnológia (elmélet+gyakorlat)
Program:	undivided program (pharmaceutical)
Schedule:	full-time
Short name of the subject:	
English name of the subject:	Nanotechnology (theory+practice)
German name of the subject:	Nanotechnologie (Vorlesung+Praktikum)
Neptun code of the subject:	GYKGYI078G1A
Type of registration:	obligatory elective
Responsible department:	Semmelweis University, Department of Pharmaceutics
Responsible tutor:	<i>Dr. István Antal</i> professor
Contact information:	phone: +36 1 217 0914 email: antal.istvan@semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Dr. István Antal, professor
Dr. Romána Zelkó, professor
Dr. Andrea Kovács, assistant lecturer
Dr. Csaba Dobó-Nagy, professor
Dr. Angéla Jedlovszky-Hajdú, associate professor
Dr. Nikolett Kállai-Szabó, associate professor
Dr. Nóra Mike-Kaszás, senior lecturer
Dr. Lívia Budai, assistant lecturer
Dr. Bálint Basa, resident
Dr. Bence Borbás, resident
Dr. Zsófia Kohod, resident
Dr. Zsófia Vilimi, resident

Number of lectures /week:	2 hours lectures, 2 hours practices
Credit point:	4 credits

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The aim of the 'Nanotechnology' subject is to acquaint the pharmacy student with the basics of nanotechnology, different types of nanoparticles and nanostructures, important physicochemical properties, physiological and toxicological aspects. It also aims to provide insight into the different areas of application of nanotechnology through practical examples in addition to general knowledge. In addition to general knowledge about nanotechnology, the subject provides practical insights into various areas of application of nanotechnology through practical examples.

Short description of the subject:

The subject "Nanotechnology" provides an overview of the main concepts of nanotechnology, the importance of different nanoparticles, their possible applications, and preparation methods. The potential toxicological aspects of drug delivery systems used in nanomedicine will be also discussed.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/semester	Normal course offer	Consultations
4th semester	2	2	–	–	56	Spring semester	–

Program of semester**Topics of theoretical classes (pro week):**

1. Week: Introduction to nanotechnology, its history, and significance. Nanotechnology concepts, definitions, classifications (nanoparticles, nanostructures, nanomaterials)
2. Week: Particle size reduction I: particle characteristics
3. Week: Particle size reduction II: Effect of particle characteristics on dissolution; nanomilling
4. Week: Vesicular systems: micelles, liposomes
5. Week: Quantum dots and nanoparticles
6. Week: Solid state, amorphous form
7. Week: Nano- and microemulsion systems
8. Week: Characterization methods in nanotechnology
9. Week: Nanofibers as drug delivery systems
10. Week: Bioactive materials, orthopedic implants, bone grafting, and bactericidal surfaces
11. Week: Nanochemistry and biomedical applications
12. Week: Nanomaterials in dentistry
13. Week: Physiological and toxicological aspects of nanotechnology
14. Week: Nanomedicine: Nanotechnology in drug therapy, targeted drug delivery, medical imaging, and diagnostics

Topics of practical classes (pro week):

1. Week: Introduction to nanotechnology laboratory practices, methods, and devices
2. Week: Preparation of quantum dots
3. Week: Preparation, examination and evaluation of liposomes
4. Week: Inhibition and study of the eutectic formation
5. Week: Morphological characterization of nanoparticles, related calculations, SEM/TEM image analysis, particle size, and distribution analysis and evaluation; modelling
6. Week: Written test
7. Week: Nanosuspension preparation, examination and evaluation
8. Week: Preparation, examination and evaluation of nanoemulsions/microemulsions
9. Week: Preparation, examination and evaluation of nano-, microfibers
10. Week: Project work and presentations: On the topic of nanoparticles and nanomedicine
11. Week: Project work and presentations: On the topic of nanotechnology in different industries
12. Week: Holiday
13. Week: Written test
14. Week: Consultation, replacement practice

Other subjects (both obligatory and optional) relating to the transversal issues of the subject. Possible overlaps between subjects:

Physical Chemistry, Colloid Chemistry, Pharmaceutical Technology

Schedule of consultations: At the times indicated in the practice schedule or at an agreed time according to the individual student's needs.

COURSE REQUIREMENTS**Prerequisites:** Colloid Chemistry**Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:**

Up to 25% of the practices (3 practices) can be missed, with the possibility of making up the time according to the practice schedule (on the 14th weeks), in the event of an additional absence, the head of the institute/head of subject determines the conditions of signing and the order of replacement.

The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments, (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their upgrading retake (as provided in §§ 25-28 of the STUDY AND EXAMINATION REGULATIONS):

Mid-term assessments:

1. The completion of 2 written tests (on 6 th and 13th weeks) from the material of the lectures and practices with the results at least 50% of each of the written tests. Possibility of retake according to the Examination and Studies Regulation.
2. There are 6 practice-related Moodle tasks during the semester divided into two blocks the final deadline for completing the tasks is Friday midnight (on 5 th and 12th weeks) before the written midterms.
3. The students must work in groups to develop and present a pre-determined nanotechnological topic within the framework of project work during the 10 th and 11 th educational weeks.

At the end of the semester, the grade is determined as follows:

Based on a percentage calculation from the sum of the points obtained on the two written tests (max. 36-36 points), the points of the practice-related tasks (max. 12 points) and the points received for the project work (max. 16 points), as follows:

90,00-100%	excellent (5)
80,00-89,99%	good (4)
63,00-79,99%	medium (3)
50,00-62,99%	sufficient (2)
0-49,99%	Insufficient (1)

Requirements of signature(as provided for in STUDY AND EXAMINATION REGULATIONS § 29):

Completion according to the SE Examination and Studies Regulation, completion of the practices and laboratory reports, as well as with a minimum of 50% in each written test and preparation of the student project work.

Number and type of projects students have to perform independently during the semester and their deadlines:

The completion of 6 practice-related Moodle tasks (deadline: Friday midnight on 5th and 12th weeks), preparation and presentation of a project work in groups (the deadline of the Moodle uploading: 10 th weeks Monday 8:00 am., presentation weeks: on 10 th and 11 th educational week), 2 written tests (on 6 th and 13th weeks).

Type of the semester-end examination: practical grade

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

The possibility and conditions for offering grades: -

List of teaching materials (List of textbooks, hand-outs, scripts, etc.):

The lectures are presented in slides in an extracted form, which contain the most important theoretical knowledge. Materials are provided to help students to carry out and learn the practices. A guide to the literature research needed to complete the project work.

The course description was prepared by: Dr. Andrea Kovács, Dr. István Antal

Physiological Pharmaceutics and Pharmaceutical dosage forms (theory+practice)

For details on this subject please contact the department or visit their website.

FACULTY OF PHARMACEUTICAL SCIENCES

**Curriculum of the credit-based training for third year students
in the 2024/2025 academic year**



Pharmaceutical Sciences
3rd year

5. SEMESTER

Subject	Lecture (hour/week)	Practice (hour/week)	Credit	Prerequisites	Exam type
Pharmaceutical Chemistry and Analysis (theory) I. GYKGYK279E1A	4	4	8	Analytical Chemistry II. Organic Chemistry II.	semi-final
Pharmaceutical Technology I. GYKGYI281G1A	2	3	5	Physiological Pharm. and pharmaceutical dosage forms, Nanotechnology, Pharmaceutical and medical terminology	practical mark
Pharmaceutical Botany CYKFMG278E1A	2	2	3	Biochemistry I.	semi-final
Biotechnology GYKGYI074E1A	1	-	1	Biochemistry I.	semi-final
Dietetics GYKGYI168E1A	1	-	1	Physiology II. Biochemistry II.	semi-final
Pharmaceutical Microbiology GYKMIK280E1A	3	2	4	Basic Immunology	semi-final
Products of Veterinary Medicine (theory) GYKGYI085E1A	1	-	1	Physiological Pharmaceutics and Pharmaceutical dosage forms	semi-final
Clinical Chemistry and Laboratory Diagnostics (theory) GYKLMIO82E1A	2	-	2	Physiology II. Biochemistry II.	semi-final
Basic Medical Pathophysiology I. (theory+practice) GYKGYH128G1A	2	1	2	Physiology II. Biochemistry II. First Aid	practical mark
Physical Education V. GYKTSII16G5A	-	1	-	-	signature
Elective or obligatory elective subjects	-	-	-		examination or practical mark
Total:	18	13	27		

Pharmaceutical Chemistry and Analysis I.

Full (Hun) name of the subject:	Gyógyszerkémia és analízis I.
Program:	Undivided program (pharmaceutical)
Schedule:	full-time
Short name of the subject:	
English name of the subject:	Pharmaceutical Chemistry and Analysis I.
German name of the subject:	Pharmazeutische Chemie und Analytik I
Type of registration:	obligatory/obligatory elective/elective/criteria requirement
Neptun code of the subject:	GYKGYK279E1A
Responsible Department:	Department of Pharmaceutical Chemistry
Responsible tutor:	Dr. György Tibor Balogh
Contact information:	Semmelweis University, Department of Pharmaceutical Chemistry 1092 Budapest, Hőgyes Endre u. 9. phone: 06-1-217-0891 email: balogh.gyorgy.tibor@semmelweis.hu
Title, academic degree:	Head of department, DSc, PhD, dr. habil

Name of the persons responsible for the teaching of the subject:

Dr. György Tibor Balogh Head, full professor, PhD
Dr. Péter Horváth Associate professor, PhD
Dr. Károly Mazák Associate professor, PhD
Dr. Márta Kraszni Associate professor, PhD
Dr. Gergő Tóth Associate professor, PhD
Dr. Arash Mirzahosseini Adjunct, PhD
Dr. Ádám Golcs Adjunct, PhD
Dr. Tamás Pálla Adjunct, PhD
Dr. Réka Angi Adjunct, PhD
Dr. Vivien Bárdos Assistant professor
Dr. Balázs Simon Assistant professor
Dr. Rita Szolláth Assistant professor
Anna Vincze Assistant professor

Class per week: 4 lectures
4 practices

Credit point(s): 8

Professional content, intent of acquirement and its function in order to implement the goals of the program:

Integration of the curriculum of various chemical and biological courses and extension with specific chemical knowledge regarding properties, mechanism of action and analytics of drug substances.

Short description of the subject:

theory: Teaching of synthesis, analytics, physico-chemical and chemical properties, structure-activity relationships, receptor-bindings and biochemical background of biological effects of drug substances.

practice: Teaching of analytics, physico-chemical and chemical properties of drug substances.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/semester	Normal course offer	Consultations
5th semester	56	56	-	-	112	Autumn semester* Spring semester Both semesters (* Please underline)	-

Program of semester

Topics of theoretical classes (pro week):

Week

1. week: Introduction. (Pharmaceutical Chemistry, Pharmacopoeias)
Preliminary testing of inorganic and organic compounds, classification
Methods for identification of inorganic compounds
Identification of organic functional groups
2. week: General purity tests in Pharmacopoeia
Structural and physical chemistry of drug action I
3. week: Proton speciation of drugs, Determination of protonation constants, optimization of pH-dependent processes
Characterization of lipophilicity, determination of partition coefficient
4. week: The role of solubility in drug discovery. Kinetic and thermodynamic solubility and methods of determination
Role of active substance permeability in ADME processes
5. week: Separation techniques TLC and HPLC
Application of UV-VIS spectrophotometry in the analysis of drugs
6. week: Determination of organic acids and bases
Major analgetics I.
7. week: Major analgetics II.
Minor analgetics
8. week: Minor analgetics
Nonsteroidal antiinflammatory drugs
9. week: Narcotics
Sedato-hypnotics and anxiolytics
10. week: Local anaesthetics
Psychopharmacons I.

11. week: Psychopharmacons II.
Cholinergic and adrenergic agents I.
12. week: Cholinergic and adrenergic agents II.
Cholinergic and adrenergic agents III.
13. week: Antiepileptics
14. week: Drug discovery and research
Drug discovery and research

Topics of practical classes (pro week):

1. week: Equipping, rules to be observed in the laboratory
Burning test demonstration and discussion.
2. week: Preliminary testing and classification of inorganic and organic drugs. Identification of inorganic drugs
3. week: Burning and other preliminary tests with model compounds.
4. week: General purity tests for inorganic ions I
5. week: Determination of protonation constants (potentiometry, UV spectroscopy)
6. week: Determination of organic functional groups
7. week: Major analgetics
8. week: Minor analgetics
9. week: Non-steroidal anti-inflammatory drugs
10. week: Determination of logP
11. week: Local anesthetics
12. week: Sedato-hypnotics, anxiolytics
13. week: Drugs effecting the vegetative nervous system
14. week: Psychopharmacons

Other subjects (both obligatory and optional) relating to the transversal issues of the subject. Possible overlaps between subjects:

Schedule of consultations:

Course requirements

Prerequisites:

Analytical Chemistry II., Organic Chemistry II.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Based on the Study and Examination Regulation

The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments, (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their upgrading retake (as provided in §§ 25-28 of the STUDY AND EXAMINATION REGULATIONS):

Project reports on weeks 5, (retake on week 7); 10 (retake on week 12); and 14.

Possibility of substitutions according to the thematic plan issued at the beginning of the semester

The average of the project report papers written during the semester counts for 1/3 of the exam mark, while the result of the colloquium counts for 2/3.

Requirements of signature (as provided for in STUDY AND EXAMINATION REGULATIONS § 29):

Attendance of lectures. (Extent of the absence is based on the Study and Exam Regulation)

Attendance of practices. (Extent of the absence is based on the Study and Exam Regulation)
The average of the scheduled project reports is at least 2 without rounding.
The required minimum amount of points during practices is accumulated.

Number and type of projects students have to perform independently during the semester and their deadlines:

Type of the semester-end examination: signature*/practical grade*/comprehensive examination*/final/end-term examination*

* Please underline

Examination requirements: (list of topics, test examination topics, mandatory parameters, diagrams, concepts, list of calculations, practical skills, and project tasks recognised as examinations, criteria for completion and assessment):

Identification of inorganic compounds
(identification of anions and cations in Ph. Eur.)

Identification of organic functional groups
(identification of acidic, basic and neutral functional groups; identification of phenols; identification of amine functional groups)

Purity tests in Ph. Eur.
(principles, classification of impurities; general tests for ammonium, arsenic, phosphate, calcium, potassium, chloride, magnesium, sulphate, iron and heavy metals; clarity and degree of opalescence, colour of liquids; calculations)

Structural and physical chemistry of drug action
(general description of drug action; description of acid-base character; requirements of the formation of the drug-target molecule complex, types of drug-target molecule interactions, characterization of drug-target molecule interactions, types of the biological response)

Protonspeciation of drugs
(macro- and microconstants /logK, pKa/, relationships; determination of the concentration of species; n-bar, H-bar, average charge, isoelectric point; calculations)

Determination of protonation macroconstants
(direct potentiometry, UV/pH titrations; calculations)

Lipophilicity, solubility, permeability
(definitions, relationships; experimental methods; calculations of logP, logD, logS, kinetic and thermodynamic solubility, effects acting on solubility, biological and artificial membranes, transport processes, sink process)

UV/VIS spectroscopy
(theoretical principles; chromophore and auxochrom groups; spectrum shifts; Lambert-Beer law; practice of spectrophotometric measurement; pharmacopoeial applications;)

Chromatographic methods, TLC, HPLC
(classification of chromatographic systems; principles; stationary- and mobile phases; TLC: practice of TLC, R_f, R_M, pharmacopoeial applications, validation; HPLC: apparatus, principles, definitions, chromatogram, chromatographic parameters (dead time, retention time, capacity factor, resolution, selectivity), pharmacopoeial applications)

Determination of organic acids and bases
(classification of solvents; measurement options with examples, calculations, multicomponent drug preparations)

Major analgetics
(classification; structure, properties and analytics of morphine; semi-synthetic agents, structure-activity relationships; synthetic opioid compounds; receptor model; (structures: morphine, codeine, ethylmorphine, dihydrocodeine, oxycodone, naloxone, naltrexone, nalbuphine, dextrometorphan, pentazocine, pethidine, fentanyl, methadone, tramadol)

Minor analgetics
(classification; properties, analytics, metabolism; structures: salicylic acid, sodium salicylate, acetylsalicylic acid, paracetamol, phenazone, aminophenazone, metamizole sodium)

Nonsteroidal anti-inflammatory drugs
(mechanism of action; classification; structures, properties, analytics, structure-activity relationships; structures: niflumic acid, diclofenac, indometacin, ibuprofen, naproxen, phenylbutazone, piroxicam, celecoxib, nimesulide)

Local anaesthetics
(mechanism of action; classification; structures, properties, analytics; structures: cocaine, benzocaine, procaine, tetracaine, lidocaine, mepi-, ropi-, bupivacaine, articaine)

General anaesthetics
(classification; structures, structural criteria of action, partition equilibria, properties, structure-activity relationships; structures: isoflurane, desflurane, sevoflurane, propofol)

Sedato-hypnotics

(classification; structure, properties, analytics, mechanism of action and structure-activity relationships of barbiturates; structures: chloral hydrate, chlorobutanol, barbital, phenobarbital, hexobarbital, thiopental)

Anxiolytics

(classification; structure, properties, mechanism of action and structure-activity relationships of benzodiazepines; structures: nitrazepam, diazepam, oxazepam, chlordiazepoxide, medazepam, midazolam, alprazolam)

Antipsychotics

(classification; structure, properties, mechanism of action, structure-activity relationships of phenothiazines and thioxanthenes; structure, properties and mechanism of action of atypical antipsychotics (benzamides, tricyclic compounds, aryl-piperazines; structures: chlorpromazine, levomepromazine, thioridazine, fluphenazine, fluphenazine decanoate, chlorprothixene, flupentixol, sulpiride, clozapine, quetiapine)

Antidepressants

(classification; structure, properties, mechanism of action, structure-activity relationships of I. and II. generation drugs; structures: imipramine, amitriptyline, maprotiline, fluoxetine, sertraline)

A list of the basic notes, textbooks, resources and literature that can be used to acquire the knowledge necessary to master the curriculum and to complete the assessments, with exact description about which of them is required to acquire which part of the syllabus (e.g. description based on topics), as well as the main technical and other aids and study aids that can be used:

Theoretical and practical material uploaded to Moodle system.

Lecture notes

Foye's Principles of medicinal chemistry

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission:

no

The course description was prepared by:

Dr. Péter Horváth

Parasympathomimetics

(receptors, receptor binding of acetylcholine; classification; structure, properties, analytics, structure-activity relationships of direct and indirect acting parasympathomimetics; structure: acetylcholine, carbachol, pilocarpine, physostigmine, neostigmine, pyridostigmine)

Parasympatholytics

(classification; structure, properties, receptor binding, analytics, structure-activity relationships of natural and synthetic parasympatholytics; structures: atropine, scopolamine, homatropine, homatropine methylbromide, ipratropine, thiotropium)

Sympathomimetics

(receptors, receptor binding of noradrenaline; classification; structure, properties, analytics and structure-activity relationships of phenylalkylamines; structures: noradrenaline, adrenaline, isoprenaline, dobutamine, terbutaline, salbutamol, phenylephrine, ephedrine, naphazoline)

Form of the semester-end examination: written

The possibility and conditions for offering grades:

No grades offered

Pharmaceutical Botany

Full (Hungarian) name of the subject:	GYÓGYSZERÉSZI NÖVÉNYTAN
Program:	Undivided program (pharmaceutical)
Schedule:	full-time
Short name of the subject:	Botany
English name of the subject:	Pharmaceutical Botany
German name of the subject:	Pharmazeutische Botanik
Type of registration:	obligatory/obligatory elective/elective/criteria requirement
Neptun code of the subject:	GYKFMG278E1A
Responsible Department:	Department of Pharmacognosy
Responsible tutor:	<i>Dr. Ágnes Alberti</i>
Contact information:	email: alberti.agnes@semmelweis.hu
Title, academic degree:	associate professor, Ph.D.

Name of the persons responsible for the teaching of the subject:	
	<i>Imre Boldizsár</i> associate professor, Ph.D.
	<i>Attila Ványolós</i> assistant professor, Ph.D.
	<i>Bernadett Szögi-Tatár</i> Ph.D. student

Class per week:	2 lectures 2 practices
Credit point(s):	2 credits (lectures) 1 credit (practice)

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The main aims of the subject are as follows:

1. To get familiar with the botanical features of plants at the cytological, histological, and organizational levels in order to gain basic knowledge essential for pharmacopeial drug analysis
2. To obtain a comprehensive picture of general and specific metabolic processes and physiological phenomena of plants to understand the production and accumulation of biologically active substances (and their mode of storage).
3. To study the chemotaxonomy of plants in order to be able to recognize medicinal herbs (and poisonous plants) and to understand their kinship and chemism.

Short description of the subject:

The subject summarizes current knowledge on the structure and function of plant cells and their participation in biochemical processes. It presents the anatomical (histological) and macroscopic morphological characteristics of the plant organs, that also represent drugs, and their physiological processes, highlighting their role in the production and accumulation of biologically active substances. It describes the systematization of the flora most important from the pharmaceutical point of view: chemotaxonomy with special emphasis on chemism. In this context, it presents important medicinal herbs (and poisonous plants) and their morphological characteristics necessary for their recognition

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/semester	Normal course offer	Consultations
5th semester	28	–	-	-	28	Autumn semester	–

Program of semester

Topics of theoretical classes (pro week):

1. week: Introduction to Pharmaceutical Botany. Aims and Scope. Cellular Plant Anatomy. Cell organelles. Cell wall structure. Plant tissues: parenchyma, sclerenchyma, collenchyma
2. week: Vascular Plant tissues: phloem and xylem. Vascular bundles. Epidermis. Stomata. Secretory tissues
3. week: Roots. Root system and morphology
4. week: Stems. Morphology, primary and secondary growth, woody stem
5. week: Leaves: macroscopic and microscopic morphology
6. week: Flowers: parts of a flower, floral types. The main types of inflorescences.
7. week: Development of seeds and fruits, double fertilization. Fruit types. Histological features of seeds and fruits.
8. week: Introduction to taxonomy. Kingdom of fungi: ecology, distribution, importance, Ascomycota, and Basidiomycota.
9. week: Pteridophyta: Filicopsida, Equisetopsida, Lycopodiopsida. Gymnosperms: Conifers, Ginkgo, Gnetales
10. week: Introduction to Angiosperms. Families of Magnoliidae, Caryophyllidae and Hamamelididae subclasses
11. week: Rosidae subclass: Rosaceae, Aerialiaceae, Fabaceae, Apiaceae, Malvaceae
12. week: Dilleniidae subclass: Malvaceae, Salicaceae, Euphorbiaceae, Urticaceae, Cannabaceae, Brassicaceae.
13. week: Lamiidae and Asteridae subclasses: Solanaceae, Boraginaceae, Schrophulariaceae, Lamiaceae, Asteraceae.
14. week: Characterization of monocot plants. Alliaceae, Asphodelaceae, Amaryllidaceae, Zingiberaceae, Poaceae

Topics of practical classes (pro week): -

Schedule of consultations: on demand

Course requirements

Prerequisites: Biochemistry II.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup: Based on the current Study and Exam regulations

The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments, (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their upgrading retake (as provided in §§ 25-28 of the STUDY AND EXAMINATION REGULATIONS): two midterm tests taken on dates specified in the beginning of the semester, retake possibilities on the week following the midterm, and also on the last week

Number, topics, and dates of tests during the semester, opportunities of makeup and improvement of results: -

Requirements of signature (as provided for in STUDY AND EXAMINATION REGULATIONS § 29):

Participation at the practices. Submission and acceptance of reports. Passing every midterm during the semester.

Number and type of projects students have to perform independently during the semester and their deadlines: -

Type of the semester-end examination: signature*/practical grade*/semi-final*/final* (* Please underline)

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Topic list for oral exam

- A/1. Characteristics of plant cells. Structure and chemistry of cell walls. Thickening of cell wall in plants. Sclerenchyma
- A/2. Plastid types and structure, main steps of photosynthesis. Plant tissues: collenchyma, parenchyma.
- A/3. Secretory tissues: types, structure, role in the synthesis of secondary metabolites.
- A/4. Epidermis, trichomes, stoma (types and examples). Periderm and rhytidome.
- A/5. Roots: types; young/primary roots, secondary growth; specialized roots.
- A/6. Stems: young/primary stems. Specialized stem structures.

- A/7. Secondary growth of stems. Woody stem, periderm.
- A/8. Leaves: macroscopic and microscopic structure.
- A/9. Flowers: parts of a flower, floral types. The main types of inflorescences.
- A/10. Development of seeds and fruits, double fertilization. Fruit types. Histological features of seeds and fruits.
- B/1. Kingdom of fungi: ecology, distribution, importance, Ascomycota, and Basidiomycota.
- B/2. Pteridophyta: general features, Filicopsida, Equisetopsida and Lycopodiopsida.
- B/3. Gymnosperms: Conifers, Ginkgo, Gnetales.
- B/4. Magnoliidae subclass: Magnoliaceae, Myristicaceae, Lauraceae, Piperaceae, Ranunculaceae, Papaveraceae
- B/5. Caryophyllidae subclass: Caryophyllaceae, Cactaceae, Chenopodiaceae, Polygonaceae.
- B/6. Hamamelididae subclass: Fagaceae, Betulaceae, Juglandaceae families.
- B/7. Rosidae subclass: Crassulaceae, Rosaceae, Mimosaceae, Cesalpiniaceae, Fabaceae.
- B/8. Rosidae subclass: Myrtaceae, Rutaceae, Anacardiaceae, Araliaceae, Apiaceae.
- B/9. Dilleniidae subclass: Malvaceae, Salicaceae, Euphorbiaceae, Urticaceae, Cannabaceae, Brassicaceae.
- B/10. Cornidae subclass: Ericaceae, Rubiaceae, Loganiaceae, Valerianaceae, Apocynaceae.
- B/11. Lamiidae and Asteridae subclass: Solanaceae, Boraginaceae, Schrophulariaceae, Lamiaceae, Asteraceae.
- B/12. Characterization of monocot plants. Alliaceae, Asphodelaceae, Amaryllidaceae, Zingiberaceae, Poaceae.

Form of the semester-end examination: oral

The possibility and conditions for offering grades: -

A list of the basic notes, textbooks, resources and literature that can be used to acquire the knowledge necessary to master the curriculum and to complete the assessments, with exact description about which of them is required to acquire which part of the syllabus (e.g. description based on topics)), as well as the main technical and other aids and study aids that can be used:

Lectures and practice seminars available for the study of each topic:

- A/1. Characteristics of plant cells. Structure and chemistry of cell walls. Thickening of cell wall in plants. Sclerenchyma (Lectures 1-2, Practice 5-6)
- A/2. Plastid types and structure, main steps of photosynthesis. Plant tissues: collenchyma, parenchyma. (Lectures 1-2, Practices 5-6)
- A/3. Secretory tissues: types, structure, role in the synthesis of secondary metabolites. (Lectures 1-2, Practice 6-7)
- A/4. Epidermis, trichomes, stoma (types and examples). Periderm and rhytidome. (Lectures 2-4, Practices 6-7)
- A/5. Roots: types; young/primary roots, secondary growth; specialized roots. (Lecture 3, Practices 10)
- A/6. Stems: young/primary stems. Specialized stem structures. (Lecture 3, Practice 10)
- A/7. Secondary growth of stems. Woody stem, periderm. (Lecture 4, Practice 11)
- A/8. Leaves: macroscopic and microscopic structure. (Lecture 5, Practice 12)
- A/9. Flowers: parts of a flower, floral types. The main types of inflorescences. (Lecture 6, Practice 1-3)
- A/10. Development of seeds and fruits, double fertilization. Fruit types. Histological features of seeds and fruits. (Lecture 7, Practice 13)
- B/1. Kingdom of fungi: ecology, distribution, importance, Ascomycota, and Basidiomycota. (Lecture 8)
- B/2. Pteridophyta: general features, Filicopsida, Equisetopsida and Lycopodiopsida. (Lecture 9)
- B/3. Gymnosperms: Conifers, Ginkgo, Gnetales. (Lecture 9)
- B/4. Magnoliidae subclass: Magnoliaceae, Myristicaceae, Lauraceae, Piperaceae, Ranunculaceae, Papaveraceae (Lecture 10)
- B/5. Caryophyllidae subclass: Caryophyllaceae, Cactaceae, Chenopodiaceae, Polygonaceae. (Lecture 10)
- B/6. Hamamelididae subclass: Fagaceae, Betulaceae, Juglandaceae families. (Lecture 10)
- B/7. Rosidae subclass: Crassulaceae, Rosaceae, Mimosaceae, Cesalpiniaceae, Fabaceae. (Lecture 11)
- B/8. Rosidae subclass: Myrtaceae, Rutaceae, Anacardiaceae, Araliaceae, Apiaceae. (Lecture 11)
- B/9. Dilleniidae subclass: Malvaceae, Salicaceae, Euphorbiaceae, Urticaceae, Cannabaceae, Brassicaceae. (Lecture 12)
- B/10. Cornidae subclass: Ericaceae, Rubiaceae, Loganiaceae, Valerianaceae, Apocynaceae. (Lecture 12)
- B/11. Lamiidae and Asteridae subclass: Solanaceae, Boraginaceae, Schrophulariaceae, Lamiaceae, Asteraceae. (Lecture 13)
- B/12. Characterization of monocot plants. Alliaceae, Asphodelaceae, Amaryllidaceae, Zingiberaceae, Poaceae. (Lecture 14)

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission:

no

The course description was prepared by: Dr. Attila Ványolós

Pharmaceutical Microbiology

Full (Hun) name of the subject: Gyógyszerészi mikrobiológia
Program: Undivided program (pharmaceutical)
Schedule: full-time

Short name of the subject:
English name of the subject: **Pharmaceutical Microbiology**
German name of the subject: **Mikrobiologie für Pharmazeuten**

Type of registration: obligatory/obligatory elective/elective/criteria requirement

Neptun code of the subject: GYKMIK280E1A

Responsible Department: Semmelweis University, Institute of Medical Microbiology

Responsible tutor: **Dr. Agoston Ghidan**

Contact information:
 phone: 06208259715
 email: ghidan.agoston@semmelweis.hu

Title, academic degree: **Master teacher, PhD**

Name of the persons responsible for the teaching of the subject:
Dr. Szabó Dóra full professor, DSc
Dr. Dobay Orsolya associate professor, PhD
Dr. Ghidán Ágoston master teacher, PhD
Dr. Andrea Horváth professor's assistant

Class per week:
 3 hours lectures
 2 hours practices

Credit point(s):
 4 credits lectures
 0 credits practices

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The importance of microbiology in the medical curriculum, including the education of students of Faculty of Pharmacy is permanently growing. The knowledge about new types of microbial agents - beside the well known old ones -, new diseases caused by microbes, the more and more frequent nosocomial infections and the epidemics believed overcome, but recently emerging is necessary for the pharmacist, too. They have to be familiar with the continuously growing possibilities of methods used in diagnostic work, prevention and therapy of infectious diseases caused by microbes.

The goal of the training course is that the students of Faculty of Pharmacy learn about the nature of the most important human pathogenic agents, their appearance, the ways of their transmission, the possibilities of killing them inside as well as outside the human body. In addition to the basic knowledge of microbiology an increasing emphasis is placed on the topics connected with the utilization of microbes in pharmacy, in pharmacological research and industry.

Short description of the subject:

The students learn about the physiological and pathological effects of microbes in the organism, i.e. in the human body. Beside the general characterization of the most important pathogens (bacteria, viruses, fungi, and parasites), the students learn about the possibilities of sterilization and disinfections, mode of actions of antimicrobial agents, control of infectious diseases as well as the basic methods of laboratory diagnosis of infectious diseases. Because microorganisms have special importance in pharmaceutical industry, the most important new results, methods (i.e. recombinant technologies) are also summarized.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/semester	Normal course offer	Consultations
5th semester	42	28	-	-	70	Autumn semester	-

Program of semester**Topics of theoretical classes (pro week):**

- Week 1. Brief history, subject and aim of Microbiology. Occurrence and importance of microbes in nature. General microbiology. Morphology, reproduction and physiology of bacteria. Microbial genetics.
- Week 2. Disinfection. Principles and practice of sterilization. Introduction to antimicrobial chemotherapy.
- Week 3. Mode of action of the antibiotics. Resistance to antibiotics.
- Week 4. Principles of microbial pathogenicity. Immunity to microbes. Active and passive immunization.
- Week 5. Cocci causing purulent diseases (Staphylococcus, Streptococcus, Neisseria)
- Week 6. Normal flora of the intestinal tract and the importance of it. Bacteria causing enteral diseases.
- Week 7. Causative agents of respiratory tract infections.
- Week 8. Endospore forming bacteria. Parasitology (protozoa and helminths).
- Week 9. Causative agents of human mycosis and their therapy.
- Week 10. General virology. Antiviral chemotherapy. DNA viruses.
- Week 11. Enteral viruses and diseases caused by them. Hepatitis viruses.
- Week 12. Respiratory pathogenic viruses. Arbo- and reoviruses, Rhabdoviruses.
- Week 13. Retroviruses. AIDS. Tumor viruses. The role of viruses in carcinogenesis.
- Week 14. Production of therapeutic substances by recombinant DNA technology. Microorganisms in pharmaceutical sciences. Nosocomial infections

Topics of practical classes (pro week):

- Week 1. Introduction to basic microbiology, laboratory rules. Microscopic examination of microbes.
- Week 2. Cultivation of bacteria.
- Week 3. Methods for sterilization and disinfection.
- Week 4. Determination of antibiotic susceptibility of bacteria.
- Week 5. In vitro antigen-antibody reactions (serological methods).
- Week 6. Gram-positive and Gram-negative cocci (Cultures, smears, biochemical reactions, serological tests, antibiotic susceptibility, vaccines).
- Week 7. Enteral Gram-negative rods (Enterobacterales). Cultures, smears, biochemical reactions, serological tests, antibiotic susceptibility, vaccines); Vibrio, Helicobacter, Campylobacter.
- Week 8. Pseudomonas. Gram-negative coccobacilli (Cultures, smears, antibiotic susceptibility, vaccines).
- Week 9. Non-spore forming Gram-positive bacteria. Mycobacteria (Cultures, smears, enzyme reactions, serological tests, antibiotic susceptibility, vaccines).
- Week 10. Endospore-forming Gram-positive aerobic and anaerobic bacteria (Cultures, smears, enzyme reactions, serological tests, antibiotic susceptibility, vaccines).
- Week 11. Spirochetes. Rickettsiae, Chlamydiae, Mycoplasmas (Cultures, smears, enzyme reactions, serological tests, antibiotic susceptibility, vaccines).
- Week 12. Medically important fungi (Cultures, smears).
- Week 13. Medical parasitology (macroscopic and microscopic preparations).
- Week 14. General virology (cultivation and morphology of viruses, cell-virus interactions, serological tests).

Other subjects (both obligatory and optional) relating to the transversal issues of the subject. Possible overlaps between subjects:

Not available

Schedule of consultations: as demanded

Course requirements**Prerequisites:**

Basic Immunology

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Presence on at least 75 % of the total number of practices based on the Study and examination regulations

The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments, (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their upgrading retake (as provided in §§ 25-28 of the STUDY AND EXAMINATION REGULATIONS):

1st Midterm on the 6th week. Topic: general microbiology (1-3 Lectures and 1-5 practices)

2nd Midterm on the 12th week. Topic: systemic bacteriology (4-12 Lectures and 6-11 practices)

Both midterm retake on the following week.

Requirements of signature (as provided for in STUDY AND EXAMINATION REGULATIONS § 29):

Active participation at the lab practice, no more than 3 absences and passing successfully both midterms

Number and type of projects students have to perform independently during the semester and their deadlines:
not applicable

Type of the semester-end examination: signature*/practical grade*/ comprehensive examination*/final/end-term examination*

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Form of the semester-end examination: written

Written test from minimum questions and if is passed successfully followed by MOODLE test. The second retake exam (third one) is an oral exam.

The possibility and conditions for offering grades:

Not applicable

A list of the basic notes, textbooks, resources and literature that can be used to acquire the knowledge necessary to master the curriculum and to complete the assessments, with exact description about which of them is required to acquire which part of the syllabus (e.g. description based on topics)), as well as the main technical and other aids and study aids that can be used:

Szabó: Basics of Medical Microbiology. E-book, Semmelweis; 2022

Murray, Rosenthal, Pfaller: Medical Microbiology. 9th Edition, Elsevier/Saunders 2020

The handouts of the lectures uploaded to the MOODLE surface

The handouts of the practices

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission:

no

The course description was prepared by:

Dr. Agoston Ghidan, tutor

Clinical Chemistry and Laboratory Diagnostics

Full name of the subject:	Klinikai kémia és laboratóriumi diagnosztika
Program:	undivided program (pharmaceutical)
Schedule:	full-time
Short name of the subject:	Laboratory Diagnostics
English name of the subject:	Clinical Chemistry and Laboratory Diagnostics (theory)
German name of the subject:	Klinische Chemie und Labordiagnostik (Vorlesung)
Neptun code of the subject:	GYKLM1082E1A
Type of registration:	obligatory
Responsible department:	Department of Laboratory Medicine of Semmelweis University
Responsible tutor:	Prof. Dr. Barna Vásárhelyi M.D., Ph.D., D. Sc. Phone: +36 20 666 3246 E-mail: vasarhelyi.barna@med.semmelweis-univ.hu
Name of the persons responsible for the teaching of the subject:	Dr. Adrienne Fehér Medical doctor, specialist of laboratory medicine, specialist of hematology and hemostasis Dr. Gellért Karvaly Dr. Ibolya Kocsis Pharmacist, specialist of laboratory medicine, Ph.D. Dr. Györgyi Molnár-Világos Pharmacist, specialist of laboratory medicine, Ph.D. Dr. Zsófia Szabó Pharm. Pharmacist, specialist of laboratory medicine, Ph.D. Dr. Zoltán Vajda Barna Vásárhelyi Professor of medicine, specialist of laboratory medicine, Ph.D., D.Sc.
Classes per week:	Theory: 2 Practice: 0
Credit point(s):	2

Professional content, intent of acquirement and its function in order to implement the goals of the program:

Discussion of the role of laboratory tests in clinical decision-making, with particular regard to areas requiring pharmaceutical knowledge.

Short description of the subject:

- Pharmacists encounter questions related to laboratory diagnostics several times during their daily work. A general request from laymen concerns the proper conduction of home tests (e.g. blood sugar, blood fat level), and the interpretation of laboratory results. In clinical care, there is a particularly high demand for the appropriate interpretation of laboratory findings with a focus on the effects and side effects of drugs. The pharmacist's approach represents a significant added value in this respect. Therapeutic drug level monitoring is a separate field in which pharmacists play a prominent role.
- The clinical diagnostic laboratory also relies on the knowledge of pharmacists. A special qualification (specialist of laboratory medicine) is acquired by experts working in his field.
- In the lectures the main aspects of reporting laboratory tests, the most frequently performed analytical procedures, and the interpretation of test results are presented.

The following topics are addressed with a special focus:

- point-of-care tests performed at the patient's bedside (in pharmacies),
- major tests employed for investigating the diseases of individual organ systems,
- clinical laboratory analysis of the pharmacodynamic effects of drugs,
- therapeutic drug monitoring,
- clinical laboratory quality assurance.

In the lectures, the theoretical background of the topics listed in the “Topics of theoretical classes” section will be presented and illustrated.

In the framework of the course, clinical diagnostic laboratory visits will be arranged in a pre-organized way, and the application of point-of-care tests performed at the patient’s bedside, in the pharmacy, or by the patients for self-checking will be demonstrated (2x70 minutes, 2x1.5 theoretical classes).

The discussion of laboratory test reports will be conducted to help students with the better understanding and proper application of the acquired knowledge (4 theoretical classes).

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
semester 5	28	–	–	–	28	Autumn semester	–

Program of semester

Topics of theoretical classes (pro week):

1. Introduction: the scope, position and functions of laboratory diagnostics in healthcare organisations
2. Blood collection procedure, types of blood collection tubes, and examples of their use. Preanalytical factors which affect laboratory results
3. Major laboratory analytical procedures and analytical systems used in clinical diagnostic laboratories. Quality assurance
4. Point-of-care tests, tests available for pharmacy self-monitoring
5. Interpretation of laboratory findings, basics of the statistical evaluation of test results. Data-oriented clinical laboratory: the importance of bioinformatics
6. Laboratory diagnosis of inflammation. Acute phase reaction
7. Liver function tests
8. Urinalysis
9. Diagnosis of tissue injury
10. Laboratory diagnosis of tumours. Molecular biology tests in the laboratory
11. Endocrinology tests: diagnosis of metabolic disorders (diabetes, hyperlipidaemia)
12. Endocrinology tests: thyroid hormones, adrenal and sex hormones
13. Therapeutic drug monitoring: basic concepts, pharmacokinetic principles, aims, factors influencing the fate of the drug in the body
14. Therapeutic drug monitoring: the role of laboratory tests in the implementation of individualised drug therapy. Precision pharmacotherapy software
15. Drugs influencing laboratory test results. Clinical drug testing
16. Fundamentals of clinical toxicology and its laboratory implications
17. Immunological tests: autoimmunity
18. immunological tests: hypersensitivity reactions, allergy tests, and immunodeficiency conditions
19. Blood count elements. Anaemias. Iron deficiency
20. Basics of blood grouping
21. Haemostasis tests. Anticoagulant monitoring
22. Discussion of laboratory test reports
23. Discussion of laboratory test reports
24. Discussion of laboratory test reports
25. Discussion of laboratory test reports
- 26-28. Laboratory visit, demonstration of point-of-care tests

Schedule of consultations: No additional consultations will be scheduled.

Course requirements

Prerequisites:

Biochemistry II.
Physiology II.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Attendance at lectures in accordance with the Study and Examination Regulations in force at the Faculty of Pharmacy

The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments, (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their upgrading retake (as provided in §§ 25-28 of the STUDY AND EXAMINATION REGULATIONS):

The grade is based on the end-of-semester colloquium (attainable score: 50), as follows: 46 – 50 points: excellent, 41 – 45 points: good, 36 – 40 points: average, 31 – 35 points: sufficient, 30 points or below: insufficient. There is no midterm partial performance evaluation.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results: None

Requirements of signature (as provided for in STUDY AND EXAMINATION REGULATIONS § 29): . No special criteria have been set.

Number and type of projects students have to perform independently during the semester and their deadlines:

No individual projects are required.

Type of the semester-end examination: Examination requirements:

The scope, position and functions of laboratory diagnostics in healthcare organisations. Blood collection procedure, types of blood collection tubes, and examples of their use. Preanalytical factors which affect laboratory results. Major laboratory analytical procedures and analytical systems used in clinical diagnostic laboratories. Quality assurance. Point-of-care tests, tests available for pharmacy self-monitoring. Interpretation of laboratory findings, basics of the statistical evaluation of test results. Data-oriented clinical laboratory: the importance of bioinformatics. Laboratory diagnosis of inflammation. Acute phase reaction. Liver function tests. Renal function tests. Urinalysis. Diagnosis of tissue injury. Laboratory diagnosis of tumours. Molecular biology tests in the laboratory. Endocrinology tests: diagnosis of metabolic disorders (diabetes, hyperlipidaemia). Endocrinology tests: thyroid hormones, adrenal and sex hormones. Therapeutic drug monitoring: basic concepts, pharmacokinetic principles, aims, factors influencing the fate of the drug in the body. Therapeutic drug monitoring: the role of laboratory tests in the implementation of individualised drug therapy. Precision pharmacotherapy software. Drugs influencing laboratory test results. Clinical drug testing. Fundamentals of clinical toxicology and its laboratory implications. Immunological tests: autoimmunity. Immunological tests: hypersensitivity reactions, allergy tests, and immunodeficiency conditions. Elements of blood count. Anaemias. Iron deficiency. Basics of blood grouping. Haemostasis tests. Anticoagulant monitoring.

