UNIVERSITY OF SZEGED

Faculty of Medicine
Faculty of Pharmacy

Where knowledge and challenge meet

CURRICULUM
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Program Director

Content

BRIEF HISTORY OF THE UNIVERSITY OF SZEGED

Before the 12th century, intellectual and scholarly life concentrated in the monasteries. With the growing professionalisation of society in the 12th and 13th centuries, demand increased for educated professionals. The universities appeared in Europe from the 11th-12th century. Medieval universities were established for the study of arts, law, theology and medicine. Universities were not defined by location and space but by individuals banded together as a corporation. The end of the medieval period signalled the arrival of modern universities where teaching and research met.

In **1581**, following the establishment of universities in other regions of Central and Eastern Europe, *István Báthory*, the Prince of Transylvania, issued a founding document for a higher educational institute in Kolozsvár (Cluj-Napoca). The Jesuit Academy (*Societatis Jesu Academia Claudiopolitana*) was organized with two faculties, the Faculty of Philosophy and the Faculty of Theology. The academy was meant to have the rank of a university from the beginning; Prince Báthory endowed the institute with the right to confer baccalaureate and master's degrees on its students. At that time, the university held a unique place in the intellectual activity of Hungary; it was the only institute for higher education in Hungary.

The academy was soon closed due to religious and political turmoil, but the Jesuits re-established it and the institute gained more stability and prestige in the 17th century.

From **1753**, according to a decree passed by the Holy Roman Empress and Queen of Hungary and Bohemia, *Maria Theresia*, the institute functioned as a university, where teaching was carried out in German. She was one of the most significant proponents of enlightened absolutism; her educational reforms were highly lauded. **1774** saw not only the introduction of mandatory education but also the start of change for the University of Kolozsvár. After the Society of Jesus had been abolished, Maria Theresia entrusted the *Piarists* with the reorganization of the institute. As a result of the restructuring–in addition to the Faculties of Theology and Arts–two new faculties were established, the Faculty of Law (1774) and the Faculty of Medicine-Surgery (**1775**).

Later on, these faculties served as the basis for the *Hungarian Royal University of Kolozsvár*, which was founded by King *Francis Joseph I* and the Hungarian Parliament in **1872**. In **1881**, the university was renamed after the king and bore his name until 1940.

In 1919, the university had to leave its founding place and after a brief stay in Budapest, found new home in Szeged. From **1921** until 1940 the *Ferenc József Tudományegyem* (Francis Joseph University) gained more and more prestige. When in **1940** the university was divided and part of it moved back to Kolozsvár, the remaining staff and students, the laboratories and the library were reorganized. The university took the name of *Miklós Horthy*, who was a former Governor of Hungary. The first rector of this institute was *Albert Szent-Györgyi*, who received the most prestigious award of sciences in 1937, the Nobel-price, for his research conducted at the university.

After World War II the institute assumed the name University of Szeged. In **1951** the Faculty of Medicine formed an independent institution under the name *Medical University of Szeged*. The pharmacy training was started as an independent faculty (separate from the medical faculty) in **1957**, and the Division of Dentistry as part of the Faculty of Medicine in **1962**. The English-Language Program for foreign students was established in **1985**. From **1999** there is also a German-Language Program at the Faculty of Medicine. In **1987** the University assumed the name of its former Biochemistry Professor, Dean of the Faculty of Medicine, Rector, and Nobel Prize Laureate, Albert Szent-Györgyi who was first to isolate vitamin C, extracted from paprika.

In **2000** the Albert Szent-Györgyi Medical University became again an integrated part of the University of Szeged. The Faculty of Medicine and the Faculty of Pharmacy functioned as the *Albert Szent-Györgyi Medical and Pharmaceutical Center* until July 2007. In the year 2004 the English-language dentistry program was launched and the Faculty of Dentistry was founded in January **2007**.

The faculties obtain their basis for education by running a high-level clinical and research work. The task of the faculties is represented by three different fields: education, research-work, prevention-treatment.

The University of Szeged is one of the most distinguished universities in Hungary and is proud to be considered as the intellectual successor of the University of Kolozsvár founded in 1581.

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Department of Psychiatry (Pszichiátriai Klinika)
(Szeged, Kálvária sgt. 57.)
Head of Department: Prof. habil. JÁNOS KÁLMÁN, M.D., PhD, D.Sc.

Psychiatry Unit I.
(I. sz. PSZICHIÁTRIAI OSZTÁLY)
(Szeged, Kálvária sgt. 57.)
Head of Unit: Dr. ZOLTÁN IMRE TERENYI, M.D., PhD.

Psychiatry Unit II.
(II.sz. PSZICHIÁTRIAI OSZTÁLY)
(Szeged, Kálvária sgt. 57.)
Head of Unit: Dr.ILDIKÓ DEMETER, M.D.

Psychiatry Unit III.
(III.sz. PSZICHIÁTRIAI OSZTÁLY)
(Szeged, Kálvária sgt. 57.)
Head of Unit: Dr. PÉTER ÁLMOS, M.D., PhD.

Psychiatry Unit IV.
(IV. sz. PSZICHIÁTRIAI OSZTÁLY)
(Szeged, Kálvária sgt. 57)
Head of Unit: Dr. MAGDOLNA PÁKÁSKI, M.D., PhD.

Psychiatry Unit V. (Psychiatric Rehabilitation Unit)
(V. sz. PSZICHIÁTRIAI OSZTÁLY, PSZICHIÁTRIAI REHABILITÁCIÓS OSZTÁLY)
(Szeged, Leányszállás köz 2/a.)
Head of Unit: Dr. ZOLTÁN AMBRUS KOVÁCS, M.D.

Psychiatry Unit VI. (Psychiatric Outpatient Unit)
(VI. sz. PSZICHIÁTRIAI OSZTÁLY, PSZICHIÁTRIAI JÁRÓBETEG-ELLÁTÁS ÉS GONDOZÁS)
(Szeged, Kálvária sgt. 5.)
Head of Unit: Dr. Anna Kiss-Szőke M.D.

Research Laboratory
(Kutatólaboratórium)
(Szeged, Vasas Szent Péter u. 1-3.)
Head of Unit: Dr. Zsolt László Datki MSc., PhD.

Department of Pulmonology (TÜDŐGYÓGYÁSZATI TANSZÉK)
(Deszk, Alkotmány u. 36. Tel./Fax: + 36 62 571-552)
Head of Department: Prof. habil ATTILA SOMFAY, M.D., Ph.D.

Department of Radiology (RADIOLÓGIAI KLINIKA)
(Szeged, Semmelweis u. 6. Tel.: + 36 62 545-429, Fax: + 36 62 545-742)
Head of Department: Prof. habil. ANDRÁS PALKÓ, M.D., Ph.D.

Department of Rheumatology and Immunology (REUMATOLÓGIAI ÉS IMMUNOLÓGIAI KLINIKA)
(6725 Szeged, Kálvária sgt. 57., Tel: +36-62-561-332)
Head of the Department: Dr. LÁSZLÓ KOVÁCS

Department of Surgery (SEBÉSZETI KLINIKA)
(Szeged, Semmelweis u. 8. Tel.: + 36 62 545-444, + 36 62 545-445, + 36 62 545-446, Fax: +36 62 545-701)
Head of Department: Prof. habil. GYÖRGY LÁZÁR, M.D., Ph.D., D.Sc.