Form of the semester-end examination: Written test

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

The possibility and conditions for offering grades: None

Scientific, yourse related researches, publivations, assays:

- The scope, position and functions of laboratory diagnostics in healthcare organisations.
- Blood collection procedure, types of blood collection tubes, and examples of their use. Preanalytical factors which affect laboratory results.
- Major laboratory analytical procedures and analytical systems used in clinical diagnostic laboratories.
- Quality assurance.
- Point-of-care tests, tests available for pharmacy self-monitoring.
- Interpretation of laboratory findings, basics of the statistical evaluation of test results.
- Data-oriented clinical laboratory: the importance of bioinformatics.
- Laboratory diagnosis of inflammation. Acute phase reaction.
- Liver function tests
- Renal function tests
- Urinalysis
- Diagnosis of tissue injury
- Laboratory diagnosis of tumours

- Molecular biology tests in the laboratory
- Endocrinology tests: diagnosis of metabolic disorders (diabetes, hyperlipidaemia)
- Endocrinology tests: thyroid hormones, adrenal and sex hormones
- Therapeutic drug monitoring: basic concepts, pharmacokinetic principles, aims, factors influencing the fate of the drug in the body
- Therapeutic drug monitoring: the role of laboratory tests in the implementation of individualised drug therapy
- Precision pharmacotherapy software
- Drugs influencing laboratory test results
- Clinical drug investigations
- Fundamentals of clinical toxicology and its laboratory implications
- Immunological tests: autoimmunity
- Immunological tests: hypersensitivity reactions, allergy tests, and immunodeficiency conditions
- Elements of blood count
- Anaemias
- Iron deficiency
- Basics of blood grouping
- Haemostasis tests
- Anticoagulant monitoring
- Barna Vásárhelyi: Trace reading in healthcare (presentation)
- Barna Vásárhelyi: Trace reading in healthcare (presentation)
- Györgyi Molnár-Világos: Major analytical procedures employed in clinical laboratories (presentation)
- Györgyi Molnár-Világos: Quality management in the laboratory (presentation)
- Ibolya Kocsis: Diagnostic analysis directly at patient's bed. Point-of-care testing (POCT) (presentation)
- Barna Vásárhelyi: Questions of postanalytical phase (presentation)
- Barna Vásárhelyi: Questions of postanalytical phase (presentation)
- Zsófia Szabó: Laboratory diagnosis of inflammation, acute phase reactants, infectious diseases (presentation)
- Ibolya Kocsis: Evaluation of liver function (presentation)
- Ibolya Kocsis: Urine studies – monitoring of kidney function (presentation)
- Ibolya Kocsis: Urine studies – monitoring of kidney function (presentation)
- Barna Vásárhelyi: Metabolic disorders 2 (presentation)
- Barna Vásárhelyi: Tumor markers: principles and their clinical use (presentation)
- Béla Blaha: Nucleic acid-based molecular diagnostics (presentation)
- Ibolya Kocsis: Labordiagnosical examination of metabolic disorders (presentation). Barna Vásárhelyi: Metabolic disorders 2 (presentation)
- Ibolya Kocsis: Labordiagnosical examination of metabolic disorders (presentation).
- Gellért Balázs Karvaly: Therapeutic drug monitoring (presentation)
- Gellért Balázs Karvaly: Therapeutic drug monitoring (presentation)
- S. Goutelle, J-B. Woillard, T. Buclin, et al. Parametric and non-parametric methods in population pharmacokinetics: experts' discussion on use, strengths, and limitations. J Clin Pharmacol 2022; 6: 158-170.
- Gellért Balázs Karvaly: Therapeutic drug monitoring (presentation)
- Gellért Balázs Karvaly: Therapeutic drug monitoring II. (presentation)
- Gellért Balázs Karvaly: Therapeutic drug monitoring II. (presentation)
- Gellért Balázs Karvaly: Therapeutic drug monitoring II. (presentation)
- Zsófia Szabó: Immunological tests I. Laboratory diagnosis of autoimmune disease (presentation)
- Zsófia Szabó: Immunological tests II. Hypersensitive reactions, allergy tests, immunodeficiency (presentation)
- Adrienne Fehér: The elements of basic blood test (presentation)
- Adrienne Fehér: The elements of basic blood test (presentation)
- Adrienne Fehér: The elements of basic blood test (presentation)
- Adrienne Fehér: Blood group evaluation (presentation)
- Adrienne Fehér: The examination of hemostasis.
- Anticoagulant monitoring (presentation)
- Adrienne Fehér: The examination of hemostasis.
- Anticoagulant monitoring (presentation)

The course description was prepared by:

Prof. Dr. Barna Vásárhelyi, dr. Gellért Balázs Karvaly

Products of Veterinary Medicine (theory)

For details on this subject please contact the department or visit their website.

Physical Education V.

Full name of the subject: **Testnevelés V.**
 Program: **undivided program (pharmaceutical)**
 Schedule: **full-time**
 Short name of the subject: **P.E.**
 English name of the subject: **Physical Education V.**
 German name of the subject: **Sport V**

Neptun code of the subject: GYKTSI116G5A
 Type of registration: obligatory
 Responsible department: Semmelweis University, Physical Education and Sports Center

Responsible tutor: **Várszegi, Kornélia** director
 Phone: +36-20/825-0611
 E-Mail: varszegi.kornelia@semmelweis-univ.hu, sportkozpont@semmelweis-univ.hu

Name of the persons responsible for the teaching of the subject:

Kovács, Imre tennis trainer
Balogh, Orsolya aerobics trainer
Kalmus, Dániel P.E. teachers
Katona, László hiking, badminton, boulder trainer
Lehel, Zsolt P.E. teachers
Nagy-Kismarci, Bence cheerleading trainer
Rimay, István football trainer
Weisz, Miklós P.E. teachers
Doharné Buczkó Anikó P.E. teachers
Farkas Dominika P.E. teachers
Kovács Imre tennis trainer
Nagy-Kismarci Bence cheerleading trainer
Balogh Orsolya aerobic and zumba trainer
Dr. Herbert – Minkó Krisztina yoga trainer
Tóth Balázs dance, zumba, salsa trainer
Kiss Valéria Bless You Gym trainer
Paksai Márton ultimate freesbe trainer
Soós Gábor tennis trainer
Kunos Gábor hiking trainer

Classes per week: 1 practice
 Credit point(s): 0

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The short-term goal of the course is to maintain and improve the students' current state of health, to create the physical conditions for a better quality of life by learning and practicing (new) branches of sports that can be practiced after graduation as well. The long-term goal is to improve the quality of life and life prospects of future physicians, and to provide students with credible preventive attitudes and life-style advice – so that they can represent those in their later practice, through their own health-promoting behavior

Short description of the subject:

Upon completion of the course the student will be able to carry out regular physical activity.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/semester	Normal course offer	Consultations
5 th semester	0	14			14	Autumn semester	

Program of semester
Topics of practical classes (pro week):

Within the framework of obligatory regular physical activity, the requirements of the subject can be fulfilled as free of charge and self-financed student as well. The former is available during classes and courses organized by the Semmelweis University's Centre for Physical Education and Sports (TSK), and the latter is available at SE-TSK accredited partner locations.

Free of charge:

60 minute classes held at the same time on a weekly basis, on the premises of the TSK facilities and other locations.
1107 Bp, Zágrábi utca 14.

1×60 min./week sessions:

Aerobics, BlessYou Gym, boulder, functional circuit training, golf, beginner Yoga, male football, salsa, step aerobics, badminton, beginner ultimate Frisbee, advanced ultimate Frisbee, Zumba

1× 90 mins./week sessions: women's football, ice hockey, beginner tennis, beginner tennis 2,

4×3 hrs. and 1×2 hrs. session packages: Hiking 1, Hiking 2.

2×90 mins./week sport training (competitive sport, for qualified only): cheer dance, cheerleader, men's football, handball, basketball, volleyball

Fee-based:

at the sports venues specified on www.semmelweis.hu/sportkozpont, which will also be advertised on the Neptun system. The list of these locations may vary per school year.

COURSE REQUIREMENTS
Prerequisites: –
Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

The number of active participations for physical education classes is 10, regardless of the number of school breaks, which is to be completed during the hours assigned to the group. Two hours can be recovered in the first week of the exam period, on two separate days. Lessons missed do not need to be certified; however, catching up is mandatory. The days of study breaks do not qualify as automatic attendance. Practice leaders follow an online presence registration at the beginning and end of the lessons, which can be individually tracked on semmelweis.hu/sportkozpont homepage.

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams.

As teams take part in championships during the school year, we only accept applications from professional athletes!

Type of the semester-end examination: signature

Requirements of signature (as provided for in STUDY AND EXAMINATION REGULATIONS § 29):

Active participation in practice classes 10 (trainings 15 times) times under the conditions described above.

The possibility and conditions for offering grades:

Active participation in practice classes 10 times (trainings 15 times) under the conditions described above.

May be exempted from attending classes the student who

1. whose diagnosis and the opinion of the sports doctor do not allow to exercise, and submits a certificate
or
2. does sports regularly and submits a certificate of association and federation in the neptun system in the exemption period preceding the semester.

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: yes

If you have not completed the course you may be readmitted in the 1. semester of the following academic year.

The course description was prepared by: Kornélia Várszegi

Basic Medical Pathophysiology I.

Full name of the subject: Kórtani és klinikai alapismeretek (elmélet+gyakorlat) I.
Program: undivided program (pharmaceutical)
Schedule: full-time
Short name of the subject: Pathophysiology I.
English name of the subject: Basic Medical Pathophysiology (theory+practice) I.
German name of the subject: Grundlagen der Pathophysiologie (Vorlesung+Praktikum) I.

Neptun code of the subject: GYKGYH128G1A
Type of registration: obligatory
Responsible department: Semmelweis University, Department of Pharmacodynamics

Responsible tutor: *Gabriella Juhász*, MD associate professor, DSc
Contact information:
 phone: +36-1-210-29-30/56362
 email: juhasz.gabriella@semmelweis.hu

Name of the persons responsible for the teaching of the subject:
Gabriella Juhász, MD associate professor, DSc
Kornélia Tekes, PharmD university professor, DSc
Ervin Finta, MD head physician, PhD
Noémi Papp, PharmD resident lecturer, PhD
Kinga Gecse, PharmD pharmacist, assistant lecturer

Class per week: 2 hours lectures, 1 hour practice
Credit point(s): 2 credits

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The goal of the subject is to provide pathophysiological background to understand the mechanism of action of drugs, to prepare pharmacists for professional advising and for the collaboration with other health professionals.

Short description of the subject:

Basic medical pathophysiology focuses on common disorders, especially those ones that can be important for pharmacists during their work. The students learn about the epidemiology of common disorders, pathophysiological mechanisms that can lead to them, acquire knowledge about the main clinical symptoms and the basic therapeutic considerations. The subject has special emphasis on tasks that pharmacists may carry out as healthcare professionals, for example identification of symptoms that require urgent medical help or providing advice for the patients regarding their pharmacological treatment. During the practicals, students deepen their knowledge by working on clinical cases and solving tests.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/semester	Normal course offer	Consultations
5th semester	28	14	–	–	42	Autumn semester	–

Program of semester**Topics of theoretical classes (pro week):**

1. week: Fundamental pathological processes, ageing
2. week: Inflammation, tissue repair, pain, edema
3. week: Disorders of erythropoiesis and haemostasis
4. week: Peripheral vascular diseases
5. week: Atherosclerosis, hypertension, stroke
6. week: Ischaemic heart disease, arrhythmias
7. week: Heart failure, circulatory shock, inflammatory diseases of the heart
8. week: Gastrointestinal diseases I.
9. week: Gastrointestinal diseases II.
10. week: Gastrointestinal diseases III.
11. week: Genitourinary diseases
12. week: Ophthalmologic diseases
13. week: Dermatologic diseases
14. week: Disorders caused by physical effects

Topics of practical classes (pro week):

1. week: Medical documentation: medical summaries and letters
2. week: Case reports: inflammation, tissue damage
3. week: Case reports: disorders of erythropoiesis and haemostasis
4. week: Written test exam on Moodle system
5. week: Case reports: peripheral vascular diseases
6. week: Case reports: cardiovascular diseases I.
7. week: Case reports: cardiovascular diseases II.
8. week: Written test exam on Moodle system
9. week: Case reports: gastrointestinal diseases I.
10. week: Case reports: gastrointestinal diseases II.
11. week: Case reports: genitourinary diseases
12. week: Written test exam on Moodle system
13. week: Case reports: dermatologic diseases
14. week: Group work

Other subjects (both obligatory and optional) relating to the transversal issues of the subject. Possible overlaps between subjects:

The subject of Basic Medical Pathophysiology builds on the basic biomedical subjects such as Biochemistry and Physiology and prepares the students for the subjects Pharmacology and Toxicology and Pharmacotherapy.

Schedule of consultations: for personal request during practicals.

Course requirements

Prerequisites:

Successful exam in:
Physiology II.
Biochemistry II.
First Aid

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Attendance at lectures and practicals will be checked in accordance with the current Study and Examination Regulations. Under the current regulations, students are allowed to miss a maximum of 25% (3 times) of the practicals. It is only possible to make up for absences from practicals with an official certificate, and at a time agreed with the tutors. Participation in the practicals is conditional on reading the lecture materials.

The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments, (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their upgrading retake (as provided in §§ 25-28 of the STUDY AND EXAMINATION REGULATIONS):

The practical grade is calculated from two elements: written test exams and group work.

1. Three written test exams will be completed by students during the semester, on Moodle, in weeks 4, 8 and 12. The first test will cover the material from weeks 1-3, the second test will cover the material from weeks 4-7 and the third test will cover the material from weeks 8-11. A maximum of 3x30 points can be achieved for the tests. Students will have the opportunity to retake the tests in the week following the test, at an agreed time outside the practical. Missing or unsuccessful tests can also be retaken on the first week of the examination period in the form of a written test exam covering the entire course content of the semester. A minimum grade of satisfactory is required for each of the three written tests during the semester for the end-of-semester signature.

- The topics for the group work will be given to the students in the 9th week of the practical course. The groups will be allocated based on the marks obtained in the first two tests, so as to ensure an even distribution of students in each group. Each member of the group should take an equal part in the preparation and presentation of the case. Each member of the group will receive the same score (0-10) for the presentation. Exceptions to this may be made if a student's performance is extremely different from the rest of the group (e.g. inactivity, not participating in the presentation) - in which case he/she may receive a different score from the rest of the group.

Practical grade calculation:

- 90-100 points (5)
- 80-89 points (4)
- 70-79 points (3)
- 50-69 points (2)

In addition, at the beginning of the practicals, students will take warm-up tests on Moodle from the material of the weekly lecture. A minimum of 50% of the points must be obtained on each warm-up test to pass. For a maximum of 5 warm-up tests can be retaken in the last week of the semester at an agreed time. Passing the small tests is a prerequisite for the end-of-semester signature.

Requirements of signature(as provided for in STUDY AND EXAMINATION REGULATIONS § 29):

- Attendance of lectures and practicals in accordance with the current Study and Examination Regulations. If a student has more practical absences than the number of practical absences described in the regulations, the semester grade will be "fail" and no practical grade will be given.
- A grade of at least "pass" in each of the three written tests during the semester.
- Pass all the warm-up tests
- A passing grade (5-10 points) on the group work.

Number and type of projects students have to perform independently during the semester and their deadlines: -

Type of the semester-end examination: practical grade

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Scientific, yourse related researches, publivations, assays:

Lecture slides and practice slides will be provided on Moodle to help students learn the course material. These form the basis for the assessments. In addition, the Moodle system contains other supplementary materials (e.g. schedules of lectures and practicals, information on written tests) to help students prepare for the course.

Recommended literature, the relevant parts of which are referred to in lectures and exercises:

Hammer-McPhee: Pathophysiology of Disease (McGraw-Hill, 2018)
Kumar-Abbas-Aster: Robbins Basic Pathology (Elsevier, 2017)

The course description was prepared by:

Gabriella Juhász associate professor

Dietetics

For details on this subject please contact the department or visit their website.

Pharmaceutical Technology I.

For details on this subject please contact the department or visit their website.

6. SEMESTER 2021/2022/2

Subject	Lecture (hour/week)	Practice (hour/week)	Credit	Prerequisites	Exam type
Pharmacognosy I. GYKFMG284G1A	2	4	5	Pharmaceutical Botany	practical mark
Pharmaceutical Chemistry and Analysis II. GYKGYK279E2A	4	4	7	Pharmaceutical Chem. and Anal. I.	final*
Pharmaceutical Technology II. GYKGYI281E2A	2	6	6	Pharmaceutical Technology I. Pharmaceutical Chemistry I. and Anal. I.	semi-final
Basic Medical Pathophysiology II. (theory+practice) GYKGYH128E2A	2	1	3	Basic Med. Path. I. Dietetics Pharm. Microbiology	final*
Statistics for Pharmacists (theory+practice) GYKGYH282G1A	2	2	3	Mathematics for Pharm., Physiological Pharmaceutics and Pharmaceutical dosage forms, Informatics	practical mark
Pharmacology and Toxicology I. GYKGYH283E1A	2	2	4	Basic Medical Pathophysiology I., Physiological Pharmaceutics and Pharmaceutical dosage forms	semi-final
Physical Education VI. GYKTSI116G6A	–	1	–	-	signature
Pharmacy Practice II. GYKANG238G2A	–	20 hours/ semester	–	Pharmaceutical Technology I. Pharmaceutical Chemistry I. and Anal. I.	signature
Summer Practice II. GYSSZG239G4A	–	4 weeks (40 hour/week)	4	Pharmaceutical Technology I.	practical mark
Total:	14	20 20/semester 4 weeks	28+4		

Pharmacognosy I.

Full (Hungarian) name of the subject: Gyógynövény- és drogismeret I.
Program: undivided program (pharmaceutical)
Schedule: full-time
Short name of the subject: Pharmacognosy I.
English name of the subject: Pharmacognosy I.
German name of the subject: Pharmakognosie I .

Neptun code of the subject: GYKFMG284G1A
Type of registration: obligatory
Responsible Department: Semmelweis University, Department of Pharmacognosy

Responsible tutor: *Szabolcs Béni* head of department, associate professor, Ph.D.
 Phone: 06-20-825-0489
 E-mail: beni.szabolcs@pharma.semmelweis.hu

Name of the persons responsible for the teaching of the subject:
Szabolcs Béni associate professor, Ph.D.
 Phone: 06-20-825-0489
Ágnes Alberti associate professor, Ph.D.
Andrea Böszörményi assistant professor, Ph.D.
Orsolya Csernák assistant professor, Ph.D.
Ida Fejős assistant professor, Ph.D.
Eszter Riethmüller assistant professor, Ph.D.
Attila Ványolós assistant professor, Ph.D.
Nóra Gampe assistant lecturer, Ph.D.
Csenge Anna Felegyi-Tóth, trainee

Classes per week: 2 lectures, 4 practices
Credit point: 5 credits

Professional content, intent of acquirement and it's function in order to implement the goals of the program:

The aim of the course is to acquaint pharmacy students with medicinal plants, herbal drugs and the analytical methods applied in their quality assurance. By doing so, it contributes to the education of pharmacy students to become key experts in herbal medicines. It contributes to the training of students with modern knowledge of pharmacognosy at a time when the knowledge about natural substances and herbs has come to the fore and has expanded with new aspects due to European harmonization.

Short description of the subject:

The topics of the classes follow the biogenetic system of plant materials. It represents a shift in proportion and, in part, selection in the curriculum that sufficiently emphasizes the importance of knowledge of herbal drugs and their active ingredients that are important in therapeutic practice. At the same time, it provides knowledge in the context of structure-activity relationships for the sufficient processing of newly emerging herbal drugs, possibly of foreign origin, based on their chemical groups. It also introduces the requirements of the European Pharmacopoeia (Ph. Eur.) regarding herbal drugs and preparations. Thus, it provides knowledge of all herbal drugs and active substances that serve as raw materials for phytopharmaceuticals (including those that will soon become traditional OTC medicines) and preventive products (dietary supplements).

Knowledge of plant material: drug recognition; macroscopic and microscopic examination.

Detection of active ingredients and constituents of herbal drugs (preparation, extraction and purification techniques, general and specific chemical reactions, chromatographic methods), quantitative evaluations (pharmacopoeial and standard methods) and isolation of individual components or selective determination by complex chromatographic and spectroscopic methods. Application of herbal drugs based on their positive effects in prevention, phytotherapy and improving quality of life.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
6 th semester	28	56	–	–	84	Spring semester	–

Program of semester

Topics of theoretical classes (pro week):

Week 1:

Introductory lecture, the concept and history of pharmacognosy. Cultivation and processing of medicinal plants. The place of the subject Herbal and Drug Knowledge in the curriculum. From herbal medicine to the production of herbal drugs, herbal medicines. Historical overview. Nomenclature of plant drugs, aspects of their grouping. Collection of herbs, protected plants. Cultivation and breeding of medicinal plants. Processing, trade and qualification of herbal drugs. Pharmacopoeias (Ph. Hg. VIII., Ph. Eur. 11.), FoNo, herbal medicine standards specifications. Therapeutic use of herbal drugs (EMA/HMPC and ESCOP monographs).

Week 2:

Biogenetic system of plant materials. Saccharides, carbohydrates.
 The concept and relationship of universal and special (primary and secondary) metabolism.
 Monosaccharides: Honey, and other bee products.
 Oligosaccharides: cyclodextrins
 Homopolysaccharides and their drugs: Glucans (starches, cellulose). Fructans: Taraxaci officinalis radix, Cichorii intybi radix, Graminis rhizoma, Arctii radix
 Heteropolysaccharides and their drugs
 Pectins, gums: Acaciae gummi, Tragacantha
 Mucilages, plant fibers: Lichen islandicus, Althaeae radix, Althaeae folium, Malvae folium, Malvae sylvestris flos, Lini semen, Trigonellae foenugraeci semen, Psyllii semen, Plantaginis ovatae semen, Salviae hispanicae semen, Cyamopsidis seminis pulvis
 Mushroom polysaccharides. Algae polysaccharides: alginates, agar, fucoidan, carrageenan

Week 3:

Vegetable acids. Polyketides. Acid metabolism, acid drugs
 Organic acids: Pulpa tamarindorum, Rosae pseudo-fructus, Hippophaeae fructus, Malpighiae fructus, Hibisci sabdariiffae flos
 Inorganic acids: Urticae folium, Equiseti herba
 Fatty oils: Biosynthesis, production, analysis, effects of fatty acids, triglycerides, waxes
 Oils rich in saturated fatty acids: Theobromatis oleum, Gossypii oleum
 Oleic acid-rich oils: Olivae oleum, Amygdalae oleum, Rapae oleum, Sesami oleum
 Linoleic acid-rich oils: Helianthi annui oleum, Carthami oleum, Soiae oleum, Cucurbitae oleum
 α -Linolenic acid-rich oils: Lini oleum
 γ -Oils rich in linolenic acid: Boraginis oleum, Oenotherae oleum
 Oils containing special fatty acids: Ricini oleum

Week 4:

Grouping phenoloids. Cinnamic acid derivatives. Biosynthesis and grouping of phenolics. Degraded cinnamic acid derivatives and their drugs
 Phenolic glycosides: Uvae ursi folium
 Salicyc glycosides: Salicis cortex, Filipendulae ulmariae herba
 Benzoic and cinnamic acid esters: Benzoic drugs, Balsamum peruvianum
 Caffeic acid derivatives and their drugs: Cynarae folium, Taraxaci officinalis herba cum radice, Melissa folium, Rosmarini folium, Rhodiolae roseae rhizoma et radix, Echinacea drugs

Week 5:

Coumarins
 Formation, chemical structure and grouping of coumarins. Medicinal significance of coumarins, phototoxicity and other toxicity issues, aflatoxins.

Coumarins: Meliloti herba, Hippocastani semen, Herniariae herba, Pelargonii radix, Fraxini folium
 Furanocoumarins, pyranocoumarins: Heracleum-species, Rutae herba, Aurantii amari epicarpium et mesocarpium, Angelicae radix,
 Ammi fructus, Ammi visnagae fructus

Week 6:

Lignans, styrylpyrones, diarylheptanoids, arylalcanons, stilbenoids
 Lignans: Eleutherococci radix, Podophylli peltati rhizoma, Schisandrae chinensis fructus, Arctii radix
 Styrylpyrones: Piperis methystici rhizoma
 Diarylheptanoids: Curcumae longae rhizoma, Curcumae xanthorrhizae rhizoma
 Arylalcanons: Zingiberis rhizoma
 Stilbenoidok: Vitis viniferae cement, Vitis viniferae rubrae folium

Week 7:

Flavonoids I
 The formation, chemical structure and biological properties of flavonoids.
 Flavone and flavonol O-glycosides: Fagopyri herba, Sophorae japonicae flos, Ginkgonis folium, Betulae folium, Solidaginis herba, Tiliae flos, Verbasci flos, Sambuci flos
 Flavon-C-glikozidok: Crataegi folium flore, Passiflorae herba, Viola herba flore
 Metoxilált flavonok, flavánok: Aurantii amari epicarpium et mesocarpium, Lupuli flos

Week 8:

Flavonoids II: additional structures
 Isoflavonoids: Ononidis radix, Liquiritiae radix, Glycini semen
 Chalcones: Carthami flos, Lupuli flos, Aspalathi linearis herba
 Anthocyanins: Myrtilli fructus recens, Vitis viniferae fructus, Hibisci sabdariffae flos
 Flavonolignans: Silybi mariani fructus

Week 9:

Tannins
 Biosynthesis, grouping, chemical structure, biological effect of tanning agents.
 Hydrolysable tannins: Quercus cortex, Cotini folium, Alchemillae herba, Epilobii herba, Hamamelidis cortex, Rubi idaei folium
 Proanthocyanidins: Crataegi folium flore, Crataegi fructus, Vaccinii macrocarpi fructus, Agrimoniae herba, Tormentillae rhizoma, Ratanhiae radix, Hamamelidis folium, Myrtilli fructus siccus, Camelliae sinensis non fermentata folia

Week 10:

Naphthoquinones, antraglycosides. Biosynthesis, biological properties of plant quinones. Pharmacological action of anthraglycosides and issues of their medicinal use.
 Drugs containing naphthoquinones: Juglandis folium, Lawsoniae herba
 Drugs containing anthraglycosides: Sennae foliolium, Sennae fructus, Frangulae cortex, Rhei radix, Aloe drugs, Rhamni purshianae cortex

Week 11:

Naphthodiantrons, terpenophenolics.
 Naphthodiantrons: Hyperici herba
 Phloroglucin derivatives: Lupuli flos
 Cannabinoids: Cannabis herba

Week 12 :

Summary presentation: preparation for the midterm exam

Week 13:

Midterm

Week 14:

Medicinal potential and toxicological significance of fungi.
 Molds: aflatoxins, fusarium toxins. Mushrooms: killer agaric, panther agaric, wrinkled ink mushroom, psilocybin. Mushrooms as sources of medicinal ingredients, edible mushrooms.

Topics of practical classes (pro week):

1. week: Introduction, safety rules. Macroscopic and microscopic knowledge. European Pharmacopoeia.
2. week: General methods in Pharmacognosy
3. week: Instrumental phytoanalytics
4. week: Vegetable drugs containing carbohydrates (starches, mucilages, etc.).
5. week: Plant lipids and their drugs.
6. week: Plant acids and their drugs.
7. week: Phenolic glycosides, lignans, coumarins and diarylheptanoids.
8. week: Flavonoids and chief drugs I.
9. week: Flavonoids and chief drugs II.
10. week: Tannins and chief tannin drugs.
11. week: Anthraglycoside containing crude drugs I. Chemical tests, quantitative determinations.
12. week: Anthraglycoside containing crude drugs II. Quantitative determination of sennosides.
13. week: Terpenophenolics and phloroglucine derivatives.
14. week: Individual task I.: Natural product development. Natural product development.

Schedule of consultations: ondemand

COURSE REQUIREMENTS

Prerequisites: – Pharmaceutical botany

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Based on the current Study and Exam Regulation

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

During the term-time: three written or oral examinations based on the material of the practices and the lectures. Test of the knowledge of herbal drugs: examination of unknown drug mixtures, identification of unknown drug powders, recognition of microscopic preparations.

The first test takes place during the 7-8th week practice. The midterm consists of a theoretical and macromorphological examination part, including the studies carried out and described during the exercises in weeks 1-7, as well as the material of seminars and classroom lectures. The grade obtained in this process will be counted with a single weight when determining the practical grade.

The second assessment takes place during the 12-13th week practice, which consists of theoretical and macromorphological examinations. The report covers the entire theoretical and practical material of weeks 1-12. The grade obtained in this process will be counted with a single weight when determining the practical grade.

At the 13th week lecture, an obligatory midterm will take place, the material of which covers the entire theoretical and practical material of the semester. At least a sufficient (2) grade must be achieved in the test. The grade is counted with double weight when determining the practical grade.

Midterm examinations may be replaced and corrected two times each. The results of the first report can be corrected during the two practices following the announcement of grades. We provide an opportunity to retake the obligatory midterm in an out-of-class time in week 14.

Requirements of signature:

Participation at the practices. Submission and acceptance of reports. The average of the grades of the midterm examinations is at least 2.0. Successful completion of the obligatory midterm test.

Number and type of projects students have to perform independently during the semester and their deadlines: Presentation of a chosen topic. performed at weeks 8-14.

Type of the semester-end examination: practical grade

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Necessary equipment: Lecture hall, projection, wi-fi.

Laboratory equipped with microscopes, labwares, extractors, distillation equipment, instruments (UV-VIS, HPLC, GC), chemicals.

Pharmaceutical Chemistry and Analysis II.

Full (Hun) name of the subject: Gyógyszerkémia és analízis II.

Program: Undivided program (pharmaceutical)

Schedule: full-time

Short name of the subject:

English name of the subject: Pharmaceutical Chemistry and Analysis II.

German name of the subject: Pharmazeutische Chemie und Analytik II

Type of registration: obligatory/obligatory elective/elective/criteria requirement

Neptun code of the subject: GYKGYK279E2A

Responsible Department:

Responsible tutor:

Dr. György Tibor Balogh Head of department, DSc, PhD, dr. habil

Contact information: Semmelweis University, Department of Pharmaceutical Chemistry

1092 Budapest, Hőgyes Endre u. 9.

phone: 06-1-217-0891

email: balogh.gyorgy.tibor@semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Dr. György Tibor Balogh Head, full professor, PhD

Dr. Péter Horváth Associate professor, PhD

Dr. Károly Mazák Associate professor, PhD

Dr. Márta Kraszní Associate professor, PhD

Dr. Gergő Tóth Associate professor, PhD

Dr. Arash Mirzahosseini Adjunct, PhD

Dr. Ádám Golcs Adjunct, PhD

Dr. Tamás Pálla Adjunct, PhD

Dr. Réka Angi Adjunct, PhD

Dr. Vivien Bárdos Assistant professor

Dr. Balázs Simon Assistant professor

Dr. Rita Szolláth Assistant professor

Anna Vincze Assistant professor

Class per week: 4 lectures

4 practices

Credit point(s): 7

Professional content, intent of acquirement and its function in order to implement the goals of the program:

Integration of the curriculum of various chemical and biological courses and extension with specific chemical knowledge regarding properties, mechanism of action and analytics of drug substances.

Short description of the subject:

Theory: Synthesis, analytics, physicochemical and chemical properties, structure-activity relationships, receptor binding and biochemical background of biological effects of drug substances and related instrumental methods are taught.

Practice: Teaching the analytical, physico-chemical and chemical properties of drugs and their testing methods.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
6 th semester	56	56	–	–	112	Autumn semester* Spring semester Both semesters (* Please underline)	–

Program of semester

Topics of theoretical classes (pro week):

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Cardiovascular drugs: Cardiac glycosides. Chemistry, analytics of cardiac glycosides, sugars
Cardiovascular drugs: antiarrhythmic agents 2. Cardiovascular drugs: antianginal agents
Cardiovascular drugs: antihypertensive agents 3. Cardiovascular drugs: antihyperlipidemic agents
Cardiovascular drugs: anticoagulants 4. Diuretics
Antidiabetics 5. Vitamins I.
Vitamins II. 6. Antihistamines
Corticosteroids 7. Sexual hormones
Disinfectants 8. Chemotherapeutics: sulfonamides 9. Chemotherapeutics: antimalarial drugs, fluoroquinolones
Chemotherapeutics: antituberculosics, antifungal agents 10. Antibiotics: tetracyclines, aminoglycosides
Antibiotics: β-lactams, macrolides 11. Antiviral drugs
Anticancer drugs 12. New approaches in drug therapy (biologics) I
New approaches in drug therapy (small molecules) II 13. Drugs acting on the thyroid gland
Analysis of medicinal products I. 14. Analysis of medicinal products II. (Instrumental)
Consultation | <ol style="list-style-type: none"> 10 chemotherapeutics ii. and antibiotics; project report 2 11 identification and quantitative determination of drug mixtures 12 aas spectroscopy of metal content of drugs, excipients; project report 3 (theoretical part of the practical final exam) 13 practical final exam; retake 3 (theoretical part of the practical final exam) before starting the practical part 14 substitutional practice, desequipping |
|---|--|

Other subjects (both obligatory and optional) relating to the transversal issues of the subject. Possible overlaps between subjects:

Schedule of consultations:

Course requirements

Prerequisites: Pharmaceutical Chemistry and Analysis I.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:
Based on the Study and Examination Regulation

The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments, (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their upgrading retake (as provided in §§ 25-28 of the STUDY AND EXAMINATION REGULATIONS):

- Project reports on weeks 6; 10 and 12; (Possibility of substitutions/retakes according to the thematic plan issued at the beginning of the semester.)
- The average of the project report papers written during the semester counts for 1/3 of the exam mark, while the result of the final exam counts for 2/3.
- The final exam consists of two parts, a written and an oral part. An oral examination may be taken if the written examination is passed with at least 50%.
- The average of the marks obtained in the project reports during the semester counts for 1/3 of the examination mark and the marks obtained in the two oral examination topics count for

Topics of practical classes (pro week):

- 1 equipping, identification
- 2 digitalis glycosides, sugars
- 3 β -receptor blockers, antianginal drugs
- 4 antihypertensive agents, anticoagulants
- 5 diuretics
- 6 vitamins; project report 1
- 7 antihistamins
- 8 steroid hormones
- 9 disinfectants and chemotherapeutics i.

1/3-1/3 of the examination mark, but both topics must be at least satisfactory.

- Requirements of signature (as provided for in STUDY AND EXAMINATION REGULATIONS § 29):
- Attendance of lectures. (Extent of the absence is based on the Study and Exam Regulation)
- Attendance of practices. (Extent of the absence is based on the Study and Exam Regulation)
- The average of the scheduled project reports is at least 2 without rounding.
- The required minimum number of points during practices is accumulated.
- If the result of the 12th week practical examination is unsatisfactory, the signature of the semester will be refused. (Retake is possible on week 13)
- In week 13, the practical assignment grade must be at least 50%.
- Number and type of projects students have to perform independently during the semester and their deadlines:

Type of the semester-end examination:
signature/final/end-term examination*

Examination requirements: (list of topics, test examination topics, mandatory parameters, diagrams, concepts, list of calculations, practical skills, and project tasks recognised as examinations, criteria for completion and assessment):

First topic: pharmacological groups

- | | | |
|-----|---|---|
| 1/1 | Sedato-hypnotics and anxiolytics. Classification. Representatives of barbituric acid derivatives and benzodiazepines. Structure, chemical and physical characteristics, structure-activity relationships.
<i>Structures: chloral hydrate, chlorobutanol, phenobarbital, thiopental, nitrazepam, diazepam, chlordiazepoxide, midazolam, alprazolam</i> | agents. Structure, chemical and physical characteristics, structure-activity relationships.
<i>Structures: chlorpromazine, levomepromazine, fluphenazine, fluphenazine decanoate, chlorprothixene, flupentixol, sulpiride, clozapine,</i> |
| 1/2 | Main groups of major analgetics. Morphine and its semi-synthetic and synthetic derivatives. Main representatives of agonist and antagonist derivatives. Structure, chemical, physical and pharmacological characteristics.
<i>Structures: morphine, codeine, ethylmorphine, dihydrocodeine, oxycodone, naloxone, naltrexone, dextrometorphan, fentanyl, methadone, tramadol</i> | 1/5 Antidepressive agents. Classification. In more detail about the tricyclic compounds and SSRI drugs. Structure, chemical and physical characteristics, structure-activity relationships.
<i>Structures: imipramine, amitriptyline, maprotiline, fluoxetine, sertraline</i> |
| 1/3 | Minor analgetics and non-steroid anti-inflammatory agents. Classification and structural characterization. Chemical and physical characteristics.
<i>Structures: salicylic acid, sodium salicylate, acetylsalicylic acid, paracetamol, phenazone, metamizole sodium, niflumic acid, diclofenac, indometacin, ibuprofen, naproxen, phenylbutazone, piroxicam, celecoxib, nimesulide</i> | 1/6 Representatives of parasympathomimetic and parasympatholytic drugs. Structure, chemical and physical characteristics and their interactions with the receptor.
<i>Structures: acetylcholine, carbachol, pilocarpine, physostigmine, atropine, hyoscyne (=scopolamine), homatropine, homatropine methylbromide, ipratropium, tiotropium</i> |
| 1/4 | Antipsychotics. Classification. Phenothiazines and related compounds. Major representatives of atypical antipsychotic | 1/7 Sympathomimetic drugs and their major representatives. Selective β_2 -agonists, as bronchodilators. Structure, chemical and physical characteristics and their relationship with the activity.
<i>Structures: noradrenaline, adrenaline, isoprenaline, terbutaline, phenylephrine, ephedrine, naphazoline</i> |
| | | 1/8 Local anaesthetics, classification, major representatives. Structure, chemical and physical characteristics, structure-activity relationships.
<i>Structures: cocaine, benzocaine, procaine, tetracaine, lidocaine, mepivacaine, ropivacaine, bupivacaine, articaine</i> |
| | | 1/9 Cardiac glycosides, structure and properties of main representatives. Mechanism of action.
<i>Structures: digitoxin, digoxin, deslanoside, lanatoside C, gitoxin</i> |
| | | 1/10 Antihypertensive agents. Classification. In more detail about the ACE-inhibitors. Structure, chemical and physical characteristics. Criteria of the receptor-binding.
<i>Structures: captopril, enalapril, lisinopril, ramipril, quinapril, losartan</i> |
| | | 1/11 Classification of antiarrhythmic agents, their main representatives. Chemical properties, structure-activity relationship.
<i>Structures: quinidine, procainamide, lidocaine, mexiletine, propafenone, propranolol, metoprolol, bisoprolol</i> |
| | | 1/12 Antianginal drugs. Main representatives of nitrites and nitrates. General structure of 1,4-dihydropyridines, some representatives. Structure, chemical and physical properties.
<i>Structures: amyl nitrite, glyceryl trinitrate, isosorbide mononitrate, nifedipine, nitrendipine, amlodipine</i> |
| | | 1/13 Antihyperlipidemic agents, classification. Phenoxy-isobutyric acid derivatives, structures, properties. General structure of natural statins, pharmacophore group, properties. Synthetic statins with example.
<i>Structures: clofibrate, ciprofibrate, lovastatin, fluvastatin</i> |
| | | 1/14 Cardiovascular agents. Anticoagulants. Vitamin K antagonists, structures, properties, analysis. Heparin, structure, properties. |

- Structures: warfarin, acenocoumarol, glucosamine, glucuronic acid, iduronic acid, acetylsalicylic acid, ticlopidine, clopidogrel*
- 1/15 Diuretics. Classification. Saluretics and loop diuretics in detail. Structures, properties, mechanism of action, analysis. *Structures: hydrochlorothiazide, chlorthalidone, indapamide, etacrynic acid, furosemide*
- 1/16 Antidiabetics. Insulin and analogs: structure and properties. Orally administered antidiabetics, chemical groups with examples. *Structures: gliclazide, nateglinide, metformin, vildagliptin*
- 1/17 Vitamins. Structure of A- and D-vitamins, chemical and physical characteristics. Structure of vitamin B₁, B₂, B₆ and C. Chemical and physical characteristics. *Structures: retinol, retinol acetate, cholecalciferol, calcitriol, thiamine, riboflavin, pyridoxine, ascorbic acid*
- 1/18 Classification of steroid hormones. Main representatives of corticosteroids. Chemical and physical characteristics. *Structures: cortisone, hydrocortisone, prednisone, prednisolone, triamcinolone, dexamethasone, betamethasone, hydrocortisone acetate, triamcinolone acetonide, fluocinolone acetonide, budesonide*
- 1/19 Classification of sex hormones. Estrogens and antiestrogens in detail. Structures, properties, structure-activity relationships, analysis. *Structures: estrone, estradiol, estriol, ethinylestradiol, diethylstilbestrol, tamoxifen*
- 1/20 Antihistamines, classification and their major representatives. Structure, chemical and physical characteristics. New generation non-sedative drugs. *Structures: histamine, diphenhydramine, dimetindene, hydroxyzine, promethazine, cetirizine, loratadine, desloratadine, cimetidine*
- 1/21 Classification of chemotherapeutic drugs. China-alkaloids and synthetic fluoroquinolones. Structure, chemical and physical characteristics. *Structures: quinine, ciprofloxacin, norfloxacin, ofloxacin, levofloxacin*
- 1/22 Classification of sulfonamides. Structural elements of antibacterial sulfonamides. Chemical, physical and pharmacological properties. *Structures: sulfacetamide, sulfadimidine, sulfaguanidine (+some samples from other pharmacological groups)*
- 1/23 General structure of β -lactam antibiotics, classification and major representatives. Reactivity, physical and chemical characteristics. *Structures: benzylpenicillin, ampicillin, amoxicillin, sultamicillin, clavulanic acid, sulbactam, cefalexin, cefaclor*
- 1/24 Tetracycline-type antibiotics. Structure of main representatives, chemical and physical properties. General structure of aminoglycoside antibiotics with the example of streptomycin. *Structures: tetracycline, oxytetracycline, doxycycline, streptomycin*
- 1/25 Antifungal drugs, classification and major representatives. 14 α -demethylase-inhibitors in detail. Main structural elements of membrane-damaging polyene antibiotics (e.g. nystatin), their mechanism of action. *Structures: bifonazole, clotrimazole, miconazole, fluconazole*
- 1/26 Strategies used in cancer therapy, grouping of agents used. Details of chemotherapy and targeted therapy options. (Cross-linking /covalent- noncovalent/, alkylation, typical structures of topoisomerase inhibiting antibiotics, characterisation of antimetabolites, main grouping of kinase inhibitors, their mechanism of action) *Structures. cyclophosphamide, cisplatin, fluorouracil,*
- Second topic: general part**
- 2/1 Distinction of inorganic and organic compounds. Preliminary investigations: burning test; dissolution test. Identification reactions of cations (aluminium; zinc; calcium; magnesium; potassium).
- 2/2 Distinction of inorganic and organic compounds. Preliminary investigations: burning test; dissolution test. Identification reactions of anions (chloride; bromide; iodide; phosphate).
- 2/3 Distinction of inorganic and organic compounds. Preliminary investigations: burning test; dissolution test. Identification reactions of functional groups in Ph. Eur. (aromatic primary amines; phenols; quaternary amines).
- 2/4 The role of lipophilicity in the transport of drugs. Definition and determination methods of the log*P* value.
- 2/5 Solubility parameters and their characterization. Relationship between solubility and pH. Possibilities of increasing solubility. Methods for determining solubility. (Kinetic and thermodynamic solubility, excipients)
- 2/6 Basicity of drugs and bio-molecules in terms of macro- and microconstants. Calculation of the pH-dependent concentration of the various macro- and microforms. Determination of the protonation constants of bases and dissociation constants of acids. Calculation of the pH-dependent number of bound hydrogen ions and the charge of the molecule.
- 2/7 Thermodynamic and structural preconditions of drug-receptor interactions. Complementarity and bioisosteric substitutions. Bonding types and energies of drug-receptor interactions.
- 2/8 Theory and practice of the impurity tests in the Ph. Eur. (heavy metals, iron, chlorides).
- 2/9 Theory and practice of the impurity tests in the Ph. Eur. (arsenic, potassium, ammonium, sulphates).
- 2/10 Theory and practice of the impurity tests in the Ph. Eur. (calcium, magnesium, phosphates).

- | | |
|--|--|
| <p>2/11 Appearance of solution (clarity and degree of opalescence, colour of liquids). The practice of the pH measurement in the Ph. Eur. Examples for the application of the potentiometric titrations in the Ph. Eur.</p> <p>2/12 Special aspects in the qualitative and quantitative analysis of drug preparations.</p> <p>2/13 Determination of organic bases and salts of organic bases. Examples. (see 1/3; 1/15)</p> <p>2/14 Determination of organic acids. Examples.</p> <p>2/15 UV and VIS spectrophotometry in the pharmaceutical analysis. Principles (chromophore; auxochrome groups; shifts in spectrum; pH-dependence; Lambert-Beer law; quantitative measurement of a single component, ratio method).</p> <p>2/16 Classification of chromatographic methods. Theory and practice of thin-layer chromatography. Application in drug analysis. System suitability test.</p> <p>2/17 Classification of chromatographic methods. Theory and practice of high-performance liquid chromatography. Main chromatographic parameters. Application in drug analysis.</p> | <p>2/18 Stages and system of drug research. Trends in drug research. Finding new chemical entities by fragment based research, biologics.</p> <p>2/19 Analysis of major analgetics (morphine, codeine, ethylmorphine, papaverine).</p> <p>2/20 Analysis of minor analgetics (salicylic acid, acetylsalicylic acid, paracetamol, phenazone, aminophenazone, metamizole sodium).</p> <p>2/21 Analysis of xanthine derivatives (caffeine, theophylline, theobromine).</p> <p>2/22 Identification and distinction of sugars (glucose, fructose, lactose, sucrose).</p> <p>2/23 Analysis of local anaesthetics (benzocaine, procaine, tetracaine, lidocaine).</p> |
|--|--|

Form of the semester-end examination: combined examination

The possibility and conditions for offering grades:

A list of the basic notes, textbooks, resources and literature that can be used to acquire the knowledge necessary to master the curriculum and to complete the assessments, with exact description about which of them is required to acquire which part of the syllabus (e.g. description based on topics)), as well as the main technical and other aids and study aids that can be used:

Theoretical and practical material uploaded to Moodle system.

Lecture notes

Foye's Principles of medicinal chemistry

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission**:**

no

The course description was prepared by:

Dr. Péter Horváth

Pharmacology and Toxicology I.

For further information contact directly with the Department.