Transfusiology Section (TRANSZFÚZIOLÓGIAI TANSZÉK)
(Szeged, Somogyi u. 2. Tel.: +36 62 546-805Fax: + 36 62 545-908)
Head of Department: Dr. KLÁRA VEZENDI, M.D. Ph.D.

Department of Traumatology (TRAUMATOLÓGIAI KLINIKA)
(Szeged, Semmelweis u. 6. Tel.: + 36 62 545-531, Fax: + 36 62 545-530)
Head of Department: Prof. habil. ENDRE VARGA M.D., Ph.D.

Department of Urology (UROLÓGIAI KLINIKA)
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Head of Department: Dr. ZOLTÁN BAJORY, M.D., Ph.D.

Pharmacy of the Faculty of Medicine (ORVOSKARI GYÓGYSZERTÁR)
(Szeged, Szikra u. 8. Tel.: + 36 62 545-061, Tel./Fax: + 36 62 545-974)
Head Pharmacist: Dr. GABRIELLA JÁNOSI, D.Pharm.

FACULTY OF PHARMACY

Institute of Clinical Pharmacy
(KLINIKAI GYÓGYSZERÉSZETI INTÉZET)
(Szeged, Szikra u. 8. Tel.: + 36 62 544-922, Fax: +36 62 544-921)
Appointed Head of Department: Dr. habil. ISTVÁN ZUBKÓ D.Pharm, Ph.D.

Institute of Pharmaceutical Analysis
(GYÓGYSZERANALITIKAI INTÉZET)
(Szeged, Somogyi u. 4. Tel.: + 36 62 545-806)
Head of Department: Prof. habil. TAMÁS MARTINEK D.Chem., Ph.D., D.Sc.

Institute of Pharmaceutical Chemistry
(GYÓGYSZERKÉMIAI INTÉZET)
(Szeged, Eötvös u. 6. Tel.: + 36 62 545-562, Fax: +36 62 545-705)
Head of Department: Dr. habil. LORAND KISS Ph.D.

Institute of Pharmaceutical Technology and Regulatory Affairs
(GYÓGYSZERTECHNOLÓGIAI ÉS GYÓGYSZERFELÜGYELETI INTÉZET)
(Szeged, Eötvös u. 6. Tel./Fax: + 36 62 545-571)
Head of Institute: Dr. habil. ILDIKÓ CSÓKA D.Pharm., Ph.D.

Department of Pharmacodynamics and Biopharmaceutics
(GYÓGYSZERHATÁSTANI ÉS BIOFARMÁCIAI INTÉZET)
(Szeged, Eötvös u. 6. Tel./Fax: + 36 62 545-567)
Head of Department: Dr. habil. ISTVÁN ZUBKÓ D.Pharm, Ph.D.

Department of Pharmacognosy
(FARMAKOGNÓZIAI INTÉZET)
(Szeged, Eötvös u. 6. Tel.: + 36 62 545-558, Fax: +36 62 324-177)
Head of Department: Prof. habil. JUDIT HOHMANN D.Chem., Ph.D., D.Sc.

LIST OF EDUCATIONAL ADVISORS AND RESEARCH CONSULTANTS

Research at the bench or on a clinical basis provides a very important perspective for future physicians. It gives the students a chance to pursue common goals with faculty mentors and may give a glimpse into potential careers. Students are strongly encouraged to consider research opportunities. See your scientific research consultant at each department.

FACULTY OF MEDICINE

Department	Educational advisor	Research consultant
Dept. of Anatomy, Histology and Embryology		
Medicine	**Dr. Endre Dobó** **+** 36 (62) 544-000/6496 *dobo.endre@med.-u-szeged.hu*	**Dr. Annamária Kovács**
Pharmacy:	**Dr. Erika Bálint** +36 62/544 967 *dr.erikabalint@hotmail.com*	
Dept. of Anesthesiology and Intensive Therapy	**Dr. Ilona Szegesdi** +36 62/545 173 *office.aiti@med.u-szeged.hu*	**Dr. László Praefort**
Dept. of Behaviour Sciences	**Prof. Dr. Bettina Pikó** +36 62/545 968 *fuzne.piko.bettina@med.u-szeged.hu*	**Dr. Oguz Kelemen**
Dept. of Biochemistry	**Dr. Csaba Csonka** +36 62/545 755 *csonka.csaba@med.u-szeged.hu*	**Dr. Tamás Csont**
Department of Cell Biology and Molecular Medicine	**Dr. Ádám Légrádi** +36 62/544-000/2296 *legradam@molmed.szote.u-szeged.hu*	**Dr. Ádám Légrádi**
Department of Clinical Microbiology	**Dr. Gabriella Terhes** +36 62/545 888 *terhesga@gmail.com*	**Dr. Gabriella Terhes**
Dept. of Laboratory Medicine	**Dr. Rita Ónody** +36 62/545 753 *onody.rita@med.u-szeged.hu*	**Dr. Rita Ónody**
Dept. of Surgery	**Prof. Dr. András Petri** +36 62/545 445 *petri.andras@med.u-szeged.hu*	**Dr. Zsolt Simonka**
Dept. of Dermatology and Allergology	**Dr. Judit Oláh** +36 62/342-642 *lazarne.olah.judit@med.u-szeged.hu*	**Dr. Zsuzsanna Bata** +36 62/545 996 *bata.zsuzsa@med.u-szeged.hu*
Clinical Immunology:	**Dr. Zsuzsanna Bata** +36 62/545 996 *bata.zsuzsanna@med.u-szeged.hu*	
1st Department of Internal Medicine	**Dr. András Rosztóczy** +36 62/545 195 *rosztoczy.andras@med.u-szeged.hu*	**Dr. Tamás Takács**
2nd Department of Internal Medicine - Cardiology:	**Dr. Andrea Vass** *vass.andrea@med.u-szeged.hu*	**Prof. Zita Borbényi** *borbenyi.zita@med.u-szeged.hu*
- Hematology:	**Dr. Tímea P. Gurbity** + 36 62/545 226 *gurbity.palfi.timea@med.u-szeged.hu*	**Dr. Szabolcs Modok** *modok.szabolcs@med.u-szeged.hu*
- Pharmacy:	**Dr. Tímea P. Gurbity** + 36 62/545 226 *gurbity.palfi.timea@med.u-szeged.hu*	
Dept. of Forensic Medicine	**Dr. Beáta Havasi** +36 62/342-910 *havasi.beata@med.u-szeged.hu*	**Dr. Beáta Havasi**
Institute of Foreign Languages	**Vanda Varga** +36 62/425-521 *varga.vanda@med.u-szeged.hu*	**Izabella Villányi**