Statistics for pharmacists (theory+practice)

Full name of the subject: Statisztika gyógyszerészeknek (elmélet+gyakorlat)

Program: undivided program (pharmaceutical)

Schedule: full-time

Short name of the subject:

English name of the subject: Statistics for pharmacists (theory+practice)

German name of the subject: Statistik für Pharmazeuten (Vorlesung + Praktikum)

Neptun code of the subject: GYKGYH282G1A

Type of registration: obligatory

Responsible department: Department of Pharmacodynamics

Responsible tutor: László Tóthfalusi

Contact information: totlasz@net.sote.hu
Title, academic degree: D.Sc.

Name of the persons responsible for the teaching of the subject:
László Tóthfalusi D.Sc.

Classes per week: 2 lecture(s)
2 practice(s)

Credit point(s): 3

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The aim of the course is to give an overview of statistical methods from a pharmaceutical viewpoint.

Short description of the subject:

In the lectures we review the theoretical basis of the methods. The purpose of the exercises is twofold: On the one hand, to provide examples of the use of statistical tools in different fields of pharmacy (quality control, analytical chemistry, technology development, clinical trial design, pharmacovigilance, economic activity). On the other hand, an introduction to the free and widely used statistical program, the R programming environment.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/semester	Normal course offer	Consultations
6 th semester	2	2	–	–	56	Autumn semester* Spring semester Both semesters (* Please underline)	–

Program of semester**Topics of theoretical classes (pro week):**

Week 1: Descriptive statistics
 Week 2: Probability theory
 Week 3: Sample distributions, estimation
 Week 4: Parametric and nonparametric statistical tests
 Week 5: Linear regression
 Week 6: Multivariate linear regression model
 Week 7: Extension of the linear regression model
 Week 8: Multivariate ANOVA, study design
 Week 9: Categorical data analysis
 Week 10: Survival analysis
 Week 11: Longitudinal data, nonlinear regression
 Week 12: Statistical evaluation of clinical trial data
 Week 13: Statistical foundation of epidemiology
 Week 14: Time series, economic applications

Schedule of consultations:

At scheduled times.

Course requirements**Prerequisites:**

GYKEGY112E1A Mathematics for pharmacists
 GYKGYI248G1A Physiological pharmaceuticals and pharmaceutical dosage forms
 GYKDEI107G1A Informatics

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup: Participation in at least 75% of the practice sessions is mandatory. The retake quiz on the last week of the semester is needed if one of the quiz opportunities are missed or if a quiz result is below the acceptable minimum. Accepted project presentation.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

Two quizzes scheduled at weeks 8 and 12. Retake is possible at the last week.

Requirements of signature:

Both quizzes must be above the passing level.

Number and type of projects students have to perform independently during the semester and their deadlines:**Topics of practical classes (pro week):**

Week 1: Using R and RStudio, Data Types
 Week 2: Elements of the R programming language
 Week 3: Data import, Data cleansing, Descriptive statistics in R
 Week 4: Statistical graphics, making a presentation in R.
 Week 5: Simulation in R
 Week 6: Group comparison in R
 Week 7: Linear regression problems
 Week 8: Quiz 1
 Week 9: Multivariate linear regression problems
 Week 10: Experimental design task
 Week 11: Statistical processing of experimental data
 Week 12: Quiz 2
 Week 13: Project presentation 1
 Week 14: Project presentation 2

One independent project must be presented.

The topic is free but should be suitable to demonstrate of the application of statistical tests and graphics.

Type of the semester-end examination: signature/practical grade/semi-final/final

Form of the semester-end examination: none

Prescribed practices outside of the university:

none

Scientific, course related researches, publications, assays:

Recommended textbooks:
 David Bock, Paul Velleman, Richard De Veaux, Floyd Bullard. Stats: Data and Models, Pearson (2019)
 William Mendenhall, Robert J. Beaver, Barbara M. Beaver. Introduction to Probability and Statistics, Cengage (2019)

Necessary equipment:

Internet access

The course description was prepared by:

László Tothfalusi. D.Sc.

Physical Education VI.

Full name of the subject:	Testnevelés VI.
Program:	undivided program (pharmaceutical)
Schedule:	full-time
Short name of the subject:	P. E. VI.
English name of the subject:	Physical Education VI.
German name of the subject:	Sport VI
Neptun code of the subject:	GYKTSI116G6A
Type of registration:	obligatory
Responsible department:	Semmelweis University, Physical Education and Sports Center
Responsible tutor:	Várszegi, Kornélia director Phone: +36-20/825-0611 E-Mail: varszegi.kornelia@semmelweis-univ.hu

Name of the persons responsible for the teaching of the subject:

Kovács, Imre tennis trainer
Orsolya, Balogh aerobics and zumba trainer
Kalmus, Dániel P.E. teachers
Katona, László hiking, badminton, boulder trainer
Lehel, Zsolt P.E. teachers
Nagy-Kismarci, Bence cheerleading trainer
Weisz, Miklós P.E. teachers
Doharné Buczkó Anikó P.E. teachers
Farkas Dominika P.E. teachers
Kovács Imre tennis trainer
Nagy-Kismarci Bence cheerleading trainer
Balogh Orsolya aerobic and zumba trainer
Dr. Herbert – Minkó Krisztina yoga trainer
Tóth Balázs dance, zumba, salsa trainer
Kiss Valéria Bless You Gym trainer
Paksai Márton ultimate freesbe trainer
Soós Gábor tennis trainer
Kunos Gábor hiking trainer

Classes per week:	1 practice
Credit point(s):	0

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The short-term goal of the course is to maintain and improve the students' current state of health, to create the physical conditions for a better quality of life by learning and practicing (new) branches of sports that can be practiced after graduation as well. The long-term goal is to improve the quality of life and life prospects of future physicians, and to provide students with credible preventive attitudes and life-style advice – so that they can represent those in their later practice, through their own health-promoting behaviour

Short description of the subject:

Upon completion of the course the student will be able to carry out regular physical activity.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/semester	Normal course offer	Consultations
6 th semester	0	14	–	–	14	Spring semester*	–

COURSE REQUIREMENTS

Prerequisites: –

Topics of practical classes (pro week):

Within the framework of obligatory regular physical activity, the requirements of the subject can be fulfilled as free of charge and self-financed student as well. The former is available during classes and courses organized by the Semmelweis University's Centre for Physical Education and Sports (TSK), and the latter is available at SE-TSK accredited partner locations.

Free of charge:

60 minute classes held at the same time on a weekly basis, on the premises of the TSK facilities and other locations.
1107 Bp, Zágrábi utca 14.

1×60 min./week sessions:

Aerobics, Bless You Gym, boulder, functional circuit training, golf, beginner Yoga, advanced Yoga, male football, salsa, step aerobics, badminton, beginner ultimate Frisbee, advanced ultimate Frisbee, Zumba

1×90 mins./week sessions: women's football, ice hockey, beginner tennis, beginner tennis 2,

4×3 hrs. and 1x 2 hrs. session packages: Hiking 1, Hiking 2.

2×90 mins./week sport training (competitive sport, for qualified only): cheer dance, cheerleader, men's football, handball, basketball, volleyball

Fee-based:

at the sports venues specified on www.semmelweis.hu/sportkozpont, which will also be advertised on the Neptun system. The list of these locations may vary per school year.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

The number of active participations for physical education classes is 10 (once a week), regardless of the number of school breaks, which is to be completed during the hours assigned to the group. Two hours can be recovered in the first week of the exam period, on two separate days. Lessons missed do not need to be certified; however, catching up is mandatory. The days of study breaks do not qualify as automatic attendance. Practice leaders follow an online presence registration at the beginning and end of the lessons, which can be individually tracked on semmelweis.hu/sportkozpont homepage.

Except for the Sport Hiking courses, where you have to attend 4 times due to blocking. 3 of these are on your own course and 1 can be made up by arrangement with the instructor!

Requirements of signature (as provided for in STUDY AND EXAMINATION REGULATIONS § 29):

Active participation in practice classes 10 times (trainings 15 times) under the conditions described above.

Type of the semester-end examination: signature

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

The possibility and conditions for offering grades:

Active participation in practice classes 10 times (trainings 15 times) under the conditions described above.

May be exempted from attending classes the student who

1. whose diagnosis and the opinion of the sports doctor do not allow to exercise, and submits a certificate
- or
2. does sports regularly and submits a certificate of association and federation in the neptun system in the exemption period preceding the semester.

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission:

If you have not completed the course you may be readmitted in the 2. semester of the following academic year

Basic Medical Pathophysiology II.

Full name of the subject: Kórtani és klinikai alapismeretek (elmélet+gyakorlat) II.
Program: undivided program (pharmaceutical)
Schedule: full-time
Short name of the subject: Pathophysiology II.
English name of the subject: Basic Medical Pathophysiology (theory+practice) II.
German name of the subject: Grundlagen der Pathophysiologie (Vorlesung+Praktikum) II

Neptun code of the subject: GYKGYH128E2A

Type of registration: obligatory

Responsible department: Semmelweis University, Department of Pharmacodynamics.

Responsible tutor: *Gabriella Juhász*, MD associate professor, DSc
Contact information:
 phone: +36-1-210-29-30/56362
 email: juhasz.gabriella@semmelweis.hu

Name of the persons responsible for the teaching of the subject:
Gabriella Juhász, MD associate professor, DSc
Kornélia Tekes, PharmD university professor, DSc
Ervin Finta, MD head physician, PhD
Noémi Papp, PharmD resident lecturer, PhD
Kinga Gecse, PharmD pharmacist, assistant lecturer
Sandor Krause, MD psychiatrist

Class per week: 2 hours lectures 1 hour practice

Credit point(s): 3 credits

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The goal of the subject is to provide pathophysiological background to understand the mechanism of action of drugs, to prepare pharmacists for professional advising and for the collaboration with other health professionals.

Short description of the subject:

Basic medical pathophysiology focuses on common disorders, especially those ones that can be important for pharmacists during their work. The students learn about the epidemiology of common disorders, pathophysiological mechanisms that can lead to them, acquire knowledge about the main clinical symptoms and the basic therapeutic considerations. The subject has special emphasis on tasks that pharmacists may carry out as healthcare professionals, for example identification of symptoms that require urgent medical help or providing advice for the patients regarding their pharmacological treatment. During the practicals, students deepen their knowledge by working on clinical cases and solving tests.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
6th semester	28	14	–	–	42	Spring semester*	–

Program of semester

Topics of theoretical classes (pro week):

1. week: Psychiatry: diagnostic systems; neurocognitive disorders
2. week: Schizophrenia, depressive disorders, addictive disorders
3. week: Anxiety disorders, sleep disorders
4. week: Eating disorders, headaches
5. week: Epilepsy, neurodegenerative disorders
6. week: Inflammatory diseases of the nervous system
7. week: Ear disorders. Respiratory diseases I.
8. week: Respiratory diseases II.
9. week: Infectious diseases.
10. week: Musculoskeletal diseases I.
11. week: Musculoskeletal diseases II.
12. week: Endocrine and metabolic diseases I.
13. week: Endocrine and metabolic diseases II.
14. week: Immunologic diseases, oncologic diseases

Topics of practical classes (pro week):

1. week: Case reports: psychiatric disorders I.
2. week: Case reports: psychiatric disorders II.
3. week: Practical class: psychiatric disorders.
4. week: Written test exam on Moodle system
5. week: Case reports: neurological diseases I.
6. week: Case reports: neurological diseases II.
7. week: Case reports: diseases of the ear
8. week: Case reports: respiratory diseases
9. week: Case reports: infectious diseases
10. week: Written test exam on Moodle system
11. week: Case reports: musculoskeletal diseases
12. week: Case reports: endocrine diseases
13. week: Practical class: recognition of emergency situations, first aid
14. week: Group work

Other subjects (both obligatory and optional) relating to the transversal issues of the subject. Possible overlaps between subjects:

The subject of Basic Medical Pathophysiology builds on the basic biomedical subjects such as Biochemistry and Physiology and prepares the students for the subjects Pharmacology and Toxicology and Pharmacotherapy.

Schedule of consultations: for personal request during practicals.

Course requirements:

Prerequisites:

Basic Medical Pathophysiology I., Pharmaceutical microbiology, Dietetics

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Attendance at lectures and practicals will be checked in accordance with the current Study and Examination Regulations. Under the current regulations, students are allowed to miss a maximum of 25% (3 times) of the practicals. It is only possible to make up for absences from practicals with an official certificate, and at a time agreed with the tutors. Participation in the practicals is conditional on reading the lecture materials

The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments, (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their upgrading retake (as provided in §§ 25-28 of the STUDY AND EXAMINATION REGULATIONS):

Elements of the mid-semester evaluations: writtent test exams, warm-up tests at the beginning of the practicals, group work.

1. Students will write two written tests during the semester, on Moodle, in weeks 4 and 9. The first test will cover the course material of weeks 1-4 (up to and including eating disorders), the second test will cover the course material of weeks 4-8 (from and including headaches). A maximum of 30-30 points can be achieved for each tests, 50% of which must be achieved to be considered a pass. It will be possible to retake the written test exams in the week following the test, at an agreed time outside the practical. Missing or failed written test exams can be retaken in the first week of the examination period in the form of a written test exam covering the entire course material of the semester. Successful completion of the written test exams is a prerequisite for the end-of-semester signature.
2. A minimum of 50% of the points must be earned on each warm-up-test in order to achieve pass. A maximum of 5 small tests can be retaken during the last exercise. Successful completion of the warm-up tests is a prerequisite for the end-of-semester signature.
3. The topics for the group work will be given to the students on the 10th week of the practicals. The groups will be allocated on the basis of the marks obtained in the two written test exams, so that there is an even distribution of students in each group. Each member of the group will be required to contribute equally to the preparation of a poster or other informative material, which the group leader

will upload to Moodle by midnight on the day before the last exercise, describing the subtasks that the team members will have completed. The uploaded work will receive an equal pass/fail grade for each team member. Exceptions to this may be made if a student's performance is extremely different from the rest of the group (e.g. inactivity, nonparticipation) - in which case he/she may receive a different grade from the rest of the group.

A passing grade for group work is a condition of the end-of-semester signature.

At the end of the semester, the students will receive a signature and then take an oral examination.

Requirements of signature (as provided for in STUDY AND EXAMINATION REGULATIONS § 29):

1. Attendance of lectures and practicals in accordance with the current Study and Examination Regulations. If a student has more practical absences than the number of practical absences described in the regulations, the semester grade will be "fail" and no signature will be given.
2. A grade of at least pass in each of the two written tests during the semester.
3. Pass all the warm-up tests
4. Pass on the group work.

Number and type of projects students have to perform independently during the semester and their deadlines: -

The possibility and conditions for offering grades:

Based on the total score of the 5 written test exams and 20 warm-up tests written during the academic year, students with the highest level of knowledge will be offered a topic exemption as follows: Of the three exam topics, a) students in the top 10% will take one topic, b) students in the top 10.1-20% will take two topics instead of three topics. Of the three items drawn, it is up to the student to decide which one (or which two) to answer, but questions arising from answering the item may cover the whole course material.

Scientific, course related researches, publications, essays:

Lecture slides and practice slides will be provided on Moodle to help students learn the course material. These form the basis for the assessments. In addition, the Moodle system contains other supplementary materials (e.g. schedules of lectures and practicals, information on written tests, a help with basic knowledge for the final exam) to help students prepare for the exam. Recommended literature, the relevant parts of which are referred to in lectures and practicals: Hammer-McPhee: Pathophysiology of Disease (McGraw-Hill, 2018) Kumar-Abbas-Aster: Robbins Basic Pathology (Elsevier, 2017)

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: on and individual assessment basis

The course description was prepared by: Gabriella Juhasz associate professor

Pharmaceutical Technology II.

For further information contact directly with the Department.

FACULTY OF PHARMACEUTICAL SCIENCES

**Curriculum of the credit-based training for fourth year
students in the 2024/2025 academic year**



Pharmaceutical Sciences
4th year

7. SEMESTER 2022/2023/1

Subject	Lecture (hour/week)	Practice (hour/week)	Credit	Prerequisites	Exam type
Pharmacognosy (practice) II. GYFMG130G2A	–	4	2	Pharmacognosy I.	practical mark
Pharmacognosy (theory) II. GYFMG130E2A	2	–	3		final*
Instrumental Pharmaceutical Analysis (practice) GYKGYK087G1A	–	5	4	Pharmac. Chem. and Analytics II Pharmaceutical Technology II.	practical mark
Instrumental Pharmaceutical Analysis (theory) GYKGYK087E1A	2	–	2		semi-final
Pharmacology and Toxicology (practice) II. GYKGYH086G2A	–	2	2	Pharmacology and Toxicology I. Basic Medical Pathophysiology II.	practical mark
Pharmacology and Toxicology (theory) II. GYKGYH086E2A	3	–	3		semi-final
Pharmacoeconomics (practice) GYKETE131G1A	0,5	0,5	1	Pharmacology and Toxicology I. Basics of Economy Statistics for Pharmacists	practical mark
Pharmaceutical Technology (practice) III. GYKGYI249G3A	–	8	5	Pharm. Techn. II.	practical mark
Pharmaceutical Technology (theory) III. GYKGYI249E3A	2	–	2		semi-final
Pharmacy Administration (theory) I. GYKEGY090E1A	2	–	2	History of Pharmaceutics and Propedeutics Pharmaceutical Technology II	semi-final
Biological Drugs (theory) GYKGYI088E1A	2	0	2	Pharmac. Chem. and Analytics II. Pharmacology and Toxicology I. Biotechnology	semi-final
Physical Education VII. GYKTSI116G7A	–	1	–		signature
Semmelweis Symposium GYKFRM288E1A	24/sem	–	–		signature
Total:	13,5 24/sem	20,5	28		

Pharmacognosy (theory) II., Pharmacognosy (practice) II.

Full name of the subject: Gyógynövény és drogismeret (elmélet) II., Gyógynövény és drogismeret (gyakorlat) II.
Program: undivided program (pharmaceutical)
Schedule: full-time
Short name of the subject: Pharmacognosy II.
English name of the subject: Pharmacognosy (theory) II., Pharmacognosy (practice) II.
German name of the subject: Pharmakognosie II.

Neptun code of the subject: GYKFMG130E2A; GYKFMG130G2A
Type of registration: obligatory
Responsible Department: Semmelweis University, Department of Pharmacognosy

Responsible tutor: *Szabolcs Béni* head of department, associate professor, Ph.D.
 Phone: 06-20-825-0489
 E-mail: beni.szabolcs@pharma.semmelweis.hu

Name of the persons responsible for the teaching of the subject:
Szabolcs Béni associate professor, Ph.D.
Ágnes Alberti associate professor, Ph.D.
Orsolya Csernák assistant professor, Ph.D.
Ida Fejős assistant professor, Ph.D.
Eszter Riethmüller assistant professor, Ph.D.
Attila Ványolós assistant professor, Ph.D.
Nóra Gampe assistant lecturer, Ph.D.
Csenge Anna Felegyi-Tóth trainee
Ákos Rácz assistant lecturer, Ph.D.

Classes per week: 2 lectures, 4 practices,
Credit point: 3 credits lecture, 2 credits practice

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The aim of the course is to acquaint pharmacy students with medicinal plants, herbal drugs and the analytical methods applied in their quality assurance. By doing so, it contributes to the education of pharmacy students to become key experts in herbal medicines. It contributes to the training of students with modern knowledge of pharmacognosy at a time when the knowledge about natural substances and herbs has come to the fore and has expanded with new aspects due to European harmonization.

Short description of the subject:

The topics of the classes follow the biogenetic system of plant materials. It represents a shift in proportion and, in part, selection in the curriculum that sufficiently emphasizes the importance of knowledge of herbal drugs and their active ingredients that are important in therapeutic practice. At the same time, it provides sufficient knowledge in the context of structure-activity relationships for the sufficient processing of newly emerging herbal drugs, possibly of foreign origin, based on their chemical groups. It also introduces the requirements of the European Pharmacopoeia (Ph. Eur.) regarding herbal drugs and preparations. Thus, it provides knowledge of all herbal drugs and active substances that serve as raw materials for phytopharmaceuticals (including those that will soon become traditional OTC medicines) and preventive products (dietary supplements).

Knowledge of plant material: drug recognition; macroscopic and microscopic examination.

Detection of active ingredients and constituents of herbal drugs (preparation, extraction and purification techniques, general and specific chemical reactions, chromatographic methods), quantitative evaluations (pharmacopoeial and standard methods) and isolation of individual components or selective determination by complex chromatographic and spectroscopic methods. Application of herbal drugs based on their positive effects in prevention, phytotherapy and improving quality of life.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
7 th semester	28	56	-	-	84	Autumn semester	-

Program of semester

Topics of theoretical classes (pro week):

Week 1: Biosynthesis and grouping of terpenoids. Essential oils in the plant kingdom, their medicinal significance.

Week 2: Essential oils containing monoterpene components.
 Acyclic monoterpenes: Lavandulae flos, Aurantii amari flos, Aurantii amari epicarpium et mesocarpium, Citri bergamiae pericarpium, Coriandri fructus, Melissa folium, Monocyclic monoterpenes: Menthae crispae folium, Menthae piperitae folium, Carvi fructus, Eucalypti folium, Melaleuca folium, Bicyclic monoterpenes: Rosmarini folium, Juniperi galbulus, Salviae officinalis folium
 Aromatic monoterpenes: Thymi herba, Serpylli herba

Week 3: Volatile phenylpropane and sesquiterpene-containing essential oils. Balms, resins.
 Phenylpropane derivatives: Caryophylli flos, Anisi fructus, Foeniculum drugs, Cinnamomi cortex, Myristicae semen, Levistici radix

Volatile sesquiterpenes: Matricariae flos, Chamomillae romanae flos, Millefolii herba, Absinthii herba, Zingiberis rhizoma, Curcuma drugs, Balms, resins: Terebinthina drugs, Balsamum peruvianum, Benzoe drugs, Myrrha

Week 4: Iridoids, sesquiterpene lactones, diterpenes: valepotriate iridoid esters, bitter substances and other types of plant metabolites.

Monoterpene derivatives

Valepotriate iridoid esters: Valerianae radix

Iridoids and secoiridoids: Gentianae radix, Menyanthidis trifoliatae folium, Centaurii herba, Harpagophyti radix, Plantaginis lanceolatae folium, Agni casti fructus, Oleae folium

Sesquiterpene derivatives

Sesquiterpene lactones: Cardui benedicti herba, Taraxaci officinalis radix, Cynarae folium, Arnicae flos

Diterpenes: Marrubii herba, Ginkgonis folium, Stevia rotundifolia

Triterpene derivatives:

Lanosterol derived bitter substances: Colocynthis fructus

Secotriterpene bitter substances: Quassiae lignum

Week 5: Triterpenes, sterane saponins, tetraterpenes, polyterpenes

Triterpene saponins: Hederae folium, Liquiritiae radix, Primulae radix, Saponariae albae radix, Hippocastani semen, Centellae asiaticae herba, Quillajae cortex
 Triterpene acids and alcohols: Olibanum indicum, Callendulae flos, Taraxaci officinalis herba cum radice
 Drugs with adaptogenic action: Ginseng radix, Poria, Eleutherococci radix
 Steroidal saponins: Rusci rhizoma, Sarsaparillae radix
 Tetraterpenes: Stigma crosses, Lycii fructus
 Polyterpenes: Resina elastica

Week 6: Cardiac sterane glycosides, special steroids
 Cardiac sterane glycosides: Digitalis purpureae folium, Digitalis lanatae folium, Convallariae folium, Strophanthi semen, Scillae bulbus
 Specific triterpenes, phytosterols: Pruni africanae cortex, Sabalis serrulatae fructus, Cucurbitae semen, Urticae radix, Epilobii herba, Cimicifugae rhizoma
 Ecdisteroids: Leuzeae radix

Week 7: Azotoids, nitrogen metabolism in plants. Biosynthesis and grouping of alkaloids. Alkaloids of ornithine origin.
 Amino acids, peptides, biogenic amines
 Alkamides: Echinacea drugs
 Lectins: Visci albae herba
 Herbal enzymes: Carica papaya, Ananas comosus, Ficus spp.
 Alkaloids
 Alkaloids of ornithine origin
 Tropane alkaloids: Belladonnae folium, Stramonii folium, Cocae folium

Week 8: Alkaloids of ornithine, lysine and tryptophan origin
 Alkaloids of ornithine origin
 Pyrrolidine and pyrrolizidine alkaloids: Nicotianae folium, Boraginis herba, Symphyti radix, Farfarae folium
 Alkaloids of lysine origin
 Piperidine alkaloids: Lobeliae herba
 Alkaloids of tryptophan origin
 Simple indol alkaloids: Physostigmae semen
 Hemiterpenoid indol alkaloids: Secale cornutum
 Monoterpenoid indol alkaloids: Rauwolfiae radix, Vincae minoris herba, Uncaria-drugs, Catharanthi rosei herba, Strychni semen, Loganiaceae-Curare
 Monoterpenoid quinoline alkaloids: Cinchonae cortex

- Week 9:** Phenylalanine alkaloids
Benzyl isoquinoline alkaloids
Aporfin-framed alkaloids: Boldi folium
Morphinane alkaloids: Papaveris maturi fructus, Opium crudum
Protoberberine, benzophenanthridine, phthalidizoquinoline alkaloids: Chelidonii herba, Fumariae herba, Hydrastis rhizoma
Bisbenzylisoquinoline alkaloids: Menispermaceae-Curcuma
Monoterpenoid isoquinoline scaffolds: Ipecacuanha radix
Amaryllidaceae-alkaloids: Galanthi bulbosus
- Week 10:** Histidine alkaloids. Protoalkaloids of phenylalanine origin. Pseudoalkaloids: alkaloids of phenylalanine and nucleotide origin.
Histidine alkaloids
Imidazole alkaloids: Jaborandi folium
Protoalkaloids
Protoalkaloids of phenylalanine origin
Tropolon alkaloids: Colchici semen
Pseudoalkaloids
Pseudoalkaloids containing exocyclic nitrogen of phenylalanine origin
 β -amino-phenyl-propane alkaloids: Ephedrae herba, Catha edulis folium
Benzyl amine alkaloids: Capsici fructus
Piperidine alkaloids: Conii fructus
Pseudoalkaloids of nucleotide origin
Purin alkaloids: Camelliae sinensis non fermentata folia, Mate folium, Cacao semen, Coffeae semen, Cola semen, Guaranae semen
- Week 11:** Pseudoalkaloids of terpene origin. Cyanogenic and mustard oil glycosides
Pseudoalkaloids of terpene origin
Diterpene alkaloids: Aconiti tuber, Taxi cortex
- Steroid alkaloids: Dulcamarae stipes, Solani nigri herba, Veratri rhizoma et radix
Cyanogenic and mustard oil glycosides: Amygdalae semen, Pruni armeniaca semen, Sinapis nigrae semen, Sinapis albae semen
Other drugs containing sulfur-containing compounds: Allii sativi bulbosus, Allii cepae bulbosus
- Week 12:** Plant Biotechnology
Week 13: Midterm
Week 14: Summary presentation: preparation for the exam.
- Topics of practical classes (pro week):**
Week 1: Work and fire safety. Requirements of the semester. Investigation of unknown sample.
Week 2: Essential oil containing drugs. I.
Week 3: Essential oil containing drugs II.
Week 4: Investigation of drugs containing valepotriates and bitter substances.
Week 5: Saponins and chief saponin drugs. Methods used in the identification and quality control of saponins.
Week 6: Cardioactive glycosides and their main drugs I
Week 7: Cardioactive glycosides and their main drugs II.
Week 8: Tropane alkaloid containing drugs. Methods of extracting alkaloids from plant materials.
Week 9: Isoquinoline alkaloids, their chief drugs
Week 10: Quinoline and indole alkaloids, their main drugs
Week 11: Pseudo- and protoalkaloids, their main drugs I.
Week 12: Pseudo- and protoalkaloids, their main drugs II.
Week 13: Plant biotechnology
Week 14: Individual task.: Natural product development. Identification of crude drugs based on the methods prescribed in the Ph. Eur.

Schedule of consultations: as demanded

Schedule of consultations: as demanded

Prerequisites:

Pharmacognosy I.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Based on the current Study and Exam regulations

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

During the semester, two midterms will be written based on the material of the exercises in writing and/or orally. Verification of material knowledge (examination of unknown drug mixtures, identification of unknown drug powders, recognition of microscopic preparations). The first test takes place during the 7-8th week practice. The report consists of a theoretical and macromorphological examination part, including the studies carried out and described during the practices in weeks 1-7, as well as the material of the seminars. The grade obtained in this process will be counted with a single weight when determining the practical grade.

In the 13th week lecture, an obligatory midterm exam will take place, the material of which covers the entire practical material of the semester. The midterm result of the grade is counted with double weight when determining the practical grade. Students who do not achieve at least sufficient (2) grades in the obligatory test must answer an additional part of the exam (herbal drug).

Midterm examinations may be replaced and corrected two times each. The results of the first report can be corrected during the two practices following the announcement of grades. We provide an opportunity to retake the obligatory midterm in an out-of-class time in week 14.

Requirements of signature: Participation at the practices. Submission and acceptance of reports. Attendance on every midterm during the semester.

Number and type of projects students have to perform independently during the semester and their deadlines:

Preparation of a presentation in a chosen topic, performed at the weeks 8-14

Type of the semester-end examination:

Lecture: final

Practice: practical grade

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Form of the semester-end examination:

Lecture: oral examination

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: no

Instrumental Pharmaceutical Analysis (theory), Instrumental Pharmaceutical Analysis (practice)

Full (Hun) name of the subject: MŰSZERES GYÓGYSZERANALÍZIS MŰSZERES GYÓGYSZERANALÍZIS (gyakorlat)
Program: Undivided program (pharmaceutical)
Schedule: full-time
Short name of the subject: MGYA
English name of the subject: Instrumental Pharmaceutical Analysis
German name of the subject: Instrumentelle Arzneimittelanalytik

Type of registration: obligatory/obligatory elective/elective/criteria requirement
Neptun code of the subject: GYKGYK087E1A and GYKGYK087G1A

Responsible Department: Department of Pharmaceutical Chemistry

Responsible tutor: *Dr. György Tibor Balogh* Head of department, DSc, PhD, dr. habil
Contact information: Semmelweis University, Department of Pharmaceutical Chemistry
 1092 Budapest, Hőgyes Endre u. 9.
 phone: 06-1-217-0891
 email: balogh.gyorgy.tibor@semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Dr. György Tibor Balogh Head, full professor, PhD
Dr. Péter Horváth Associate professor, PhD
Dr. István Antal Dean, full professor, PhD
Dr. Károly Mazák Associate professor, PhD
Dr. Márta Kraszni Associate professor, PhD
Dr. Gergő Tóth Associate professor, PhD
Dr. Anna Vincze Adjunct, PhD
Dr. Arash Mirzahosseini Adjunct, PhD
Dr. Vivien Bárdos PhD student
Dr. Balázs Simon PhD student
Dr. Rita Szolláth PhD student
Dr. Gergely Dombi PhD student

Class per week: 2 hours lectures
 5 hours practices

Credit point(s): 2 credits lectures
 4 credits practices

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The theoretical presentation and practical application of modern routine and large-scale analytical techniques used in the pharmaceutical industry, as found in the monograph of the pharmacopoeia, aiming to provide a comprehensive understanding of the testing of pharmaceutical raw materials, intermediates, and products produced through small, medium, and large-scale processes. Additionally, this encompasses the interpretation of the advanced instrumental methods employed in various sections of the Pharmacopoeia. Another objective is to equip our students for easier integration into the pharmaceutical industry.

Short description of the subject:

The fundamental objective of the course is to acquaint students with the essential routine and large-scale analytical measurement methods necessary for determining the quality of pharmaceutical preparations and raw materials. Students will become familiar with the construction and operation of various instruments. They will gain insight into the potential applications of each instrument and, through hands-on experience, acquire knowledge of the key instrumental techniques in pharmaceutical analysis.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
7 th semester	28	70	-	-	98	<u>Autumn semester*</u> Spring semester Both semesters (* Please underline)	-

Program of semester

Topics of theoretical classes (pro week):

1. 1 UV/VIS spectroscopy
2. 2 Electroanalytical methods (potentiometry, amperometry)
3. 3 IR, Raman spectroscopy
4. 4 HPLC I.
5. 5 HPLC II.
6. 6 ORD, CD spectroscopy
7. 7 Capillary electrophoresis
8. 8. Mass spectrometry, LC-MS
9. 9 MS II.
10. 10 NMR spectroscopy I
11. 11 NMR spectroscopy II.
12. 12 HTS methods
13. 13 Analytical techniques in solid state characterization. Nondestructive and Process Analytical Technology (PAT) approaches
14. 14 Consultation

Topics of practical classes (pro week):

1. UV spectroscopy, optical rotation
2. UV spectroscopy II, amperometry
3. IR, RAMAN
4. Potenciometry
5. HPLC I
6. ORD, CD
7. HPLC II
8. Capillary electrophoresis
9. HPLC III
10. MS
11. NMR
12. NMR II
13. Plate-based methods, permeability measurements
14. Consultation

Other subjects (both obligatory and optional) relating to the transversal issues of the subject. Possible overlaps between subjects:
Biophysics, analytical chemistry

Schedule of consultations: based on requirements

Course requirements

Prerequisites:

Pharmaceutical Chemistry and Analysis II.

Pharmaceutical Technology II.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Based on study and examination regulations

The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments, (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their upgrading retake (as provided in §§ 25-28 of the STUDY AND EXAMINATION REGULATIONS):

Throughout the semester, there will be 3 midterms (in the 5th week, 9th week, and 13th week), the results of which must achieve an average of at least 2.0 without rounding. The topics will be detailed in the topic list provided at the beginning of the semester (via Moodle).

Requirements of signature (as provided for in STUDY AND EXAMINATION REGULATIONS § 29):

- 1) It is obligatory to be present on the practices.
- 2) Maximum 3 absences are acceptable. In case of a further absence the semester has to be repeated.
- 3) The practices begin and finish punctually. Latecomers can be sent home by the instructor.
- 4) You have to be prepared for the practices. Your preparation can be checked by the instructor at any time, without former notification, both in written and oral form. Unprepared students can be sent home by the instructor.
- 5) Scheduled project reports must be written on the designated practice. Students absent during scheduled project reports must retake them within a week.
- 6) A practical course grade can only be given to a student if
 - a) the average of the scheduled project reports is at least 2.00 and at least 2 of them must be passed;
 - b) he/she accumulates the required minimum number of points (min 50%) during practices;
 - c) the number of the absences does not exceed the acceptable limit.
- 7) After the end of the study programme the practical course grade can only be improved in the first week of the exam period.
- 8) A laboratory report must be kept about your work in the lab. All the examination results of the unknowns must be written into this and handed in by the end of the practice or until a deadline agreed with the instructor. Otherwise, no points will be rewarded for the practice.

Number and type of projects students have to perform independently during the semester and their deadlines:

Completing the tasks defined in the practical curriculum, creating reports on the measurements conducted on a weekly basis. The reports must be submitted by the end of the lab session or within the timeframe agreed upon by the lab instructor and the students.

Type of the semester-end examination: practical grade / comprehensive examination

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Form of the semester-end examination: written examination

REQUIREMENTS FOR EXAM

- UV/VIS Spectroscopy (Electronic excitation, HOMO-LUMO orbitals, chromophore, auxochrome, spectral shifts, solvent cut-off values, steps of spectrophotometer qualification (wavelength, intensity, linearity; scattered light); Transmittance-absorbance; Lambert-Beer law, specific and molar absorptivity (+calculation), quantitative analytical possibilities (overlapping/non-overlapping/partially overlapping spectra, difference spectroscopy +calculation examples), concept of derivative spectroscopy, its application)
- ORD, CD Spectroscopy (Optical (physical) background of ORD spectrum formation, Cotton effect curve, specific rotation and calculation;
- Optical (physical) conditions for CD spectrum formation, chiral and chiral perturbed chromophore, rotator strength concept, TEM, TMM, and relationship to rotator strength. Comparison of CD and ORD spectroscopy, range of applicability. Induced CD, its uses, protein structural analysis, absolute configuration determination, concept of dissymmetry factor (g) and its application)

- Electroanalytical Methods (Potentiometry (description of electrode potential using Nernst and Nikolsky-Eisenmann equations, classification of indicator electrodes with examples, pH measurement with combination glass electrode (examples from the pharmacopoeia));
- Voltammetry (cell setup, types of electrodes, polarographic curve and segments, cyclic voltammetry), Amperometry (titration curve, examples from the pharmacopoeia); Coulometry; Biocatalytic electrodes (three generations of amperometric glucose electrodes in detail)
- Vibrational Spectroscopy IR and RAMAN (Infrared spectroscopy ranges and characteristics, normal modes of vibration, selection rules, basics of quantitative and qualitative analysis, IR spectrum, ATR measurement setup, FT-IR, sample preparation and measurement setups, theory of Raman spectroscopy, Raman scattering, Raman spectrum, Raman spectrometer setup, comparison of NIR and Raman spectroscopy, chemical mapping, applications)
- HPLC (classification of chromatographic methods, separation mechanisms, HPLC instrument structure, concepts, detection methods, comparison of UPLC and HPLC, causes and consequences of peak broadening in HPLC, reversed-phase chromatography, C18 column classification, normal-phase chromatography, normal-phase fillers, HILIC, polar organic mode, chiral chromatography, main chiral selectors)
- MS, LC-MS (definitions: mass spectrometry, monoisotopic mass, mass spectrum, molecular ion, base peak, fragment ion, mass spectrometer structure, ion sources (electron impact, chemical, ESI, MALDI), comparison of ionization types, analyzers (TOF, Q), comparison of analyzers, tandem mass spectrometry, uses of mass spectrometry, qualitative LC-MS)
- Capillary Electrophoresis (apparatus structure, separation principles, electroosmotic flow, factors influencing electroosmotic flow, injection, detectors, UV detection in capillary electrophoresis, CZE, MEKC, chiral capillary electrophoresis, capillary electrochromatography)
- NMR (spin, spin quantum number, and magnetic quantum number relationship, NMR-active/inactive nuclei, precession, magnetic energy levels, Larmor frequency (formula), NMR experiment, FID definition and characteristics, NMR spectrum, instrument structure, calculation of chemical shift, ^1H and ^{13}C chemical shift scales, spin-spin coupling, Karplus equation, multiplicity of NMR signals, magnetic equivalence, splitting caused by equivalent and non-equivalent nuclei, intensity/integrated area of NMR signals, relaxation definition and types, inversion recovery pulse sequence and T_1 relaxation time measurement, effect of field strength on spectrum, ways to increase signal-to-noise ratio, ^{13}C acquisition modes and their comparison in terms of sensitivity and quantitiveness, nuclear Overhauser effect, basis of quantitative NMR measurement, advantages over other analytical methods, parameters for quantitative NMR acquisition and processing, ^{13}C satellite signal, inverse gated decoupling mode, actual concentration determination, criteria for quantitative NMR standard materials and 2 examples, determination of hydroxypropylbetadex molar substitution by NMR)
- Solid-Phase Analysis (DSC, XRD, thermoanalytical methods, distinction between amorphous and crystalline forms)
- Plate-Based Methods (HTS method principles, practical applications, possibilities of permeability determination)

The possibility and conditions for offering grades:

There are no possibilities for offering grades.

A list of the basic notes, textbooks, resources and literature that can be used to acquire the knowledge necessary to master the curriculum and to complete the assessments, with exact description about which of them is required to acquire which part of the syllabus (e.g. description based on topics)), as well as the main technical and other aids and study aids that can be used:

All the lectures will be available in the Moodle system with the syllabus and main questions regarding each topic.

Hansen, Pedersen-Bjergaard, Rasmussen: Introduction to Pharmaceutical Chemical Analysis

(Wiley, 2012)

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission**:**

yes*/no*/on and individual assessment basis*

(* Please underline)

The course description was prepared by::

Dr. Gergő Tóth

Pharmaceutical Technology (theory) III., Pharmaceutical Technology (practice) III.

Full name of the subject: GYÓGYSZER-TECHNOLÓGIA III., GYÓGYSZER-TECHNOLÓGIA (gyakorlat) III.
Program: undivided program (pharmaceutical)
Schedule: full-time
Short name of the subject: Pharm. Tech.
English name of the subject: Pharmaceutical Technology (theory) III., Pharmaceutical Technology (practice) III.
German name of the subject: Pharmazeutische Technologie III.

Neptun code of the subject: GYKGYI249E3A (lecture); GYKGYI249G3A (practice)
 Type of registration: obligatory
 Responsible Department: Semmelweis University, Department of Pharmaceutics

Responsible tutor: **Dr. István Antal** Professor, Ph.D., Habil.
 Contact information:
 phone: +36-1-217-0914
 email: antal.istvan@semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Dr. Nikolett Kállai-Szabó Associate professor, Ph.D.
Dr. Krisztina Ludányi Associate professor, Ph.D.
Dr. Emese Bertalan-Balogh Senior lecturer, Ph.D.
Dr. Lívía Budai Senior lecturer, Ph.D.
Dr. Mária Hajdú Senior lecturer, Pharm.D.
Dr. Miléna Lengyel Senior lecturer, Ph.D.
Dr. Borbála Dalmadi-Kiss Research scientist, Ph.D.
Dr. Dóra Farkas Assistant lecturer, Ph.D.
Dr. Andrea Kovács Assistant lecturer, Ph.D.
Dr. Nóra Mike-Kaszás Assistant lecturer, Ph.D.
Dr. Noémi Anna Niczinger Assistant lecturer, Ph.D.
Dr. Márton Király Assistant lecturer, Pharm.D.
Dr. Petra Szalkai Assistant lecturer, Pharm.D.

Classes per week: 2 lectures, 8 practices,
 Credit point: 2 credits lecture, 5 credits practice

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The aim of the Pharmaceutical Technology course is to provide the student with the theoretical knowledge and practical skills necessary for the basic professional activity of a pharmacist, the preparation of pharmaceuticals.

Short description of the subject:

The subject covers the theoretical and practical knowledge required for the preparation of medicinal products. An overview of the history of pharmaceutical preparation. Pharmaceutical technology aspects of ensuring efficacy, quality requirements for the pharmaceutical formulation. Tasks and conditions of pharmaceutical preparation, basic operations. Individual (magistral) and factory production of pharmaceuticals. Aspects, excipients, quality requirements for formulation of medicinal products. Identification and resolution of possible incompatibilities of ingredients, compatibility, stability.

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Course data		Normal course offer	Consultations
				Individual lectures	Total number of contact hours/ semester		
7 th semester	28	112	-	-	140	Autumn semester	-

Program of semester

Topics of theoretical classes (pro week):

1. Introduction. The task, history, and evolution of pharmaceutical manufacturing.
2. Engineering principles of pharmaceutical manufacturing, scale-up, in-process control, critical quality attributes and process parameters.
3. Pharmaceutical development. Preformulation, formulation.
4. Packaging materials and operations, shelf life and stability aspects.
5. Drug stability and stabilization, stability testing.
6. Pharmaceutical technology operations and procedures: Particle size reduction, milling, grinding. Mixing, dispersing.
7. Pharmaceutical technology operations and procedures: Heat transfer, evaporation, distillation. Filtration, sedimentation, centrifugation, extraction.
8. Pharmaceutical technology operations: Crystallization, polymorphism. Amorphization.
9. Pharmaceutical technology operations: Drying. Fluidization.
10. Pharmaceutical technology operations: Spray drying. Freeze drying (lyophilization).
11. Conditions for pharmaceutical production, GMP. Safety aspects.
12. Parenteral medicinal products. Sterile pharmaceutical production.
13. Small-volume parenteral preparations, solution and suspension type injections. Additives.
14. Large-volume parenteral preparations. Development of sterile preparations.

Topics of practical classes (pro week):

Pilot practices

- Study on the drying process
- Study on the filtration process
- Study on the mixing process*
- Study on the fluidization
- Study on particle size reduction*
- Preparation of suspensions. Suppository replacement factor
- Preparation and stability examination of emulsions*
- Study on compression*
- IPC for solid dosage forms

Parenteral practices

- Preparation and examinations, IPC control of infusions (carbohydrate containing, electrolyte containing, infusions against acidosis)*
- Study of infusion bottles
- Study of the Laminar air flow technology
- Autoclaving, autoclaving indicators*
- Isotonization*

Chemical practices

- Study of the stability of penicillin containing solutions in the presence of other medicinal substances
- Study of the catalytic oxidation of ascorbic acid solutions*
- In vitro investigation of the acid binding capacity of thermolabile aluminium hydroxide gels

- Testing the activity of antacid formulations with Rossett-Rice method
- Investigation of ASA content decreasing due to moisture in solid drug preparation*
- Preparation of a KCl-containing capsule composition*
- Preparation and encapsulation efficiency of theophylline-containing microcapsules
- Encapsulation of tocopheryl acetate into liposomes
- Study of the interaction of ASA and caffeine
- Project work: development of a biorelevant dissolution study

Physical practices

- Water purification*
- Studies on ion exchange resins*
- Effect of pH on the solubility of drugs
- Evaluation of macromolecular colloids by viscometry*
- Effect of permittivity on the solubility of salicylic acid
- Hydrotropic auxiliary materials. Solubilization of volatile oils by Tweens*
- Effect of excipients on droplet number and surface tension of pharmaceutical preparations*
- Analysis of the rheological behavior of hydrogels: effect of the pH
- Analysis of the rheological behavior of hydrogels: effect of electrolytes
- Determination of critical micelle concentration (CMC) of pharmacons
- Measuring the sun protection effect of oily products by spectrophotometry, Study on the particle size distribution of suspensions by Andreasen's device, Determination of sedimenting velocity by Wiegner tube

Formulation lecture: -technical background, -composition, -production elaboration

Completion of the practices marked with an asterisk* is a condition of signature. In the case of absence from other practices, an oral report must be made by arrangement.