Institute of Surgical Research	**Dr. Andrea Szabó** +36 62/545 106 *szabo.andrea.exp@med.u-szeged.hu*	**Dr. József Kaszaki**
Dept. of Medical Biology	**Dr. Dóra Tombácz** +36 62/542 384 *tombacz.dora@med.u-szeged.hu*	**Dr. István Belecz**
Dept. of Medical Chemistry	**Dr. Györgyi Váradi** +36 62/545 136 *varadi.gyorgyi@med.u-szeged.hu*	**Dr. Lajos Kovács**
Dept. of Medical Genetics	**Dr. Zsuzsanna László** +36 62/546 127 *laszlo.zsuzsanna@med.u-szeged.hu*	**Dr. Nikoletta Nagy**
Dept. of Medical Physics and Informatics	**Dr. Ferenc Peták** +36 62/545 832 *petak.ferenc@med.u-szeged.hu*	**Dr. Ferenc Peták**
Dept. of Medical Microbiology and Immunobiology	**Dr. Tímea Mosolygó** +36 62/342 840 *mosolygo.timea@med.u-szeged.hu*	
Dept. of Neurology	**Dr. János Tajti** +36 62/545 355 *tajti.janos@med.u-szeged.hu*	**Dr. János Tajti**
Dept. of Neurosurgery	**Dr. Dávid Kis** +36 62/545 383 or 71-880 kis.david@med.u-szeged.hu	**Dr. Pál Barzó**
Dept. of Nuclear Medicine	**Dr. Miklós Papós** +36 62/545 736 *papos.miklos@med.u-szeged.hu*	**Dr. Miklós Papós**
Dept. of Obstetrics and Gynecology 4th year medicine: 6th year medicine:	**Dr. Virág Márton** *marton.virag@med.u-szeged.hu* **Dr. Norbert Pásztor** *pasztor.norbert@med.u-szeged.hu*	**Dr. György Bártfai**
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Dept. of Ophthalmology	**Prof. Dr. Andrea Facskó** **Dr. Edit Tóth-Molnár** +36 62-545-487 *office.opht@med.u-szeged.hu*	**Prof. Andrea Facskó**
Dept. of Orthopedics	**Dr. Péter Kellermann** +36 62/541 314 *kellermann.dr@gmail.com*	**Dr. László Tajti**
Dept. of Oto-Rhino-Laryngology	**Dr. Miklós Csanády** +36 62/545 317 *csanady.miklos@med.u-szeged.hu*	
Dept. of Pathology	**Dr. Levente Kuthi** +36 62/546 176 *kuthi.levente@med.u-szeged.hu*	**Dr. Birinyiczki Kitti**
Dept. of Pathophysiology	**Dr. Zsófia Mezei** +36 62/545 111 *mezeizsofia@gmail.com*	**Prof. Dr. Zoltán Rakonczay**
- Pharmacy:	**Dr. Zsolt Bagosi** +36 62/545 789 *bagosi@hotmail.com*	
Dept. of Pediatrics	**Dr. Ágnes Bognár** +36 62/545 330 *bognar.agnes@med.u-szeged.hu,* *office.pedia@med.u-szeged.hu*	**Dr. Pál Pásztor**

Dept. of Child and Adolescent Psychiatry	**Dr. Enikő Kiss** *kiss.eniko@med.u-szeged.hu*	
Dept. of Pharmacology and Pharmacotherapy	**Dr. Andrea Orosz** +36 62/545 674 *oroszandrea@yahoo.com*	**Dr. István Baczkó**
Dept. of Physiology		
Medicine:	**Dr. Ferenc Domoki** +36 62/545 100 *domoki.ferenc@med.u-szeged.hu*	**Dr. Ferenc Domoki**
Pharmacy:	**Dr. Gyöngyi Horváth** +36 62/544 971 *horvath.gyongyi@med.u-szeged.hu*	
Dept. of Psychiatry	**Dr. Hajnalka Nórándt-Pásztor** *norandt-pasztor.hajnalka@med.u-szeged.hu* **Dr. Anett Hotorán-Rosu** *rosu.anett@med.u-szeged.hu*	
Dept. of Public Health (Public Health)		
Medicine:	**Dr. Andrea Szabó** +36 62/342 869 *szabo.andrea@med.u-szeged.hu*	**Dr. András Papp**
Pharmacy:	**Dr. Zsuzsanna Máté** +36 62/342 866 *mate.zsuzsanna@med.u-szeged.hu*	
Dept. of Public Health (Medical Sociology)	**Dr. Regina Molnár** +36 62/342 872 *molnar.regina@med.u-szeged.hu*	**Dr. Regina Molnár**
Dept. of Pulmonology	**Dr. Regina Pálföldi** +36 62/571 552 *palföldi@deszkikorhaz.hu*	**Dr. Regina Pálföldi**
Dept. of Radiology	**Dr. Endre Szabó** *endrebacsi@gmail.com*	**Dr. Erika Vörös**
2nd Department of Internal Medicine	**Dr. Szabolcs Modok** +36 62/545 226 *moszadokbolcs@gmail.com*	**Dr. Zita Borbényi**
Dept. of Traumatology	**Dr. Endre Varga** +36 62/545 531 *varga.endre@med.u-szeged.hu* *office.trauma@med.u-szeged.hu*	**Dr. Sándor Pintér** +36 62/341-493 *pinter.sandor@med.u-szeged.hu*
Dept. of Urology	**Dr. Sándor Molnár** +36 (62) 561-361/545 *molnar.sandor@med.u-szeged.hu*	**Dr. Bajory Zoltán**

FACULTY OF PHARMACY

Department	**Educational advisor**
Institute of Clinical Pharmacy	**Dr. Péter Doró** +36 62/544 944 *dorop@pharm.u-szeged.hu*
Institute of Pharmaceutical Analysis	**Dr. Gerda Szakonyi** +36 62/545 925, 545-804 *gerda.szakonyi@pharm.u-szeged.hu*
Institute of Pharmaceutical Chemistry	**Dr. Márta Palkó** *palko@pharm.u-szeged.hu*
Institute of Pharmaceutical Technology and Regulatory Affairs	**Dr. Erzsébet Csányi** +36 62/545 573 *csanyi@pharm.u-szeged.hu*
Department of Pharmacodynamics and Biopharmacy	**Dr. Eszter Ducza** +36 62/541-977 *ducza@pharm.u-szeged.hu*
Department of Pharmacognosy	**Dr. Katalin Veres** +36 62/546 451 *veres@pharm.u-szeged.hu*

ACADEMIC CALENDAR

Faculty of Medicine
Faculty of Pharmacy
2017/2018

ACADEMIC PERIODS

1st semester
Education period: September 4 – December 8, 2017
Examination period: December 11, 2017– January 27, 2018
Repeat examination period: January 29 – February 3, 2018
Winter break: December 23, 2017 – January 1, 2018
Holidays: October 23, November 1

2nd semester
Education period: February 5 – May 19, 2018
Examination period: May 22– June 30, 2018
Repeat examination period: July 2 – July 7, 2018
Spring break: March 26 – April 2, 2018
Holidays: March 15, March 30, April 2, May 1, May 21

For other important dates and deadlines please check the relevant Info Sheet, our website or the Clerkship Guide.

FEES

1. Tuition fees

In case the students' academic progress does not follow the suggested study plan, tuition fee is calculated according to the following*:

Fee of attending three or more compulsory subjects	100% of one semester's tuition fee*
Fee of attending one or two compulsory subjects	max. 50% reduction of one semester's tuition fee can be requested*
Fee of attending solely compulsory elective / elective / criteria subject	max. 50% reduction of one semester's tuition fee can be requested
Fee of taking subject(s) that do not involve class attendance	max. 80% reduction of one semester's tuition fee can be requested

* Examination course fee is included.

Payments can be made by transfer to the following bank account:

University of Szeged
IBAN: HU94-10004012-10008016-00220332
Bank name: Hungarian State Treasury
(correspondent: Hungarian National Bank, SWIFT code: MANEHUHB)
Bank address: H-1054 Budapest, Hold u. 4.
Swift code: HUSTHUHB

Fees are subject to change. For updates please check the relevant Info Sheet.

GENERAL GUIDELINES

1.) Registration: Students have to **register for each semester** in order to have an active student status. Students who are not registered properly are not entitled to attend the classes. **LATE REGISTRATION IS NOT POSSIBLE.**

Registration requirements:

- **Tuition fee** has to be credited to the University's bank account in full before registration.
- Valid **residence permit**. Please check in the NEPTUN (under My Data/ Personal Information / Records) whether you have submitted a copy of your valid residence permit. If it was renewed recently, please present the original and a copy to the Secretariat.
  Please note that you have to apply at the Immigration Office for a renewal of your residence permit card 30 days before it expires!
- Valid **health insurance** (If it was renewed recently please present the original and a copy at the Secretariat.)
- **Summer practice** evaluation sheet (if required)
- Settled outstanding balance for **youth hostel fees** and **medical treatment costs**
- Valid **Medical Fitness Certificate** (completed medical check-up by the University Doctor)

2.) Payment of the tuition fee: The deadline of payment is always specified in the information sheets distributed to the students before the beginning of the upcoming semester. Proof of payment has to be submitted to the Secretariat. Students have to make sure that the exact amount of the tuition fee is credited to the University's account until the deadline. Late payment is not possible.

3.) Neptun course registration: Students have to sign up for their courses in the Neptun (computer-based academic system) each semester. Students failing to meet this requirement are not entitled to attend the classes. The number of course registrations in a subject is limited: one course can be registered 3 times during the period of studies. Make sure you sign up for all your courses (both the lectures and practices, examination courses, physical education -2 semesters required).

4.) Residence permit

http://www.med.u-szeged.hu/fs/current-students/residence-permit

5.) Health Insurance

All students must have a valid health insurance during their stay in Hungary.
http://www.med.u-szeged.hu/fs/health-insurance/

6.) Attendance of classes: If the absence does not exceed 15% of the total number of classes, students are not obliged to provide a certificate justifying the absence. If the absence falls between 15 and 25% of the total number of classes, students may only make up for the missed classes if they provide a certificate. The departments have the right to refuse the acceptance of a semester if the student missed more than 25 % of the practicals and did not make up for the absences.

7.) Obligation to report changes to the Secretariat: If there is a change in your personal data (address, e-mail address, telephone number etc.) you are required to *notify the Secretariat and correct the data in the Neptun*.
If you have to leave Szeged for a longer period of time during the lecture period due to substantial reasons (hospitalization, extraordinary family issues), you need to request permission in writing. Applications have to be handed in at the Foreign Students' Secretariat.

8.) General information regarding the examinations:

General information before you sign up for your exams:

- All exams including date, time and place is posted in the Neptun.
- Exam dates can be postponed before the Neptun closes the registration (*usually* 24 hours before the date of the exam. Clicking the course code, one can determine the closing of registration.) However, it is your duty to secure another date and time for your exam when you make changes.
- Students not showing up on an exam will lose one chance unless their absence is justified. Documents justifying the absence have to be presented at the Department concerned. To get the ticket to your next examination, please see the fee schedule below.
- A successful examination can be improved only in one subject / semester and only with the permission of the Program Director. The requests have to be handed in at the Foreign Students' Secretariat.

Procedures for unsuccessful exams:

- Repeated exam can be scheduled at the earliest by the 3rd day following the unsuccessful exam.
- Unsuccessful exams can be repeated 2 times during the exam period. Upon request, a repeated exam can be taken before a committee. The exam committee is appointed by the Department Chair. Repeated exams with committee can be scheduled only for exam dates announced in the Neptun.
- 3rd repeat chance can be granted to those who have **only one exam left**. (In these cases the chances should be decreased by one when students sign up for the course for the 3rd time). Requests have to be handed in at the Foreign Students' Secretariat.
- In case of even one unjustified absence in an examination the student will not be entitled to any further equities and exceptional permissions in any subject in the respective examination period (e.g. 3rd repeat examination chance).
- In the repeat examination period only repeated exams can be taken. First examinations – even with a former absent registration – cannot be taken in the repeat examination week!
- In exceptional cases (hospitalization, extraordinary family issues) further examination chances can be requested from the Dean. Examinations granted as an exceptional equity can be taken only till the end of second week following the repeat examination period. Supporting documents must be attached to the application.

Please take into consideration that all matters not regulated in the Acadaemic and Examination Regulations will be evaluated on individual basis by the Academic Board.

Further details are available in the relevant Info Sheet.

EXPRESSIONS

Compulsory Elective Subject (including Behavioral Science Subjects – only for medical students): There is a given number of credit points that has to be acquired in Compulsory Elective Subjects in the certain modules. One can choose freely from the subjects offered, however it is strongly recommended to follow the Suggested Study Plan.

Compulsory Subject: It is obligatory to take the subject in the module given.

Contact hours: Contact hours are the units of time required for a teacher to present subject material and to assess a student's performance. Contact hours include lectures, seminars, practical demonstrations, consultation hours and assessment.

Course requirement: The course requirement defines the precondition of a certain course. The course requirement can either be a **subject** or an **examination requirement**. In case of the *subject requirement* a course can be signed up for only if the examination defined in the course requirement has been completed successfully. In case of the *examination requirement* the examination of a course can only be taken if the examination defined in the course requirement has been completed successfully.

Credit: Credits are standard measurement of a student's accepted study time. One credit equals thirty hours of study time.

Credit transfer: Is a procedure accorded by the University of Szeged Code of Study and Examination Regulations, whereby a partial or full exemption can be given from completing one or more subjects by acknowledging previously completed subjects and thereby award the appropriate number of credit points.

Criteria Subject: Completion of criteria subjects is a precondition for entering the next module or receiving the diploma after finishing the final year (Physical Training, Summer Practices, Hungarian Language). Criteria subjects have no credit allocated to.

Elective Subject: There is a given number of credit points that has to be acquired in the certain modules. One can choose freely from the subjects offered, however it is strongly recommended to follow the Suggested Study Plan.

Examination course: If one cannot pass an examination successfully in the semester given, the examination can be repeated in the next examination period if the Department concerned announces it in the given semester and you get permission from the Academic Board. This means that the student will be exempted from fulfilling the requirements of the semester (classes do not have to be attended). An examination course can be taken only once in a certain subject.

Suggested study plan: the order and timing of subjects offered to students enabling them to obtain qualification within a specified period of time.