Schedule of consultations: as demanded

Prerequisites: Pharmaceutical technology II.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Meet at least 75% attendance and participation requirement per lab for practical sessions

- In the event of late arrival (10 minutes) the practice can only be started with the permission of the teacher. Further guidelines are provided by the Study and Examination Regulations.
- Completion of the exercises marked with an asterisk* in the practical topics is a prerequisite for signature.
- In case of absence, complete the exercise in the make-up exercises. Make-ups are recommended, as the material is part of both the written reports, the semi-final and the final examination. In case of non-completion of the exercises not marked with an asterisk, an oral report of the practical material must be given by arrangement.
- It is not mandatory to make up the absences, but opportunity is provided to complete the exercise in the make-up exercises. Supplementation is recommended, as the course material is part of both midterms, the semi-final, and the final examination.
- Due to failure to meet the attendance requirements, the responsible tutor determines the conditions of the signature and the order of the possibility of making up.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

	Expected date	Expected date for retake 1	Expected date for retake 2
1st midterm	October 10. (week 6) 14.30-16.00	October 17. (week 7) 14.30-16.00	December 11.
2nd midterm	November 28. (week 13) 14.30-16.00	December 5. (week 14) 15.30-17.00	December 11.

The written tests include the material of the practices, including the calculations. In the case of a rewrite, the result of the rewrite will override the result of the previous assessment.

The practical grade is determined based on the average of the % result of the midterms as follows:

90.00-100%	excellent (5)
80.00-89.99%	good (4)
65.00-79.99%	fair (3)
50.00-64.99%	pass (2)
0-49.99%	fail (1)

Requirements of signature:

- To obtain a signature the student must attend at least 75% of the practical sessions.
- Complete the practices marked with an asterisk* in the practical topics.
- From the 6 pop tests at least 5 must be written and min. 50.00% must be reached in each laboratory.
- The student must achieve a minimum of 50.00% individually in each of the two midterms.
- The 4 moodle calculation tests must be successfully completed by the end of the semester (December 18, 2023, 12.00).
- Completion of project works.

Type of the semester-end examination:

Lecture: semi-final

Practice: practical grade

Examination requirements:
Theoretical topics:

1. The task, development, and evolution of pharmaceutical manufacturing
2. Condition system of manufacturing. Good Manufacturing Practice (GMP)
3. Pharmaceutical development, formulation, and manufacturing process
4. Engineering principles of pharmaceutical manufacturing, basic operations
5. Basics of drug stability, types of changes
6. Stabilization of pharmaceutical products, stability testing
7. Packaging technology and packaging materials, patient centricity
8. Critical quality attributes and parameters, scaling up, optimisation
9. Heat transfer, evaporation, and distillation
10. Particle size reduction, grinding, sieving, micronisation, particle design
11. Mixing, homogeneity testing, dosing aspects
12. Drying, spray drying
13. Freeze drying (lyophilisation)
14. Separation operations, filtration, centrifugation, extraction
15. Importance and characteristics of polymorphic and amorphous materials
16. Crystallisation, amorphisation
17. Principles of the formulation of parenteral preparations
18. Formulation of injections, parenteral additives
19. Formulation of infusions, large volume parenteral preparations
20. Manufacturing of sterile preparations

Modern dosage forms:

1. Inhalation powder, pre-dispensed
2. Gene therapy medicine (infusion solution)
3. Inhalation powder, hard capsules
4. Concentrate for solution for infusion
5. Solution for infusion
6. Solution for injection
7. Nasal drops
8. Nasal spray solution

- | | |
|---|---------------------------------------|
| 9. Eye drops, solution | 13. Sublingual spray |
| 10. Powder and solvent for solution for injection | 14. Nebuliser Suspension |
| 11. Powder and solvent for prolonged-release suspension for injection | 15. Suspension for injection |
| 12. Powder for dispersion for infusion (albumin bound nanoparticles) | 16. Suspension for injection in vial |
| | 17. Pressurised Inhalation Suspension |

Calculations, practical knowledge, excipients and definitions: as published by the department on the MOODLE interface by the start of the academic term.

Form of the semester-end examination: combined examination

Written part:

- o Calculation (assessment on a two-point scale: pass/fail)
- o Practical knowledge (assessment on a five-point scale)
- o Excipients (assessment on a five-point scale)

Oral part:

- o Theoretical topic (assessment on a five-point scale)
- o Definition (assessment on a two-point scale: pass/fail)
- o Modern dosage form (assessment on a five-point scale)

The possibility and conditions for offering grades:

Exemption from subsections or partial grade may be offered for certain parts of the examination based on the mid-semester performance in the following ways:

Definitions: At the lectures, there will be a non-obligatory short assessment (“slip”) of the knowledge presented that day, which results in exemption from the definition subsection of the oral part if the student completes at least 75%.

Practical knowledge:

Based on the performance on the pop tests – if the average is

- min. 80.00%, a good grade (4),
- min. 90.00%, an excellent grade (5) is offered for the practical topic.

Excipients: 2 prearranged times during the semester, in the form of a test, based on the overall result:

- min. 80.00%, a good grade (4),
- min. 90.00%, an excellent grade (5) is offered for the excipient topic.

Scientific, course related research, publications, essays:

The lecture materials, the supplementary material for the excipients and the practical work are available in electronic form on Moodle.

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: on an individual assessment basis

The course description was prepared by:

Dr. István Antal

Biological Drugs (theory)

Full name of the subject:	Biológiai gyógyszerek (elmélet)
Program:	undivided program (pharmaceutical)
Schedule:	full-time
Short name of the subject:	
English name of the subject:	Biological Drugs (theory)
German name of the subject:	Biopharmazeutika (Vorlesung)
Neptun code of the subject:	GYKGYI088E1A
Type of registration:	obligatory
Responsible Department:	Semmelweis University, Department of Pharmaceutics

Responsible tutor: **Dr. Krisztina Ludányi** associate professor, PhD
 Contact information:
 phone: 36 1 476-3600/53017
 email: ludanyi.krisztina@semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Dr. István Antal professor, PhD
Dr. Romána Zelkó/Dr. Szilvia Sebők professor, DSc
Dr. Borbála Dalmadi-Kiss research fellow, PhD
Dr. Katalin Baranya-Ganzler (Richter G. Plc.) scientific advisor, PhD
Dr. László Drahos (ELKH TTK Research Centre for Natural Sciences, MS Proteomics Research Group) senior research fellow, research group leader, PhD
Dr. Ádám Fizil/Dr. Zoltán Szakács (Richter G. Plc.) PhD
Dr. Erik Bogsch/Dr. László Tóth (Richter G. Plc.) director, PhD/ HoD, PhD
Dr. Veronika Harmat/Dr. Zsolt Dürvanger (ELTE Institute of Chemistry) senior lecturer, PhD/ research fellow, PhD
Tímea Erdősi (National Public Health Centre)
Dr. Hilda Kőszegi-Szalai, OGYÉI honorary associate professor, PhD

Classes per week: 2 lectures
Credit point: 2 credits lecture

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The aim of the course "Biological drugs" is to give the student an overview of macromolecules important in biological therapy, their production, official regulation of marketing and the most commonly used analytical techniques for qualitative and quantitative determination, especially the methods used in the development and manufacture (quality control) of biological preparations.

Short description of the subject:

The course summarizes the possibilities of the production and introduction of biologics, biosimilar preparations, its regulation for official licensing, as well as the sample preparation (digestion, enrichment, etc.), separation techniques (chromatography, electrophoresis), spectroscopy (MS, NMR, CD, fluorescence, X-ray diffraction, etc.), molecular biological methods (PCR, Elisa, etc.) reviews the research results in the fields of quantification, and the challenges of the clinical application of the biological drugs.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
7 th semester	2	-	-	-	28	Autumn semester	-

Program of semester**Topics of theoretical classes (pro week):**

1. Definitions, structure, properties (biologics, biosimilar drugs)
2. Grouping of biological drugs, industrial aspects
3. Possibilities of the administration of biological drugs, aspects of formulation and technological aspects of quality
4. Pharmacokinetic properties of biological drugs
5. Regulation and authorization of biological medicinal products
6. Proteins produced by recombinant technology Monoclonal antibodies
7. Advanced therapy medicinal products: gene therapy, cell therapy, tissue engineered products
8. Qualitative characterization of biological drugs: Molecular biological techniques (Elisa, Westernblot, immunoprecipitation, PCR, microarray)
9. Qualitative characterization of biological drugs: Sample preparation (extraction, cell extraction, solubilisation, digestion, purification/ enrichment, filtration) Separation techniques (chromatography: IEX, RP-HPLC, HILIC, nanoLC, 2D; gel and capillary electrophoresis) Spectroscopic methods: fluorescence, UV-VIS, infrared, CD
10. Qualitative characterization of biological drugs: Mass spectrometry: LC-MS/MS, MALDI_MS, imaging, lab-on-a-chip Protein sequencing: bottom up / top down, peptide sequencing, post-translational modifications (glycosylation)
11. Qualitative characterization of biological drugs: Nuclear magnetic resonance analysis
12. Structure determination by protein crystallography technique, cryo-electron microscope
13. Quantitative characterization of proteins
14. Aspects of the clinical application of biological drugs

Other subjects (both obligatory and optional) relating to the transversal issues of the subject. Possible overlaps between subjects:

Biochemistry, Biotechnology, Pharmacology, Pharmaceutical chemistry, Instrumental drug analysis
There is no overlap

Schedule of consultations: According to individual student demand, at an agreed time.

Prerequisites:

Pharmaceutical Chemistry II.
Pharmacology and toxicology I.
Biotechnology

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:
according to the Examination and Studies Regulation

Type of the semester-end examination:

Lecture: semi-final

Examination requirements:

as published by the education-research department on the MOODLE interface by the start of the academic term.
Topic list:

1. Definitions, structure, properties (biological drugs, biosimilar medicines)
2. Grouping of biological drugs, industrial aspects
3. Possibilities of introducing biological drugs into the body, aspects of formulation
4. Technological aspects of quality
5. Pharmacokinetic properties of biological drugs
6. Regulation and authorization of biological medicinal products
7. Proteins produced by recombinant technology (grouping, expression strategies, production)
8. Monoclonal antibodies, structure-effect relationship, design, production and quality assurance
9. Advanced therapy medicinal products: gene therapy, cell therapy, tissue engineered products
10. Application of Elisa, Westernblot, immunoprecipitation, microarray in the analysis of biological substances
11. PCR and its application in the analysis of biologicals
12. Sample preparation: extraction, cell extraction, solubilization, digestion, purification / enrichment, filtration

13. Separation techniques: chromatography, electrophoretic methods in the production and characterization of biologicals
14. Mass spectrometry: LC-MS/MS, MALDI-MS, imaging, protein sequencing (bottom up/top down, determination of peptide sequence), post-translational modifications (glycosylation)
15. Nuclear magnetic resonance analysis (de novo structure determination, verification of higher order structural similarity based on spectral fingerprinting, 2D spectra, ligand detected NMR protein binding studies)
16. Application of protein crystallography and cryo-electron microscope in the analysis of biological substances
17. Quantitative characterization of proteins
18. Aspects of the clinical use of biological drugs

Form of the semester-end examination: practical examination/the assessment of completing project work

The possibility and conditions for offering grades:

Conditions for offering an exam mark:

- correctly answering five questions at the end of the lectures (the questions are related to the material of the lecture that day)
- the student have to be present at 75 % of lectures
- at the end of the semester, the offer of a mark is determined based on the overall result in accordance with the the Examination and Studies Regulation: "(a) students who achieve the top 10% can terminate the subject with excellent grade,(b) students who achieve the top 10.1-20% can receive an offer of a mark with a good grade"

Scientific, course related research, publications, essays:

Slides presented at lectures

Recommended literatures:

- K. Vékey, A. Telekes, A. Vertes: Medical Applications of Mass Spectrometry, Elsevier, 2006
- L. Endrényi, P. J. Declerck, S. C. Chow: Biosimilar drug product development, CRC Press, 2017
- K. M. Nagel: Introduction to Biologic and Biosimilar Product Development and Analysis, Springer, 2018
- R. Sheets: Fundamentals of Biologicals Regulation: Vaccines and Biotechnology Medicines, Elsevier, 2017

The course description was prepared by:

Dr. Krisztina Ludányi, Prof. István Antal

Pharmacology and Toxicology (theory) II., Pharmacology and Toxicology (practice) II.

For further information contact directly with the Department.

Physical Education VII.

Full name of the subject:	Testnevelés VII.
Program:	undivided program (pharmaceutical)
Schedule:	full-time
English name of the subject:	Physical Education VII.
German name of the subject:	Sport VII
Neptun code of the subject:	GYKTSI116G7A
Type of registration:	obligatory
Responsible department:	Semmelweis University, Physical Education and Sports Center
Responsible tutor:	Várszegi, Kornélia director E-Mail: varszegi.kornelia@semmelweis-univ.hu Phone: +36-1/264-1408

Name of the persons responsible for the teaching of the subject:

Imre, Kovács tennis trainer
Orsolya, Balogh aerobics trainer
Kalmus, Dániel circuit training trainer
Katona, László hiking, badminton, boulder trainer
Lehel, Zsolt tennis, golf, icehockey trainer
Nagy-Kismarci, Bence cheerleading trainer
Rimay, István football trainer
Weisz, Miklós basketball trainer
Doharné Buczkó Anikó P.E. teachers
Farkas Dominika P.E. teachers
Kovács Imre tennis trainer
Nagy-Kismarci Bence cheerleading trainer
Balogh Orsolya aerobic and zumba trainer
Dr. Herbert – Minkó Krisztina yoga trainer
Tóth Balázs dance, zumba, salsa trainer
Kiss Valéria Bless You Gym trainer
Paksai Márton ultimate freesbe trainer
Soós Gábor tennis trainer
Kunos Gábor hiking trainer

Classes per week:	1 practice
Credit point:	0

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The short-term goal of the course is to maintain and improve the students' current state of health, to create the physical conditions for a better quality of life by learning and practicing (new) branches of sports that can be practiced after graduation as well. The long-term goal is to improve the quality of life and life prospects of future physicians, and to provide students with credible preventive attitudes and lifestyle advice - so that they can represent those in their later practice, through their own health-promoting behavior.

Short description of the subject:

The short-term goal of the course is to maintain and improve the students' current state of health, to create the physical conditions for a better quality of life by learning and practicing (new) branches of sports that can be practiced after graduation as well. The long-term goal is to improve the quality of life and life prospects of future physicians, and to provide students with credible preventive attitudes and lifestyle advice - so that they can represent those in their later practice, through their own health-promoting behaviour.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/semester	Normal course offer	Consultations
7 th semester	0	14			14	Autumn semester	

Program of semester

Topics of practical classes (pro week):

Within the framework of obligatory regular physical activity, the requirements of the subject can be fulfilled as free of charge and self-financed student as well. The former is available during classes and courses organized by the Semmelweis University's Centre for Physical Education and Sports (TSK), and the latter is available at SE-TSK accredited partner locations.

Free of charge: 60 minute classes held at the same time on a weekly basis, on the premises of the TSK facilities and other locations. 1107 Bp, Zágrábi utca 14.

1×60 min./week sessions:

Aerobics, BlessYou Gym, boulder, functional circuit training, golf, beginner Yoga, advanced Yoga, male football, salsa, step aerobics, badminton, beginner ultimate frisbee, advanced ultimate frisbee, zumba

1×90 mins./week sessions: women's football, ice hockey, beginner tennis, beginner tennis 2,

4×3 hrs. and 1×2 hrs. session packages: Hiking 1, Hiking 2.

2×90 mins./week sport training (competitive sport, for qualified only): cheerdance, cheerleader, men's football, handball, basketball, volleyball

Fee-based: at the sports venues specified on www.semmelweis.hu/sportkozpont, which will also be advertised on the Neptun system. The list of these locations may vary per school year.

COURSE REQUIREMENTS

Prerequisites:

Prerequisites Physical Education I, III. and V.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

The number of active participations for physical education classes is 10, regardless of the number of school breaks, which is to be completed during the hours assigned to the group. Two hours can be recovered in the first week of the exam period, on two separate days, after registration in the Neptun system. Lessons missed do not need to be certified; however, catching up is mandatory. The days of study breaks do not qualify as automatic attendance. Practice leaders follow an online presence registration at the beginning and end of the lessons, which can be individually tracked on semmelweis.hu/sportkozpont homepage.

Except for the Sport Hiking courses, where you have to attend 4 times due to blocking. 3 of these are on your own course and 1 can be made up by arrangement with the instructor!

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes!

Requirements of signature:

Active participation in practice classes 10 times (trainings 15 times) under the conditions described above.

The possibility and conditions for offering grades:

Active participation in practice classes 10 times (trainings 15 times) under the conditions described above.

May be exempted from attending classes the student who

1. whose diagnosis and the opinion of the sports doctor do not allow to exercise, and submits a certificate to the TSK or
2. does sports regularly and submits a certificate of association and federation to the Foreign Students Secretariat until the last study day in the 4th week of the semester. On the basis of the submitted application and its annexes, the TVB decides on the exemption of both the Hungarian and foreign students.

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: yes

If you have not completed the course you may be readmitted in the 2. semester of the following academic year.

The course description was prepared by: Kornélia Várszegi

Pharmacy Administration (theory) I.

Full (Hun) name of the subject: Gyógyszerügyi ismeretek (elmélet) I.
Program: Undivided program (pharmaceutical)
Schedule: full-time
Short name of the subject:
English name of the subject: Pharmacy Administration (theory) I.
German name of the subject: Pharmazeutische Administration (Vorlesung) I
Type of registration: obligatory/obligatory elective/elective/criteria requirement
Neptun code of the subject: GYKEGY090E1A
Responsible Department: University Pharmacy
Responsible tutor: *Dr. Romána Zalkó* professor, Ph.D., DSc
Contact information: phone: 06-1-2170919
 email: zelko.romana@semmelweis.hu
Title, academic degree:

Name of the persons responsible for the teaching of the subject:

Dr. Ágnes Mészáros associate professor, Ph.D., Dr. Habil
Dr. Adrien Kazsoki-Nochta lecturer, Ph.D.

Class per week: 2

Credit point(s): 2

Professional content, intent of acquirement and its function in order to implement the goals of the program:

It aims to provide an introduction to the different branches of pharmacy and the responsibilities of the pharmacist, by teaching professional skills required in the field of community and hospital pharmacy, as well as in the industry and the authority.

Short description of the subject:

In the course, the primary areas of pharmacy and the competencies of a pharmacist are examined. Topics include the necessary competencies and professional skills for drug dispensing, as well as administrative, legal, and management/quality management activities.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/semester	Normal course offer	Consultations
7 th semester	28	–	–	–	28	Autumn semester	

Program of semester**Topics of theoretical classes (pro week):**

1. Introduction to Pharmacy Administration
2. Pharmaceutical Industry
3. Pharmacy education (Good Pharmacy Education Practice)
4. Quality management within the lifecycle of drugs
5. Publication strategies
6. Evidence Based Medicine and Systematic reviews
7. The European Pharmacopoeia
8. Risk assessment
9. Financial pressures in health care
10. Drug Reimbursement and cost containment
11. Managing health care
12. Managing quality in health care, information needs
13. Human recourse management
14. Change management

Topics of practical classes (pro week): none

Other subjects (both obligatory and optional) relating to the transversal issues of the subject. Possible overlaps between subjects:

Pharmaceutical management

Schedule of consultations: -

Course requirements

Prerequisites: History of Pharmaceutics and Propedeutics, Pharmaceutical Technology II

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

According to the University's Study and Examination Regulations

The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments, (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their upgrading retake (as provided in §§ 25-28 of the STUDY AND EXAMINATION REGULATIONS):

Requirements of signature (as provided for in STUDY AND EXAMINATION REGULATIONS § 29):

Successful semifinal exam.

Number and type of projects students have to perform independently during the semester and their deadlines: –

Type of the semester-end examination: end-term examination

Examination requirements: (list of topics, test examination topics, mandatory parameters, diagrams, concepts, list of calculations, practical skills, and project tasks recognised as examinations, criteria for completion and assessment):

Completely accessible on the Moodle platform.

Form of the semester-end examination: written examination

The possibility and conditions for offering grades: -

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission**:**

no

The course description was prepared by: Dr. Mészáros Ágnes

Pharmacoeconomics (practice)

Full name of the subject:	FARMAKOÖKONÓMIA
Program:	undivided program (pharmaceutical)
Schedule:	full-time
Short name of the subject:	
English name of the subject:	Pharmacoeconomics (practice)
German name of the subject:	Pharmakoökonomie
Neptun code of the subject:	GYKETE131G1A
Type of registration:	obligatory
Responsible Department:	Semmelweis University, Center for Health Technology Assessment
Responsible tutor:	Prof. András Inotai Assoc Prof.; Ph.D., DrHabil
Contact information:	phone: 06/70 430-46-45 email: inotai.andras@semmelweis.hu

Name of the persons responsible for the teaching of the subject:
Prof. Zoltán Kaló PhD, DrHabil
Assoc. Prof. Balázs Nagy PhD, DrHabil
Zsuzsanna Petykó PhD candidate

Class per week: 1x45 min (2x45 mins bi-weekly, 1x45 lecture followed by 1x45 practice)Credit point: 1 credit

Professional content, intent of acquirement and its function in order to implement the goals of the program:

Health technology assessment (HTA) is the evaluation of health technologies (including pharmaceuticals) from different perspectives (incl. clinical, economic, organizational, ethical etc.) to support health policy decision making at institutional-, and macro (i.e national) level. Practice-oriented teaching of basic health- and pharmacoeconomic knowledge for students enables them interpreting and determining the cost-effectiveness of health technologies (including pharmaceuticals), and understanding the principles of pharmaceutical pricing and reimbursement. Competencies acquired through the completion of the course: Command of key health economic terms, including: health technology assessment (HTA), steps of economic evaluations, measurement of health outcomes incl. health related quality of life, measurement of costs, pricing and reimbursement of pharmaceuticals, pharmaceutical policy

Short description of the subject:

Practice-oriented teaching of basic health- and pharmacoeconomic knowledge for students to enable them interpreting and determining the cost-effectiveness of pharmaceuticals, and understanding the principles of pharmaceutical pricing and reimbursement.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/semester	Normal course offer	Consultations
7th semester	7	7	-	-	14	Autumn semester	7 (bi-weekly 1x45 min lecture followed by 1x45 min practice: total 90 mins)

Program of semester**Topics of theoretical classes (pro week):**

Class	Topic	Lecturer
Week 1 45 min	Health care market and market failures Elements of health care system Financing health care	Zoltán Kaló
Week 3 45 min	Pharmacoeconomics, Health Technology Assessment, Classification of economic evaluations	Zoltán Kaló
Week 5 45 min	Steps of health economic evaluation I - Evidence synthesis, health outcome measurement (quality of life, utility, quality adjusted life years)	Zsuzsanna Petykó, András Inotai
Week 7 45 min	Steps of health economic evaluation II – Measuring costs, decision rule (threshold, multicriteria decision analysis)	Balázs Nagy
Week 9 45 min	Health economic modelling (classification, applicability)	Balázs Nagy
Week 11 45 min	Pricing of original and generic medicines	András Inotai
Week 13 45 min	Pharmaceutical reimbursement system, cost control techniques	András Inotai
Evaluation Week 14	Test type exam	

Topics of practical classes (pro biweek):

Class	Topic	Lecturer
Week 1 45 min	Health care market and market failures Elements of health care system Financing health care	Zoltán Kaló
Week 3 45 min	Pharmacoeconomics, Health Technology Assessment, Classification of economic evaluations	Zoltán Kaló
Week 5 45 min	Steps of health economic evaluation I - Evidence synthesis, health outcome measurement (quality of life, utility, quality adjusted life years)	Zsuzsanna Petykó, András Inotai
Week 7 45 min	Steps of health economic evaluation II – Measuring costs, decision rule (threshold, multicriteria decision analysis)	Balázs Nagy
Week 9 45 min	Health economic modelling (classification, applicability)	Balázs Nagy
Week 11 45 min	Pricing of original and generic medicines	András Inotai
Week 13 45 min	Pharmaceutical reimbursement system, cost control techniques	András Inotai
Evaluation Week 14	Test type exam	

Schedule of consultations: 90 mins bi-weekly (contact hours, 1x45 min lecture followed by 1x45 min practice)

Prerequisites:

Pharmacology and Toxicology I.
Statistics for Pharmacists
Basics of Economics

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Regular attendance is strongly recommended; however, it is not mandatory for semester acceptance. No attendance sheet will be used. Audio recordings of the classes will be available throughout the semester and will be shared on Moodle for students to make up for absences. No need to justify absence.

Requirements of signature: No further requirement is applicable for the signature

Type of the semester-end examination:

practical grade

Examination requirements:

as published by the education-research department on the MOODLE interface by the start of the academic term. Test-type written (Moodle based) classroom exam of the entire semester curricula at week 14 (according to semester schedule), opportunity for correction: week 1 of exam period. Exam schedule to be disclosed during the first contact class. Duration 45 mins/40 test type questions incl. true/false, simple choice, multiple correct answer quiz question. Min. 40% is required to pass. Detailed technical information and test tutorial will be shared on Moodle.

Form of the semester-end examination: practical examination/the assessment of completing project work

Test-type written (Moodle based) classroom exam of the entire semester curricula at week 14 (according to semester schedule), opportunity for correction: week 1 of exam period. Exam schedule to be disclosed during the first contact class. Duration 45 mins/40 test type questions incl. true/false, simple choice, multiple correct answer quiz question. Min. 40% is required to pass. Detailed technical information and test tutorial will be shared on Moodle.

Test result (%)	Pharmacy students (obligatory)	Medical students (elective)
85-100	5 (excellent)	Distinction
70-84.99	4 (good)	Distinction
55-69.99	3 (average)	Merit
40-54.99	2 (satisfactory)	Merit
0-39.99	1 (unsatisfactory)	Fail

List of teaching materials: slide decks and audio recordings of the classes (available throughout the semester), obligatory and recommended reading materials, test tutorial for the entire semester curricula. All materials are uploaded to Moodle and assigned to be-weekly classes.

Scientific, course related research, publications, essays:

slide decks and audio recordings of the classes (available throughout the semester), obligatory and recommended reading materials, test tutorial for the entire semester curricula. All materials are uploaded to Moodle and assigned to be-weekly classes.

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: no

The course description was prepared by:

András Inotai

8. SEMESTER 2022/2023/2

Subject	Lecture (hour/week)	Practice (hour/week)	Credit	Prerequisites	Exam type
Industrial pharmaceutical Technology (theory) II. GYVGYI185E2A	2	–	2		examination
Pharmacology and Toxicology (practice) II. GYKGYH086G3A	–	2	2	Pharm. and Tox. I. Pharm. Techn. III. Basic Med. Pathop. I.	practical mark
Pharmacology and Toxicology (theory) II. GYKGYH086E3A	3	–	4		final*
Pharmaceutical Technology (practice) IV. GYKGYI126G4A	–	8	4	Pharmaceutical Technology III.	practical mark
Pharmaceutical Technology (theory) IV. GYKGYI126E4A	2	–	5		final*
Pharmacy Administration (practice) I. GYKEGY254G1A	2	2	4	Basics of Pharmacoec. Hist. of Scienc.and Prop. Pharm. Techn. III.	practical mark
Phytotherapy (theory) GYKFMG092E1A	2	–	2	Pharmacognosy II.	examination
Pharmaceutical management (theory) GYKEGY255E1A	1	–	1	Introduction to Pharmacoeconomics	examination
Pharmaceutical management (practice) GYKEGY255G1A	–	1	1	Introduction to Pharmacoeconomics	practical mark
Public Health (practice) GYKNEI091G1A	–	2	2	Basic Medical Pathophysiology I.	practical mark
Public Health (theory) GYKNEI091E1A	2	–	2		examination
Physical Education VIII. GYKTSI116G8A	–	1	–	–	signature
Diploma Work I. GYKSZD094G1A	–	4	–	Passing all examinations and finals of the 7th semester	signature
Elective or obligatory elective subjects	–	–	–		examination or practical mark
Total:	14	20	29		

Pharmacology and Toxicology (theory) III., Pharmacology and Toxicology (practice) III.

For details on this subject please contact the department or visit their website.

Pharmacy Administration (practice) II., Pharmacy Administration (theory) II.**Pharmacy Administration (practice) II.**

Full (Hun) name of the subject: Gyógyszerügyi ismeretek (gyakorlat) II
Program: Undivided program (pharmaceutical)
Schedule: full time

Short name of the subject:
English name of the subject: Pharmacy Administration (practice) II
German name of the subject: Pharmazeutische Administration (Praktikum) II
Type of registration: obligatory/obligatory elective/elective/criteria requirement

Neptun code of the subject: GYKEGY090G2A, GYKEGY090E2A

Responsible Department: University Pharmacy
Responsible tutor *Dr. Romána Zeltó* professor, Ph.D., D.Sc.
Contact: telephone: 2170-927
 e-mail: zelko.romana@semmelweis.hu

Name of the persons responsible for the teaching of the subject:
Dr. Ágnes Mészáros associate professor, Ph.D., Dr. Habil
Dr. Adrien Kazsoki-Nochta lecturer, PhD

Class per week: 0 lecture(s)
 2 practice(s)
Credit point(s): 2

Professional content, intent of acquirement and its function in order to implement the goals of the program:

It aims to provide an introduction to the different branches of pharmacy and the responsibilities of a pharmacist, by teaching professional skills required in the field of community and hospital pharmacy, as well as in the industry and the authority.

Short description of the subject:

In the course, the primary areas of pharmacy and the competencies of a pharmacist are examined. Topics include the necessary competencies and professional skills for drug dispensing, as well as administrative, legal, and management/quality management activities.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/semester	Normal course offer	Consultations
8 semester		28			28	spring semester	--

Program of semester

Topics of theoretical classes (pro week): -

Pharmacy Administration (theory) II.

Full (Hun) name of the subject: Gyógyszerügyi ismeretek (elmélet) II
Program: Undivided program (pharmaceutical)
Schedule: full time

Short name of the subject:
English name of the subject: Pharmacy Administration (theory) II
German name of the subject: Pharmazeutische Administration (Vorlesung) II
Type of registration: obligatory/obligatory elective/elective/criteria requirement

Neptun code of the subject:

Responsible Department: University Pharmacy
Responsible tutor *Dr. Romána Zelkó* professor, Ph.D., D.Sc.
Contact: telephone: 2170-927
 e-mail: zelko.romana@semmelweis.hu

Name of the persons responsible for the teaching of the subject:
Dr. Ágnes Mészáros associate professor, Ph.D., Dr. Habil
Dr. Adrien Kazsoki-Nochta lecturer, PhD

Class per week: 2 lecture(s)
 0 practice(s)
Credit point(s): 2

Professional content, intent of acquirement and its function in order to implement the goals of the program:

It aims to provide an introduction to the different branches of pharmacy and the responsibilities of a pharmacist, by teaching professional skills required in the field of community and hospital pharmacy, as well as in the industry and the authority.

Short description of the subject:

In the course, the primary areas of pharmacy and the competencies of a pharmacist are examined. Topics include the necessary competencies and professional skills for drug dispensing, as well as administrative, legal, and management/quality management activities.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/semester	Normal course offer	Consultations
8 semester	28	–	–	–	28	spring semester	--

Program of semester**Topics of theoretical classes (pro week):**

1. Pharmaceutical research
2. Good Laboratory Practice - GLP
3. European Marketing Authorization I
4. Marketing of pharmaceuticals
5. Quality Management and GMP (I)
6. Good Documentation systems
7. Pharmacovigilance
8. Fight against counterfeit Medicine
9. Good Pharmacy Practice (GPP)
10. Elements of therapeutic decision making; Pharmacist Prescribing
11. Duties of the Hospital Pharmacy
12. Drug Utilization Studies
13. Personal carrier management
14. Questionnaire Design

Topics of practical classes (pro week): -**Schedule of consultations:**

Course requirements

Prerequisites:

Pharmaceutical Technology III.,
Pharmacy Administration I.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

According to the University's Study and Examination Regulations

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results: -**Requirements of signature:**

Successful final exam.

Number and type of projects students have to perform independently during the semester and their deadlines: -

Type of the semester-end examination: final

Examination requirements:

Completely accessible on the Moodle platform.

Form of the semester-end examination: written examination

The possibility and conditions for offering grades: -

Scientific, related research, publications, essays:

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission**:**
no

The course description was prepared by:

Dr. Mészáros Ágnes

Topics of practical classes (pro week):

1. Objectives of health promotion, patient education
2. Drug information service within the Hospital Pharmacy
3. GCP and the role of the hospital pharmacist
4. European Marketing Authorization and CTD
5. GMP in practice (II).
6. Good Distribution Practice (GDP)
7. How to plane the ideal Hospital Pharmacy
8. About the EU in relation to health care
9. Reliable information for the patient, "Healthy" Website
10. ADR report, a case study
11. Professional life after graduation
12. Students Presentation on health promotion I.
13. Students Presentation on health promotion II
14. Written test to obtain the practical mark

Phytotherapy (theory)

Full (Hungarian) name of the subject:	Fitoterápia
Program:	undivided program (pharmaceutical)
Schedule:	full-time
English name of the subject:	Phytotherapy
German name of the subject:	Phytotherapie
Neptun code of the subject:	GYKFMG092E1A
Type of registration:	obligatory
Responsible Department:	Semmelweis University, Department of Pharmacognosy
Responsible tutor:	Ágnes Alberti associate professor, Ph.D. Phone: 06-1/459-1500 / 55307 alberti.agnes@pharma.semmelweis-univ.hu

Name of the persons responsible for the teaching of the subject:	Ágnes Alberti associate professor, Ph.D. Eszter Riethmüller assistant professor, Ph.D. Orsolya Csernák assistant professor, Ph.D. Ida Fejős assistant professor, Ph.D. Nóra Gampe assistant lecturer, Ph.D. Csenge Anna Felegyi-Tóth , assistant lecturer, Ph.D.
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Classes per week:	2 lecture(s)
Credit point(s):	2 credits

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The aim of the course is to acquaint pharmacy students with herbal drugs and medicines, dietary supplements and other preparations that can be used in rational phytotherapy: focusing on their composition, effects, methods of administration, indications for therapy, relevant pharmacological and clinical data, major side effects and interactions. It provides a basis for the selection of herbal medicines with traditional and well-established use in stand-alone or complementary therapy. It contributes to the assessment of herbs according to their real values, to the recognition of their importance in prevention and therapy.

Short description of the subject:

In the context of the subject, lecturers describe the relevant areas of indication in rational phytotherapy and the medicinal plants and plant-based preparations that can be used in them, including their active ingredients. The subject describes industrial / galenic preparations, tea blends and recipes containing medicinal plants. It presents the mechanisms of action revealed so far, the most significant synergistic effects, the possible side effects and interactions. It deals with the data of clinical studies, recommendations for use and dosing, and presents examples for herbal medicines and phytotherapeutic preparations from Hungary and other countries.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
8 th semester	28	0	–	–	28	Spring semester	–

Program of semester

Topics of theoretical classes (pro week):

1. week: The place of phytotherapy in drug therapy. Characteristics and development of phytotherapeutic products.
2. week: Interactions of medicinal plants and their active substances. Phytotherapeutics and adverse drug interactions
3. week: Evidence of efficacy of phytotherapeutics, herbal monographs (EMA/HMPC, ESCOP, WHO, etc.).
4. week: Side effects of medicinal plants and their active ingredients, the role of the quality of phytotherapeutics in the occurrence of side effects.
5. week: Herbs and their preparations acting on the central nervous system.
6. week: Herbs and their preparations for upper respiratory diseases.
7. week: Herbal products acting on the digestive
8. week: Herbal products acting on the digestive tract
9. week: Herbs and metabolic syndrome.
10. week: Herbs and their preparations that act on the cardiovascular system
11. week: Phytotherapeutics for diseases of the urogenital system
12. week: Herbal anti-inflammatories and analgesics.
13. week: Herbs for skin and oral mucosa diseases.
14. week: Immunomodulatory and adaptogenic medicinal plants

Schedule of consultations: on demand

Course requirements

Prerequisites: Pharmacognosy II.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Based on the current Study and Exam Regulations

Requirements of signature: According to the current in STUDY AND EXAMINATION REGULATIONS

Number and type of projects students have to perform independently during the semester and their deadlines: -

Type of the semester-end examination: semi-final

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Form of the semester-end examination: oral examination

A list of the basic notes, textbooks, resources and literature that can be used to acquire the knowledge necessary to master the curriculum and to complete the assessments:

Topic list and lectures to be used for learning, requirements

1. The place of phytotherapy in drug therapy, categorization and specificity of phytotherapeutic preparations – lecture 1
2. Proof of the effectiveness of phytotherapy, herbal monographs - lecture 2
3. Side effects of herbs, inadequate quality as a possible source of side effects – lecture 3
4. Demonstration of synergistic and antagonistic interactions of phytotherapeutics with examples – lecture 3
5. Drug interactions of phytotherapeutics – lecture 4
6. Herbs acting on the central nervous system – lecture 5
 - St. John's wort
 - Valerian
 - Hop strobile
 - Lime flower
 - Passionflower herb
 - Lavander
 - Melissa leaf
 - Lemon verbena leaf

Eschscholziae herba

7. Herbs used to relieve the symptoms of upper respiratory tract diseases – lecture 6
Herbs used to relieve runny nose, nasal congestion: peppermint oil, eucalyptus oil
Herbs used to relieve sore throat: medical sage leaf, matricaria flower, Iceland moss, Ribwort plantain
Medicinal plants with diaphoretic effect: lime flower, elder flowers
8. Herbs used to treat cough – lecture 6
Herbs with antitussive effect: Iceland moss, ribwort plantain, marshmallow root, honey, mallow leaf and flower
Plants with expectorant effect: ipecacuanha root, ivy leaf, primula root, senega root, liquorice root, thyme, thyme oil, anise oil, peppermint oil, eucalyptus oil
For the treatment of both dry and productive: Iceland moss, ivy leaf
9. Herbs used in diseases of the gastrointestinal tract: appetite enhancers, antiemetics, stomachics, digestives, carminatives – lecture 7
Herbs used in the treatment of loss of appetite: gentian root, white wormwood, white horehound, bogbean leaf, centaury, holy thistle, ginger peppermint leaf, peppermint oil, caraway, bitter fennel fruit / fruit oil, matricaria flower
Herbs with antiemetic effect: ginger
Herbs with carminative effect: caraway fruit/fruit oil, bitter fennel fruit / fruit oil, peppermint leaves, peppermint oil, matricaria flower
10. Herbs used in diseases of the gastrointestinal tract: laxatives, constipatives – lecture 8
Herbs containing dietary fiber: psyllium seed, ispaghula husk, linseed
Herbs with laxative action: castor oil, frangula bark, cascara bark, senna leaflets, senna pod, rhubarb root, psyllium seeds and ispaghula husks, linseed
Herbs that can be used in the treatment of diarrhea: agrimony, green tea, black tea, psyllium seeds and ispaghula husks,
11. Herbs that can be used in the treatment of diseases of the hepatobiliary system – lecture 7
Herbs with cholagogue effect: artichoke leaves, holy thistle, turmeric rhizome
Herbs with hepatoprotective action: milk thistle fruit, liquorice root
12. Herbs acting on the cardiovascular system; Herbs and metabolic syndrome – lecture 9
Herbs that affect the cardiovascular system: hawthorn leaf and flower and fruit, horse chestnut, butcher's broom, flavonoids, centella, ginkgo leaf
Herbs and metabolic syndrome: phytosterols, garlic
13. Herbs used in diseases of the genitourinary system – lecture 11
Herbs used in the treatment of urinary tract infections: bearberry leaf, American cranberry,
Diuretic herbs: goldenrod, birch leaves, equisetum stem, java tea, restharrow root, nettle, dandelion root, burdock root, couchgrass rhizome, juniper cone berry
Herbs used to relieve the symptoms of benign prostatic hyperplasia: sabal palm fruit, pumpkin seeds, pumpkin seed oil, nettle root, willow herb, rye pollen
Herbs used to relieve the symptoms of menopause: black cohosh, phytoestrogens
Herbs that can be used to relieve complaints before menstruation: agnus castus fruit
Herbs to relieve the symptoms of menstruation: shepherd's purse, yarrow, bitter fennel fruit
14. Herbal anti-inflammatories, herbs for use in musculoskeletal disorders – lecture 12
Hyperemic herbal preparations: peppermint oil, eucalyptus oil, rosemary leaf and oil, red pepper /red pepper extract, methyl salicylate
Analgesic herbs applied externally: comfrey root, calendula, arnica
Analgesic herbs used internally: willow bark, meadowsweet, devil's claw root, ash tree leaf, incense, turmeric rhizome
Herbs for the treatment of headache: peppermint oil, capsaicin, feverfew
15. Herbs that can be used in diseases of the skin and oral mucosa – lecture 13
Antiviral herbs: melissa leaf, greater celandine
Herbs used in the treatment of skin infections: tea tree oil, sage leaf, clove oil
Herbs with a wound healing effect: calendula, centella, matricaria flower and oil, yarrow, rose, St. John's wort, hamamelis leaf and bark, pansy
Herbs for the treatment of atopic skin: evening primrose oil, soy oil
Herbs that can be used for the care of oral mucosa: tea tree oil, calendula, matricaria flower
16. Herbs with immunomodulatory and adaptogenic effects – lecture 14
Herbs with immunomodulatory action: purple coneflower herb, geranium root
Herbs with adaptogenic effect: ginseng, eleutherococcus, golden root

The course description was prepared by: Dr. Ágnes Alberti

Pharmaceutical Technology (practice) IV., Pharmaceutical Technology (theory) IV.

Full name of the subject: GYÓGYSZER-TECHNOLÓGIA IV., GYÓGYSZER-TECHNOLÓGIA (gyakorlat) IV.
Program: undivided program (pharmaceutical)
Schedule: full-time
Short name of the subject: Pharm. Tech.
English name of the subject: Pharmaceutical Technology (theory) IV., Pharmaceutical Technology (practice) IV.
German name of the subject: Pharmazeutische Technologie IV.

Neptun code of the subject: GYKGYI249E4A (lecture); GYKGYI249G4A (practice)
Type of registration: obligatory
Responsible Department: Semmelweis University, Department of Pharmaceutics

Responsible tutor: *Dr. István Antal* Professor, Ph.D., Habil.
 Contact information:
 phone: +36-1-217-0914
 email: antal.istvan@semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Dr. Nikolett Kállai-Szabó Associate professor, Ph.D.
Dr. Krisztina Ludányi Associate professor, Ph.D.
Dr. Emese Bertalan-Balogh Senior lecturer, Ph.D.
Dr. Lívia Budai Senior lecturer, Ph.D.
Dr. Mária Hajdú Senior lecturer, Pharm.D.
Dr. Miléna Lengyel Senior lecturer, Ph.D.
Dr. Borbála Dalmadi-Kiss Research scientist, Ph.D.
Dr. Dóra Farkas Assistant lecturer, Ph.D.
Dr. Andrea Kovács Assistant lecturer, Ph.D.
Dr. Nóra Mike-Kaszás Assistant lecturer, Ph.D.
Dr. Noémi Anna Niczinger Assistant lecturer, Ph.D.
Dr. Márton Király Assistant lecturer, Pharm.D.
Dr. Petra Szalkai Assistant lecturer, Pharm.D.

Classes per week: 2 lectures, 8 practices,
Credit point: 6 credits lecture, 4 credits practice

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The aim of the Pharmaceutical Technology course is to provide the student with the theoretical knowledge and practical skills necessary for the basic professional activity of a pharmacist, the preparation of pharmaceuticals.

Short description of the subject:

The subject covers the theoretical and practical knowledge required for the preparation of medicinal products. An overview of the history of pharmaceutical preparation. Pharmaceutical technology aspects of ensuring efficacy, quality requirements for the pharmaceutical formulation. Tasks and conditions of pharmaceutical preparation, basic operations. Individual (magistral) and factory production of pharmaceuticals. Aspects, excipients, quality requirements for formulation of medicinal products. Identification and resolution of possible incompatibilities of ingredients, compatibility, stability.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/semester	Normal course offer	Consultations
8 th semester	28	112	-	-	140	Spring semester	-

Program of semester

Topics of theoretical classes (pro week):

1. Development of solid pharmaceutical forms, solid state characterization I. Excipients.
2. Particle systems, granules
3. Capsules
4. Tablets I.
5. Tablets II.
6. Coating
7. Modern dosage form design: testing and evaluation of drug release profile; modified drug release; tablets
8. Modern dosage form design: improvement of dissolution and solubility
9. Modern dosage form design: transdermal and other therapeutic systems.
10. Molecular pharm. tech. microfabrication, nanotechnology, delivery of biopharmaceuticals Liposomal preparations.
11. Formulation of biological drugs.
12. Modern dosage form design: the role of the quality of excipients; patient-centered drug release systems
13. Pharmaceutical technology and quality assurance. Quality by Design, PAT, nondestructive analysis
14. Radiopharmaceuticals. Other preparations. Medical aids.