Grading system

Five-grade system

5 - excellent
4 - good
3 - accepted
2 - passed
1 - failed

Faculty of Medicine

GENERAL INFORMATION REGARDING THE STRUCTURE OF STUDIES AT THE FACULTY OF MEDICINE FOR THOSE WHO STARTED THEIR STUDIES IN THE ACADEMIC YEAR 2013/2014 OR LATER

I. STRUCTURE OF STUDIES

In the academic year 2017/2018, first, second, third, fourth and fifth year students follow the curriculum/ suggested study plan of University of Szeged, Faculty of Medicine (9001AK_N_2013) introduced in 2013/2014.

In order to obtain the Doctor of Medicine diploma, students need to acquire a minimum of 360 credits (by fulfilling the study and examination requirements of the subjects listed in the suggested study plan). In the final year, students, furthermore, have to complete the Final (State Board) Examination which consists of writing and defending a thesis, passing a complex written test and an oral patient examination (theoretical and practical part).

The order of taking the courses is set in the suggested study plan which is designed for completing medical studies within 12 semesters (6 years). **It is highly recommended to take the courses according to the Suggested Study Plan.**

Teaching is performed in 3 modules: Basic & Pre-Clinical Module (1st, 2nd, 3rd year)
Clinical Module (4th, 5th year)
Final Module (6th year)

Types of courses: Compulsory Courses
Compulsory Elective Courses
Elective Courses
Criteria Subjects

Credits to be acquired:

	Basic & Pre-Clinical Module (semesters 1-6)	**Clinical Module (semesters 7-10)**	**Final Module (semesters 11-12)**
	Credits		
Compulsory Courses	145	108	40
Compulsory Elective Courses	45*		
Elective Courses	18		
Criteria Subjects (no credits)	Physical Education, Hungarian Language, Summer Practice	Hungarian Language, Summer Practice Doctor-Patient Communication, Examination in Forensic Medicine and Public Health	

* This number includes 20 credits for the completion of the fifth year courses Thesis Plan I. & II., the completion of which is compulsory for all the fifth year students.

All the requirements of a module have to be fulfilled in order to enter the next module.

II. SPECIAL RULES FOR BEHAVIORAL SCIENCE SUBJECTS

In the fourth year (7th semester), students have to take a final examination which covers the knowledge, skills and attitudes learned during the seven previous semesters. The precondition for taking the examination is the earlier acquisition of 13 credits from the subjects below. However, it is recommended to complete all Behavioral Science Subjects (15 credits).

Recommended schedule for acquiring 13 credits:

- 8 credits for compulsory subjects:
  Introduction to Psychology, basics of nursing
  Communication skills
  (2 credits, year 1, spring semester)
  Ethics in Medicine
  (3 credits, year 3, spring semester)
  Medical Psychology I.
  (2 credits, year 3, spring semester)
  Medical Psychology II.
  (1 credit, year 4, fall semester)

- 5 credits for compulsory elective subjects. You can choose from the following courses:
  Introduction to Medicine
  (2 credits, year 1, fall semester)
  Medical Sociology
  (2 credits, year 2, fall semester)
  Medical Anthropology
  (1 credit, year 2, spring semester)
  Gerontology
  (2 credits, year 3, spring semester)

- Criteria subject:
  Doctor-Patient Communication
  (0 credit, **criteria subject**; year 4, fall or spring semester)

GENERAL INFORMATION REGARDING THE CREDIT SYSTEM AT THE FACULTY OF MEDICINE FOR THOSE WHO HAVE STARTED THEIR STUDIES BEFORE THE ACADEMIC YEAR 2013/2014

I. STRUCTURE OF STUDIES

for students who are in 6th year in the academic year 2017/2018.

Students have to complete 4 modules in order to obtain the Doctor of Medicine diploma.

All the requirements of a module have to be fulfilled in order to enter the next module:

- acquisition of the required *credits*
- completion of *Criteria Subjects*:
  - 2 semesters of ***Physical Education*** till the end of the 12th semester (It is recommended to complete it in the Basic Module)
  - ***Summer practices*** (Nursing, Internal Medicine, Surgery)
  - 8 semesters of ***Hungarian Language***

Behavioral Science Subjects:

In the fourth year (7th semester) students have to take a final examination which covers the knowledge, skills and attitudes learned during the seven previous semesters. The precondition for taking the examination is the earlier acquisition of 10 credits from the subjects below. However, it is recommended to complete all Behavioral Science Subjects (13 credits).

Recommended schedule for acquiring 13 credits:

• 8 credits for compulsory subjects:
Introduction to Psychology, basics of nursing (0 credit, year 1, spring semester)
Communication skills (3 credits, year 1, spring semester)
Ethics in Medicine (2 credit, year 3, spring semester)
Medical Psychology I. (2 credits, year 3, spring semester)
Medical Psychology II. (1 credit, year 4, fall semester)

• 5 credits for compulsory elective subjects. You can choose from the following courses:
Introduction to Medicine (2 credits, year 1, fall semester)
Medical Sociology (2 credits, year 2, fall semester)
Medical Anthropology (1 credit, year 2, spring semester)
Gerontology (2 credits, year 3, spring semester)

\+ **Doctor-Patient Communication** (0 credit, **criteria subject**; year 4, fall or spring semester)

II. MODULES:

1. BASIC MODULE

In the **Basic Module (years 1-2, semesters 1-4)** one has to acquire **117 credits** in order to enter the Pre-Clinical module.

Credits have to be acquired according to the following scheme:

Required credits:

- Compulsory Subjects (94 credits)
- Compulsory Elective Subjects (17 credits)
- Elective Subjects (6 credits)
- Criteria Subjects (Nursing Summer Practice – to be completed after the 2nd semester, 4 semesters of Hungarian Language)

2. PRE-CLINICAL MODULE

In the **Pre-Clinical Module (year 3, semesters 5-6)** one has to acquire **56 credits** in order to enter the Clinical module.

Credits have to be acquired according to the following scheme:

Required credits:

- Compulsory Subjects (45 credits)
- Compulsory Elective Subjects (8 credits)
- Elective Subjects (3 credits)
- Criteria Subjects (Internal Medicine Summer Practice – to be completed after the 6th semester, 2 semesters of Hungarian Language)

3. CLINICAL MODULE

In the **Clinical Module (years 4-5, semesters 7-10)** one has to acquire **132 credits** in order to enter the Final module.

Credits have to be acquired according to the following scheme:

Required credits:

- Compulsory Subjects (106 credits)
- Compulsory Elective Subjects (18 credits)
- Elective Subjects (8 credits)
- Criteria Subjects (Surgery Summer Practice – to be completed after the 8th semester, 2 semesters of Hungarian Language, Doctor-Patient Communication)

4. FINAL MODULE – CLERKSHIP YEAR

In the **Final Module (year 6, semesters 11-12)** one has to acquire **60 credits** in order to be eligible to sit for the State Board Examination.