Topics of practical classes (pro week):

Pilot practices

- Production of solutions on an industrial scale, testing
- Production of ointments on an industrial scale, testing*
- Production of suppositories on an industrial scale, testing*
- Aspects of evaluation of dissolution tests, methods of comparing profiles
- Production of granules, testing*
- Production of pellets, testing*
- Production of tablets, testing*
- Production of coated dosage forms, testing*
- Digital technology (3D printing)

Parenteral practices

- Preparation, IPC testing of injections*
- Study and testing of membrane filters*
- Isotonization*
- Study and tests of aerosols
- Study and tests of foams
- Ampule filling, closure
- Lyophilization

Chemical practices

- Study of the interaction of methyl p-hydroxybenzoate (methylparaben) and macromolecules
- Maillard reaction: interaction between primary and secondary amines (caffeine) and lactose
- HPLC study of Ciprofloxacin containing film-coated tablet in milk (SPE sample preparation)
- Hydrolytic resistance testing of pharmaceutical vials
- Quality testing of plastic containers
- Examination of extractable and leachable compounds: determination of ethyl 3-ethoxy propionate from the preparation/packaging material
- Identification of potentially leachable and/or extractable substances
- Method validation: precision, determination of linearity range (for E&L testing)
- Measurement validation: accuracy, specificity, limit of detection (for E&L test)

Physical practices

- Determination of slip point and dropping point for suppository vehicles and ointment bases
- Examination of the compression strength and disintegration time of suppositories; Studies on vehicles of ointments and suppositories with penetrometry
- Softening point determination of ointments and suppository vehicles; Determination of the congealing point of vehicles
- Study of the temperature dependence of viscosity
- Homogeneity of active ingredient distribution in suppositories*
- Examination of drug release from suppositories
- Preparation of suppositories by the Münzel method and their pharmacopoeial control tests
- Statistical evaluation of uniformity of mass of single-dose uncoated capsules*
- Examination of polymorph crystals
- Examination of drug release from tablets in the presence of activated charcoal
- Determination of the real density of granules; Examinations of granules and powders*
- Factors affecting the drug release of pharmaceutical dosage forms in connection with the application*

Completion of the practices marked with an asterisk is a condition of signature. In the case of absence from other practices, an oral report must be made by arrangement.*

Schedule of consultations: Upon request, individually.

Prerequisites: Pharmaceutical technology III.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

- Meet at least 75% attendance and participation requirement per lab for practical sessions
- In the event of late arrival (10 minutes) the practice can only be started with the permission of the teacher. Further guidelines are provided by the Study and Examination Regulations.
- Completion of the exercises marked with an asterisk* in the practical topics is a prerequisite for signature.
- In case of absence, complete the exercise in the make-up exercises. Make-ups are recommended, as the material is part of both the written reports, the semi-final and the final examination. In case of non-completion of the exercises not marked with an asterisk, an oral report of the practical material must be given by arrangement.
- It is not mandatory to make up the absences, but opportunity is provided to complete the exercise in the make-up exercises. Supplementation is recommended, as the course material is part of both midterms, the semi-final, and the final examination.
- Due to failure to meet the attendance requirements, the responsible tutor determines the conditions of the signature and the order of the possibility of making up.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

	Expected date	Expected date for retake 1	Expected date for retake 2
1st midterm	week 6	week 7	1st week of exam period
2nd midterm	week 12	week 13	1st week of exam period

The written tests include the material of the practices, including the calculations. In the case of a rewrite, the result of the rewrite will override the result of the previous assessment.

The practical grade is determined based on the average of the % result of the midterms as follows:

90.00-100%	excellent (5)
80.00-89.99%	good (4)
65.00-79.99%	fair (3)
50.00-64.99%	pass (2)
0-49.99%	fail (1)

Requirements of signature:

- To obtain a signature the student must attend at least 75% of the practical sessions.
- Complete the practices marked with an asterisk* in the practical topics.
- From the 6 pop tests at least 5 must be written and min. 50.00% must be reached in each laboratory.
- The student must achieve a minimum of 50.00% individually in each of the two midterms.
- The 4 moodle calculation tests must be successfully completed by the end of the semester (December 18, 2023, 12.00).
- Completion of project works.

Type of the semester-end examination:

Lecture: final*

Practice: practical grade

Examination requirements:**Theoretical topics:**

- Quality requirements, principles and control methods for medicinal products (e.g. Ph.Hg. VIII General Chapters 1. Principles and 2. Importance of analytical methods).
- Preformulation and formulation, aspects of formulation development. Salt selection, importance of polymorphic and amorphous materials, structure analysis, biopharmaceutical aspects.
- Importance of compatibility, testing. Physical and chemical incompatibilities in pharmaceutical technology.
- Production of stable pharmaceutical formulation, drug stability and testing. Unwanted physical, chemical, microbiological changes during shelf life of drugs. Options for stabilisation.
- Preparatory and basic operations in the manufacture of pharmaceuticals, significance.
- Particle size: significance, reduction, testing.
- Packaging, packaging materials. Testing.
- Technical fundamentals of pharmaceutical manufacturing, scale-up, in-process control, critical quality characteristics and process parameters.
- Technological aspects of pharmaceutical manufacturing and quality, conditions. GMP, authorised person. planned quality (QbD). process analytical technology (PAT).
- Preparation and testing of solution preparations.
- Emulsion preparation and quality control (HLB concept, surfactants).
- Preparation and quality control of suspensions.
- Extraction operation, preparation and testing of a preparation containing extracts.
- Preparation and quality control of ophthalmic, otological and nasal preparations.
- Preparation and testing of sterile preparations (aseptic drug preparation, clean room and isolation techniques, sterilisation, pyrogen-free, parametric release).
- Formulation of injections, parenteral additives.
- Formulation of infusions, large volume parenteral preparations.
- Preparation and quality control of rectal and vaginal preparations. Medicinal sticks.
- Manufacturing and quality control of dermal formulations.
- Preparation and quality control of inhalation formulations, aerosols.
- Preparation and quality control of powders, granules for ingestion.
- Preparation and quality control of pharmaceutical pellets. Medicinal chewing gum.
- Preparation and quality control of capsules.
- Preparation and quality control of tablets.
- Production and quality control of film-coated formulations.
- Modified release formulations. Pharmaceutical technology options and testing of drug delivery. Patient-centric drug delivery systems.
- Manufacturing and quality control of transdermal formulations.
- Production and quality control of enhanced bioavailability formulations (dissolution and absorption promotion, solubilisation, complexation).
- Preparation and quality control of colloidal nanoparticle delivery systems.
- Formulation aspects and quality control of biological drug formulation.
- Modern dosage forms:
 - Inhalation powder, pre-dispensed
 - Dragee
 - Gene-therapy medicine (infusion solution)
 - Gastroresistant hard capsule
 - Gastroresistant tablet
 - Inhalation powder, hard capsule
 - Injection
 - Concentrate for solution for infusion
 - Soft capsule
 - Modified-release film-coated tablets
 - Solution for infusion
 - Solution for injection
 - Nasal spray solution
 - Nasal drops
 - Osmotic, retard film-coated tablet
 - Prolonged release tablet with pellets
 - Powder and solvent for solution for injection
 - Powder and solvent for prolonged-release suspension for intramuscular injection
 - Powder for dispersion for infusion (albumin nanocarrier)
 - Prolonged-release film-coated tablet
 - Prolonged-release hard capsule
 - Retard tablets
 - Orodispersible granules
 - Orodispersible tablet
 - Sublingual spray
 - Eye drops, solution
 - Suspension for injection
 - Suspension for injection in cartridges
 - Transdermal patch
 - Pressurised suspension for inhalation

Calculations, practical knowledge, excipients and definitions:

as published by the department on the MOODLE interface by the start of the academic term.

Form of the semester-end examination: combined examination

Practical examination (assessment on a five-point scale)

Written part:

- Calculation (assessment on a two-point scale: pass/fail)
- Excipients (assessment on a five-point scale)

Oral part:

- Theoretical topic (assessment on a five-point scale)
- Definition (assessment on a two-point scale: pass/fail)
- Modern dosage form (assessment on a five-point scale)

The possibility and conditions for offering grades:

Exemption from subsections or partial grade may be offered for certain parts of the examination based on the mid-semester performance in the following ways:

Practical examination: Partial grade can be offered in two ways: either by achieving an outstanding result in the student competition, or by meeting the following conditions:

- Excellent (5) grade is offered if:
 - o the practical grade in the previous semester is 5 AND
 - o the result of the pop-tests in the 2nd semester is at least 90.00%.
- Good (4) grade is offered if:
 - o the practical grade in the previous semester is at least 4 AND
 - o the result of the pop-tests in the 2nd semester is at least 80.00%.

Definitions: At the lectures, there will be a non-obligatory short assessment (“slip”) of the knowledge presented that day, which results in exemption from the definition subsection of the oral part if the student completes at least 75%.

Calculation: If the student completes 5 of the 6 slips correctly in the lectures of week 2-7, the calculation can be passed early, on week 8.

Excipients: Based on the performance in the related 45-minute consultations.

Scientific, course related research, publications, essays:

The lecture materials, the supplementary material for the excipients and the practical work are available in electronic form on Moodle.

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: on an individual assessment basis

The course description was prepared by: Dr. István Antal

Public health (theory), Public health (practice)

Full (Hun) name of the subject: Népegészségtan (elmélet) , Népegészségtan (gyakorlat)
Program: Undivided program (pharmaceutical)
Schedule: full-time

Short name of the subject:
English name of the subject: Public Health (theory), Public Health (practice)
German name of the subject: Gesundheitslehre (Vorlesung), Gesundheitslehre (Praktikum)

Type of registration: obligatory/obligatory elective/elective/criteria requirement

Neptun code of the subject: GYKNEI091E1A, GYKNEI091G1A

Responsible Department: Semmelweis University, Institute of Preventive Medicine and Public Health
Responsible tutor: *Ferenc Horváth* MD assistant lecturer
Contact information: 1089 Budapest, Nagyvárad tér 4. 13. em
 phone: +36-20-825-0596
 email: horvath.ferenc@semmelweis.hu

Name of the persons responsible for the teaching of the subject:
András Terebessy senior lecturer, PhD
Ferenc Horváth assistant lecturer
Vince Pongor senior lecturer, PhD
Dorottya Árva resident, MD
Norbert Dósa resident, MD
Dávid Major resident, MD
Kata Pártos resident, MD
Noémi Mózes senior lecturer, PhD

Class per week: 2 hours lectures
 2 hours practices

Credit point(s): 2 credits lectures
 2 credits practices

Professional content, intent of acquirement and its function in order to implement the goals of the program:

Acquire skills in qualitative assessment of different epidemiological studies, comprehensive and comprehensible reading of the scientific evidence-based literature. Acquire basic statistical skills. Design and conduct research, choosing the most appropriate epidemiological methods. Conducting individual health promotion based on key lifestyle factors and learning the basics of community health promotion. Apply practical knowledge of epidemiology and infection control.

Short description of the subject:

Public health deals with issues affecting human health at the population level. As an applied science, its basic aim is to preserve and improve health and prevent disease. To achieve these objectives, public health integrates several disciplines. Epidemiology introduces students to the prevention of communicable diseases, with a particular focus on infection control. Classical public health describes the role of environmental factors in the development of disease, the clinical aspects of which are nowadays dealt with in environmental medicine. The main aim of occupational medicine is to protect the health of employees by preventing occupational diseases. Our professional background is strengthened by the fact that our Institute merged with the Department of Occupational and Environmental Medicine of the University in 2010. In addition to disease prevention, the idea of health promotion was pioneered in the second half of the 20th century with the formulation of the "new public health". Our aim is to enable future pharmacists to carry out individual health promotion and to be familiar with the concept of community health promotion. For all these activities, the acquisition and use of epidemiology as a methodology of public health is essential. Our aim is to familiarize students with the application of health promotion and prevention at the population and individual level, preparing them for practice.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
8 th semester	28	28	-	-	56	Spring semester	-

Program of semester

Topics of theoretical classes (pro week):

- Week 1: History of Hungarian medicine/public health. Definition of health, levels of prevention. Theoretical foundations of health promotion. The concept and functioning of public health
- Week 2: Health determinants. Health status of the Hungarian population. Health determinants in Hungary. Principles of health policy
- Week 3: Epidemiology and prevention of smoking and smoking-related diseases
- Week 4: Epidemiology and prevention of cardiovascular diseases. Epidemiology and prevention of cancer
- Week 5: Epidemiology and prevention of respiratory diseases. Thyroid diseases. Vulnerable groups
- Week 6: Mental health. Ageing
- Week 7: Obesitas//Diabetes. Physical activity
- Week 8: Epidemiology of communicable diseases. Vaccinations
- Week 9: Infection control. Nosocomial infections
- Week 10: Nutritional status and dietary habits of the Hungarian population. Food safety
- Week 11: Environmental health: climate change, environmental health effects of air. Environmental health: soil, water
- Week 12: Chemical safety and toxicology. Ionising radiation, types, effects, limits
- Week 13: Occupational health. Maternal, infant, child and adolescent health, health inspector network and school health
- Week 14: Structure, financing and administration of health and public health in Hungary. Health policy. Quality assurance and quality improvement in health care

Topics of practical classes (pro week):

- Week 1: Introduction. Demography
- Week 2: Epidemiology. Morbidity measurement (incidence, prevalence). Risk and causality (risk indicators). Epidemiological study types (descriptive studies, analytical studies: cross-sectional, cohort, case-control)
- Week 3: Screening tests (population) for public health purposes. Evaluation of screening tests (sensitivity, specificity, predictive values, ROC curve)
- Week 4: Interventional studies (RCTs). Meta-analyses. Critical reading
- Week 5: Design, organisation and evaluation of health promotion programmes.
- Week 6: Smoking and minimal intervention
- Week 7: Alcohol SBI (screening and brief intervention)
- Week 8: Physical activity/movement recommendations.
- Week 9: Mental health, mental hygiene. Prevention of illicit drug use
- Week 10: Preparing an individual health plan
- Week 11: Epidemiological concepts. Epidemiology system. Epidemiological investigation
- Week 12: Practical knowledge of vaccination
- Week 13: Case studies in environmental and occupational health
- Week 14: Practical exam

Other subjects (both obligatory and optional) relating to the transversal issues of the subject. Possible overlaps between subjects:

Schedule of consultations: if necessary, in agreement with the teacher

Course requirements

Prerequisites: Basic Medical Pathophysiology II., Dietetics

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup: In order to obtain a signature, the student must meet at least 75% of the attendance in the practical sessions and seminars. This means 11 completed practicals for 14 practicals (the 3 'allowed' absences do not need to be certified). Make-ups can be made on another practice in the same week

The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments, (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their upgrading retake (as provided in §§ 25-28 of the STUDY AND EXAMINATION REGULATIONS):

Week 14, a practical exam on the practical material. Failed practical examinations can be made up until the end of the first week of the examination period, in agreement with the trainer, up to a maximum of 2 times.

Requirements of signature (as provided for in STUDY AND EXAMINATION REGULATIONS § 29):

The condition for obtaining a signature is that the student meets the attendance and participation requirement of at least 75% in practical sessions and seminars.

Type of the semester-end examination: practical grade / comprehensive examination

Examination requirements: (list of topics, test examination topics, mandatory parameters, diagrams, concepts, list of calculations, practical skills, and project tasks recognised as examinations, criteria for completion and assessment): as published by the education-research department on the MOODLE interface by the start of the academic term

Form of the semester-end examination: combined examination

Practice: practical grade - oral

Lecture: semi-final - written

The possibility and conditions for offering grades:

A list of the basic notes, textbooks, resources and literature that can be used to acquire the knowledge necessary to master the curriculum and to complete the assessments, with exact description about which of them is required to acquire which part of the syllabus (e.g. description based on topics)), as well as the main technical and other aids and study aids that can be used:

Public health e-learning material (<https://itc.semmelweis.hu/moodle/>)

The course description was prepared by:

Ferenc Horváth MD

Physical Education VIII.

Full name of the subject:	Testnevelés VIII.
Program:	undivided program (pharmaceutical)
Schedule:	full-time
Short name of the subject:	PE VIII.
English name of the subject:	Physical Education VIII.
German name of the subject:	Sport VIII
Neptun code of the subject:	GYKTSI116G8A
Type of registration:	obligatory
Responsible department:	Semmelweis University, Physical Education and Sports Center
Responsible tutor:	Várszegi, Kornélia director
	Contact information:
	Phone: +36-20/825-0611
	E-Mail: varszegi.kornelia@semmelweis-univ.hu

Name of the persons responsible for the teaching of the subject:

Imre, Kovács tennis trainer
Kalmus, Dániel P.E. teachers
Katona, László hiking, badminton, boulder trainer
Lehel, Zsolt P.E. teachers
Weisz, Miklós P.E. teachers
Doharné Buczkó Anikó P.E. teachers
Farkas Dominika P.E. teachers
Kovács Imre tennis trainer
Nagy-Kismarci Bence cheerleading trainer
Balogh Orsolya aerobic and zumba trainer
Dr. Herbert – Minkó Krisztina yoga trainer
Tóth Balázs dance, zumba, salsa trainer
Kiss Valéria Bless You Gym trainer
Paksai Márton ultimate freesbe trainer
Soós Gábor tennis trainer
Kunos Gábor hiking trainer

Classes per week:	1 practice
Credit point:	0

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The short-term goal of the course is to maintain and improve the students' current state of health, to create the physical conditions for a better quality of life by learning and practicing (new) branches of sports that can be practiced after graduation as well. The long-term goal is to improve the quality of life and life prospects of future physicians, and to provide students with credible preventive attitudes and life-style advice - so that they can represent those in their later practice, through their own health-promoting behavior.

Short description of the subject:

Upon completion of the course the student will be able to carry out regular physical activity.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
8	0	14			14	Spring semester	

Topics of practical classes (pro week):

Within the framework of obligatory regular physical activity, the requirements of the subject can be fulfilled as free of charge and self-financed student as well. The former is available during classes and courses organized by the Semmelweis University's Centre for Physical Education and Sports (TSK), and the latter is available at SE-TSK accredited partner locations.

Free of charge:

60 minute classes held at the same time on a weekly basis, on the premises of the TSK facilities and other locations.
1107 Bp, Zagrabi utca 14.

1x60 min./week sessions:

Aerobics, BlessYou Gym, boulder, functional circuit training, golf, beginner Yoga, male football, salsa, step aerobics, badminton, beginner ultimate Frisbee, advanced ultimate Frisbee, Zumba
1 x 90 mins./week sessions: women's football, ice hockey, beginner tennis, beginner tennis 2,
4 x 3 hrs. and 1x 2 hrs. session packages: Hiking 1, Hiking 2.
2x90 mins./week sport training (competitive sport, for qualified only): cheer dance, cheerleader, men's football, handball, basketball, volleyball

Fee-based:

at the sports venues specified on www.semmelweis.hu/sportkozpont, which will also be advertised on the Neptun system. The list of these locations may vary per school year.

Prerequisites:

Prerequisites Physical Education II, IV. and VI.

The possibility and conditions for offering grades:

Active participation in practice classes 10 times (trainings 15 times) under the conditions described above.

May be exempted from attending classes the student who

1. whose diagnosis and the opinion of the sports doctor do not allow to exercise, and submits a certificate or
2. does sports regularly and submits a certificate of association and federation in the neptun system in the exemption period preceding the semester.

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: yes

If you have not completed the course you may be readmitted in the 9. semester of this academic year.

The course description was prepared by: Kornelia Varszegi

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

The number of active participations for physical education classes is 10 (once a week), regardless of the number of school breaks, which is to be completed during the hours assigned to the group. Two hours can be recovered in the first week of the exam period, on two separate days. Lessons missed do not need to be certified; however, catching up is mandatory. The days of study breaks do not qualify as automatic attendance. Practice leaders follow an online presence registration at the beginning and end of the lessons, which can be individually tracked on semmelweis.hu/sportkozpont homepage.

Except for the Sport Hiking courses, where you have to attend 4 times due to blocking. 3 of these are on your own course and 1 can be made up by arrangement with the instructor!

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes!

Requirements of signature:

Active participation in practice classes 10 times (trainings 15 times) under the conditions described above.

Type of the semester-end examination: signature

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

FACULTY OF PHARMACEUTICAL SCIENCES

**Curriculum of the credit-based training for fifth year students
in the 2024/2025 academic year**



Pharmaceutical Sciences
5th year

9. SEMESTER

Subject	Lecture (hour/week)	Practice (hour/week)	Credit	Prerequisites	Exam type
Obligatory Practice Before the Board Exam (2 months) I. GYKANG133G1A	–	40	8	Pharmacology and Toxicology III., Pharmaceutical Technology IV., Pharmacy Administration II.	practical mark
Drug Therapy (theory+practice) GYKGYH250E1A	2	3	4	Pharmacology and Toxicology III., Pharmaceutical Technology IV., Phytotherapy	semi-final
Pharmaceutical Care (theory+practice) GYKEGY096E1A	2	3	4	Pharmacology and Toxicology III., Pharmaceutical Technology IV.	semi-final
Clinical Pharmacokinetics and Biopharmacy (theory+practice) GYKGYI251G1A	2	3	3	Pharmacology and Toxicology III., Pharmaceutical Technology IV.	semi-final
Pharmaceutical Communication and Integrated Consulting (theory+practice) GYKMAG098G1A	1	2	2	Pharmacology and Toxicology III, Pharmacy Administration I.	practical mark
Pharmaceutical Informatics (theory+practice) GYKDEI099G1A	1	1	1	Pharmacy Administration I. Pharmaceutical Technology IV.	practical mark
Pharmaceutical management (theory+practice) GYKEGY093E1A	1	1	2	Pharmacoeconomics	semi-final
Clinical Pharmaceutics (theory+practice) GYKEGY100E1A	1,2	1,2	1	Pharm. and Tox. III. Pharm. Techn. IV.	semi-final
Pharmaceutical Ethics and Sociology (theory+practice) GYKMAG101E1A	1	1	1	Pharmacology and Toxicology III., History of Pharmaceutics and Prop.	semi-final
Diploma Work II. GYKSZD132G2A	–	5	–	Diploma Work I.	signature
Physical Education IX GYKTSI116G9A	–	1	–		signature
Drug Licensing (theory+practice) GYKGYI102G1A	12/sem.	12/sem.	1	Pharmaceutical Technology IV. Pharmacy Administration I.	practical mark
Pharmacovigilance and pharmacoepidemiology (theory+practice) GYKGYI103G1A	4/sem	4/sem	1	Pharmacology and Toxicology III.	practical mark
Quality Assurance (theory+practice) GYKGYI104G1A	4/sem	4/sem	1	Pharmaceutical Technology IV. Pharmacy Administration I.	practical mark
Drug innovation and clinical studies (theory+practice) GYKGYI105G1A	8/sem	8/sem	1	Pharmacology and Toxicology III. Pharmaceutical Technology IV.	practical mark
Total:	11,2	21,2	30		

Drug Therapy (theory+practice)

For further information contact directly with the Department.

Pharmaceutical Communication and Integrated Consulting (theory+practice)

Complete name of the course: Gyógyszerészi kommunikáció és integrált tanácsadás
Name of the Programme: Pharmacy Basic Education
Abbreviated name of the course: Pharmaceutical Communication
English name of the course: Pharmaceutical Communication and Integrated Consulting (theory+practice)

Neptun-Code: GYKMAG098G1A
Type of registration: obligatory
Institute: Institute of Behavioural Sciences of Semmelweis University

Name of the tutor/lecturer: *Dr. Pilling János* PhD, Associate professor
 Phone: +36 (1) 2102930/56457
 E-Mail: pilling.janos@med.semmelweis-univ.hu

Further tutors: *Zsófia Hídvégi* Psychologist, assigned lecturer
Karolina Szabó Psychologist, assigned lecturer

Number of classes /week: 1 (lecture)+ 2 (practice)
Credit points: 2

Professional content, the intent of acquirement, and its function in order to implement the goals of the program:

- to teach basic skills to improve pharmacists' communicational techniques of information gathering, active listening, and patient education
- improving skills, which can help to handle difficult communicational situations, such as coping with angry, aggressive patients, intimate questions, etc.
- to teach and practice communication techniques that can improve the success of pharmaceutical work, i.e. team, marketing, and assertive communication

Short description of the subject:

The education will be interactive and practical. In the first part of the semester students will get familiar with the basic concepts of pharmaceutical communication with a special focus on information delivery, patient education, active listening, and empathy. Risk communication and shared decision making will be also covered, such as improving compliance and promoting lifestyle changes. The second part of the semester will cover the possible coping strategies with communicational challenges in pharmaceutical practice such as handling tense, hostile patients, communication about intimate topics (menstruation, sexuality, stigmatizing disorders etc.), communication with patients from different age-groups. Students will learn communicational techniques to handle patients with mental health disorders such as anxiety, depression, suicidal ideation, alcohol/drug addiction, and psychosis. At the end of the semester marketing communication skills and team communication techniques will be the main focus of the seminars.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lecture	Total number of contact hours/semester	Semester	Consultation
9	10	20	–	–	30	autumn	–

Semester program

I. Lecture topics/week

1. week: Role of communication in pharmaceutical practice. Active listening and empathy.
2. week: Communication difficulties and possible solutions of patient education. Possibilities of improving health literacy.
3. week: Communication about risk of the treatment. Shared decision-making. Communicational questions of patient safety.
4. week: Improving patient's adherence and promoting lifestyle changes in the pharmacy.
5. week: The specialities of age and gender in pharmaceutical communication. Communication about intimate questions.
6. week: Team communication. Assertive communication
7. week: Communication with tense, hostile patients, strategies to prevent violence. Handling complaints and patient's claims.
8. week: Communication with patients with mental health disorders I: anxiety, depression, crisis
9. week: Communication with patients with mental health disorder II: addiction, psychosis
10. week: Marketing communication in pharmaceutical practice.

II. Practice topics/week

1. week: Role of communication in pharmaceutical practice. Active listening and empathy. Verbal and non-verbal communication.
2. week: Communication difficulties and possible solutions of patient education. Possibilities of improving health literacy
3. week: Communication about risk of the treatment. Shared decision-making. Communicational questions of patient safety.
4. week: Improving patient's adherence and promoting lifestyle changes in the pharmacy.
5. week: The specialities of age and gender in pharmaceutical communication. Communication about intimate questions.
6. week: Team communication. Assertive communication
7. week: Communication with tense, hostile patients, strategies to prevent violence. Handling complaints and patient's claims.
8. week: Communication with patients with mental health disorders I: anxiety, depression, crisis
9. week: Communication with patients with mental health disorder II: addiction, psychosis
10. week: Written exam

COURSE REQUIREMENTS

Seminars will ensure the possibility of ongoing consultation with the seminar leader.

Prerequisites:

Pharmacology and Toxicology III.
Pharmacy Administration I.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

The participation at minimum 75% of the practice seminars is the prerequisite of the signature. Makeup is possible in another seminar group the same week based on a previous agreement with the seminar lecturers.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

The final grade will be created as follows. A maximum of 100 points is available:

1. Points earned in lectures: 10 points
2. Presentation in the seminar: 30 points
3. Written exam: 60 points

Evaluation:

- Excellent (5): 80-100 points
- Good (4): 70-79 points
- Satisfactory (3): 60-69 points
- Pass (2): 50-59 points
- Fail (1): Below 50 points

1. Points earned at lectures: At the end of the lecture, the student answers the question related to the topic presented at the lecture on a paper basis. You can get 0 or 1 point for the answer.
2. Presentation:: The student gives a 5-10 minute presentation about a specific topic related to the course. Students agree with the seminar teachers at the beginning of the practical classes on which topics they create professional content and perform a presentation. A maximum of 30 points is available.
3. Topics of the exam: the required literature of the course, as well as the materials of the lectures and seminars. A maximum of 60 points is available.

If the student does not reach 50% (30 points) in the exam, the points obtained in the lecture and the points obtained in the seminar presentation cannot be added to the score obtained in the exam paper, in this case, the exam paper must be repeated.

If the exam is unsuccessful or the student does not appear for it, it is possible to make it up once. The exam will take place in the last week of the seminars. A retake exam will be held during the exam period.

In the case that the student does not have a successful written exam by the end of the semester, but the number of absences does not exceed 25%, and the seminar presentation has been accepted, the course can be taken up later as a CV course (therefore, there is no need to attend the seminars, the exam should be repeated).

Requirements of the signature at the end of the semester:

- participation in at least 75% of the seminars
- accepted seminar presentation
- passing the written exam (at least 50%)

Number and type of projects students have to perform independently during the semester and their deadlines:

Students have to prepare and perform a 10 minutes presentation on an agreed topic. In the presentation they have to show the capacity to prepare individual work based on agreed literature, show that they are able to synthesize and use the knowledge gained during the course and demonstrate presentation skills. The presentation slides have to be uploaded to Moodle before the presentation deadline. Deadlines will be discussed in the seminars at the beginning of the semester.

Type of the semester-end examination: practical grade

Required material:

Pilling, János: Medical Communication in practice. Medicina, Budapest, 2020.

Beardsley, RS. – Skrabal, MZ. – Kimberlin, CL: Communication Skills in Pharmacy Practice. Wolters Kluwer. Seventh edition. 2020.

The course description was prepared by:

Dr. Mónika Ditta Tóth,

Kinga Babonits-Farkas, Dr.

Orsolya Szépe

Pharmaceutical informatics (theory+practice)

Full name of the subject:	Gyógyszerészi informatika (elmélet+gyakorlat)
Program:	undivided program (pharmaceutical)
Schedule:	full-time
Short name of the subject:	Pharmaceutical Informatics
English name of the subject:	Pharmaceutical informatics (theory+practice)
German name of the subject:	Pharmazeutische Informatik (Vorlesung+Praktikum)
Neptun code of the subject:	GYKDEI099G1A
Type of registration:	obligatory
Responsible department:	Institute of Digital Health Sciences of Semmelweis University
Responsible tutor:	<i>Dr. Szócska Miklós</i> PhD, professor titkarsag.dei@semmelweis-univ.hu
Name of the persons responsible for the teaching of the subject:	<i>Dr. Zajzon Gergely</i> assistant lecturer <i>Dr. Tamus Zoltán Ádám</i> PhD, associate professor <i>Tóth Tamás</i> assistant lecturer <i>Iváncsy Tamás</i> guest lecturer, PhD
Classes per week:	2
Credit point:	1

Professional content, intent of acquirement and its function in order to implement the goals of the program:

To acquaint students with the IT systems and applications used in pharmacy. The subject reviews the life cycle of medicines and related legislation, and then presents in detail the IT tools that can be used during each step, from drug development and official licensing to drug distribution.

Short description of the subject:

Successful completion of the subject will result in the acquisition of the following competencies: Knowledge of the processes of drug development, authorization and distribution. Getting to know the IT methods, tools, code systems and databases used in these.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/semester	Normal course offer	Consultations
9 th semester	10	10	–	–	20	Autumn semester	–

Program of semester**Topics of theoretical classes (pro week):**

1. week: Lifecycle of pharmaceutical products, Introduction to the relevant legal hierarchy
2. week: Methods of computer molecular design
3. week: Drug development process, approval of clinical trials
4. week: Introduction to Drug authorization (Regulatory Affairs): CTD (Common Technical Document), eCTD standards
5. week: Pharmacovigilance, related IT systems, databases (Eudra-Vigilance, E2B, PSUR)
6. week: Drug Reimbursement system and relevant databases
7. week: Pharmacy IT systems, Serialisation
8. week: Mobile devices, portable devices, sensors, smart devices in healthcare
9. week: IT tools for evidence-based medicine and personalized medicine
10. week: Prescription software, electronic prescription

Topics of practical classes (pro week):

1. week: Clinical trial related IT systems – EudraCT, clinicaltrials.gov, clinicaltrialsregister.eu
2. week: National and international pharmaceutical databases (OGYÉI database, basics of pharmaceutical electronic register system, EudraPharm, EudraGMP, EudraNET)
3. week: CTD, eCTD
4. week: IT background of pharmaceutical reimbursement: Pupa, OWL, fix reimbursement
5. week: Pharmaceutical code systems and standards (ATC, DDD)
6. week: Pharmaceutical code systems and standards (Active ingredients register, INN, BNO, MedDRA)
7. week: QRD, Readability, structure of product information files (SmPC, PIL)
8. week: Pharmaceutical promotion and marketing
9. week: IT systems for pharmaceutical sales information – OSAP1913 – P@NKA, IMS
10. week: ORKA prescription software

Schedule of consultations: by agreement

Course requirements**Prerequisites:**

Pharmacy Administration I.
Pharmaceutical Technology IV

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Attendance of at least 75% of the classes. Max. 3 absences are allowed

Requirements of signature:

Attendance of at least 75% of the classes

Type of the semester-end examination:

practical grade

Examination requirements:

as published by the education-research department on the MOODLE interface by the start of the academic term

Form of the semester-end examination:

written (computer test)

Scientific, course related researches, publications, assays:

The educational materials are available at <http://dei-cloud.semmelweis.hu>.
Username and password are announced at the first class.

The course description was prepared by:

Dr. Zajzon Gergely and Dr. Tóth Tamás

Clinical Pharmacokinetics and Biopharmacy (theory+practice)

Full name of the subject: Klinikai farmakokinetika és biofarmácia (elmélet+gyakorlat)
Program: undivided program (pharmaceutical)
Schedule: full-time
Short name of the subject:
English name of the subject: Clinical Pharmacokinetics and Biopharmacy (theory+practice)
German name of the subject: Klinische Pharmakokinetik und Biopharmazie (Vorlesung+Praktikum)

Neptun code of the subject: GYKGY
Type of registration: obligatory
Responsible department: Department of Pharmaceutics of Semmelweis University

Responsible tutor: *Prof. Antal István* professor, Dr. habil
phone: 061-217-0914
email: antal.istvan@semmelweis.hu

Name of the persons responsible for the teaching of the subject:
Prof. Antal István university professor, PhD, habilitated doctor
Prof. Balogh György university professor, PhD, habilitated doctor
Prof. Klebovich Imre Professor emeritus, Doctor of MTA
Dr. Ludányi Krisztina associate professor, PhD
Bertalanné dr. Balogh Emese associate professor, PhD
Dr. Lengyel Miléna associate professor, PhD
Dalmaidiné dr. Kiss Borbála research associate, PhD
Dr. Farkas Dóra assistant lecturer, PhD
Dr. Király Márton assistant lecturer, PhD
Dr. Kohod Zsófia teaching resident, PharmD

Classes per week: 2 hours lectures, 3 hours practices

Credit point: 3

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The aim of the subject to provide the students with theoretical knowledge and practical skills in the field of biopharmacy and pharmacokinetics.

Short description of the subject:

The course focuses on the therapeutical response and relationships between the fate of the drug in the body, the time course of drug action and intensity and the physico-chemical properties of the drug as well as the dosage form. The evaluation needs the pharmacokinetic interpretation of processes in the body (drug absorption, distribution, metabolism and excretion) as well as qualitative and quantitative description of the time course changes regarding also clinical considerations. During the practical training students perform tasks using in vitro and in vivo methods and bioanalytical procedures. Furthermore they learn the mathematical calculations of pharmacokinetic parameters and computer simulations.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/semester	Normal course offer	Consultations
9 th semester	10	10	–	–	20	Autumn semester	–

Program of semester**Topics of theoretical classes (pro week):**

1. The importance of clinical pharmacokinetics and biopharmaceutics. Fate and characterisation of the drug in the body.
2. Release of active ingredients and practical significance of the Biopharmaceutical Classification System
3. Absorption and transport processes.
4. Metabolism and its biopharmaceutical implications. Significance of bioanalytics.
5. Elimination, excretion processes and influencing factors.
6. Pharmacokinetic models and parameters, analysis I.
7. Pharmacokinetic models and parameters, analysis II.
8. Bioavailability, bioequivalence, biosimilarity.
9. Pharmacokinetic studies in drug discovery and development
10. Biopharmaceutical and pharmacokinetic studies, in vitro and in vivo correlation.

Topics of practical classes (pro week):

1. Study of the distribution of salicylic acid in a three-phase liquid bridge model. Effect of surfactant on transport processes.

2. Investigation of the drug release rate of diclofenac-containing tablets using a rotary basket method
3. Investigation of drug release of topical ointment under in vitro conditions. Study of drug penetration from a semi-solid dosage form using a device based on Franz cell theory.
4. Study of diclofenac release from drug patch.
5. Study of urinary excreted acetylsalicylic acid (ASA) in different suppositories.
6. Study of the drug content of plasma samples following iv administration of theophylline in beagle dogs. Mid-term I.
7. Study of the recoverability of diclofenac sodium in synovial fluid.
8. Plasma samples after per os administration of theophylline tablets in beagle dogs.
9. Pharmacokinetic calculations. Mid-term II.
10. Application of computational methods in biopharmacy and pharmacokinetics. Substitution, retake, consultation

Schedule of consultations: on request

COURSE REQUIREMENTS**Prerequisites:**

Pharmacology and Toxicology III.
Pharmaceutical Technology IV.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Written mid-term report in weeks 7 (theory, background, counting of in vitro exercises) and 10 (theory, background, counting of in vivo exercises).

Retake and corrections are possible in week 10 and week 1 of the exam period. at an agreed time. The result of the corrected mid-term will overwrite the original grade. The practical retake (optional) is in week 10 and week 1 of the exam period.

Requirements of signature:

The course culminates in an oral colloquium and is taught through theoretical lectures (2 hours per week for 10 weeks) and 3 hours per week of practicals. Both written mid-terms must reach at least. 50.00%. Min. 50.00% of the written reports have to be accepted. A maximum of 25% of the absences, as specified in the Study Regulation.

Number and type of projects students have to perform independently during the semester and their deadlines:

Written reports of the practices have to be submitted by the end of week of practice (Sunday 23:59)

Type of the semester-end examination:

signature, end-term examination

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Form of the semester-end examination: combined examination

- The exam has written and oral parts.
- Written part: calculation* based on practical tasks and reports (accepted/ not accepted).
- Oral part: Theoretical topic, Practical topic*, Definition* (accepted/not accepted), Innovative dosage form (pharmacokinetics)

**The possibility and conditions for offering grades:
parts of exam marked with * can be offered as follows:**

The calculation can be offered based on the result of the practical reports.

The practical topic is accepted

as a 5 when min 90.00%

as a 4 when min 80.00% of mid-terms are reached.

Scientific, course related researches, publications, assays:

The lecture slides are available for the students.

1. Michael E. Aulton, Kevin Taylor: Aulton's Pharmaceutics: The Design and Manufacture of Medicines, Elsevier Health Sciences, 2013
2. James Swarbrick, Marcel Dekker Encyclopedia of Pharmaceutical Technology, Second Edition - Volume 1 of 3, 2002
3. Remington Pharmaceutical Sciences, Ed. 20. (Easton, Pennsylvania, 1999) Rácz, I.: Drug formulation. (Wiley, New York, 2001.)

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions

for admission: no

The course description was prepared by:

Dr. István Antal

Pharmaceutical Ethics and Sociology (theory+practice)

Full (Hun) name of the subject: Gyógyszerési etika-szociológia (elmélet+gyakorlat)
Program: undivided program (pharmaceutical)
Schedule: full-time
Short name of the subject: Pharma. Ethics and Soc. (theory+practice)
English name of the subject: Pharmaceutical Ethics and Sociology (theory+practice)
German name of the subject: Pharmazeutische Ethik und Soziologie (Vorlesung+Praktikum)

Neptun code of the subject: GYKMAG101E1A
Type of registration: obligatory
Responsible department: Institute of Behavioural Sciences of Semmelweis University

Responsible tutor: *Dr. József Kovács* MD, PhD, (Head of the Department of Bioethics)
 Contact information: 210-2953
 kovacs.jozsef@med.semmelweis-univ.hu

Name of the persons responsible for the teaching of the subject:
Dr. Zsuzsa Gyórfy PhD, associate professor
Dr. Edmond Girasek PhD Assistant Professor
Bence Dóbróssy MSc assistant lecturer

Classes per week: 1 lecture, 1 practice
Credit point: 1

Professional content, intent of acquirement and its function in order to implement the goals of the program:

- To enable students to recognize ethical issues when encountered in everyday clinical practice and research
- To provide students with a conceptual-logical system, which helps them to address ethical questions and to resolve ethical dilemmas in an efficient way
- To introduce students to a body of knowledge, which helps them to understand, respect and protect the rights of patient research subjects and fellow health care professionals
- To help the would be health care professional to understand the responsibility of the individual, of the health care system and of the society as a whole in maintaining health
- To gain a solid foundation for future studies in any social subject related to pharmacy
- To enhance competence in designing, undertaking and evaluating research involving human subjects
- To enhance communication skills useful in dispensaries or in hospitals

Short description of the subject:

The course is designed to give a broad overview of the field of bioethics, including concepts, theory, and research. Regarding sociology, the usage of medications became an integrated practice in modern societies which has several social connotations. Pharmacists will encounter the social problems connected with discovering, producing, distributing and consuming medicines on an everyday basis. The course aims to provide understanding of all these processes based on introducing some, selected sociological concepts

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
9th semester	10	10	–	–	20	Autumn semester	–

Program of semester**Topics of theoretical classes (pro week):**

1. week: Principles of Medical Ethics (Jozsef Kovacs)
2. week: Competence and Capacity to Make Health Care Decisions. Informed Consent I.
3. week: Informed consent II. Confidentiality and Medical Records (Jozsef Kovacs)
4. week: End of Life Issues (Jozsef Kovacs)
5. week: Pharmacist-patient, pharmacist-pharmacist relationship. Pharmacist and society. Malpractice. Ethical Questions of Human Research. Ethical questions of organ transplantation. (Jozsef Kovacs)
6. week: Introduction to sociology. Basic Concepts The Pharmaceutical Aspects of Illness Behaviour (Edmond Girasek)
7. week: Inequalities in Health (Edmond Girasek)
8. week: The pharmaceutical Aspects of Intercultural (Bence Döbrössy)
9. week: Technology and Society (Zsuzsa Györfly)
10. week: Healthcare Systems (Edmond Girasek)

Topics of practical classes (pro week):

1. week: Principles of Medical Ethics (Jozsef Kovacs)
2. week: Competence and Capacity to Make Health Care Decisions. Informed Consent I. (Jozsef Kovacs)
3. week: Informed consent II. Confidentiality and Medical Records (Jozsef Kovacs)
4. week: End of Life Issues (Jozsef Kovacs)
5. week: Pharmacist-patient, pharmacist-pharmacist relationship. Pharmacist and society. Malpractice. Ethical Questions of Human Research. Ethical questions of organ transplantation. (Jozsef Kovacs)
6. week: Introduction to sociology. Basic Concepts The Pharmaceutical Aspects of Illness Behaviour (Edmond Girasek)
7. week: Inequalities in Health (Edmond Girasek)
8. week: The pharmaceutical Aspects of Intercultural (Bence Döbrössy)
9. week: Technology and Society (Zsuzsa Györfly)
10. week: Healthcare Systems (Edmond Girasek)

Schedule of consultations: None

COURSE REQUIREMENTS**Prerequisites:**

Pharmacology and Toxicology (theory) III.
History of Sciences, Propedeutics

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Students are expected to attend regularly the course and participation list will be recorded at the end of every lecture. Participating on at least 75% of the total number of lectures is a prerequisite for getting the signature needed to absolve the course. The maximum number of absences permitted: three absences from the classes

Requirements of signature:

Participation on at least 75% of the total number of classes is a prerequisite for getting the signature needed to absolve the course

Form of the semester-end examination: written

Scientific, course related researches, publications, essays:

List of teaching materials: (List of textbooks, hand-outs, scripts, etc.)

1. Conrad Fischer—Caterina Oneto (2016): Medical Ethics for the Boards. (Third edition) New York: McGraw-Hill Education. ISBN: 978-1-259-64121-3
MHID 1-25-964121-X
2. The textbook is available in the following bookshop: Medicina könyvesbolt, Budapest, IX. Üllői út 91/a (tel: 06-1-215-3786)
3. Graham Scrambler (ed) Sociology as Applied to Health and Medicine, Palgrave Macmillan 2018
Lectures: The power point slides of the lectures can be found at:
<http://semmelweis.hu/magtud/en/education/faculty-of-pharmacy>
The lecture slides are also available on Moodle

Physical Education IX.

Full name of the subject:	Testnevelés IX
Program:	undivided program (pharmaceutical)
Schedule:	full-time
Short name of the subject:	P.E.
English name of the subject: P	hysical Education IX.
German name of the subject:	Sport IX.
Neptun code of the subject:	GYKTSI116G9A
Type of registration:	obligatory
Responsible Department:	Semmelweis University, Physical Education and Sports Center

Responsible tutor:	Várszegi, Kornélia director Contact information: Phone: +36-20/825-0611 E-Mail: varszegi.kornelia@semmelweis.hu
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Name of the persons responsible for the teaching of the subject:	Lehel, Zsolt icehockey trainer Nagy-Kismarci, Bence cheerleading trainer Rimay, István football trainer Weisz, Miklós basketball trainer
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Classes per week:	1 hour practice
Credit point:	0

Professional content, intent of acquirement and it's function in order to implement the goals of the program:

The short-term goal of the course is to maintain and improve the students' current state of health, to create the physical conditions for a better quality of life by learning and practicing (new) branches of sports that can be practiced after graduation as well. The long-term goal is to improve the quality of life and life prospects of future physicians, and to provide students with credible preventive attitudes and life-style advice - so that they can represent those in their later practice, through their own health-promoting behavior.