SUGGESTED STUDY PLAN - MEDICINE - 2017/2018

Course Code	Course	Department	Head of Department	Theory Hrs/week	Practice Hrs/week	Form of exam	Credit	Course Requirement (SR=Subject requirement; ER=Examination requirement; P=Parallel Completion)
1st (fall) semester (9001AK_N_2013)		**1st YEAR**						**BASIC AND PRE-CLINICAL MODULE**
	Compulsory Subjects							
AOK-KUA011	Anatomy, Histology and Embryology I.	Dept. of Anatomy	Prof. Antal Nógrádi	2	-	Examination	5	P: AOK-KUA012, AOK-KUA013
AOK-KUA012	Dissection Practice I.	Dept. of Anatomy	Prof. Antal Nógrádi	-	3	Term Mark(5)	3	P:AOK-KUA011, AOK-KUA013
AOK-KUA013	Anatomy Seminar	Dept. of Anatomy	Prof. Antal Nógrádi	-	2	Signature	-	P:AOK-KUA011, AOK-KUA012
AOK-KUA041	Basic Life Support	Deparment of Emergency Medicine	Dr. Zoltán Pető	-	2	Term Mark(5)	2	-
AOK-KUA051	Medical Physics and Statistics I.	Dept. of Med. Physics and Informatics	Prof. Ferenc Bari	3	-	Examination	4	-
AOK-KUA052	Medical Physics and Statistics I.	Dept. of Med. Physics and Informatics	Prof. Ferenc Bari	-	2	Signature	-	P:AOK-KUA051
AOK-KUA061	Medical Chemistry I.	Dept. of Med. Chemistry	Prof. Gábor Tóth	3	-	Examination	6	-
AOK-KUA062	Medical Chemistry I.	Dept. of Med. Chemistry	Prof. Gábor Tóth	-	3	Signature	-	P:AOK-KUA061
AOK-KUA071	Cell Biology and Molecular Genetics I.	Dept. of Med. Biology	Prof. Zsolt Boldogkői	2	-	Examination	4	-
AOK-KUA072	Cell Biology and Molecular Genetics I.	Dept. of Med. Biology	Prof. Zsolt Boldogkői	-	2	Signature	-	P:AOK-KUA-071
	Compulsory Elective Subjects							
AOK-KA1311	Basics in Molecular Biology	Dept. of Med. Biology	Prof. Zsolt Boldogkői	1	-	Evaluation(5)	1	-
AOK-KA1801	Biostatistical Calculations	Dept. of Med. Physics and Informatics	Prof. Ferenc Bari	-	2	Term Mark(5)	2	
AOK-KA1891	Cytomorphology and Microtechnics	Dept. of Cell Biology and Molecular Medicine	Prof. Károly Gulya	2	-	Evaluation(5)	2	-
AOK-KA091	Developmental Genetics I.	Dept. of Med. Biology	Prof. Zsolt Boldogkői	1	-	Evaluation(5)	1	
AOK-KA1321	Frontiers of Molecular Biology	Dept. of Med. Biology	Prof. Zsolt Boldogkői	2	-	Evaluation(5)	2	-
AOK-KA101	Genetic Analysis I.	Dept. of Med. Biology	Prof. Zsolt Boldogkői	1	-	Evaluation(5)	1	-
AOK-KA601	Introduction to Medicine	Dept.of Behavioural Sciences	Dr. Oguz Kelemen	1	-	Evaluation(5)	2	-
AOK-KA602	Introduction to Medicine	Dept.of Behavioural Sciences	Dr. Oguz Kelemen	-	1	Signature	-	P:AOK-KA601
AOK-KA1921	Electrophysiology: ion channels and ion transport mechanisms in the regulatin of cell functions	Dept. of Pharmacology	Prof. András Varró	3	-	Evaluation(5)	2	-
AOK-KA1922	Electrophysiology: ion channels and ion transport mechanisms in the regulatin of cell functions	Dept. of Pharmacology	Prof. András Varró	-	total 6	Signature	-	P:AOK-KA1921
	Criteria Subjects							-
AOK-KUA251	Hungarian Language I.*	Dept. of Foreign Lang.	Dr. Éva Demeter	-	4	Term Mark(5)	-	-
AOK-KUA351	Medical Latin Language I.	Dept. Of Foreign Lang.	Dr. Éva Demeter	-	2	Signature	-	
XT0011-PHE	Physical Education (P.E.)**	Sport Center	Andrea Böröcz Hézsőné	-	2	Signature	-	-

* The completion of the course is obligatory in the semester given.

** One has to complete 2 semesters of Physical Education until the end of the 5th year.

2nd (spring) semester (9001AK_N_2013)								**BASIC AND PRE-CLINICAL MODULE**
	Compulsory Subjects							
AOK-KUA014	Anatomy, Histology and Embryology II.	Dept. of Anatomy	Prof. Antal Nógrádi	2	-	Examination	3	ER: AOK-KUA011 P: AOK-KUA015, AOK-KUA016
AOK-KUA015	Dissection Practice II.	Dept. of Anatomy	Prof. Antal Nógrádi	-	3	Term Mark(5)	3	P:AOK-KUA014, AOK-KUA016
AOK-KUA016	Histology Practice I.	Dept. of Anatomy	Prof. Antal Nógrádi	-	2	Term Mark(5)	2	P:AOK-KUA014, AOK-KUA015
AOK-KUA053	Medical Physics and Statistics II.	Dept. of Med. Physics and Informatics	Prof. Ferenc Bari	2	-	Examination	4	ER: AOK-KUA051
AOK-KUA054	Medical Physics and Statistics II.	Dept. of Med. Physics and Informatics	Prof. Ferenc Bari	-	2	Signature	-	P: AOK-KUA053
AOK-KUA063	Medical Chemistry II.	Dept. of Med. Chemistry	Prof. Gábor Tóth	3	-	Examination	6	ER: AOK-KUA061
AOK-KUA064	Medical Chemistry II.	Dept. of Med. Chemistry	Prof. Gábor Tóth	-	3	Signature	-	P: AOK-KUA063
AOK-KUA073	Cell Biology and Molecular Genetics II.	Dept. of Med. Biology	Prof. Zsolt Boldogkői	2	-	Examination	4	ER: AOK-KUA071
AOK-KUA074	Cell Biology and Molecular Genetics II.	Dept. of Med. Biology	Prof. Zsolt Boldogkői	-	2	Signature	-	P: AOK-KUA073
AOK-KUA081	Introduction to Psychology, basics of nursing	Dept.of Behavioural Sciences	Dr. Oguz Kelemen	1	-	Signature	-	-
AOK-KUA082	Communication Skills	Dept.of Behavioural Sciences	Dr. Oguz Kelemen	-	2	Term Mark(5)	2	P:AOK-KUA081
	Compulsory Elective Subjects							
AOK-KA1312	Basics in Molecular Biology	Dept. of Med. Biology	Prof. Zsolt Boldogkői	1	-	Evaluation(5)	1	-
AOK-KA092	Developmental Genetics II.	Dept. of Med. Biology	Prof. Zsolt Boldogkői	1	-	Evaluation(5)	1	ER: AOK-KA091
AOK-KA1322	Frontiers in Molecular Biology	Dept. of Med. Biology	Prof. Zsolt Boldogkői	2	-	Evaluation(5)	2	-
AOK-KA102	Genetic Analysis II.	Dept. of Med. Biology	Prof. Zsolt Boldogkői	1	-	Evaluation(5)	1	-
AOK-KA1231	Introduction to Chemistry	Dept. of Med. Chemistry	Prof. Gábor Tóth	1	-	Evaluation(5)	2	-
AOK-KA1232	Introduction to Chemistry	Dept. of Med. Chemistry	Prof. Gábor Tóth	-	1	Signature	-	P:AOK-KA1231
AOK-KA081	Introduction to Medical Informatics	Dept. of Med. Physics and Informatics	Prof. Ferenc Bari	1	-	Evaluation(5)	3	-
AOK-KA082	Introduction to Medical Informatics	Dept. of Med. Physics and Informatics	Prof. Ferenc Bari	-	2	Signature	-	P:AOK-KA081
AOK-KA151	Modern Instrumental Analysis and Separation Methods	Dept. of Med. Chemistry	Prof. Gábor Tóth	1	-	Evaluation(5)	1	-
AOK-KA121	Neurocytology	Dept. of Anatomy	Prof. Antal Nógrádi	2	-	Evaluation(5)	2	-
AOK-KA161	Steric Strucure of Biopolimers	Dept. of Med. Chemistry	Prof. Gábor Tóth	1	-	Evaluation(5)	1	-

SUGGESTED STUDY PLAN - MEDICINE - 2017/2018

Course Code	Course	Department	Head of Department	Theory Hrs/week	Practice Hrs/week	Form of exam	Credit	Course Requirement (SR=Subject requirement; ER=Examination requirement; P=Parallel Completion)
	Elective Subjects							
AOK-KUA261	Chemical Misconceptions	Dept. Of Med. Chemistry	Prof. Gábor Tóth	2	-	Evaluation(5)	2	-
	Criteria Subjects							
AOK-KUA252	Hungarian Language II.*	Dept. of Foreign Lang.	Dr. Éva Demeter	-	4	Term Mark(5)	-	SR: AOK-KUA251
AOK-KUA352	Medical Latin Language II.	Dept. Of Foreign Lang.	Dr. Éva Demeter	-	2	Signature	-	
XT0011-2PHE	Physical Education (P.E.)**	Sport Center	Andrea Böröcz Hézsőné	-	2	Signature	-	-
AOK-KUA211	Nursing Practice			-	4x30	Signature	-	-

* The completion of the course is obligatory in the semester given. **One has to complete 2 semesters of Physical Education until the end of the 5th year.

3rd (fall) semester (9001AK_N_2013) **2nd YEAR** **BASIC AND PRE-CLINICAL MODULE**

	Compulsory Subjects							
AOK-KUA017	Anatomy, Histology and Embryology III.	Dept. of Anatomy	Prof. Antal Nógrádi	2	-	Comprehensive Exam	3	ER:AOK-KUA014 P:AOK-KUA018, AOK-KUA019 ***
AOK-KUA018	Dissection Practice III.	Dept. of Anatomy	Prof. Antal Nógrádi	-	3	Term Mark(5)	3	P:AOK-KUA017, AOK-KUA019
AOK-KUA019	Histology Practice II.	Dept. of Anatomy	Prof. Antal Nógrádi	-	2	Term Mark(5)	2	P:AOK-KUA017, AOK-KUA018
AOK-KUA021	Biochemistry I.	Dept. of Biochemistry	Prof. László Dux	4	-	Examination	6	SR:AOK-KUA063, ER:AOK-KUA073 ***
AOK-KUA022	Biochemistry I.	Dept. of Biochemistry	Prof. László Dux	-	2	Signature	-	P:AOK-KUA021
AOK-KUA031	Medical Physiology I.	Dept. of Physiology	Prof. Gyula Sáry	4	-	Examination	8	SR:AOK-KUA053, AOK-KUA073,
AOK-KUA032	Medical Physiology I.	Dept. of Physiology	Prof. Gyula Sáry	-	4	Signature	-	P:AOK-KUA031
	Compulsory Elective Subjects							
AOK-KA351N	Medical Physiology (Seminar) I.	Dept. of Physiology	Prof. Gyula Sáry	-	4	Evaluation(5)	4	P:AOK-KUA031
AOK-KA871	Molecular Cytology and Histology	Dept. of Anatomy	Prof. Antal Nógrádi	2	-	Evaluation(5)	2	-
AOK-KA631	Medical Sociology	Dept. of Public Health	Dr. Edit Paulik	-	2	Examination	2	-
AOK-KA1921	Electrophysiology: ion channels and ion transport mechanisms in the regulatin of cell functions	Dept. of Pharmacology	Prof. András Varró	3	-	Evaluation(5)	2	-
AOK-KA1922	Electrophysiology: ion channels and ion transport mechanisms in the regulatin of cell functions	Dept. of Pharmacology	Prof. András Varró	-	total 6	Signature	-	P:AOK-KA1921
AOK-KA091	Developmental Genetics I.	Dept. of Med. Biology	Prof. Zsolt Boldogkői	1	-	Evaluation(5)	1	
	Elective Subjects							
AOK-KA1771	Body Development and Diseases and a Molecular Biological Background	Dept. of Biochemistry	Prof. László Dux	2	-	Evaluation(5)	2	-
	Criteria Subjects							
AOK-KUA253	Hungarian Language III.*	Dept. of Foreign Lang.	Dr. Éva Demeter	-	4	Term Mark(5)	-	SR:AOK-KUA252
XT0011-PHE	Physical Education (P.E.)**	Sport Center	Andrea Böröcz Hézsőné	-	2	Signature	-	-

* The completion of the course is obligatory in the semester given.