Brief course summary:

Upon completion of the course the student will be able to carry out regular physical activity.
After completing the „beginner swimming” course, one will acquire water-confident swimming skills.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/semester	Normal course offer	Consultations
9 th semester	0	1	–	–	14	Autumn semester	–

Program of semester**Topics of theoretical classes (pro week): -****Topics of practical classes (pro week):**

You can register for the “independent sports activity” course as part of the Physical Education course in the Neptune system.

Every week, a questionnaire is sent to the students through the Neptune system:

- The questionnaire can be filled in from Monday to Sunday in a semester (no entries can be made in advance or afterwards).
- Students must assure themselves that they have completed the questionnaire truthfully.
- It is a minimum requirement for the signature that a training of 1 × 60 minutes per week is completed (to be 10 times responses) and this is recorded in the questionnaire.

Other way, Free of charge:

2x90 mins./week sport training (competitive sport, for qualified only): cheerleader, female’s football, men’s football, handball, basketball, volleyball, waterpolo

Prerequisites: Prerequisites Physical Education I – VIII.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

The student who completes the independent sport activity course is also supposed to attend 10 classes and record their participation in the weekly sent UniPoll questionnaire.. Practice leaders follow an online presence registration at the beginning and end of the lessons, which can be individually tracked on semmelweis.hu/sportkozpont homepage.

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes!

Requirements of signature:

Active participation in practice classes 10 times (trainings 15 times) under the conditions described above.

Type of the semester-end examination: signature

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Form of the semester-end examination: -

The possibility and conditions for offering grades:

Active participation in practice classes 10 times (trainings 15 times) under the conditions described above.

May be exempted from attending classes the student who

1. whose diagnosis and the opinion of the sports doctor do not allow to exercise, and submits a certificate
or
2. does sports regularly and submits a certificate of association and federation in the neptun system in the exemption period preceding the semester.

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: individual assesment basis

If the subject is not passed, it can be retaken with special permission.

The course description was prepared by: Kornélia Várszegi

Drug Licensing (theory+practice)

Full name of the subject:	Gyszeripari és gyógyszerfelügyeleti, hatósági ismeretek_Gyógyszerengedélyezés (elmélet+gyakorlat)
Program:	undivided program (pharmaceutical)
Schedule:	full-time
Short name of the subject:	-
English name of the subject:	Knowledge of the Pharmaceuticoindustrial and Pharmacovigilance Authorities - Drug Licensing (theory+practice)
German name of the subject:	Behördenkenntnisse der pharmazeutischen Industrie und Arzneimittelüberwachung - Arzneimittelzulassung und Registrierung (Vorlesung+Praktikum)
Neptun code of the subject:	GYKGYI102G1A
Type of registration:	obligatory
Responsible Department:	Semmelweis University, Department of Pharmaceutics
Responsible tutor:	<i>Prof. Antal István</i> professor, Dr. habil phone: 061-217-0914 email: antal.istvan@semmelweis.hu
Name of the persons responsible for the teaching of the subject:	<i>Dr. Miléna Lengyel</i> Assistant professor, PhD Phone: +36-1-459-1500 Extension: 53069 E-mail: lengyel.milena@semmelweis.hu <i>Dr. Romána Zelkó</i> University Professor, Dr. habil <i>Dr. Nikolett Kállai-Szabó</i> Associate Professor, PhD <i>Dr. Bálint Basa</i> PhD Student, PharmD <i>Dr. Herta Pálfiné Goóts</i> invited lecturer, PhD <i>Dr. Zsófia Kohod</i> PharmD
Classes per week:	12/sem lectures, 12/sem practices
Credit point:	1

Professional content, intent of acquirement and it's function in order to implement the goals of the program:

The purpose of the subject is to review the authorization process of medicines and preparations that cannot be considered medicines, but are sold in pharmacies, as well as the aspects of the development and evaluation of the information and documentation that underpins this.

Short description of the subject: Students will learn the basics of marketing authorization, the regulatory environment and system of requirements that determine the content and form requirements of technical documentation, including drug quality, as well as the tasks related to the application for marketing authorizations, official evaluation and the maintenance of authorizations. The subject provides an overview of industrial and official processes prior to placing on the market. It presents, in general, the activities and knowledge materials required for maintaining and amending the license after obtaining it.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
9th semester	12	12	-	-	24	Autumn semester	-

Program of semester

Topics of theoretical classes (2-week block in the 1-2. weeks of semester)

1. Introduction. Importance of licensing, legal environment, application
2. Drug authorization processes. Modification processes of already authorized pharmaceutical products.
3. Border area products and non-pharmaceutical products distributed in the pharmacy
4. The planning process for the development of original medicines
5. The planning process for the development of generic drugs
6. Planning process for the development of generic added value medicines
7. Biological medicines and biosimilar preparations
8. Planning of WEU and its traditional development
9. Official evaluation of medicines
10. Quality assurance related to drug licensing
11. Audits and inspections in pharmaceutical production
12. Pharmacovigilance of medicines
13. Instructions for use in everyday life, OTC preparations

Topics of practical classes:

During the exercises, students acquire additional knowledge about the content of the registration documentation in parallel with the theoretical lessons,

- on the structure of Common Technical Documentation
- about the QP declaration,
- on the practical implementation of the amendment of marketing authorizations.

Schedule of consultations: on demand

Prerequisites:

Pharmaceutical Technology IV.
Pharmacy Administration I.

The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their upgrading retake (as provided in §§ 25-28 of the STUDY AND EXAMINATION REGULATIONS):

Attendance of lectures and practicals expected according to study regulations. The written exam (Moodle test on Sept. 29.) or makeup exam (3. educational week) must be passed ("accepted"). The overview lecture slides will be published on Moodle.

Requirements of signature:

Attendance of lectures and practicals expected according to study regulations

Type of the semester-end examination: practical grade

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term. The written exam or makeup exam must be passed, min 50% ("accepted").

Form of the semester-end examination: written

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: individual assesment basis

The course description was prepared by: Dr. Antal István

Pharmacovigilance and pharmacoepidemiology (theory+practice)

Full name of the subject:	Gyógyszeripari és gyógyszerfelügyeleti, hatósági ismeretek - Farmakovigilancia és farmakoepidemiológia (elmélet+gyak
Program:	undivided program (pharmaceutical)
Schedule:	full-time
Short name of the subject:	-
English name of the subject:	Knowledge of the Pharmaceuticoindustrial and Pharmacovigilance Authorities - Pharmacovigilance and pharmacoepidemiology (theory+practice)
German name of the subject:	Behördenkenntnisse der pharmazeutischen Industrie und Arzneimittelüberwachung - Pharmakovigilanz und Pharmakoepidemiologie (Vorlesung+Praktikum)
Neptun code of the subject:	GYKGYI103G1A
Type of registration:	obligatory
Responsible Department:	Semmelweis University, Department of Pharmaceutics
Responsible tutor:	Prof. Antal István professor, Dr. habil phone: 061-217-0914 email: antal.istvan@semmelweis.hu
Name of the persons responsible for the teaching of the subject:	Dr. Miléna Lengyel Assistant professor, PhD Phone: +36-1-459-1500 Extension: 53069 E-mail: lengyel.milena@semmelweis.hu Dr. Tamás Tábi Associate Professor, Ph.D Dr. Panka Kónya invited lecturer, Ph.D. Dr. Attila Oláh invited lecturer, Ph.D. Dr. Orsolya Szokolóczy invited lecturer, Ph.D. Dr. Zoltán Barna invited lecturer, PharmD Dr. Bálint Basa PhD Student, PharmD Dr. Zsófia Kohod PharmD
Classes per week:	4/sem lectures, 4/sem practices
Credit point:	1

Professional content, intent of acquirement and it's function in order to implement the goals of the program:

The aim of the course is to provide information on the national and European pharmacovigilance system established to promote the safe use of medicines and its importance to the pharmaceutical industry.

Short description of the subject:The lectures will cover the most common mechanisms of adverse drug reactions, the industry and regulatory system of adverse drug reaction reporting and evaluation, with special emphasis on the national and EU practice. The course will cover the detection and investigation of new risks from drug safety data, the continuous monitoring and evaluation of the benefit/risk ratio of medicines, the proactive management of drug-related risks and their effective communication.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/semester	Normal course offer	Consultations
9th semester	4	4	–	–	8	Autumn semester	–

Program of semester**Topics of theoretical classes (pro week)**

1. Importance of pharmacovigilance, regulations (GVP) and regulatory hierarchy, definitions (AE, ADR), special situations
2. QPPV person's tasks, responsibilities, obligations
3. Duties of a pharmacovigilance specialist, "how a day goes by", in which areas they work (industry, authority, etc.)
4. The relationship of pharmacovigilance with other areas, e.g. registration, quality assurance, drug development (clinical and post-marketing studies), marketing, etc.

Topics of practical classes (pro week):

1. Sources of side effect reporting, literature review,
2. Side effect reporting sheet and its parts,
3. Actions related to notifications, e.g. follow-up, targeted follow-up
4. Process and manner of reporting to authorities.

Schedule of consultations: On request

Prerequisites:

Pharmacology and Toxicology III.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup: On individual consultation.

The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their upgrading retake (as provided in §§ 25-28 of the STUDY AND EXAMINATION REGULATIONS):

Moodle test at the last day of course (Sept 29.) Successful written exam (min. 2.00, min 50%) is accepted.

Requirements of signature:

Attendance according to Study and Examination Regulations (max. 25% absence)

Type of the semester-end examination: practical grade

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Form of the semester-end examination: written

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: individual assesment basis

The course description was prepared by: Dr. Antal István

Quality Assurance (theory+practice)

Full name of the subject:	Gyógyszeripari és gyógyszerfelügyeleti, hatósági ismeretek - Minőségbiztosítás (elmélet+gyakorlat)
Program:	undivided program (pharmaceutical)
Schedule:	full-time
Short name of the subject:	Quality Assurance
English name of the subject:	Knowledge of the Pharmaceuticoindustrial and Pharmacovigilance Authorities - Quality Assurance (theory+practice)
German name of the subject:	Behördenkenntnisse der pharmazeutischen Industrie und Arzneimittelüberwachung - Qualitätssicherung (Vorlesung+Praktikum)
Neptun code of the subject:	GYKGYI104G1A
Type of registration:	obligatory
Responsible Department:	Semmelweis University, Department of Pharmaceutics
Responsible tutor:	Prof. Antal István professor, Dr. habil phone: 061-217-0914 email: antal.istvan@semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Dr. Miléna Lengyel Assistant professor, PhD
 Phone: +36-1-459-1500 Extension: 53069
 E-mail: lengyel.milena@semmelweis.hu
Dr. Romána Zekó University Professor, Dr. habil
Dr. Nikolett Kállai-Szabó Associate Professor, Ph.D.
Dr. Bálint Basa PhD Student, PharmD
Dr. Lívía Gál invited lecturer, PharmD
Dr. Bulcsú Rác invited lecturer Ph.D.
Dr. Dávid Szegvári invited lecturer Ph.D.

Classes per week:	4/sem lectures, 4/sem practices
Credit point:	1

Professional content, intent of acquirement and it's function in order to implement the goals of the program:

The aim of the course is to familiarise students with the specific aspects of quality assurance in the pharmaceutical industry and the responsibilities arising from the legal framework.

Short description of the subject: Students will be introduced to the most important activities, such as change management, risk management, variance investigation, OOS results management, qualification, validation, cross_contamination prevention, stability testing, microbiological issues, contaminants, etc. In the classroom exercises, students will be able to follow a risk management and investigation process.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
9th semester	4	4	–	–	8	Autumn semester	–

Program of semester**Topics of theoretical classes (pro week)**

1. Basics of pharmaceutical quality assurance
2. Responsibilities of the authorised person (QP), release of batches
3. Risk management, risk-based GMP
4. Investigation of manufacturing deviations, OOS
5. Qualification and process validation
6. Audits, inspections
7. Release (parametric, "real-time")
8. Process analysis, PAT

Topics of practical classes (pro week):

1. Liberation
2. Risk analysis
3. Change management
4. Elements of PAT, typical methods, examples of PAT application

Schedule of consultations: On request

Prerequisites:

Pharmaceutical Technology IV.

Pharmacy Administration I.

Conditions of attending the classes, amount of acceptable absents, way of presentation of

leave, opportunity for makeup: max. 25% absence, according to the Study and Examination Rules, makeup on individual request

The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their upgrading retake (as provided in §§ 25-28 of the STUDY AND EXAMINATION REGULATIONS):

Attendance of lectures and practicals expected according to study regulations. The written exam (Moodle test on Sept. 29.) or makeup exam (3. educational week) must be passed ("accepted"). The overview lecture slides will be published on Moodle.

Requirements of signature:

Attendance according to Study and Examination Rules, max. 25% absence, attendance at visits at pharmaceutical plants

Type of the semester-end examination: practical grade

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Form of the semester-end examination: written

A list of the basic notes, textbooks, resources and literature that can be used to acquire the knowledge necessary to master the curriculum and to complete the assessments: Lecture slides will be published on Moodle. All necessary information for the successful exam can be found on the slides, however, the presenters provide deeper understanding of the schematic information slides.

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: individual assesment basis

The course description was prepared by: Dr. Antal István

Drug innovation and clinical examinations (theory+practice)

Full name of the subject:	Gyógyszeripari és gyógyszerfelügyeleti, hatósági ismeretek - Gyógyszerinnováció és klinikai vizsgálatok (elmélet+gyakorlat)
Program:	undivided program (pharmaceutical)
Schedule:	full-time
Short name of the subject:	Drug innovation and clinical examinations
English name of the subject:	Knowledge of the Pharmaceuticoindustrial and Pharmacovigilance Authorities – Drug innovation and clinical examinations (theory+practice)
German name of the subject:	Behördenkenntnisse der pharmazeutischen Industrie und Arzneimittelüberwachung - Arzneimittelinnovation und klinische Studien (Vorlesung+Praktikum)
Neptun code of the subject:	GYKGYI105G1A
Type of registration:	obligatory
Responsible Department:	Semmelweis University, Department of Pharmaceutics
Responsible tutor:	Prof. Antal István professor, Dr. habil phone: 061-217-0914 e-mail: antal.istvan@semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Dr. Miléna Lengyel Assistant professor, PhD
phone: +36-1-459-1500 Extension: 53069
e-mail: lengyel.milena@semmelweis.hu
Dr. Romána Zelkó University Professor, Dr. habil
Dr. Nikolett Kállai-Szabó Associate Professor, Ph.D.
Dr. Bálint Basa PhD Student, PharmD
Dr. Ágnes Mészáros Associate Professor, Ph.D.
Dr. Szabolcs Barótfi invited lecturer, Ph.D.
Dr. Éva Kollár invited lecturer
Dr. István Laszlovszky invited lecturer

Classes per week:	8/sem lectures, 8/sem practices
Credit point:	1

Professional content, intent of acquirement and it's function in order to implement the goals of the program:

The purpose of teaching the subject is for the student to master the most important theoretical and practical aspects necessary for the innovation activity of pharmaceutical products, with particular regard to the development of original and generic products, industrial property rights protection, and aspects of clinical trials.

Short description of the subject: The topic of the subject includes the pharmaceutical aspects of pharmaceutical innovation and research and development, the basics of strategic planning of products, the basics of industrial rights protection and the patentability of inventions, as well as the most important issues of drug development and licensing of original, generic and super-generic (innovative drug technology) preparations.

In addition, the subject aims to summarize the phases, significance, objectives and course of clinical trials based on the GCP directive, and also to provide insight into the related ethical aspects.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/semester	Normal course offer	Consultations
9th semester	8	8	–	–	16	Autumn semester	–

Program of semester

Topics of theoretical classes (pro week)

1. Pharmaceutical innovation from the perspective of industry
2. Pharmaceutical research and development today, opportunities, limitations, trends
3. Pharmaceutical industry aspects of industrial law protection
4. Regulatory environment for drug development and licensing
5. Development of original, generic, generic+ preparations: preclinical and clinical studies
6. Clinical trials in research and development
7. Phases of a clinical trial, authorisation, ethical aspects

Topics of practical classes (pro week):

1. Strategic planning, life cycle, product life curve theory, BCG matrix
2. Patent description structure and content aspects
3. Clinical trial protocol
4. Practical conduct of clinical tests,
5. Statistical evaluation

Schedule of consultations: On request

Prerequisites:

Pharmacology and Toxicology III.
Pharmaceutical Technology IV.

Conditions of attending the classes, amount of acceptable absents, way of presentation of

leave, opportunity for makeup: max. Attendance as in STUDY AND EXAMINATION REGULATIONS, makeup on individual request in the 3. week of the semester

Requirements of signature:

Attendance (max. 25% absence) attendance at visit at pharmaceutical plants

Type of the semester-end examination: practical grade

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Form of the semester-end examination: written

A list of the basic notes, textbooks, resources and literature that can be used to acquire the knowledge necessary to master the curriculum and to complete the assessments: Lecture slides and practical documents can be found on Moodle

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: individual assesment basis

The course description was prepared by: Dr. Antal István

Pharmaceutical Care (theory+practice)

Full (Hun) name of the subject:	Gyógyszerészi gondozás (elmélet+gyakorlat)
Program:	Undivided program (pharmaceutical)
Schedule:	full-time
Short name of the subject:	
English name of the subject:	Pharmaceutical Care (theory+practice)
German name of the subject:	Pharmazeutische Betreuung (Vorlesung+Praktikum)
Type of registration:	obligatory/obligatory elective/elective/criteria requirement
Neptun code of the subject:	GYKEGY096E1A
Responsible Department:	University Pharmacy
Responsible tutor:	<i>Dr. Ágnes Mészáros</i> associate professor, Ph.D., Dr. Habil. Phone: 06-20663-2460 E-Mail: meszaros.agnes@semmelweis.hu
Name of the persons responsible for the teaching of the subject:	<i>Dr. Romána Zelkó</i> Professor, PhD, DSc <i>Dr. Dénes Kleiner</i> PhD
Class per week:	2 lecture(s) 3 practice(s)
Credit point(s):	4

Professional content, intent of acquirement and it's function in order to implement the goals of the program:

The objective of the course is to provide an overview of the pharmacist's activities and services with a special focus on the community, on pharmaceutical care and medication therapy management, patient education. Its task is to provide knowledge on professional skills required in the pharmacy.

Short description of the subject:

The course wishes to discuss essential topics in relation to personalised, safe and effective medication therapy management (including drugs, herbal supplements as well as medical devices), lifestyle issues and travel medicine. It enables the student to apply the knowledge acquired in everyday practice.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
9th semester	20	30	–	–	50	Autumn semester* Spring semester Both semesters (* Please underline)	–

Program of semeste

Topics of theoretical classes (pro week):

1. The Concept of Pharmaceutical care, patient safety-clinical check of prescriptions
2. Individual therapy with magistral preparation (compounding)
3. Management of side effects of cytotoxic drugs
4. Special drug forms in the elderly and in children
5. Inhalation therapy management, Asthma/COPD and Smoking cessation
6. Geriatrics and its relation to therapy management
7. Special aspects of medication in Pregnancy
8. LMWH and NOAC therapy management
9. Bandages and wound healing
10. Patients with disabilities (language, attitude ...) in the Pharmacy

Topics of practical classes (pro week):

1. Compliance, Adherence, Persistence
2. Patient education with prescription drugs, with the example of anti-hypertensive drugs
3. Management of diabetes and insulin therapy, use of insulin-pens, blood sugar measurers
4. Pharmaceutical care in relation to antibiotic therapy
5. Patient education in case of OTC drugs
6. Travel Medicine
7. Perioperative Medicine
8. New therapeutic challenges with cannabis
9. Hygiene and antiseptics
10. Safe medication management: presenting a case study

Other subjects (both obligatory and optional) relating to the transversal issues of the subject. Possible overlaps between subjects:

Schedule of consultations:

COURSE REQUIREMENTS

Prerequisites: Pharmacology and Toxicology III., Pharmaceutical Technology IV.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup: According to the university's Study and examination guide.

The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments, (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their upgrading retake (as provided in §§ 25-28 of the STUDY AND EXAMINATION REGULATIONS):

Requirements of signature (as provided for in STUDY AND EXAMINATION REGULATIONS § 29):

Attending 75% of the practices and completion of the case study

Number and type of projects students have to perform independently during the semester and their deadlines:

A presentation, as it is scheduled.

Type of the semester-end examination: signature*/practical grade*/comprehensive examination*/final/end-term examination*

* Please underline

Examination requirements: (list of topics, test examination topics, mandatory parameters, diagrams, concepts, list of calculations, practical skills, and project tasks recognised as examinations, criteria for completion and assessment):

Completely accessible on the Moodle platform.

Form of the semester-end examination: written*/oral*/combined examination/practical examination/the assessment of completing project work (according to STUDY AND EXAMINATION REGULATIONS 30.§)* (*Please underline*)

The possibility and conditions for offering grades:

At least 80% of correct answers on questions related to the lectures enables the omission of "question A" at the semi-final oral exam.

A list of the basic notes, textbooks, resources and literature that can be used to acquire the knowledge necessary to master the curriculum and to complete the assessments, **with exact description about which of them is required to acquire which part of the syllabus (e.g. description based on topics), as well as the main technical and other aids and study aids that can be used:**

Filipa Alves da Costa, J. W. Foppe van Mil, Aldo Alvarez-Risco: The Pharmacist Guide to Implementing Pharmaceutical Care. Springer, 2019.

file:///C:/Users/zelko/Downloads/ibook.pub-the-pharmacist-guide-to-implementing-pharmaceutical-care.pdf

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission**:**
no

The course description was prepared by: Dr. Mészáros Ágnes

Pharmaceutical Management (theory+practice)

Full (Hun) name of the subject: Gyógyszerészi gazdálkodás és menedzsment (elmélet+gyakorlat)
Program: Undivided program (pharmaceutical)
Schedule: full-time
Short name of the subject:
English name of the subject: Pharmaceutical management (theory+practice)
German name of the subject: Pharmazeutische Management (Vorlesung+Praktikum)

Type of registration: obligatory/obligatory elective/elective/criteria requirement

Neptun code of the subject: GYKEGY093E1A

Responsible Department: University Pharmacy

Responsible tutor *Dr. Ágnes Mészáros* associate professor, Ph.D.
Contact information: Phone: 06-20663-2460
 E-Mail: meszaros.agnes@semmelweis.hu

Name of the persons responsible for the teaching of the subject:
Dr. Romána Zelkó professor, Ph.D., DSc.

Class per week: 1
Credit point(s): 2

Professional content, intent of acquirement and it's function in order to implement the goals of the program:

The aim of this course is to introduce topics of management and administration of a Pharmacy (community and hospital) through practical examples and to prepare students for future pharmacy practice.

Short description of the subject:

In the framework of the course, the student will learn about the operation of community and hospital pharmacies with particular focus on the activities of pharmacists; it wishes to provide an insight into the management issues (inventory management, dispensing) and other professional competences.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/semester	Normal course offer	Consultations
9th semester	10	10	–	–	20	<u>Autumn semester*</u> Spring semester Both semesters (* Please underline)	–

Program of semester**Topics of theoretical classes (pro week):***Community Pharm. Management*

6. Responsibilities, duties of the Pharmacist
7. Logistics and stock control; inventory models in pharmacy practice
8. "New" Pharmaceutical activities (vaccination, public health issues)
9. Hospital Pharm. Management:
10. Drug and therapeutic committee
11. Handling of Drug shortages

Topics of practical classes (pro week):*Community Pharm. Management*

1. The Medical Prescription
2. Dispensing robots in the community pharmacy
3. Establishment of a Pharmacy

Hospital Pharm. Management:

1. The Unit Dose Dispensing system
2. Drug Shortage case report

Other subjects (both obligatory and optional) relating to the transversal issues of the subject. Possible overlaps between subjects:

Schedule of consultations:**COURSE REQUIREMENTS**

Prerequisites: Pharmacoeconomics

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

According to the university's Study and examination regulations

The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments, (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their upgrading retake (as provided in §§ 25-28 of the STUDY AND EXAMINATION REGULATIONS):

Requirements of signature (as provided for in STUDY AND EXAMINATION REGULATIONS § 29):

Attending 75 % of the practices.

Number and type of projects students have to perform independently during the semester and their deadlines:

-

Type of the semester-end examination: signature*/practical grade*/ comprehensive examination*/final/end-term examination*

* Please underline

Examination requirements: (list of topics, test examination topics, mandatory parameters, diagrams, concepts, list of calculations, practical skills, and project tasks recognised as examinations, criteria for completion and assessment):

Completely accessible on the Moodle platform.

Form of the semester-end examination: written*/oral*/combined examination/**practical examination/the assessment of completing project work (according to STUDY AND EXAMINATION REGULATIONS 30.§)***

(* Please underline)

The possibility and conditions for offering grades: -

A list of the basic notes, textbooks, resources and literature that can be used to acquire the knowledge necessary to master the curriculum and to complete the assessments, **-with exact description about which of them is required to acquire which part of the syllabus (e.g. description based on topics)), as well as the main technical and other aids and study aids that can be used:**

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission**:**

yes*/no*/on and individual assessment basis*

(* Please underline)

The course description was prepared by: Dr. Mészáros Ágnes

Clinical Pharmaceutics (theory+practice)

Full (Hun) name of the subject: Klinikai gyógyszerészet (elmélet+gyakorlat)
Program: Undivided program (pharmaceutical)
Schedule: full-time
English name of the subject: Clinical Pharmaceutics (theory+practice)
German name of the subject: Klinische Pharmazie (Vorlesung+Praktikum)

Neptun code of the subject: GYKEGY100E1A

Responsible Department: University Pharmacy

Responsible tutor *Dr. Ágnes Mészáros* associate professor, Ph.D., Dr. Habil
 phone: 206632460
 e-Mail: meszaros.agnes@semmelweis.hu

Name of the persons responsible for the teaching of the subject:
Dr Romána Zelkó professor, Ph.D., D.Sc.
Dr. Dénes Kleiner Ph.D.

Classes per week: 1,2 lecture(s)
 1,2 practice(s)

Credit point(s): 1

Professional content, intent of acquirement and its function in order to implement the goals of the program:

Clinical Pharmaceutics aims to give an overview on the most important areas of hospital pharmacy and activities of a hospital (clinical) pharmacist.

Its task is to provide selected knowledge on professional skills required in the hospital pharmacy.

Short description of the subject:

The course covers the tasks of the hospital (clinical) pharmacists, while it focuses on essential services and activities. It also gives an overview of selected disease groups that affect a large population. The topics are discussed in the form of a theoretical lectures, that is followed by a seminar/ practice.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
9th semester	10	10	–	–	20	<u>Autumn semester*</u>	–

Program of semester**Topics of theoretical classes (pro week):**

1. Clinical Pharmacy and Medication reconciliation
3. Anaesthesia and surgery
5. Essentials in Paediatrics
7. Essentials in Cardiology
9. Renal failure and drug therapy management and a lecture on Case studies

Topics of practical classes (pro week):

1. Therapeutic decision making and the Drug Formulary
2. Anaesthesia and surgery
3. Essentials of therapy in Paediatrics
4. Essentials of therapy in Cardiology
5. Cytotoxic infusion production and a Case study – Project work

Other subjects (both obligatory and optional) relating to the transversal issues of the subject.**Possible overlaps between subjects:**

Pharmacotherapy
Pharmaceutical care

Schedule of consultations:**COURSE REQUIREMENTS**

Prerequisites: Pharmacology and Toxicology III., Pharmaceutical Technology IV

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

According to the university's Study and examination regulations.

Requirements of signature (as provided for in STUDY AND EXAMINATION REGULATIONS § 29):

Attending 75% of the practices and completion of the case study/ project work.

Number and type of projects students have to perform independently during the semester and their deadlines:

Completion of the project work by end of the term.

Type of the semester-end examination: signature*/practical grade*/ comprehensive examination*/final/end-term examination*

* Please underline

Examination requirements: (list of topics, test examination topics, mandatory parameters, diagrams, concepts, list of calculations, practical skills, and project tasks recognised as examinations, criteria for completion and assessment): Completely accessible on the Moodle platform.

Form of the semester-end examination: written examination

The possibility and conditions for offering grades:

At least 80% of correct answers on questions related to the lectures and practices, with the completion of the case study with good or excellent result.

A list of the basic notes, textbooks, resources and literature that can be used to acquire the knowledge necessary to master the curriculum and to complete the assessments, **-with exact description about which of them is required to acquire which part of the syllabus (e.g. description based on topics), as well as the main technical and other aids and study aids that can be used:**

Marc Mitchell (Editor), Melanie Snelling (Editor), Nicola Stoner (Editor), Philip Wiffen (Editor): Oxford Handbook of Clinical Pharmacy; Oxford University Press; 3rd edition, 2017

The course description was prepared by: Dr. Mészáros Ágnes

10. SEMESTER 2022/2023/2

Subject	Lecture	Practice (hour/sem.)	Credit	Prerequisites	Exam type
Obligatory Practice e Before the Board Exam (4 months)II. GYKANG133G2A	–	40	16**	Obligatory Practice I.	practical mark
Diploma Defence GYKSZD134E1A	1/sem.	–	10**	Diploma Work II.	final*
Principles of Professional Ethics II. GYKANG071E2A	–	–	–		signature
Elective or obligatory elective subjects	–	–	–		examination or practical mark
Total:	1/sem.	40	26		

* Counts to the qualification of the diploma

EVALUATION OF PROGRESS

Grading system

- a) Five-scale
 - excellent (5)
 - good (4)
 - average/fair (3)
 - satisfactory/pass (2)
 - unsatisfactory/fail (1)
- b) Three-scale
 - excellent (5)
 - fair (3)
 - fail (1)

Types of evaluation

1. Practical course grade (gyakorlati jegy) (according to either the 5-scale or the 3-scale grading system)
2. Semi-final examination (kollokvium) Evaluation of a one-semester subject matter (1–5 grading system)
3. Final examination (szigorlat) Evaluation of the whole subject matter (1–5 grading system)
4. Obligatory practice at hospital (3-scale grading system)

Average Results

When the student has taken all the obligatory examinations and fulfilled every other obligation during the examination period, the semester will be validated in the student's lecture book by the Dean's signature.

The student's average results are:

Outstanding	(kitűnő)	if the average is 5.00
Excellent	(jeles)	if the average is 4.51–4.99
Good	(jó)	if the average is 3.51–4.50
Satisfactory	(közepes)	if the average is 2.51–3.50
Pass	(elégséges)	if the average is 2.00–2.50

EXEMPTION

Exemption **from courses** and examinations may be granted on the basis of the student's previously documented studies or additional credit-by-examinations stipulated by the departments. The student must submit all relevant documents at the departments concerned. Exemption may be granted by the Educational Board of each Faculty on the basis of the department's written prior approval. "Checking" exams can be prescribed by the departments. PE exemption: Only under condition the diagnosis is checked by a licensed Hungarian health care practitioner, too.

Application deadline: Prior to registration to the first and the second semester!

No reduction of tuition fee is granted in case of exemptions.

REQUIREMENTS FOR APPLICATION AND ADMISSION

Application Criteria

Applicants must be at least 18 years of age by the end of the calendar year of application, and preferably under the age of 30. Applicants are requested to either have completed high school/senior secondary school before the time of application, or to currently attend the last year of high school/secondary school. In the latter case, the Matriculation / School Leaving Certificate has to be uploaded into SEMAPHOR by the 21st of August the year of application.

Semmelweis University seeks students who possess a strong background and interest in natural sciences (particularly in biology and chemistry), a good command of English, and a strong motivation to study and practice medicine, dentistry, pharmaceutical sciences or other health care professions.

Applications should be submitted online in SEMAPHOR (Semmelweis Application Handling and Online Review) system at <https://semaphor.semmelweis.hu> **until the 31st of May.**

The following documents are required to be uploaded (original, or as certified copies, in English or in the original language with a certified English translation).

1. **Matriculation / School Leaving Certificate** from an accredited high school / senior secondary school. Registration number of documents should be indicated. If you are in your final year and have not yet received this certificate, you can still apply and take the entrance examination. The final deadline for uploading the Matriculation Certificates is the 21st of August.
2. **Curriculum Vitae** (Resume) in English.
3. **Motivation letter**
4. **Copy of passport (or ID card for citizens of Schengen Area member countries)** with your personal data.
5. **Passport photo.**

Medical Certificate – Certification that the applicant is physically and mentally able to complete higher educational studies, and does not suffer from chronic or infectious diseases is requested from the successful applicants **for the acceptance of an offered admission.** The **certificate downloaded from the University's website** should be issued within 90 days before the date of uploading.

Applicants have to register (sign up) for the entrance examinations in SEMAPHOR after having submitted a valid application (and paid the Admission Procedure Fee). Registrations can only be withdrawn before the deadline for registration to the given examination. The absence of a registered applicant at the entrance examination is not considered as the withdrawal of registration but as an examination attended without valuable result.

COST OF THE PROGRAM FOR TWO SEMESTERS

Tuition fee for the 2021/2022 academic year

Medicine	USD 9,100 / semester
Dentistry	USD 9,100 / semester
Pharmaceutical Sciences	USD 6,000 / semester

The first year tuition fee (+ the enrollment fee – USD 220 payable in the 1st semester) should be paid in two installments (unless the Hungarian Visa regulations have different conditions):

Medicine	USD 9,320 (USD 9,100 tuition fee + USD 220 enrollment fee enrollment fee is payable once during the studies)
Dentistry	USD 9,320 (USD 9,100 tuition fee + USD 220 enrollment fee enrollment fee is payable once during the studies)
Pharmaceutical Sciences	USD 6,220 (USD 6,000 tuition fee + USD 220 enrollment fee enrollment fee is payable once during the studies)
Before February 1	Medicine USD 9,100 Dentistry USD 9,100 Pharmacy USD 6,000

Dentistry students pay additional material fee:

years 3, 4 & 5:	USD 3,600
(first semester:	USD 1,800
second semester:	USD 1,800)

Please note: the material fee is subject to change; also 2nd year students taking clinical subject(s) from the 3rd year have to pay material fee 3rd, 4th and 5th year students may apply for exemption from paying the material fee under certain conditions. Please inquire about the rule regarding eligibility for exemption at the **Directorate of International Studies**.

Students admitted to the 1st year are obliged to pay a deposit fee of USD 2000 to confirm their seat. The deposit fee is non-refundable.

Students failing a year or after passive status pay the sum of the year they join after the failure/ passive status.

Transfer students pay the highest tuition fee in force in the actual academic year.

Application fee for transfer students: USD 350 (non-refundable)

Enrollment fee for transfer students: USD 220 (payable together with the tuition fee)

The student admitted delaying the commencement of his/her studies is obliged to pay the tuition fee of that academic year when he/she starts his/her studies.

Payment Details

Payment can be either made by bank transfer to the USD joint account of the student or sent to the main USD account of Semmelweis University:

USD currency collective account

Account holder: Semmelweis University

Account Number (IBAN): **HU69117638420088301800000000**

Bank name: OTP Bank Nyrt.

Bank address: Nádor u. 6. 1051 Budapest, Hungary

SWIFT code (BIC): OTPVHUHB

USD currency main account

Account holder: Semmelweis University

Account Number (IBAN): **HU57117638420088101600000000**

Bank name: OTP Bank Nyrt.

Bank address: Nádor u. 6. 1051 Budapest, Hungary

SWIFT code (BIC): OTPVHUHB

To be identified, the student's Neptun ID (code) must be entered in the comment field when making the transfer: e.g. NK-123ABC (NK = Neptun Kód)

Personal checks and money orders are not accepted.

Please note that the above mentioned net amounts have to arrive to the account – the bank commission charges have to be paid by the student.

Important: *If the tuition fee is not credited to our bank account by the above deadlines, students have to pay a default charge to the university and may be suspended/dismissed.*

OTHER MEDICAL UNIVERSITIES IN HUNGARY

University of Szeged, Hungary

H-6720 Szeged, Dugonics square 13.

Phone: (+36-62) 544-000

Fax: (+36-62) 546-371

Foreign Students' Secretariat

Head: Andrea Lehocki-Balog

office.fs@med.u-szeged.hu

Tel.: + 36 62 545-458

University of Pécs, Medical School

H-7624 Pécs, Szigeti út 12., HUNGARY

General Medicine in English

Dentistry in English

Pharmacy

Livia Csildei (Ms.)

Head of the English Student Service Center

Tel.: +36 72/ 536-018

Fax: +36 72/ 536-110

E-mail: student.service.center@aok.pte.hu

University of Debrecen Medical and Health Science Center

International Education Center

Address: Nagyerdei krt. 98.

4032 Debrecen

Hungary

E-mail: info@edu.unideb.hu

Tel.: + 36 52 258-051, + 36 52 258-052

VISA AND RESIDENCE PERMIT INSTRUCTIONS

Application for Entry Visa & Residence Permit

Foreign nationals (**under visa obligation**) wishing to pursue studies in Hungary are required to apply for entry visa & residence permit (exceeding 90 days) in their home countries and enter the country on the entry visa issued by the Hungarian Embassy or Consulate.

The entry visa is valid for a single entry and up to 30 days of stay in Hungary. Within 3 DAYS upon arrival, you will have to register your address and within 30 DAYS you have to submit your application for the residence permit to the Immigration Office in Budapest.

The following documents are required for the application for the entry permit:

- A wholly and legibly completed **Application** for Residence Permit (+ INSET 14 – Purpose of Study or Student Mobility)
- a valid **passport** (valid for at least eighteen months at the time of submitting the application)
- two passport size color **photos** (not older than six months)
- **Letter of Acceptance** from the University
- **proof of payment of the tuition fee*** (you get it from the University after your tuition fee has arrived)
- **proof of financial means** ensuring livelihood in Hungary (bank statement about the balance of your credit card, cash, or a declaration by the parents that they will provide the funds for all your expenses in Hungary)
- an **application fee of 60 EUR**
- the Hungarian Embassy may ask for your flight reservation and air ticket
- the **address of your residence in Hungary**
- certification of **valid medical insurance** coverage in Hungary

REGISTRATION PROCEDURE FOR EU AND EEA CITIZENS

Citizens of the member states of the European Union and the European Economic Area are not required to obtain a student visa in order to enter Hungary for the purpose of studies. They will, however, be required to register their stay with the Immigration Office not later than 93 days, following their entry into Hungary.

The following documents are required for registration:

- **completed** Data Sheet for the Issuance of Registration Certificate and for the Registration of Residence
- **school certificate in Hungarian** from the secretariat of your college / university
- your **ID card or your valid travel document**
- **lease contract** (*lakásbérleti szerződés*) for the apartment (It has to specify the landlord's and your personal data – date and place of birth, mother's maiden name, permanent address, landlord's ID number, your passport number. The contract has to be signed by two witnesses.)*

If you stay with an acquaintance or a relative as a guest, a statement of admission (befogadói nyilatkozat) has to be attached by the owner of the apartment that you stay with them as a guest. If the apartment is your property, a property sheet (tulajdoni lap) has to be attached to verify it. If you rent the apartment through an agency and you signed a contract with the agency, the agency should provide the authorization received from the owner of the apartment.

- The administrative service fee charged for the issue of a registration certificate is HUF 1,000, payable by credit card at the Immigration office
- proof of funds to cover your expenses (bank statement for 3 months) – You may also be required to hand in maintenance statement signed by your parents.

*Citizens of countries in Africa, Asia, Eastern Europe (under visa obligation) and the Middle East are required to transfer the tuition fee for the first academic year in full before applying for the entry permit.

If you are the holder of the bank account (opened in your home country or in Hungary), it is sufficient to enclose a bank statement on the current balance. If the holder of the account is a parent or a relative, you should document that you have exchanged or drawn funds from ATMs in the amount of at least approx. USD 800 and enclose a photocopy of the bank card.

- copy of a valid medical insurance coverage in Hungary (EHIC card, contract with a private medical insurance company or a valid health insurance policy), but take the original too with you.

If you meet all conditions for residence in Hungary for a period longer than three months, the immigration authority will issue a Registration Certificate to you that contains the address of your first residence in Hungary. You will receive your ID card on spot and Address Card by mail. Please see below for how to reach the Immigration Office.

Application for residence permit for students from non-EU countries with a permanent residence visa

Within 30 days of your arrival in Hungary, you have to go to the Immigration Office to Clients' Service II. ("II. sz. Kirendeltség") to receive your residence permit and to register your accommodation in Hungary.

The following documents are required:

- your passport with your visa inside
- 1 passport-size photo
- your lease contract
- completed address registration form (signed by the owner of the property).

Please see below for how to reach the Immigration Office.

Application for residence permit for students from Non-EU countries with a permanent residence visa

After arriving in Budapest

Within **30 days** on arrival in Hungary, you have to go to the Immigration Office to Clients' Service II. ("II. sz. Kirendeltség") to receive your residence permit and to register your accommodation in Hungary.

The following documents are required:

- your passport with your visa inside
- 1 passport-size photo
- your lease contract
- completed address registration form (signed by the owner of the property)

Application for residence permit for citizens of Non-EU countries arriving without visa

You are required to submit your application for residence permit to the Immigration Office within 90 days after your arrival.

Documents required for the residence permit:

- passport valid for at least 3 more months longer than the period you are applying for (about 15 months)
- application form (Application for Residence Permit + INSET 14 – Purpose of Study or Student Mobility)
- address registration form („lakcímbejelentő”) signed by the owner(s) or an authorized person
- lease contract for the apartment (It has to specify the landlord's and your personal data: date and place of birth, mother's maiden name, permanent address, landlord's ID number, your passport number. The contract has to be signed by two witnesses.)
- 1 passport-size photo
- the administrative service fee charged for the issue of a registration certificate is HUF 18,000 payable by credit card at the Immigration office
- proof of funds to cover your expenses
- certification of valid medical insurance coverage in Hungary
- school certificate in Hungarian from the secretariat of your college /university.

Please see below for how to reach the Immigration Office.

Application for extension of residence permit for citizens of Non-EU countries

You are required to submit your application for extension of residence permit to the Immigration Office at least 30 days prior to the expiry of your present one.

Documents required for extension of residence permit:

- passport valid for at least 3 more months longer than the period you are applying for (about 15 months)
- application form (Application for Residence Permit + INSET 14 – Purpose of Study or Student Mobility)
- address registration form („lakcímbejelentő”) signed by the owner(s) or an authorized person
- lease contract for the apartment (It has to specify the landlord's and your personal data: date and place of birth, mother's maiden name, permanent address, landlord's ID number, your passport number. The contract has to be signed by two witnesses.)
- 1 passport-size photo
- the administrative service fee charged for the issue of a registration certificate is HUF 10,000 payable by credit card at the Immigration office
- proof of funds to cover your expenses
- certification of valid medical insurance coverage in Hungary
- school certificate in Hungarian from the secretariat of your college /university.

Please see below for how to reach the Immigration Office.

How to reach the Immigration Office in Budapest

The Immigration Office is located at the Twin Office Center Office Building, Szegedi út 35-37, 1135 Budapest (13th district), Hungary. Within the building, the Immigration Office is located at the Ground Floor, Clients' Service II. ("II. sz. Kirendeltség")

Office hours:

Monday	8:30 am to 1:00 pm
Tuesday	1:00 pm to 5:00 pm
Wednesday	8:30 am to 12:00 noon
Thursday	8:30 am to 1:00 pm
Friday	8:30 am to 12:00 noon

E-mail: bp2@bah.b-m.hu (It is possible to book an appointment in advance.)

To get there, please take buses number 20E, 30, 30A or 32 from the Keleti Railway Station („Keleti pályaudvar”) and get off at the bus stop named 'Szegedi út'.

REDUCTION OF TUITION FEE

1. Students may apply for a reduction after completing the first semester of the first academic year if their semester weighted average results were above 4.51. From the third semester the reduction is granted under an extra condition: from the end of the second semester, all their semester weighted average results have to be continuously above 4.51, including the weighted average of the second semester. The reduction is 10% of the tuition fee with average results above 4.51 and 15% with average result of 5.00. Students may apply for a reduction after completing each semester on condition they meet the above requirements, and in case they have completed all the obligatory semester subjects, and gained minimum 20 credits in each semester. No reduction is given in case of exemption from one or more subjects (except from PE). No reduction is given during retaken semesters on account of subjects already completed. Students eligible for the tuition fee reduction pay with 10-15% reduced tuition fee in the next semester.

Application deadlines:

first semester:	until the 15th of September
second semester:	until the 15th of February

2. Students taking just either one normal or one exempted "FM" course (regardless plus how many exam courses "CV") in a semester pay 50% of their semester tuition fee. Signing up solely for one or more exam courses "CV" also entitles for the 50% reduction. (Note: The permission can be granted upon the student's written request that has to be handed in at the Directorate of International Studies before starting the semester!)
3. **Tuition fee for the 6th year:**
In case the student completes all the rotations regardless whether the 1 week Transfusion course is completed at Semmelweis University or abroad, he/she has to pay 80% of the tuition fee valid in the academic year. The relevant acceptance letters should be handed in latest until December 15, 2021. Otherwise the student is not entitled for the reduction!

Please write a letter of request addressed to the Director of the Directorate of International Studies when applying for the 20% reduction!

HOW TO GET A CERTIFICATE WHICH PROVES THAT THE DIPLOMA ISSUED BY SEMMELWEIS UNIVERSITY IS IN CONFORMITY WITH THE EU REQUIREMENTS, AND A CERTIFICATE OF GOOD STANDING

The National Directorate General for Hospitals (Országos Kórházi Főigazgatóság; OKFŐ) congratulates you for being awarded a university healthcare degree by one of our Universities.

This brochure aims to briefly summarize the procedures of the OKFŐ that may be necessary to access the healthcare profession granted by your diploma, either in Hungary or abroad. Further information can be found on the OKFŐ's website.

After graduation your University has 30 calendar days to report the diploma details of the newly graduated students to the OKFŐ in order to get them listed in the National Basic Register of the Healthcare Professionals

Once you have your diploma listed in the Basic Register, you should decide if you intend to

- **leave Hungary and work abroad** (see point A) **OR**
- **stay and work in Hungary** (see point B)

We hope you find the information provided in this publication to be informative and helpful.

National Directorate General for Hospitals Directorate of
Human Resources Development

For the procedure please study the following document carefully:

https://semmelweis.hu/english/files/2021/05/information-for-foreign-graduates_2021.pdf

DECLARATION

for foreign citizens intending to work outside of Hungary

Personal details

Basic registration number:
Surname:
Given name:
Name at birth:
Mother's maiden name:
Place and date of birth:
Nationality:

I, (name) hereby declare that I am a healthcare professional with foreign citizenship and I do not intend to work in the area of healthcare in Hungary currently, the license to pursue healthcare activities – getting registered in the Operational Registry – is only necessary for the recognition of my professional qualification abroad. Due to the abovementioned it is not obligatory to have the membership of the chamber. I, furthermore, acknowledge that in case I return to Hungary to pursue healthcare activities, I will be required to become a member of the chamber.

Date:

.....
Signature

STUDENT CARD

How to order a new student card

1. To obtain a new student card, you must first have an official photo taken and provide your official signature at „Központi Okmányiroda” (Central Document Office) Address: 13th District, 110 – 112 Visegrádi utca.
You must take your residence permit and passport with you to the Központi Okmányiroda.
 2. There you will be given a NEK (Nemzeti Egységes Kártyarendszer) datasheet. This form has a 16-character identification number in the upper right corner.
 3. Log on to your Neptun site, go to 'Administration' and click on 'Student Card request' in the drop-down list.
A smiley:) will warn you not to add the hyphens when typing in your 16 character NEK identifier into yellow text box!
- 3/a. Click on the grey tab 'Add new' and type your 16 character NEK identifier into the blank called 'NEK azonosító'
- 3/b. then choose 'Demand type'. Check that your permanent (home) address is correct and shows up in the 'Street, number' text box.
Please note that you will also need your temporary (Hungarian) address written in the Neptun. This will serve for your temporary, A4-format student card you will receive at the Directorate of International Studies.

The plastic card **takes about 6-8 weeks** to be produced after being ordered from the Directorate of International Studies. You will need to **use the temporary, A4-format certificate** until you receive your official card. Please note that the temporary certificate is valid only for 2 month, after which time it must be renewed.

INSURANCE

By paying the tuition fee, and signing the insurance contract during - *or after* - registration, students are entitled to use the services offered under the insurance policy established on September 1, 2017 between Generali Biztosító Zrt and Semmelweis University.

You will receive an information sheet about the details of this insurance policy during the registration itself (or alternatively, you can also acquire the information sheet at the front desk of the Directorate of International Studies, or online through <https://semmelweiskft.hu>).

Throughout the duration of your studies, this insurance will cover the medical bills of outpatient and inpatient treatments provided by the designated health care service providers, as well as emergency medical care during the active semester(s). Details about terms and conditions found in „Customer information and General Provisions Governing Insurance Policies” as well as in the „Product Information on Generali’s Fee-for-Service Health Insurance”.

Living Costs

In addition to tuition, students may have the following expenses:

- In addition to tuition, students may have the following expenses:
- Expenses related to studies (student ID card, books, photocopying, etc.) about 200 EUR/semester
- Accommodation (depending on the size and the location of the flat, as well as on the number of students sharing it) about 250-350 EUR/month/person
- Living expenses (food, transport, miscellaneous) 200-250 EUR/month

FREQUENTLY ASKED QUESTIONS - FAQ-s

- **Where can I find the Directorate of International Studies?**

EOK (Basic Medical Science Center) 37-47 Tűzoltó utca, 1st Floor, room 1.604

- **What are the Directorate of International Studies's office hours?**

Monday 09.30 – 12.00

Tuesday 09.30 – 12.00

Wednesday closed

Thursday 10.00 – 12.00

Friday 10.00 – 12.00

- **How do I get my class schedule for the next term?**

You can check your schedule in your Neptun under Studies/Class schedule after subject registration.

- **How do I get a Student card?** – Read detailed information for the students of all faculties – Student Card Request (pdf)

- **How many credits do I need to graduate?**

General Medicine	360 credits
Dentistry	300 credits
Pharmacy	300 credits

- **How many credits do I have to earn per semester?**

Please see your semester curriculum in the Calendar. The amount of the required credits are set out by each semester's curriculum under the curriculum schedule.

Attention!

- **Training and Examination Regulations**

Section 26. The certificate of degree (Diploma)

The diploma, the certificate.

1. The credit value of subjects accomplished in other institutions of higher education and recognized by the University in a credit transfer procedure shall not exceed two-thirds of the credits required for the award of the diploma as defined by the qualification requirements.

- **How can I apply for the approval of the place of the summer practice?**

- **1. Summer practice at an Institution/Clinic of Semmelweis University**

No approval or certificate on completion is needed in this case. The completion is recorded in the Neptun system by the host Institution/Clinic. To organize your practice and ensure that you will be accepted you should contact the relevant Institution/Clinic and speak with your tutor.

Please note: some Semmelweis departments require that you do a special registration via Neptun for their summer practice. About details and departmental regulations, please consult your tutor.

- **2. Summer practice at an Institution/Clinic outside of Semmelweis University**

Approval of such summer practice is needed beforehand, and a certificate on completion must be submitted at registration to the next term. Please contact your registrar for details with specifics.

- **When and how do I have to submit the certification on my completed summer practice?**

Certificates on a completed summer practice outside Semmelweis University should be submitted to the Directorate of International Studies at the registration to the next term.

Please note: students are not allowed to proceed to the next year unless the form of completion is submitted to the Directorate of International Studies at registration.

Please use the downloadable forms at each Faculty.

Compulsary summer practices by Faculties:

year/Faculty	General Medicine	Dentistry	Pharmaceutical Sciences
1st	Summer Nursing Practice* (1 month) (*after 1st or 2nd year)	Summer Nursing Practice (2 weeks) Summer Dental Laboratory Practice (2 weeks)	–
2nd		–	Summer Practice I. (4 weeks)
3rd	Summer Internal Medicine Practice (1 month)	Summer Dento-Alveolar Practice (1 week)	Summer Practice II. (4 weeks)
4th	Summer Surgery Practice (1 month)	Summer General Dentistry Practice (4 weeks)	–

- **How much is the tuition fee per semester?**

The tuition fee is determined by the year of enrollment to the Program. Students who complete their studies continually (without failing a year) pay the same tuition fee every year (see the table below). Students who repeat a year due to failure or a passive semester, and students transferred from another university have to pay the tuition fee according to the year of enrollment at the course they are joining. Eg. a student enrolled in 2015/2016 academic year and failed a semester has to pay the tuition fee of those enrolled in 2016/2017.

year of enrollment/ Faculty	General Medicine	Dentistry	Pharmaceutical Sciences
2006.	6 100 USD	5 400 USD	5 400 USD
2007.	6 100 USD	5 400 USD	5 400 USD
2008.	6 100 USD	6 600 USD	5 400 USD
2009.	7 200 USD	8 000 USD	5 800 USD
2010.	8 000 USD	8 000 USD	6 000 USD
2011.	8 200 USD	8 200 USD	6 000 USD
2012.	8 500 USD	8 500 USD	6 000 USD
2013.	8 750 USD	8 750 USD	6 000 USD
2014.	8 750 USD	8 750 USD	6 000 USD
2015.	8 950 USD	8 950 USD	6 000 USD
2016.	9 100 USD	9 100 USD	6 000 USD
2017.	9 100 USD	9 100 USD	6 000 USD
2018.	9 100 USD	9 100 USD	6 000 USD
2019.	9 100 USD	9 100 USD	6 000 USD
2020.	9 100 USD	9 100 USD	6 000 USD
2021.	9 100 USD	9 100 USD	6 000 USD
2022.	9 100 USD	9 100 USD	6 000 USD

- **When is my tuition fee due?**

Generally:

Fall semesters: 31st of August

Spring semesters: 31st of January

The current deadlines of payment are **announced by the registrars before the beginning of every semester.**

Rules regarding tuition fee payment and penalty.

- Students have **one month** (counted from the first day of the semester) for paying the tuition fee of the given semester **without penalty.** (Please note that students cannot get a student certificate, a valid insurance or validation of their student card until their tuition fee is completely settled.)
- **After the semester's first month** has passed, the tuition fee can be paid with a default **penalty of 500 USD.**
- The **latest deadline** for paying the tuition fee and penalty is **the last day of the study period.** (Please note that students cannot register for any exam until their tuition fee plus penalty are completely settled.)
- **If the above final deadline is missed**, i.e. the tuition fee plus penalty are not settled by the end of the study period, the **tuition fee for the current semester can no longer be paid**, student's **status will remain active**, but **every signature** acquired and **every grade** earned by the student during the semester **will be deleted.**
- *Please take the above rules and deadlines seriously as they will be strictly enforced.*

- **What is my tuition per semester?**

All continuing students will remain on the same fee rate as when they first enrolled in the program. Students who take a semester off, failed a year, or transferred from another university has to pay the tuition fee of that specific year they join the program (again).

- **How can I ensure full payment of the tuition fee on time by bank transfer?**

To ensure full payment, please consider that a transfer fee is usually applied when sending money by bank transfer. When transferring the exact amount for the tuition fee, a transfer fee might be deducted from that amount, rendering your tuition fee deficient. Therefore, please contact your home bank prior to transferring the tuition fee and find out whether the bank deducts a transfer fee from the transferred amount. If yes, please pay the transfer fee in addition to the tuition fee.

Payment by wire transfer:

all payments can be made by wire transfer to Neptun joint account. Payments have to be made in USD.

USD currency joint account

Account holder: Semmelweis University

Account Number (IBAN): **HU69117638420088301800000000**

Bank name: OTP Bank Nyrt.

Bank address: Nádor u. 6. 1051 Budapest, Hungary

SWIFT code (BIC): OTPVHUHB

It is your responsibility to ensure timely and full payment of your tuition fee. It is important for you to keep in mind that checking whether the tuition fee has been paid properly is your responsibility. You are recommended to contact your registrar each term before the payment deadline to find out whether the tuition fee has arrived without any problem.

- **Am I eligible for a reduction of the tuition fee?**

Tuition fee reduction in the following case:

Excellent study record

Students may apply for a reduction if they completed all the obligatory subjects and gained at least 20 credits in the semester, and their weighted average is 4,51 or above continuously started from the first or the second semester of the first year. If the weighted average is 4,51 or above in the first semester a reduction can be granted in the second semester. If the weighted average is 4,51 or above only from the second semester then the reduction can be granted from the third semester. The reduction is 10% for students having a weighted average between 4,51 and 4,99, and it is 15% for students having a weighted average 5,00. Students who have a weighted average below 4,51 during their studies after the first year are no longer eligible for a reduction of the tuition fee. No reduction is given in case of exemption from one or more subjects.

- **How do I calculate my average?**

Study average means the *weighted average*, which is a way to measure a student's academic success in school. The weighted average is calculated from the grades and the credit points belonging to each subject. For each completed course for the previous semester, the number of credit points must be multiplied with the grade received. All subjects are added up and then this amount is divided by the total number of credits collected in the semester.

Example for one semester:

Anatomy:	grade of 3 for 9 credits	= 27
Basics of Biostatistics and Informatics:	grade of 4 for 3 credits	= 12
Hungarian Medical Terminology I.:	grade of 5 for 4 credits	= 20
Basics of Medical Physics:	grade of 5 for 3 credits	= 15
Medical Chemistry:	grade of 4 for 6 credits	= 24
Basics of Medical Chemistry:	grade of 5 for 3 credits	= 15
Medical Terminology:	grade of 5 for 2 credits	= 10
Physical Education I.		none

Σ : 27 + 12 + 20 + 15 + 24 + 15 + 10 = 123

Number of credits earned in the semester: 30

Weighted average from the first semester: 123/ 30 = 4.1

- **What is the difference between weighted average and cumulative weighted average?**

The weighted average and cumulative weighted average are based on grades given for each course taken and the number of credit hours specified for those courses over the specified period of time (one term for weighted average; more or all terms for cumulative weighted average). The difference between the two is that *weighted average* is calculated for one semester of the year and *cumulative weighted average* is based on two or more semesters of the individual.

- **What if I can't attend an exam or class at the time scheduled?**

Students are required by university regulations to present written justification stating the reasons of their absence. Upon returning to school after an absence, students should report to the department's office and present a doctor's note, if their absence was caused by medical reasons. Excuses not provided within 3 days after the missed exam or class will result in the absence being marked as an unexcused absence.

It should be noted that the student will be recorded absent even if s/he is absent for a valid reason such as sickness. In the case of absence with a valid reason, an official document that proves the reason of absence should be provided. The department has the right to reject any document of questionable credibility. If you are sick and cannot take the exam or class, you should telephone your tutor immediately and leave a message for the department office even if this is not the first day of your absence.

- **Do I have to pay a fine if in case of my absence from an exam remains uncertified?**

Yes. Please see „Extra curricular fees“ on the home page.

- **How do I pay my missed exam fees online?**

Go to Finances/ Payment

Transcribe item

Payment titles: Service

Service type: Missed exam fee (7450 HUF)

- **Do I have to pay for exams?**

Students have to pay for their second and third retake exam (3rd and 4th exam) for a given subject. Please see „Extra curricular fees“ on the home page.

- **How do I pay for my 3rd or 4th exam in a given subject?**

Log on to your Neptun account, go to „Finances“, choose „Payment“, then „Transcribe item“. Choose „Retake exam“, choose „Semester“ then the relevant subject from the list and finally click on „Create item“.

To pay online you will have to select 'Payment by credit card' from the two payment options offered to you.

EXEMPTION

- **Should I go directly to the department when applying for an exemption?**

Yes, except in case of Physical Education, summer practices and First Aid. Physical education medical certificates and certificates/degree proving the completion of summer practices/first aid course must be submitted to the Directorate of International Studies by registration to both semesters each year. For a physical education exemption you must also submit a letter of request describing your problem in a few words and apply for a permission to be exempted from the subject. The request letter must be addressed to the Directorate of International Studies.

For other subjects you must first get a blank exemption form from the Directorate of International Studies. Then, you must show the form and certificate of your previous studies to the competent department, which will be reviewed before granting an exemption from the subject. You need to get your exemption form signed and stamped at the department.

Important: the teacher must indicate the grade for the subject on the form. After having the form completed and stamped, you have to return it to the Directorate of International Studies for processing. If everything is OK with the form, your registrar will enter the given grade into the Neptun system and indicate it in your grade book. If you successfully complete the above, you have no further obligations regarding that particular subject.

Approved exemptions must be submitted to the Directorate of International Studies by the start of the semester!

- **Can I be exempted from Physical Education if I have a gym membership?**

No. You will not be exempt because of your gym membership so please do not apply for an exemption on these grounds.

What is the process of submitting a doctor's note for Physical Education exemption?

If you are requesting an exemption from physical education due to medical complications that inhibit you from partaking in physical activity for an indefinite time; you then must submit evidence to the Directorate of International Studies in Hungarian or in English language from a licensed health care practitioner that documents a diagnosis of a temporary physical or mental disability.

- **What do the so-called CV and FM exams mean?**

CV and FM are abbreviations. CV stands for the Hungarian term „Csak Vizsga”, meaning „Exam only”. The term indicates that the student has already received the signature for taking the course, that is, fulfilled the semester requirements and only the exam is missing, which can be taken in the following semester.

FM stands for the Hungarian term „Felmentett”, meaning „Exempt”. This term also indicates that the subject requirements have been fulfilled and student only needs to take the exam. The student is not obliged to take the course again, however since the subject is offered again, he/she can decide to do so. [Should the student decide to attend the course again, even though he/she has already fulfilled the requirements, the same rules shall apply to him/her as to those attending the class for the first time (Absence, attendance at classes, etc.)]

- **Do I have to fail a course at least once in order to be allowed to take the CV course in the next term?**

No. You can roll over all 3 exam opportunities to the following semester and take them as a CV course.

- **How many retake opportunities do I have in a semester and in an academic year?**

There are 3 exam opportunities in each subject per semester (1 exam, and 2 retakes) when the subject is offered as a normal or FM course. In the following semester – when the subject is offered as a CV course – only the remaining chances left from the previous semester can be used. There is a special 4th try once a year (the 3rd retake), which may be used exclusively in 1 chosen subject. After using this 4th exam opportunity in one subject, the student shall not have a 4th try in any other subjects; they also will not be granted “special permission” for a 5th opportunity. Please count your remaining exam opportunities carefully!

For example, if you use 2 exam opportunities for Biophysics II in the 2nd semester, you will have only one remaining opportunity for the retake in the following semester (plus the one extra (4th) chance, if you haven't used it already in that specific academic year in another subject).

- **What is a prerequisite?**

Prerequisites are courses that must be taken before another course. For example, Medical Chemistry is a prerequisite for Medical Biochemistry, Molecular and Cell Biology I.

Students must successfully complete Medical Chemistry before registering for Medical Biochemistry, Molecular and Cell Biology I. Please note that prerequisites are clearly listed in the curriculum.

- **What is a corequisite?**

Corequisites are courses that must be taken at the same time as normal courses. Registration for corequisites must be done prior to registration for normal courses in the given term. Corequisites are marked with a star symbol in the Calendar of each semester's curriculum affected (e.g. 3rd and 4th year)

- **What do I need to do if I am planning to take a leave of absence?**

If you take a semester off you will need to email your registrar and register for a 'passive' semester via the Neptun system during the registration period for the next semester.

For details, please see the Neptun manual/ Registration in the beginning of the Calendar

- **What do I need to do if I am returning from a leave of absence?**

Contact your registrar for procedures regarding returning from an official leave of absence and check your Neptun account on a regular basis. Make sure your tuition fee is paid by the relevant deadline.

TRANSCRIPT

- **What is a transcript? How do I request my transcript?**

The transcript is an official statement of all results achieved through study at Semmelweis University as of the date of printing. You cannot have a transcript until all grades are posted in the Neptun student information system by the departments and your grade book is submitted to the Directorate of International Studies with all results. It is the department's responsibility to upload the exam results to the Neptun system.

Transcript requests must be made in writing. To make your request, you may stop by the Directorate of International Studies or send it via e-mail. You can indicate in your request if you would like us to forward the transcript to your email address. Processing of transcript requests takes approximately 5 business days. However, during certain times of the year there will be a slight delay, 2-3 days, due to the heavy volume of requests. The fee for the transcript must be paid for prior to the issuance of the transcript(s). Please be sure to allow sufficient processing time for your request.

Please note: the university may discontinue or suspend this service at any time without notice if the fee for the transcript is not paid.

STUDENT COUNSELLING

The Institute of Behavioural Sciences at Semmelweis University is providing student counselling in English and German as well. Coming to university can be a very exciting and rewarding time. It can also be a time of change and stress, especially if you study in Budapest, left your home country and have to face a new culture, language and environment. There may be a whole range of difficulties and dilemmas affecting your life and studies.

These may be the result of either past or present experiences. The University Counselling Service is one of the services which are there to help. One way of starting to with things is to see a counsellor. This involves meeting with a trained person to talk about the issues that are important for you.

There are a number of ways in which counselling can help, such as:

- Dealing with a crisis or immediate concern
- Support with longer term difficulties
- Getting access to specialist help
- Referring on to other resources

Counselling is an active process that is designed to give you the time, space and encouragement to explore and understand the issues you bring. The counsellor will be able to help you think about your problems from a different perspective. Their role is to provide you with a secure framework in which to reflect upon your circumstances. The aim is, that in time this will increase your awareness of yourself, your situation, and the choices that are open to you. Coming for counselling can take courage as it involves facing yourself and asking someone else for help.

Counselling provides a safe place, separate from your daily life, where you can explore issues or feelings which are causing you difficulty. The counsellor will aim to relate to you in a supportive and purposeful manner and assist you in the task of finding your own way forward. Your use of counselling remains confidential to the service within the limits agreed with your counsellor.

Emotional and psychological problems encountered by student counselling services include:
anxieties about aspects of study including exams and presentations

- general stress and anxiety
- depression
- relationship difficulties
- eating problems
- bereavements and parental separations
- loneliness and homesickness
- lack of self confidence or low self esteem
- managing transitions
- making difficult decisions
- traumatic experiences including rape, assault and abuse
- difficulties with alcohol or drugs
- issues around sex, sexual orientation and sexuality
- self-injury
- suicidal thoughts
- anger management
- worries about appearance
- any other topic or problem you wish to talk about

Contact:

If you have any question, need to talk to someone on the phone in advance, or want to book an appointment to see a counsellor, just send us an email and we will get back to you within 48h:

Dr. János Kollár

E-mail: studentcounselling@net.sote.hu

Home page: <http://behsci.hu/health/student-counselling>

Institute of Behavioural Sciences

Nagyvárad tér 4, 20th floor,

1089 Budapest

Appointments are available between Monday and Friday (16-20 o'clock) upon request (via mail)

ERASMUS Program

<https://semmelweis.hu/erasmus/en/>

Office Hours and Contacts

Office Hours

Monday:	9 a.m. – 12 p.m.
Tuesday:	1 p.m. – 3 p.m.
Wednesday:	9 a.m. – 12 p.m.
Thursday:	1 p.m. – 3 p.m.
Friday:	CLOSED

For the efficient and continuous work of the office, we kindly ask that you respect our office hours! In case of an urgent matter, please contact the ERASMUS office either by phone or email, in order to obtain a personal appointment.

Address

H-1085 Budapest, Üllői út 26. Room 202

Contact Information

Ms. Nóra Schreiberne Seres

ERASMUS Institutional Coordinator

Tel: (+36-1) 459-1491

E-mail: erasmus@semmelweis-univ.hu seres.nora@semmelweis-univ.hu

SEMMELWEIS ALUMNI

<http://alumni.semmelweis.hu/eng/semmelweis-alumni>

Mission Statement

Semmelweis Alumni's mission is to help build long-lasting and mutually beneficial relationships between the University and its current students, alumni, faculty and researchers.

Membership

To become a member of Semmelweis Alumni, you need to complete a registration form. Registration is free of charge and memberships remain valid indefinitely.

You may become a member if you meet any of the following criteria:

- You are currently a student at Semmelweis University and have successfully completed at least four semesters;
- You are a former student of Semmelweis University or one of its legal predecessors and successfully completed at least four semesters;
- You are currently a faculty member or researcher at Semmelweis University
- You were formerly a faculty member or researcher at Semmelweis University

INTERNATIONAL STUDENT ASSOCIATION - ISSA

It is an association made up of students from different faculties at Semmelweis University in different years with very different nationalities and backgrounds. Their aim is to give voice to the international student community at Semmelweis University and support them in different methods. Their reach includes but is not limited to the following:

1. Organizing international student events two of which is the Freshmen's Day event for the incoming students every year and also the Semmelweis Carnival
2. Creating a bridge between the students and staff (teaching and non-teaching) through conducting interviews
3. Listening to students concerns through Student Affairs and handling case by case
4. Creating a magazine dedicated to international student committee Review which is full of information for the students and also from students
5. and many more...

The association is actively working to create a pleasant life for the students at Semmelweis University and give voice to their needs. Our mission statement is as follows:

- **Learning** – We compliment and enhance the academic experience.
- **Service** – We are dedicated to serving students and our broader community. We provide good customer service and resources for events/event planning and offer leadership development opportunities.
- **Advocates** – We strive to serve as student advocates.
- **Balance** – We strive for wellness and balance in our activities and events.
- **Ethical Decision Making** – We believe in honesty and integrity during all interactions.
- **Stewardship** – We strive to use all resources effectively and efficiently.
- **Community** – We strive to build a supportive and inclusive office environment/campus community where everyone feels welcome.
- The **Student Affairs Committee (SAC)** is a student-run organization within ISSA. Our express goal is to improve lines of communication between students and members of faculty, as well as advocate on behalf of students' opinions and interests. The backbone of the Student Affairs Committee is the representatives from each year and faculty (Dentistry, Medicine, Pharmaceutical Sciences). Representatives are responsible to both their classmates and their fellow committee members. They are the first to be approached should any issues arise among students within their year. They then bring these problems to the committee so that the SAC team may resolve them. At times, the representative may be responsible for resolving the problems themselves; at times they will be charged with handing over the responsibility to a higher up. Class reps may also be called on to speak with members of the administration, something they are able to do with confidence and professionalism.

STUDENTS' SCIENTIFIC ASSOCIATION (TDK)

<http://semmelweis.hu/english/student-life/clubs-and-organisations/students-scientific-association/>

A unique feature of Hungarian universities is that undergraduate students have the opportunity to be involved in top-level scientific research starting in their undergraduate years. To facilitate this, students maintain their own organisation, the Students' Scientific Association (in Hungarian: Tudományos Diákkör – TDK). TDK activities, which include organising scientific conferences, are overseen by the TDK Council. During the last ten years, the number of students involved in scientific research has grown twofold, while the number of lecturers attending TDK conferences has increased threefold. Currently, over 1000 Semmelweis University students pursue science in addition to their regular studies, more than 400 of whom present their research results at the annual TDK conferences.

The University's students often receive great honours at national and international conferences and many of them publish scientific research articles in international journals as either first or co-authors. Each year, the ten best graduating students receive the "Outstanding TDK Student of Semmelweis University" distinction.

It is pleasing to see that the University is attracting ever more students who had started doing research during their high school years. To encourage the continuation of this practice, the TDK Council promotes the involvement of students in scientific research from their very first year at university.

The TDK Council also promotes close contacts with fellow TDK organisations abroad. Students are sent to international TDK conferences and cooperate with the Hungarian Medical Students' International Relations Committee (HuMSIRC), through whom longer study tours can be organised.

TALENT SUPPORT PROGRAM OF SEMMELWEIS UNIVERSITY

To support the talented and gifted students the Senate of Semmelweis University initiated a Talent Support Program named after the former professor of our University, Ödön Kerpel-Fronius.

Participants of the program will be recruited after a personal assessment interview of the students on the Excellency List organized by the Talent Support Council of the University.

The Excellency List contains not more than the best 5% of the students of the university.

Application for the inclusion in the Excellency List is possible by filling in the Application Form, which can be downloaded from the kerpel.sote.hu/kivalosagi_listara_kerules_szabalyrendszer or kerpel.sote.hu/kivalosagi_lista web-sites.

Applications should be sent electronically to the tehetsegpont.se@gmail.com email address as an attached file until **March** of each year.

Students on the Excellency List will be called for an interview by the Talent Support Council of the Semmelweis University and approximately half of them will be included to the Kerpel-Fronius Ödön Talent Support Program.

POSTGRADUATE MEDICAL STUDIES AT SEMMELWEIS UNIVERSITY

General information on Ph.D. studies, resident training and postgraduate studies for foreign applicants

In principle, there is no possibility to continue medical (or dental) studies at Semmelweis University with an undergraduate degree obtained at a foreign university, due to the differences in the structure of the curriculum and that of the degree system. It must be noted that **there is no Bachelor level in the medical (and dental) education in Hungary** and therefore such foreign degrees do not enjoy automatic acceptance in our country.

The general medical education in Hungary is a single, 6-year-long full time course that is divided into three modules: the basic medical sciences module (2 years), the preclinical module (1 year) and the clinical module (2 years). The sixth year of education is an internship year. After successfully completing the sixth year and passing all the exams, medical students in Hungary obtain the Doctor of Medicine (MD) degree.

Against this background, **holders of Bachelor-level degrees are not entitled to study at Semmelweis University as postgraduate students.**

However, one may sit for the entrance examination for the first academic year and after being accepted and enrolled, one may ask for exemptions on the documented previous studies and examinations of his/her Bachelor-level course.

For further information on our English language undergraduate programmes please visit the website at <http://semmelweis.hu/english/education/english-language-program/>

Those who already hold a **Doctor of Medicine (MD)** degree and wish to continue their studies in order to obtain a **Ph.D. degree**, may send an application to the School of Doctoral Studies. For further information please visit <http://phd.semmelweis.hu/en/>

School of Ph.D. Studies

Office: 1085 Budapest VIII. Üllői u. 26. fszt. 9.

Phone: +36 1 266-7483 és +36 1 266-2343

Fax: +36 1 317-4888 (only fax!)

Office hours:

Monday: closed

Tuesday, Thursday, Friday: 8.30-12.00

Wednesday: 13.00-16.00

Those persons who hold a **Doctor of Medicine** degree obtained at a non-Hungarian university and wish to join a medical **Residency Training** at Semmelweis University have to go through a special application procedure. Please note that **a good command of the Hungarian language is a precondition to join the Residency Training.** Further information can be obtained from

<http://semmelweis.hu/english/education/continuing-education/>

Directorate of Continuing Education

Phone: +36-1-210-1784, +36-1-459-1446

Address: 1091 Budapest, Üllői út 25. (City Corner Office Block)

Mailing address: 1085 Budapest Üllői út 26.

E-mail: szakestovabbkepzes@semmelweis-univ.hu

Postgraduate Courses at Faculty of Dentistry

Address: 1088 Budapest, Szentkirályi u. 47. VII/751.

Phone: 36 1 266 7006

E-mail: szkepz@dent.semmelweis-univ.hu

Office hours:

Thursday: 09.00-11.00

Postgraduate Courses at Faculty of Pharmaceutical Sciences

Address: 1092 Budapest, Hőgyes Endre u. 7-9. B

Phone: + 36 1 266 8411

E-mail: szakkepzes@pharma.semmelweis-univ.hu

Office hours:

Monday, Tuesday, Thursday: 13.00 – 15.00

Wednesday: 10.00 – 13.30

Friday: 09.00 – 12.00

Group of Unprompted Instructors

We are happy to announce, that from this year the famous Spring Training of IÖCS (Instruktor Öntevékeny Csoport – Group of Unprompted Instructors) is open for international students as well. It is one of the oldest student association of the university, and certainly the one with most members. We help organising most of the biggest events for Freshmen like the Summer Camp and the Ball, we also take a huge part in the Carnival and many others. It is a strictly non-profit organisation; our greatest reward is the time and fun we spend together.

What can you expect from the spring training?

- Meetings every other week, where you will learn about the association, our structure and programs, you can improve your social skills, get to know an immense amount of new people and form a strong group together.
- Teambuilding games, workshops.
- Spend a weekend together with every newcomer in the organisation at the end of the training, it's a lot like a mini Freshmen's Camp.
- Eventually you will be an Instructor, you can take part in all of our events, work together and welcome the freshmen at the university so we can help them finding their way in this big community.

Lóránt Csehi (csehi.lorant@ioccs.hu)

FACULTY OF HEALTH SCIENCES



*Faculty of Health
Sciences*

Brief History of the Faculty of Health Sciences

The University's second largest Faculty is the Faculty of Health Sciences. The Faculty started its first academic year in 1975 with the aim of training highly accomplished, skilled, committed and open-minded health care professionals. This was the first higher-level school in Hungary that trained dietitians, health visitors, physiotherapists, public health and epidemiology inspectors, vocational teachers and paramedics. During the past years both the structure of education and the curriculum have undergone changes in the spirit of modernization. The Faculty continuously expands the range of its Hungarian and English language training programmes. To its prospective students, the Faculty offers study rooms, lecture halls, specialist laboratories, demonstration rooms and a public library that are all equipped with state-of-the-art technology, as well as a great variety of opportunities for an active student life, and a motivating environment. Following graduation, students of the Faculty can immediately be involved in various areas (ex.: health care, tourism, education, sociology) and they are able to have a positive impact on their close and broad environment.

Facts and Figures

The Faculty of Health Sciences celebrated its 40th anniversary in 2015. Since its foundation, more than 30.000 students graduated from the Faculty and today more than 4000 students are studying at this institution. The Faculty is very proud of its library containing more than 50.000 volumes.

During the last four decades the Faculty has developed extensive international relations, and as a result, we have connections with about 50 higher educational institutions throughout Europe, Asia and America. Many students and staff members have the opportunity to take part in short- and long-term exchanges in the framework of the Erasmus+ programme in our partner institutions.

The Faculty's Asian relations have also been largely extended by establishing a fruitful relationship with Shanghai Jiao Tong University School of Medicine (SJTU) and with Heilongjiang University of Chinese Medicine (HLJUCM), that launched its off-campus B.Sc. Traditional Chinese Medicine training at our Faculty. In the framework of the programme, students study in Hungary during the first 4 years, while they can get acquainted with the practical aspects of Chinese Medicine at the Chinese university in the last year in China.

We are also proud of having operated our Italian, French and English B.Sc.-level Physiotherapy training in Lugano, Switzerland since 2009. Currently, over 300 students participate in our programme there. The extent of our international relationships is growing on a daily basis and we accept several groups of students from different countries on our 2-4 weeks advanced professional programmes mainly from the USA, China and Japan. In these programmes our students have the opportunity to participate in, and to build international professional connections.

Leadership, Dean's Office

Address: H-1088 Budapest, Vas utca 17.
 Mailing address: H-1085 Budapest, Üllői út 26.
 Phone: +(36-1)486-5910
 Fax: +(36-1)486-5913
 E-mail: etk.student@semmelweis.hu
 Home Page: <https://semmelweis.hu/etk>

Dean **College Professor Dr. Gabriella Dörnyei PhD**
 Vice Deans **College Professor Dr. Klára Gadó PhD – Vice Dean for General Affairs**
College Professor Dr. István Vingender PhD – Vice Dean Responsible for Academic Affairs
College Professor Dr. Zoltán Balogh PhD – Vice Dean Responsible for Clinical Relations

Director of the English Language Programmes

Professor Dr. Alán Alpár MD, PhD, Vice Rector Responsible for International Training Programmes

Dean's Office

völgyi	Ms. Marianna Kakuk	– Head of Dean's Office
	Phone: +(36-1)486-5912	e-mail: kakuk.marianna@semmelweis.hu
	Mr. Benedek Horváth	– Secretary
	Phone: +(36-1)486-5911	e-mail: horvath.benedek@semmelweis.hu
Ms. Éva Kámán	– International Coordinator	Ms. Nóra Rózsa-Olt-
Phone: +(36-1)486-5917	e-mail: kaman.eva.maria@semmelweis.hu	
	– Erasmus+ Coordinator	
	Phone: +(36-1)486-4893	e-mail: etk.erasmus@semmelweis.hu

Foreign Students' Secretariat

Fax: +(36-1)486-5913	room: 129
Ms. Anikó Gergye	– Administrator
Phone: +(36-1)486-5905	e-mail: gergye.anita@semmelweis.hu
Fax: +(36-1)486-5913	room: 129
Ms. Panna Herczeg	– Administrator
Phone: +(36-1)486-5909	e-mail: herczeg.panna@semmelweis.hu
Fax: +(36-1)486-5913	room: 129

Information about the B.Sc. and M.Sc. programmes

Training system

Hungary, as a member of the European Union, belongs to the unified European Higher Education Area, which in principal follows the multi-cycle (bachelor, master and doctorate) training system. In this system it is much easier for students, lecturers and researchers to travel and build international relations, moreover, as citizens of the European Union they can continue their studies and plan their future as employees or entrepreneurs in any of the member states.

These opportunities open up a wider field for non-European citizens studying in Hungary as well, since the possibilities of internal mobility inside the unified Europe are based on the training channels and close relationships between countries in the labour market and among institutions.

Programmes of the Faculty

I. Bachelor of Science (B.Sc.) Programmes

1. Nursing and Patient Care B.Sc. Programme

Specialized programmes: Physiotherapy (Hungarian, English), Nursing (Hungarian, English), Midwifery (Hungarian, English), Dietetics (Hungarian, English), Paramedics (Hungarian), Voice, speech and swallowing therapy (Hungarian)

Physiotherapy

Physiotherapists act as autonomous practitioners who are able to perform functional examinations, identify impairments, functional limitations, abilities and disabilities by using clinical decision-making processes. Physiotherapists treat patients with therapeutic exercises, manual techniques and other therapeutic modalities as the professionals' chief task is to improve the functions of the musculoskeletal system. The therapists develop movement therapies and apply electrotherapeutic treatment, therapeutic ultrasound, and various manual and massage treatments for the sake of healing and rehabilitation or for the prevention of health damage. Graduates take part in healing locomotor (orthopaedic, rheumatologic, traumatologic), cardiovascular, obstetrical, gynaecological, neurological and psychiatric disorders. Prevention and health promotion belong to the specialists' profession, too. Physiotherapists plan, explain, carry out, and adapt an examination-based treatment, draw conclusions from the examination as a whole and rank the main problems according to priority.

Qualification

Physiotherapist

Nursing

The occupation of nurses is a vocation that is pursued for the sake of health preservation, promotion and patient healing. Nurses observe patients in the hospital and continuously monitor their needs, take part in disease prevention and act as active contributors to the process of the patient's recovery and rehabilitation. They help patients absorb and understand the information on their health status. Nurses holding a B.Sc. degree can organise, manage and supervise all their internal medical, surgical, obstetric-gynaecological, psychiatric, intensive nursing and primary care tasks in every area of health care. They are responsible for conducting the healing-nursing activities prescribed by the physician, and help the patient and the physician perform certain examinations. Graduates of the speciality are able to provide health care treatment for each age group from premature infants to elderly patients, explore the special needs of the patient and the person cared for, prepare nursing diagnoses and perform the tasks professionally on the basis of priorities, participate in planning, developing and implementing health care and social services.

Qualification

Nurse

Midwifery

Midwives fulfil caring and nursing tasks during pregnancies, in the postpartum period and on the occasion of gynaecological problems. Their responsibilities are to monitor pregnancies, labours and the postpartum progress while cooperating with other health care professionals in order to achieve the best possible outcome for each family. From the start of the parturition, midwives prepare and continuously support and encourage the woman during labour, monitor the process of delivery and the mother-infant connection, assess and register their observations. Midwives individually assist deliveries, take care of the pro-

tection of the perineum and of the treatment of the woman and the new-born baby during the post-delivery period. Graduate midwives look after, nurse and care for female patients and perform the required specialised treatment. State of the art skill laboratories help the preparation of the students for their future profession.

Qualification

Midwife

Dietetics

Dietitians deal with the questions of human nutrition and possess knowledge about healthy diet and diseases caused by unhealthy nutrition. Graduates are able to practise diet therapy independently, or perform dietetic and catering tasks as members of a therapist team. The specialist's tasks include individual and group counselling, preventing nutrition related chronic and non-contagious diseases, organising diet plans according to the client's sensitivity and disease type. They manage catering units: lead the catering service, organise catering work procedures, and establish appropriate and acceptable conditions for catering. Dietitians play an important role in teaching how to lead a preventive and healthy life as they can also develop and implement programmes for health promotion.

Qualification

Dietitian

Paramedics

Graduates are able to approach professionally and safely patients or victims in prehospital emergency care (oxyology), able to perform triage, on an individual basis and during a catastrophic event. On the scene, paramedics familiarise themselves with the nature of the emergency, examine the patient, and make a primary diagnosis. They stabilise and care for the patient, decide on the possibilities of leaving the patient on the scene. Paramedics observe and monitor the patient during transport, communicate appropriately with the patient and his/her relatives, complete the necessary interventions, and provide psychological support for the suffering patient. Paramedics holding a B.Sc. degree also complete standby on-call duties, organise teamwork in the system of emergency care within health institutions, teach First Aid, and participate in the further training of emergency nurses and ambulance car drivers. Paramedics work in close alliance with the control staff, ambulance assistants, physicians, and health care professionals of hospital emergency care.

Qualification

Ambulance Officer (Paramedic)

Voice, speech and swallowing therapy

Voice, speech and swallowing therapists perform diagnostic and therapeutic tasks in otolaryngology, phoniatrics, neurology, paediatrics, geriatrics and rehabilitation units as well as in outpatient services and can treat certain functional disorders in private practice. Their responsibilities include the functional examination and therapy of phoniatrics, articulation, speech-language abilities, nutrition intake (chewing, swallowing). Graduates are able to treat the disorders of two fundamental functions of human life: the disorders of communication and of food intake. They are able to contribute to the rehabilitation of persons suffering from these functional disorders, thus enabling them to manage their social responsibilities and to integrate into society. Graduates are able to participate in preventive, curative, nursing and rehabilitating professional work on any level of the health care and/or social care system.

Qualification

Voice, speech and swallowing therapist

2. Health Care and Disease Prevention B.Sc. Programme

Specialized programmes: Health Visitor (Hungarian), Public Health Care Inspector (Hungarian, English)

Health Visitor

The health visitor is present in the families' life during the most important steps of life: during pregnancy, reception of the new-born baby, formation of family life and at the time of enrolment to nursery and elementary school. Graduates are able to provide counselling concerning family planning and parenthood, help and provide nursing care to the pregnant woman, and perform screening tests. After childbirth, the health visitor teaches the mother the ways of breastfeeding and her tasks related to the child. They monitor the health condition and development of neonates, provide community health care for children (aged 3-18), aid in the prevention of behavioural disorders and bad habits, solve the problems of teenagers and direct them to the appropriate professional. Health visitors give mental hygiene support to families and organise vaccinations. Health visitors take part in planning, organising and conducting health development and promotion programmes for individuals and communities. They perform their duties either independently or in cooperation with doctors and other medical experts.

Qualification

Health Visitor

Public Health Supervisor

A public health supervisor deals with epidemiological tasks that consist of the organisation of public health investigations and the analysis of data retrieved during the investigations. Graduates of the speciality are able to perform public health related municipal activities, conduct appropriate municipal supervision based on current regulations, initiate, plan and manage epidemiological tasks, analyse, interpret, use and critically apply the results of epidemiological examinations, process and realize local and central health policies in order to improve the health status of the population. Public health supervisors plan and realize nosocomial surveillance, monitor the health status of the population, plan, organize, realize and evaluate preventive programmes.

Qualification

Public Health Supervisor

3. Medical Diagnostic Analysis B.Sc. Programme

Specialized programmes: Optometry (Hungarian, English), Radiography (Hungarian)

Optometry

Optometrists are able to utilise their optic, optometric, measuring and clinical knowledge gained during the training programme, conduct the examination and correction of the eye individually and prescribe optical aids (eyeglasses, contact lenses) with the aim of attaining the optimal visual acuity in patients. The professionals are able to estimate the refractive medium, refractive ability, errors of refraction, the way eye muscles function, and the ability of heterophoria and convergence. Professionals examine binocular vision, the chamber of the eye, crystalline lens, vitreous humour and the eye fundus with the help of a slit lamp, and they estimate ocular tension. Optometrists utilize their clinical and nursing knowledge during their daily activities, actively participate in improving the culture of vision of individuals, communities and the population. Through examinations, the optometrist recognises and evaluates the disorders of the eye and so contributes to the immediate receipt of specialised care.

Qualification

Medical Diagnostic Analyst (Optometrist)

Radiography

Medical diagnostic analysts individually operate modern diagnostic imaging appliances (e.g. X-ray, ultrasound, computer tomography /CT/) while keeping the related regulations and procedures. They process, evaluate and archive diagnostic imaging information, establish a daily contact with patients and prepare them for diagnostic imaging therapies. The specialists observe patients during examinations, perceive pathological situations, participate in therapeutic examinations, recognize health damaging effects as results of radiological interventions, and other technological errors, and they prevent them.

Qualification

Medical Diagnostic Analyst (Radiographer)

4. Health Care Management B.Sc. Programme

Specialized programme: Health Tourism Management (English)

Health Tourism Management

Graduates of the training take part in organising and managing health promotion activities, prepare projects that aim at developing health tourism and strengthening international cooperation, and they participate in the implementation of tourism development programmes of the European Union. The health care manager is a versatile professional who is proficient both in health care processes and in the field of tourism. Their acquired knowledge comprises information on health, tourism and business, therefore they are not only able to see through, organise and coordinate the operation of health care institutions but with appropriate business knowledge they are able to market and manage them, too. The speciality provides the necessary knowledge to create health tourism, health preservation, curative and rehabilitation programmes.

Qualification

Health Care Manager (Health Tourism Management)

Traditional Chinese Medicine B.Sc. Programme –graduate programme of Heilongjiang University of Chinese Medicine

Heilongjiang University of Chinese Medicine organizes its Traditional Chinese Medicine B.Sc. training programme in Hungary at Semmelweis University Faculty of Health Sciences.

The programme based on traditional Chinese medicine is a unique training in Hungary as it is a 5-year bachelor training programme. In this framework, students study in Hungary during the first 4 years, while they can get acquainted with the practical aspects of Chinese Medicine at the Chinese university in the last year. Students who successfully complete the programme receive the B.Sc. degree of the university of Harbin.

Qualification

Bachelor of Chinese Medicine – Acupuncture, Moxibustion and Tuina

II. Master of Science (M.Sc.) Programmes

Physiotherapy M.Sc. Programme

Master's level physiotherapists develop therapeutic procedures and protocols based on their extensive national and international knowledge and skills, recognise and analyse physical, anatomical, physiological and pathological factors affecting physical ability and capacity. They participate in solving scientific problems in physiotherapy, and finding new skills and knowledge in their expertise. The specialists perform scientific evaluation of the effectiveness of physiotherapeutic methods, organise and realise clinical research in physiotherapy, publish new scientific results and act as leaders in hospital units of physiotherapy, apply fundamental regulations and quality control principles in the management of health institutions and private enterprises. The promotion of health education on local, community, national and international levels also belongs to the tasks of a physiotherapist.

Qualification

Physiotherapist

Languages

Hungarian, English

Nursing M.Sc. Programme (Advanced Practice Nurse)

Master's level nurses characterise the health status of the population, formulate problems, priorities and aims in public health. They conduct research and analyse technical literature, interpret the results of modern statistical methods, perform tasks of organisation and management related to the nursing process. They are able to perform human resource management tasks related to nursing. Planning budget and writing tenders, planning, realising and evaluating programmes, and establishing co-operation between institutions and individuals belong to the tasks of nurses, too. The health care professionals are acquainted with the role and the possibilities of the improvement of health sciences in the life of society, and they are able to characterise the health status of the population. Master's level nurses formulate problems, priorities and aims in public health, they take part in solving the scientific problems of nursing, in finding new and constructing ideas about the profession and in the promotion of their practical usage.

Specialisations within the Nursing M.Sc. programme

Emergency Nursing (Hungarian)
 Geriatric Nursing (Hungarian)
 Community Nursing (Hungarian, English)
 Intensive Nursing (Hungarian)
 Perioperative Nursing (Hungarian)

Qualification

Nurse

Languages

Hungarian, English

Nutritional Sciences M.Sc. Programme (Joint training of Semmelweis University and the Hungarian University of Agriculture and Life Sciences)

Nutritionists develop quality food, functional food, food supplements, special nutrients, eco products and organic food. They develop food industrial innovations, determine food qualities considering hygienic aspects, take part in professional and counselling tasks in the field of nutrition sciences and catering. Master-level dietitians determine the composition of food and diets for healthy people and those with different diseases, perform innovative research and development work preferred by the support system of the European Union. Master's level dietitians are able to understand and solve professional problems assertively, come up with reform ideas, and carry out innovative activities. The nutrition specialist plans and compiles healthy diets in the field of health industry, wellness, medical tourism and hotel industry. Nutritionists promote the achievements of nutrition science in order to improve public health figures, work as highly qualified nutritionists, researchers, advisors and health educators.

Qualification

Nutritionist

Language

Hungarian

Teacher of Health Sciences and Health Care M.Sc. Programme

Master's level health care teachers are capable of educating people about healthy lifestyle using their knowledge gained in the fields of health sciences and pedagogy. For the sake of improving the quality of life of people, professionals plan, develop and adopt prevention programmes in the specialist training, suggest problem solving and up-to-date life models in accordance with the altered health statuses. They give advice on career orientation, career choices and career planning. While applying health education methods, the teachers are able to recognize those negative effects that arise from harmful environment or poor social situation and lifestyle. In specialised health related interpersonal relationships, their activity is characterised by high communication standards and didactic preparedness. Master's level health care teachers possess the ability to educate, and to demonstrate good example while teaching, moreover, they are able to recognize the relationship and development opportunities between the training institutions, the economy, the labour market and the social environment.

Qualification

Teacher of Health Sciences and Health Care

Language

Hungarian

III. Doctoral School

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The main objective of the Doctoral School of Health Sciences is to combine theoretical and preclinical knowledge, clinical and comparative health science research, and public and public health sciences, and to improve the social sciences related to health sciences. It also aims to complement the doctoral programs at the University to ensure that health sciences are also incorporated, thus giving extra emphasis to preventive – domestic and international – health preservation programmes that satisfy public health needs and affect society as a whole.

PhD studies can be conducted in the following professional fields:

1. Clinical and comparative health sciences
2. Theoretical and preclinical health sciences
3. Society and health
4. Public health sciences

IV. Postgraduate specialist training courses

Addictology Counselling (Hungarian)

Podiatrist (Hungarian)

DEPARTMENTS

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Background

The Department was founded in 1975 as a part of the College of Health Care of the Postgraduate Medical School (now Semmelweis University Faculty of Health Sciences). It was the first college in Hungary to award degree to health care teachers in 1977. Academic level training of nurses began with part-time courses in 1989/90; since 1990/91 a full-time course has been offered as well. The College of Health Care was also the first to introduce a four-year baccalaureate certificate programme in nursing. The Masters-level programme in nursing was introduced in Academic Year 2002/2003.

Education

B.Sc. in Nursing is an eight-semester programme, either a full-time or part-time, which provides students a general knowledge of science related to nursing, health and social sciences. The Nursing B.Sc. programme is based on the Directive 2005/36/EC of the European Parliament and the one of the European Council of 7 September 2005 on recognition of professional qualifications. Our programme has been running in English since the 2011/2012 academic year.

M.Sc. in Nursing is a three-semester part-time programme based on a former bachelor degree in nursing. During their studies, students learn the planning of nursing in all areas of health care, the organisation of the nursing work, the teaching of the basics of nursing and health care, the organisation of research projects in nursing, and the supervision of quality assurance in nursing care.

Research

The previous members of the Department's staff supported projects such as the development of a nursing curriculum with the introduction of distance education methodology into nursing training programmes (in collaboration with Columbia University, School of Nursing (USA) in 1995-98 and a Hungarian-Canadian nursing programme for a methodology and model of prior learning assessment and recognition (PLAR) of nurse-candidates (Douglas College, Canada) in 1999-2000.

In co-operation with the Chamber of Hungarian Health Care Professionals, the present members of the Department performed investigative research into the Hungarian situation with regard to needle-stick injuries in 2006, 2008, 2013, 2018 among health care professionals. The objectives of the study were twofold: to reveal the trend in the extent to which health workers are affected, and to draw the attention of economic and education decision-makers to the importance and prevalence of the issue.

The other research programme aims to explore from an international perspective the meaning of care from the point of view of nurses and patients and to find common and shared definitions between these partners of caring. In addition, it aims to identify the relationship between nurse caring and patient satisfaction and to clarify the opinion of nurses and patients on individualized nurse caring. In this study (2008-2014), participants from 6 EU countries: Cyprus, Czech Republic, Finland, Greece, Hungary and Italy united their efforts in order to achieve the aims of the study. Europe faces severe population ageing in the near future. A new positive vision of ageing and promotion of possibilities in older age is needed. The challenge is how to transfer this vision into practice. Higher Education Institutes and associations agreed to launch a project. Funding was received from Lifelong Learning Program-Erasmus Academic Networks for a project for the years 2013-2016.

Department of Clinical Studies in Obstetrics and Gynaecology

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Background

The Department of Clinical Studies in Obstetrics and Gynaecology was founded in 2014. Earlier, the training of midwives was performed by the Division of Midwifery of the Department of Nursing. Academic level training of nurses began through part-time courses in 1989/90; since 1990/91 a full-time training programme is offered as well. Additional programmes have been introduced in recent years, including the training of midwives (2002) and a masters-level programme in nursing (2003). The English language midwifery training programme was introduced in the 2011/12 academic year.

Education

The B.Sc. midwifery training programme can be completed on either a full-time or part time track. Those who receive a midwifery degree upon successful completion of this programme are able to carry out communicational/informational/documentation activities, provide a safe and hygienic environment, complete general midwifery tasks, and provide first aid, complete tasks related to antenatal care, conduct deliveries, care for female patients, and care for the new-born and the postpartum mother. The Midwifery B.Sc. programme is based on the Directive 2005/36/EC of the European Parliament and of the European Council of 7 September 2005 on the recognition of professional qualifications. Duration of the training: 8 semesters, number of credits: 240 ECTS.

Research

Members of the Department's staff support projects and conduct research in different fields of health care and health care education, e.g.: health behaviour of practising midwives, simulation education and curriculum development, and the impact of maternal depression on pregnancies and early attachment.

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Background

Underwater therapy equipment was used in the Császár baths as early as 1891. The first physiotherapy training in Hungary, which was more like an artistic movement therapy, was started by Alice Madzsar in 1912. The need for physiotherapy arose during the time of the Poliomyelitis epidemic, resulting in the foundation of a proper physiotherapy school in Budapest in 1955. At this time, the training was two years long, the duration of studies increased to four years only in 2000.

Education

The Department's aim is to train physiotherapists who can be valuable members of a health care team of prevention, care and rehabilitation. The Physiotherapy undergraduate programme consists of 240 credits, which corresponds to the requirements of a Bachelor's degree. The Department also offers the Master's Programme for another 90 credits in 3 semesters. Each term consists of courses corresponding to 30 credits. Courses are divided into theoretical and practical units, each unit covering a particular field of physiotherapy. At the B.Sc. programme the supervised clinical practice takes place from the 1th to the 7th semester (two to three weeks), and in the 8th semester (12 weeks) at a variety of medical centres. The physiotherapy programme comprises an independent graduate project corresponding to 1152 clinical practice hours, which is equal with 48 credits. The Master's programme's last semester can be divided into two halves. At the beginning the students have theoretical and practical courses and in the last 8 weeks they attend specialised clinical practice and scientific research.

Successful completion of the programme requires that students:

- acquired sufficient knowledge and skills to be able to work independently as physiotherapists;
- acquired knowledge and skills of physiotherapeutic methods of assessment and treatment, as well as knowledge of the connection between science and long-established experience;
- developed their self-recognition and capacity for empathy, thereby paying attention to ethical considerations;
- and familiarised themselves with conditions in society which affect people's health, and gained an ability to initiate and take part in the health-promoting and preventive efforts.

Biomechanical Lab

The biomechanical lab is equipped with the latest technology. With these modern pieces of equipment we can perform dynamic and kinematic measurements to demonstrate the discrepancies of musculoskeletal, neurological and other problems, moreover, we can compare the physiological and pathological movement patterns. The use of these devices helps us to test the validity of traditional physiotherapy examination methods, as well as measuring the effectiveness of the therapies by objective data. In addition, our laboratory with the new visual stimulation biofeedback equipment can be used not only to analyse the walking but to correct and develop it. So now it is suitable for therapeutic interventions.

Both the B.Sc. and M.Sc. programmes' curriculum include subjects that instruct the students how to use these devices for their thesis, dissertation research and for projects in the Students' Scientific Association.

Research

Some areas of research interests at the Department:

- the biomechanical characteristics of standing stability and balance maintenance, testing by biomechanical equipment and therapeutic possibilities with physiotherapy;
- examination of posture with ultrasound-based 3D movement analyser equipment, correction of posture by physiotherapy;
- treatment of incontinence with complex physiotherapy methods;
- effects of positive end-expiratory pressure in cystic fibrosis;
- conservative therapeutic options of the knee-instabilities;
- chest physiotherapy in cystic fibrosis with the specific features of childhood;
- clinical features of paraneoplastic syndrome in the musculoskeletal system;
- the effect of exercise in cardiac rehabilitation;
- the effect of exercise in musculoskeletal rehabilitation;
- gait analysis according to the ultrasound- based 3D method.

Division of Physical Education

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The Division of Physical Education teaches the 4-semester long criteria subject, the Physical Education (PE) for each full-time B.Sc. student. PE classes enable students to several opportunities for sport (swimming, volleyball, handball, basketball, football, floorball, conditioning, aerobic) in different locations (gym, swimming pool).

Apart from the PE course, therapeutic swimming that is highly demanded by our students is also launched as a selective subject in each semester.

Colleagues of the Division participate in the operation of the Student Sport Association (DSE). Primarily, the Association provides student participation in the university's system of sport competitions.

Department of Dietetics and Nutritional Sciences

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Background

Education of dietetics in Hungary dates back to the 1920s and was initiated by Aladár Soós. The Department of Dietetics was founded in 1975 as part of the newly established College of Health Care (now Semmelweis University Faculty of Health Sciences). The main task of the Department is the undergraduate and graduate training of dieticians while providing courses on nutritional sciences and dietotherapy for other health professionals educated at the Faculty. The Department of Dietetics and Nutrition Sciences is responsible also for the training of Masters of nutrition and food sciences. The programme is carried out in collaboration with the Hungarian University of Agricultural and Life Sciences.

Education

Over the last 40 years, as many as 2000 dietitians completed their studies here. The undergraduate training course consists of eight semesters, with a total number of 240 ECTS, of which 40% is devoted to theoretical training and 60% to practice. During the education students are taught about each scope of dietetic practice such as clinical, administrative and public health/community dietitians. Graduate students can be employed in different areas of public health nutrition and nutritional research fields. Postgraduate training programmes are also available for dietitians.

In the 2009/2010 academic year a new training programme, the Master of Nutrition and Food Sciences was launched. Students are taught by experienced teachers who are recognized as experts in the field of nutrition and food technology as well as in research methodology. The duration of the training is 4 semesters with a total number of 120 ECTS. Graduate students can be employed in different areas of public health nutrition and nutritional research fields.

Postgraduate training programmes are also available for dieticians. Graduating as Masters of nutrition and food sciences allows students to continue their studies at PhD level at Semmelweis University Doctoral School in Health Sciences.

The Department of Dietetics and Nutrition Sciences has collaborative partnership with the European Federation of the Associations of Dietitians (EFAD).

Research

The Department has been involved in several projects sponsored by, for example, the EU: the "Ageing Nutrition" project (2004-06, organised by the Department), the "PORGROW" project (2004-06), furthermore, the Department participated as partner institution in the thematic network called DIETS1, „Dietitians Improving the Education and Training Standards (2006-09)" and DIETS2, 'Dietitians ensuring education, teaching and professional quality' (funded by the EACEA 2010-13). The Department is involved in the preparation of the Hungarian version of EPODE Project collaborating with the Association of Hungarian Dietitians (2014).

Members of the Department's staff are involved in the PhD education as tutor teachers.

Research area:

- Food production by fermentation for patients with food allergy and intolerance
- Nutrition Science Analysis and Diethoterapic Interventions
- Innovation in public catering
- Disease Specific Nutrition Therapy and Communication Method
- Examination of the nutrition and nutritional status of the elderly

Fields of scientific interest are:

- Investigation of biologically active component of vegetable and fruit during cultivation, post harvesting, food technology and food preparation
- Determination of mycotoxin contamination in foodstuffs
- Monitoring of allergen contamination of equipment, tools and food preparation process
- Role of food labelling in order to improve informed and safe food choice of people with special dietetic needs
- Monitoring of different groups' nutritional status and nutrient intake for the purpose of health preservation and to identify risk factors of diet-related diseases
- Assessment and analysis of the fluid consumption habits, attitudes and product choice preferences and education of theme for the purpose of health preservation
- Teaching correct dietary habits in children's catering, development of eating behaviours
- Members of the Department's staff are actively involved in the boards of various professional organizations in the field of nutrition, such as Hungarian Society of Nutrition, Association of -Hungarian Dietitians, Hungarian Food Allergy and Food Intolerance Databank, College of -Health Dietetics and Human Nutrition Council, National Association of Catering Managers.
- Moreover, they hold positions in the editorial boards of several professional periodicals.

Department of Oxyology and Emergency Care

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Background

Oxyology – the science of rapid intervention as described by the famous Hungarian physician Aurel Gabor - is a specialisation that has been recognized since 1975. The main task of the Department of Oxyology and Emergency Care is the training of paramedics at the highest possible level. It is our mission to qualify health care providers not only for the National Ambulance Services but also for the national emergency departments. The department is also responsible for the first aid teaching at the Faculty of Medicine in English and German language, and for first aid classes held at the Faculty of Dentistry.

Besides theoretical and practical B.Sc. trainings, we offer postgraduate specialist trainings for qualified nurses and paramedics, and regular accredited courses in various areas of acute care for physicians and nurses. We have been participating in the training of the Doctoral School of the Faculty with an independent research subject since 2009, while regularly offering advanced education for the students of Semmelweis University's School of PhD Studies.

The Department manages its tasks with four full-time members and a number of highly qualified consulting teachers. Practical teaching is organized with the co-operation of the National Ambulance Service, hospital practices are completed in accredited teaching hospitals.

Education

- Regularly provides vocational and postgraduate trainings.
- Is closely connected with the new University Emergency Centre where practical teaching takes place.
- Has an established relationship with the University of Massachusetts, Department of Emergency -Medicine in the area of research and development.
- Members of the Department participate in numerous professional and societal organizations of acute care and hold leading positions in the Society of Emergency Medicine and Oxyology.
- The leader of the Department is an active Examiner in Emergency Medicine for the European Board of Emergency Medicine.
- Students can join the PhD School offering participation and thesis work on "Point-of-care technologies in emergency medical care".

- An M.Sc. training programme targeting the intrahospital emergency care has been started resulting in the qualification of advanced practice nurses (APN), those capable health care professionals who work in the emergency departments under the supervision of the lead physician.
- We have launched a monthly meeting named OxyNox for trainee and graduate paramedics. This event is held in the Vas utca building where a well-known representative of prehospital care is invited as guest speaker followed by case discussions from everyday practice.
- The Paramedic Day is organised each May, where students demonstrate their practical skills during a competition.

Research

PhD research topic:

- Point of Care technologies in emergency medical care.

Students' Scientific Association research topics:

- Acute Coronary Syndrome;
- First aid training;
- Position and activities of paramedics in the Emergency Department;
- Care of the multiple injured patients;
- Shock management;
- Mental aspects of rescue/emergency work;
- Complex cardiopulmonary resuscitation;
- Communication in emergency situations;
- Role players and standardized patients in HiFi simulation.

Department of Family Care Methodology

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Background

Academic level training of health visitors (similar to district or family nurse) started in 1975 in Hungary.

Education

The aim of this eight-semester programme is to train health visitors who can give assistance to children and pregnant women in social care and in the prevention of illnesses. Practical training takes place under clinical and real-life circumstances (e.g. in hospitals and district consulting rooms).

The basic subjects (e.g. anatomy, physiology, pathology, biology) are followed by special studies in paediatrics, nursing, obstetrics, sanitation and nursing methodology. Pedagogy, psychology, health education, social sciences and information sciences are integrated into the curriculum. After submitting a thesis, students are tested in theoretical, practical and professional skills before attaining their diploma. Upon completion of the programme health visitors are entitled to work in municipal primary health care facilities, or in schools and in the area of primary preventive medical services. They can perform their duties either independently or in cooperation with doctors and other medical experts.

Research

- Preventive/visiting nurse system in Europe
- The characteristics of childhood onset depression according to depressive symptoms, co-morbidities and quality of life
- Influence of smoking during pregnancy on preterm-birth and low birth-weight
- Connection between childhood obesity, IDDM and physical activity

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Background

The overall duty of the Department of Public Health Sciences, the legal successor of the Department of Epidemiology, is to provide appropriate training for health practitioners in the field of public health and carry out different research projects. Our aim is to equip students with the knowledge and skills to make valuable contribution to public health.

The Department offers undergraduate degree programmes at B.Sc. level and a master programme will be introduced in the near future.

Courses of disease prevention and health promotion are available in English for full time students of physiotherapy. The Department for Epidemiology offers a wide range of research topics with professional assistance for students, and they also contribute to the improvement of our doctoral degree programme.

A well-equipped laboratory belongs to the Department for laboratory practices of microbiology and infection control investigations.

Education

Within epidemiology, students are taught both general and specific aspects of pest control and disinfection techniques, including insect and rodent control. Following the fourth and sixth semesters, students take part in four-week practice sessions, and during the eighth semester they participate in a thirteen-week practicum.

Research

Infection Control Centre

- In order to prevent nosocomial and healthcare associated infections, the Department forms an infection control centre in collaboration with external public health partners.
- The key elements of active laboratory surveillance system:
 - molecular biology methods for comparison/characterization of strains isolated from different sources;
 - monitoring infections;
 - computer data analysis of bacterial isolates including antimicrobial-resistance patterns.

Burial customs and funeral practices

- Treatment of dead persons according to the law and the process of mourning
- Dead people – from a public health and cultural historical view
- Characteristics and forms of burial from an intercultural perspective

Research Projects for the Students' Scientific Association

- Epidemiology and prevention of infectious diseases
- Epidemiology of diseases of civilization
- Profile of secondary prevention in Hungary and in the EU
- Appropriate food hygiene practice, infestation of food, food poisoning
- Probiotics and their effects on the human body
- The impact of climate change on food safety
- Research on natural antimicrobial proteins

Department of Clinical Studies

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Head of Department

College Professor Dr. Klára Gadó PhD, MD

Contact person

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Background

The tasks of the Department of Clinical Studies are: instruction of clinical knowledge in the frame of the bachelor and master degree programmes of the Faculty of Health Sciences, and participation in health sciences programmes of Semmelweis University's School of PhD Studies as consultant or reviewer.

Education

- The Department's educational activities include:
 - transmission of evidence-based, modern, medical-clinical knowledge, and familiarization with the etiology and pathomechanism of different diseases;
 - enabling students to recognize the signs of diseases, evaluate symptoms, and complete adequate patient care based on competences;
 - providing basic pharmacological knowledge, therapeutic possibilities and effects, side effects, therapeutic responses;
 - helping students to gain insights into the clinical significance of most important laboratory, radiological and endoscopic examinations, into the methods of clinical problem-solving, and into the pharmacological basis of medical therapy;
 - preparation for the assistance in advanced diagnostic and therapeutic methods, the understanding of current medical science, and the acquirement of the competences required for health practitioners;
 - the development of the solid approach of prevention-remedy-nursing-care-rehabilitation.
- The Department actively participates:
 - in the preparation of student-focused didactical strategies;
 - in the development of new subjects and training programmes;
 - in the preparation of textbooks and lecture books;
 - and in special didactical and applied clinical researches.

Research

- Hemostasis changes in pregnancies
- Diagnosis and therapy of thrombophilias
- The methodology of teaching clinical knowledge
- Fitting the level of higher education to the European Qualification Framework
- Development of validation processes in higher education
- Family planning, family care
- Social and cultural background of health care employees
- The support of parents expecting their first child; application of the APP model (PhD research)
- Family planning and maternity plans of Health Visitor students
- Anaesthesiology and Intensive therapy – patient security/safety, monitoring
- Clinical nutrition and its management with pharmaceutical aspects
- Risk screening, nutritional assessment, oral nutrition support, enteral and parenteral nutrition,
- Parenteral nutrition compatibility and incompatibility
- Methods of examination of TPN emulsions, physicochemical stability of TPN
- Role of nutrition team

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Background

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- Family planning and maternity plans of Health Visitor students
- Anaesthesiology and Intensive therapy – patient security/safety, monitoring
- Clinical nutrition and its management with pharmaceutical aspects
- Risk screening, nutritional assessment, oral nutrition support, enteral and parenteral nutrition,
- Parenteral nutrition compatibility and incompatibility
- Methods of examination of TPN emulsions, physicochemical stability of TPN
- Role of nutrition team

Department of Clinical Ophthalmology

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Head of Department

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Background

The education of optometry started in 1992 in Hungary at the College of Health Care (now Semmelweis University Faculty of Health Sciences). The Department of Clinical Ophthalmology was established in 2008. Prior to this, the education of optometry belonged to the tasks of the Department of Clinical Studies. The Department is responsible for training optometrists. This includes developing the curriculum of the optometry training, organising clinical and optical trainings for students, and keeping connection with educators and institutions who participate in the practical training.

Education

The training is the one and only optometry training in Hungary and runs as a part time training programme. The undergraduate training programme consists of eight semesters and 240 ECTS with a total number of 1062 of contact hours and 6138 individual hours, of which 40% is devoted to theoretical training and 60% to practice.

Graduate training programmes are also available after completion of the basic training.

Research

The Department conducts scientific research activities in two ways:

- 1 **In cooperation with the Department of Ophthalmology at the University in the following fields:**
 - Femtolasers in the surgery of cataracts;- Development of a new intraocular lens in surgery of cataracts.
- 2 **The Department's individual scientific work is carried out in the following fields:**
 - Correction of presbyopia with contact lens;
 - Screening of the visual acuity and ametropia of children of age 7 to 14;
 - Contact lens related dry eye;
 - Contact lens wearing in childhood;
 - Computer Vision Syndrome and its connection with ametropies.

Department of Imaging and Medical Instrumentation

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Head of Department

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Background

The Department of Imaging and Medical Instrumentation conducts teaching, scientific and supplemental activities. The Department is responsible for the education of imaging diagnostic analyst specialists corresponding to the task of training highly qualified radiographers who are experienced in every sub-field of radiology.

Education

In the four-year part-time B.Sc. education, the first three basic semesters are followed by specialist courses (Conventional radiology, US, MRI, Nuclear Medicine, Interventional therapy, Radiation therapy).

Students attaining the degree are able to use imaging tools to plan and perform examinations on their own, and to process and apply the obtained information.

Teaching is performed by leading radiologists and radiographers, mainly of Semmelweis University and of large teaching hospitals. Practical training takes place in these hospitals as well.

The Medical Engineering group teaches “Basics of Biophysics and Medical Technology” and “Info-Communication” to dietitian, nurse, health visitor, physiotherapist, paramedics and public health supervisor students.

The Department continuously produces innovative books, image collections and other teaching materials necessary for the education. For this purpose, the Department works in collaboration with the other 3 similar departments in the country to harmonize the teaching materials and the requirements.

An emphasized task of the Department is the graduate teaching of radiographers including the organisation of courses.

Research

The professors of the Department have leading positions in associations of radiology, radiography and medical technology inside and outside Hungary, and they are in the editorial boards of various scientific papers. The focus of the researchers is on clinical decision support, medical informatics, self-monitoring, on developing an immersive learning environment, or a virtual

learning environment. Significant focus is put on emergency care systems, on the reduction of supply times and on successful cooperation with emergency departments.

Moreover, the Department joined the European Association of Radiographers.

Department of Applied Psychology

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Education

The main task of the Department is to offer basic psychological knowledge for all departments of the Faculty of Health Sciences in four modules which are as follows:

- *Basics of Psychology* – theoretical course including general psychology, developmental psychology, theories of personality.
- *Social Psychology* – theoretical course including group dynamics, social phenomena, attitudes, prejudices, attributes, stereotypes.
- *Communication and Personal-Development* – We use structured exercises to develop skills in the following fields: enhance group cohesion, basic communication skills, assertive communication, emphatic communication, stress managing methods, conflict management, and profession-specific communication strategies.
- *Health Psychology* – Health psychology is the field within psychology devoted to understanding psychological influences on how people stay healthy, why they become ill, and how they respond when they do get ill. It focuses on health promotion and maintenance; prevention and treatment of illness; the etiology and correlates of health, illness, and dysfunctions; and improvement of the health care system and the formulation of health policy. Health psychologists' fields of work: behavior risk factors/"pathogens" (possibilities of intervention for correction of risk behavior) behavior health preservation / „immunogenic". Conducting research into what are the views, opinions, attributes of health and illness among everyday people. Communication, cooperation, decision-making (health professional – patient interaction). The environment of treatment (how the work environment influences the health worker). Psychology of patients with chronic diseases (disabled, dying).

Division of Applied Pedagogy

Another task of the Department is promoting the basic knowledge of theoretical and practical health education and prevention for students in B.Sc. and M.Sc. trainings; emphasising the pedagogical aspects of patient-care; improving the indispensable skills in counselling and education in paramedical professions; teaching methods of health promotion, and the possibilities of development of health culture, lifestyle and health behaviour.

Research

Since the Department's scope is necessarily broad, staff members have been participating in research activities of various psychological fields:

- Nutritional and sport habits of students;
- Stress among the Professional helpers;
- The exploration of the learning attitude among 19-26 years old students;
- The relationship between burn out, emotion regulation and empathy among health professionals;
- Assessment of ethical and legal issues regarding professional tasks of doctors and nurses working in perinatal centres from the point of view of dilemmas related to the beginning and the end of life

Department of Addictology

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Head of Department

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Background

The Department of Addictology coordinates the educational and research activities of the Faculty related to addictive disorders. Some of our fields are the symptomatology, therapy, and prevention of addictive problems. Addiction medicine is present at every specialization of our Faculty; secondary topics like intravenous drug-use, models of preventive medicine are especially practical and optional courses. Our students are involved in many of our research programmes in collaboration with other institutions in Hungary or abroad. The new fields of addiction medicine like gambling and Internet-addiction are also present in our teaching and research activities.

We have close contacts with therapeutic and rehabilitation institutions in Hungary, preventive and outpatient centers (Blue Point Center).

Education

Our Department coordinates the „Addiction Counsellor“ specialization, which is the first and only opportunity to study addiction counselling in our country. The most important specialists of this field are our invited teachers. Our counsellors are also taught economics and management, which are necessary for their everyday work as coordinators of therapeutic and financial processes. They are also able to organize preventive courses on alcohol and illegal drug abuse fields.

Research

Our research interests include the application and adaptation of counselling methods in the health and social care of alcohol and drug abusers, the analytic epidemiological study of deviant behaviour, biological and ethic sides of human behaviour, the social background of medical organizations, and researches about the newest therapeutical approaches for intravenous drug users and dependent patients as well as the qualitative and quantitative approaches in the study of hidden substance users (epidemiological, qualitative and quantitative studies on the users of new psychoactive substances).

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Background

The Department of Morphology and Physiology as a unit of the Institute of Basic Health Sciences has been operating at Semmelweis University Faculty of Health Sciences since its foundation in 1975. The Department participates in the education of the full time English language physiotherapy B.Sc. programme since 2005. The full time English language training of nurses and midwives was introduced in the 2011/2012 academic year.

Education

The Department's educational tasks include the teaching of core and optional subjects to students participating in the full- and part time trainings of the Faculty, as well as to students taking part in the Master's level programmes, in the doctorate courses and in vocational trainings. Members of the Department's staff contribute to different medical and health care research projects, too.

The Morphology Working Group teaches Anatomy and Applied Biology, whilst the Physiology Working Group teaches Physiology-Pathophysiology, Chemistry and Biochemistry in the first, second and third semesters. The following optional subjects are offered in English language:

- Biology of stem cells;
- From classical genetics to epigenetics;
- Chapters of venous circulation and hemodynamics;
- The genetic basis of muscle disorders;
- Functions of hormone receptors: scientific research and clinical practice, health and disease,
- Applied sport physiology and sport health sciences.

Research

The main research areas of the teaching staff are as follows:

- Maintaining of functional abilities and prevention of falls among older adults;
- The examination of decreased function due to low back pain with validated, self-reported questionnaires;
- The examination of posture balance and talent parameters of high school student age group;
- Signalling pathways and autophagy in cancer;
- Stem cells: prospects and challenges;
- Statistical analysis of Hungarian twin data;
- Signal transduction pathways in maternal-fetal interactions in normal and complicated pregnancies;
- A possible model of venous varicosity in rats;
- Effects of hormones on vascular remodelling;
- Roles of G protein-coupled receptor signalling in the vascular function;
- Roles of physical activity in prevention of chronic diseases;
- Signs of cardiovascular sport adaptation;
- Gerontokinesiology – translational animal models: organization of motor control and cognitive functions,
- Walking assessment and dementia prediction;
- Prevention of falling and fracture in elderlies;
- Movement/sport nutrition;
- Active and passive exercise (experimental and human studies);
- Bariatric and metabolic surgery in rats;
- Neurocardiological aspects of exercise-driven rehabilitation in rats,
- Survey of environmental factors influencing ADHD symptoms among elementary school children.

Department of Social Sciences

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Head of Department

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Background

The Department of Social Sciences belongs to the Institute of Basic Health Sciences. The role of the Department is to support all students to recognize and to prepare for the social, cultural and economic embeddedness of their future health care professions. Our Department offers theoretical and practice-oriented knowledge – discussing general and special health care related problems – in the fields of Sociology, Social Anthropology, History of Health Sciences, Law, Ethics, Scientific Research Methods, as well as Medical Economy and Management. These modules – as essentials in health care labour market – are to improve conscious employee competencies and social responsibility. Our Department actively participates in an extended Europe-wide network, COEHRE. The members of the Department of Social Sciences occupy leading positions in several professional and social organizations and take part in their work (Hungarian Association of Medical History, Public Body of Hungarian Academy of Sciences, Hungarian Sociological Association, American Anthropological Association, The European Association for the History of Medicine and Health (EAHMH), Hungarian Association of Sport Studies). Furthermore, our colleagues have a hand in the edition of different scientific journals, such as Development and Financing, Central European Studies, Kaleidoscope – Journal of History of Culture, Science and Medicine, and the newly initiated Developments of Health Sciences.

Education

The Department takes part in the educational development of all B.Sc. and M.Sc. programmes of the Faculty and in the elaboration of curricular directives. As a participant of full time and part time trainings in Nursing and Patient Care, Health Care and Disease Prevention, and Medical Laboratorial Diagnostic programmes, the Department is responsible for teaching the following subjects: Health and Society, Introduction to Health Care Economics, Health Care Management, Health Care Law, Bioethics and Professional Ethics, Philosophy of Health, Thesis Methodology. Additionally, the Department has been organising the Health Care Project Manager postgraduate course (in Hungarian) since 2008, which enables graduates of the course to successfully (project) manage tasks and situations in every area of the health system. As a result of an educational cooperation between Semmelweis University Faculty of Health and Public Services, Semmelweis University Faculty of Health Sciences and the Budapest Metropolitan University, the Health Care Management B.Sc. started in Hungarian language (with Health Tourism Management speciality) in a form of part time programme in September 2014. The programme is supervised by the Faculty of

Health and Public Services (the programme supervisor is Dr. Miklós Szócska). Our Department is involved in the coordination and teaching work related to the programme.

The Health Care Management B.Sc. programme enables graduates of the course to successfully design and construct client-centred health tourism programs, to analyse statistical data related to tourism, and to coordinate touristic and health touristic projects with the implementation of knowledge about the system of health care and touristic institutions.

One of the main concerns of the Department is to provide adequate and flexible knowledge in the most suitable ways, therefore we devote special attention to the innovation of our methods of instruction. To keep a continuous interdisciplinary discussion about this topic, we have organized eight 'Professional Days on Teaching and Research Methodologies' so far. Most of our staff have experience in teaching abroad, which has broadened our perspectives and made us more conscious about the approaches we apply.

Research and professional forums

With the aim of building networks of knowledge relating to social sciences and health, the Department of Social Sciences highly engaged with the creation of forums for interdisciplinary and inter-professional discussion. As a result, the Department hosted various professional days and conferences in the past years.

As a result of this work, in 2016 the Department organized the 5th Professional Day and Conference on Patient Rights. The next edition of this bi-yearly event was in the fall of 2018. The aim of the conference was to examine the current ethical and legal issues arising in the everyday practice of health care with the involvement of a wide circle of scientific and professional audience. The highlighted topics of the conference are the ethical and legal questions of health care for children, the dilemmas related to informed consent and communicational gaps during health care delivery, the questions of legal liability in emergency care and the opportunities for implication patients' rights during health care delivery.

In 2018, the Department gave place for the Professional Day on Health Tourism. The programme of the event put emphasis on the facilitation of discussion about the opportunities, weak points, results and possible legal regulation of health tourism.

With the initiation of the Faculty of Health Sciences, Department of Social Sciences a conference has been organized since 2017 with the title of 'Harmful/Protective Society'. The conference is a fruit of cooperation between three organizational units of Semmelweis University: The Faculty of Medicine Institute of Behavioural Sciences, the Faculty of Health and Public Service, Institute of Mental Health and the Faculty of Health Sciences Department of Social Sciences. The primary aim of the conference is to build a scientific community for those researchers who work on better understanding of the interconnectedness of health and society. The programme of the conference represents the results of ongoing research projects in the fields of Medical Sociology and Sociology of Health, with the emphasis on the mental, physical, and social dimension of health. Furthermore, the participants may share their experiences about challenges of teaching social sciences in health care training programmes.

Main research areas of the Department include: labour migrants in the health care sector; health and social care of migrants and minorities in Europe; comparative analysis of archive sources, legal sources on health care of the 18-19th centuries; epistemology of interpretive anthropology; developing intercultural competences; minority education and its effects on cultural connectedness; comparative analysis of dentistry business income producing capability; typology of ancient votive uterus-representations; analysis of the archival sources related to the birth-control and the midwife training; ethical and legal dilemmas in the practice of perinatal intensive care from the point of view of the beginning and the end of life; the socio-economic status of nurses and its sociocultural context; modern pedagogical approaches of Hungarian health promotion by peer education (TANTUdSZ Programme).

Our department provides external review and evaluation for the Healthy Diversity project, which is an international consortium of 7 different organisations aiming at developing training materials for health care professionals in VET sector.

Department of Health Promotion Methodology

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Background

The mission of the Department of Health Promotion Methodology is to represent in the higher education sector the healthy lifestyle and healthcare decision support solutions increasingly used on electronic devices; which is world-class in its form as an educational, research, knowledge and service center.

Education

The department's areas of expertise cover the basic knowledge of process-based and value-based healthcare as well as healthcare founded on evidence obtained in real life, with special emphasis on health promotion as function of health behavior, the processes of patient support, health planning, health care communication and health-cooperation, the user experience and health experience, the human-machine collaboration and service-planning responding to this, job competency development as well as device design.

In education, it is primarily adapted to the training programs of the Faculty, while it also plays a role in the training programs of other faculties. It makes its training materials available for medical and health sciences students of other domestic institutions.

Research and professional forums

Its research focuses on the areas of health promotion solutions and human-machine collaboration emerging with the development of technology, with its sub-themes being organization, analysis and evaluation, behavioral, social, planning and design. Through its knowledge-sharing activities, it assumes an active role in disseminating knowledge about people-centered healthcare to both other disciplines and to the general public.

Through a wide range of collaborations, the University is developing health-promoting applications that can be used by the population.

Department of Voice, Speech and Swallowing Therapy

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Background

The task of the Department of Voice, Speech and Swallowing Therapy is primarily to train its students, to teach professional subjects related to the program, to elaborate and develop subject programs, and to perform organizational work related to theoretical and practical education.

In order to ensure the professional development of our students, our task is to maintain continuous contact, cooperation and coordination with all organizational units and professional practice venues involved in the training of voice, speech and swallowing therapist students.

We regularly hold further training and preparation consultations, workshops and professional trainings for the therapists and master instructors conducting internships.

Education

At the department, we carry out research aimed at the development of the profession of voice, speech and swallowing therapist, and publish the results of the research in domestic and foreign journals.

We provide an opportunity for students to get involved in research work, we help their Students' Scientific Association (TDK) and the preparation of their dissertation as a supervisor.

We participate as a lecturer in professional national and international conferences and domestic trainings in the fields of ear, nose, laryngology, phoniatrics, neurology, rehabilitation, child rehabilitation, special education.

The instructors are members of the management and are professional supporters of various national professional and social organizations.

ANDRÁS PETŐ FACULTY



András Pető Faculty

Brief of Professor András Pető, the founder and namesake of András Pető Faculty

The founder of conductive education was born on 11th September 1893, in Szombathely, Having studying medicine at the University in Vienna and working in various hospitals in Austria, Andras Peto became an experienced neurologist. He was a pioneer in working with children with cerebral palsy by using a holistic approach to overcome any difficulties connected to their neurological motor disorders.

In the beginning of 1950, Peto founded his first Conductive Education centre which has been a foundation of the current András Pető Institute of Conductive Education and College for Conductor Training in Budapest, Hungary. Pető began to work with children with cerebral palsy, whose condition had been thought incurable and after a year an inspection committee reported that the children's condition had considerably improved. He provided motor therapy, special gymnastics, breathing exercises and motor education. "He put 'health' and 'illness' on another basis. He approached the problem with a bio-psycho-social-holistic view. It appears in his terminology too – there is 'client' instead of 'patient', a dynamic process analysis instead of the causal approach, educative-reeducative learning together instead of therapy-curing, a conductor leads towards independence instead of a doctor-physiotherapist."*

He worked persistently until his death. He died in the institute in 1967.

Pető's mission and legacy have been carried through the years and the geographical borders; although the aim remained the same – to show individuals suffering from injuries to the central nervous system and their families the way to a full life and to make society aware of the opportunities to help.

Nowadays, the András Pető Faculty of Semmelweis University (also known as Pető Institute) apart from providing conductive care to individuals with motor disorders; also prepares future professionals for implementing and practicing Conductive Education.

Facts and Figures

- More than two thousand students graduated since conductor training has started. Among these students there are Hungarian as well as international students, since the 1980's.
- The faculty has participated in international Erasmus programmes via different European projects, and different Erasmus+ student programmes. The Practicing Institutions of the Faculty also accepts students for Erasmus+ traineeship programme and offers the opportunity to get familiar with the practice of conductive education.
- The Faculty has different higher education cooperations in Europe, such as the United Kingdom, Germany, Russia, Ukraine and Romania.
- Training of Japanese conductors gave the opportunity to establish conductive education institutions in Japan, as our first Asian partners.
- New education cooperation has been established in the Public Republic of China, Shandong, and Jinan.
- More than 30 years of experience in coeducation is gained with the Aquinas College, in Grand Rapids, Michigan, United States.
- The faculty members are continuously working on developing its education programmes both in Hungarian and English and the cooperations with other higher education institutions.

Leadership, Dean's Office

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Dean **Andrea Zsebe PhD**
 Vice Deans **Ibolya Túri PhD –Vice Dean of Scientific Affairs**
László Matos DLA – Vice Dean of Academic Affairs

Information about the Conductive Pedagogy Bachelor programme

Training system

Hungary, as a member of the European Union, belongs to the unified European Higher Education Area, which in principle follows the multi-cycle (bachelor, master, and doctorate) training system. In this system it is much easier for students, lecturers, and researchers to travel and build international relations, moreover, as citizens of the European Union they can continue their studies and plan their future as employees or entrepreneurs in any of the member states.

These opportunities open a wider field for non-European citizens studying in Hungary as well, since the possibilities of internal mobility inside the unified Europe are based on the training channels and close relationships between countries in the labour market and among institutions.

Conductive Pedagogy Bachelor programme

The conductor is an educational rehabilitation professional who is trained to use the method of conductive education and support the habilitation of children with cerebral palsy or other impairments of the nervous system causing difficulties in motor development/performance or coordination. Conductor is able to participate in adult rehabilitation as well, specialised in motor development of those who has neurodegenerative diseases such as Parkinson disease or Multiple Sclerosis, or conditions after stroke, or cranial/brain injuries. Conductive education through its holistic approach supports its participants in developing as independent life as possible by coming over or learning to live with their difficulties.

Field Practices

Practical training is closely related to the theoretical education in conductor training and organised by the faculty. The given order of the different practice cannot be changed.

The conductor BA programme is an 8-semester-long training including more than 40 percent practice of the total education hours.

Major curricular components: History of Education, Theory of Education, Functional Anatomy, Special Education, Anatomy of the neuro-system and musculoskeletal systems, Introducing to Psychology, Neuro Psychology, Conductive Pedagogy, and methodologies of rehabilitation at different fields of study.

Career opportunities: working in conductors' team, working in multi-professional teams in education, rehabilitation, or health institutions.

Qualification

Conductor

DEPARTMENTS

Department of Conductive Education

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Head of Department

Renáta Földesi PhD

Department of Human Sciences

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Head of Department

Róbert Mascher PhD

LIST OF LECTURERS

Name	Position	Department
dr. Brigitta Balogh	College Associate Professor	Department of Human Sciences
dr. Andrea Benyovszky	College Senior Lecturer	Department of Conductive Pedagogy
Dr. Gábor Csikós	College Senior Lecturer	Department of Human Sciences
Ágnes Elek	Master Teacher	Department of Human Sciences
dr. Éva Feketéné Szabó	College Professor	Department of Conductive Pedagogy
dr. András Fogarasi	Professor	Department of Conductive Pedagogy
dr. Renáta Földesi	College Associate Professor	Department of Conductive Pedagogy
dr. Tamás Frank	College Senior Lecturer	Department of Human Sciences
Franciska Gál	Master Teacher	Department of Conductive Pedagogy
Kata Hodász	Assistant Lecturer	Department of Conductive Pedagogy
Helga Hollosy	Language Teacher	Department of Human Sciences
dr. Zsófia Kállay	College Senior Lecturer	Department of Conductive Pedagogy
Anita Gabriella Kapcsándy	Master Teacher	Department of Conductive Pedagogy
dr. habil Anna Kelemen	College Professor	Department of Conductive Pedagogy
Dorottya Kenesei	Assistant Lecturer	Department of Conductive Pedagogy
dr. István Kollega Tarsoly	Senior Research Fellow	Department of Human Sciences
Erika Kolumbán	Master Teacher	Department of Conductive Pedagogy
dr. János Lengyel	Language Teacher	Department of Human Sciences
dr. Róbert Mascher	College Professor	Department of Human Sciences
László Matos DLA	College Professor	Department of Human Sciences
Dóra Ágnes Miliesz	College Assistant Lecturer	Department of Conductive Pedagogy
Eszter Pázmándi	College Assistant Lecturer	Department of Human Sciences
Katalin Perger	Master Teacher	Department of Human Sciences
dr. Henriett Pintér	College Associate Professor	Department of Human Sciences
Márk Pulay	Master Teacher	Department of Human Sciences
Gábor Szabó	Assistant Lecturer	Department of Human Sciences
dr. habil Zsuzsanna Szilárd	College Professor	Department of Human Sciences
Andrea Zsebe Phd.	College Professor	Department of Human Sciences