** One has to complete 2 semesters of Physical Education until the end of the 5th year.

*** SR: AOK-KUA011, AOK-KUA041, AOK-KUA051, AOK-KUA061, AOK-KUA071

4th (spring) semester (9001AK_N_2013) **BASIC AND PRE-CLINICAL MODULE**

	Compulsory Subjects							
AOK-KUA101	Immunology	Dept. of Med. Microbiology	Dr. Katalin Burián	2	-	Exam	2	SR:AOK-KUA014,AOK-KUA053,AOK-KUA063 ER:AOK-KUA017
AOK-KUA111	Basic Surgical Skills	Inst. of Surgical Research	Prof. Mihály Boros	1	-	Exam	3	-
AOK-KUA112	Basic Surgical Skills	Inst. of Surgical Research	Prof. Mihály Boros	-	2	Signature	-	P:AOK-KUA111
AOK-KUA023	Biochemistry II.	Dept. of Biochemistry	Prof. László Dux	4	-	Comprehensive Exam	6	ER:AOK-KUA021
AOK-KUA024	Biochemistry II.	Dept. of Biochemistry	Prof. László Dux	-	2	Signature	-	P:AOK-KUA023
AOK-KUA033	Medical Physiology II.	Dept. of Physiology	Prof. Gyula Sáry	6	-	Comprehensive Exam	10	ER:AOK-KUA031
AOK-KUA034	Medical Physiology II.	Dept. of Physiology	Prof. Gyula Sáry	-	4	Signature	-	P:AOK-KUA033
	Compulsory Elective Subjects							
AOK-KUA271	Human Embryology: Development of the Organ Systems	Dept. of Anatomy	Prof. Antal Nógrádi	2	-	Evaluation(5)	2	ER:AOK-KUA017
AOK-KA352N	Medical Physiology (Seminar) II.	Dept. of Physiology	Prof. Gyula Sáry	-	4	Evaluation(5)	4	P:AOK-KUA033
AOK-KA1632	Biochemistry Seminar II.	Dept. of Biochemistry	Prof. László Dux	2	-	Evaluation(5)	2	P:AOK-KUA023
AOK-KA861	Cardiac Electrophysiology as a Basic Property of Cardiac Function	Dept. of Pharmacology	Prof. András Varró	1	-	Evaluation(5)	2	-
AOK-KA862	Cardiac Electrophysiology as a Basic Property of Cardiac Function	Dept. of Pharmacology	Prof. András Varró	-	1	Signature	-	-
AOK-KA881	Molecular Developmental-Biology	Dept. of Biochemistry	Prof. László Dux	2	-	Evaluation(5)	2	SR:AOK-KUA073
AOK-KA621	Medical Anthropology	Dept.of Behavioural Sciences	Dr. Oguz Kelemen	-	1	Evaluation(5)	1	SR:AOK-KA601,AOK-KA602
AOK-KA1221	Biochemical Basics of Preventive Medicine	Dept. of Biochemistry	Prof. László Dux	2	-	Evaluation(5)	2	SR: AOK-KUA021
	Elective Subjects							
AOK-KUA281	Clinical Anatomy	Dept. of Anatomy	Prof. Antal Nógrádi	-	3	Term Mark(5)	3	SR:AOK-KUA017
AOK-KA99051	Mathematical and Statistical Modelling in Medicine Lecture	Dept. of Med. Physics and Informatics	Prof. Ferenc Bari	1	-	Evaluation(5)	2	SR:AOK-KUA053
AOK-KA99052	Mathematical and Statistical Modelling in Medicine Practice	Dept. of Med. Physics and Informatics	Prof. Ferenc Bari	-	1	Signature	-	P:AOK-KA99051
AOK-KA092	Developmental Genetics II.	Dept. of Med. Biology	Prof. Zsolt Boldogkői	1	-	Evaluation(5)	1	ER: AOK-KA091

SUGGESTED STUDY PLAN - MEDICINE - 2017/2018

Course Code	Course	Department	Head of Department	Theory Hrs/week	Practice Hrs/week	Form of exam	Credit	Course Requirement (SR=Subject requirement; ER=Examination requirement; P=Parallel Completion)
	Criteria Subjects							
AOK-KUA254	Hungarian Language IV.*	Dept. of Foreign Lang.	Dr. Éva Demeter	-	4	Prel.Exam	-	SR:AOK-KUA253
XT0011-2PHE	Physical Education (P.E.)**	Sport Center	Andrea Böröcz Hézsőné	-	2	Signature	-	-

* The completion of the course is obligatory in the semester given.

** One has to complete 2 semesters of Physical Education until the end of the 5th year.

5th (fall) semester (9001AK_N_2013) **3rd YEAR** **BASIC AND PRE-CLINICAL MODULE**

	Compulsory Subjects							
AOK-KUA121	Basic Principles of Internal Medicine (Basics of Haematology)	1st Dept. of Int.Med. / 2nd Dept. of Int.Med.	Prof. György Ábrahám/	2	-	Examination	4	**see below****
AOK-KUA122	Basic Principles of Internal Medicine (Basics of Haematology)	1st Dept. of Int.Med. / 2nd Dept. of Int.Med.	Prof. György Ábrahám/	-	2	Signature	-	P:AOK-KUA121
AOK-KUA171	Pathophysiology I.	Dept. of Pathophysiology	Prof. Gyula Szabó	3	-	Examination	5	**see below****
AOK-KUA172	Pathophysiology I.	Dept. of Pathophysiology	Prof. Gyula Szabó	-	2	Signature	-	P:AOK-KUA171
AOK-KUA093	Microbiology II.	Dept. of Med. Microbiology	Dr. Katalin Burián	3	-	Comprehensive Exam	5	**see below****
AOK-KUA094	Microbiology II.	Dept. of Med. Microbiology	Dr. Katalin Burián	-	2	Signature	-	P:AOK-KUA093
AOK-KUA131	Basics of Emergency Medicine	Dept. of Anesthesiology and Intensive Therapy	Prof. Zsolt Molnár	1	-	Signature	-	P:AOK-KUA132
AOK-KUA132	Basics of Emergency Medicine	Dept. of Anesthesiology and Intensive Therapy	Prof. Zsolt Molnár	-	2	Term Mark(5)	2	**see below****
AOK-KUA151	Stomatology and Oral Surgery	Faculty of Dentistry	Dr. Laczkóné Dr. KingaTurzó	1	-	Examination	2	**see below****
AOK-KUA152	Stomatology and Oral Surgery	Faculty of Dentistry	Dr. Laczkóné Dr. KingaTurzó	-	1	Signature	-	P:AOK-KUA151
AOK-KUA201	Pathology I.	Dept. of Pathology	Prof. Béla Iványi	3	-	Examination	6	**see below****
AOK-KUA202	Pathology I.	Dept. of Pathology	Prof. Béla Iványi	-	3	Signature	-	P:AOK-KUA201
	Compulsory Elective Subjects							
AOK-KA1461	Advanced Surgical Skills	Inst. of Surgical Research	Prof. Mihály Boros	total: 12	-	Evaluation(5)	2	SR: AOK-KUA111
AOK-KA1462	Advanced Surgical Skills	Inst. of Surgical Research	Prof. Mihály Boros	-	total: 12	Signature	-	P: AOK-KA1461
AOK-KA1451	Microsurgery	Inst. of Surgical Research	Prof. Mihály Boros	total: 8	-	Evaluation(5)	2	SR: AOK-KUA111
AOK-KA1452	Microsurgery	Inst. of Surgical Research	Prof. Mihály Boros	-	total: 20	Signature	-	P:AOK-KA1451
AOK-KA1011	Molecular Medicine	Dept. of Cell Biology and Molecular Medicine	Prof. Károly Gulya	2	-	Evaluation(5)	2	-
AOK-KA1611	Pathophysiology of Sepsis at the Bedside	Dept. of Anesthesiology and Intensive Therapy	Prof. Zsolt Molnár	1	-	Evaluation(5)	1	-
AOK-KA1921	Electrophysiology: ion channels and ion transport mechanisms in the regulatin of cell functions	Dept. of Pharmacology	Prof. András Varró	3	-	Evaluation(5)	2	-
AOK-KA1922	Electrophysiology: ion channels and ion transport mechanisms in the regulatin of cell functions	Dept. of Pharmacology	Prof. András Varró	-	total 6	Signature	-	-
	Elective Subjects							
AOK-KA1771	Body Development and Diseases and a Molecular Biological Background	Dept. of Biochemistry	Prof. László Dux	2	-	Evaluation(5)	2	-
AOK-KA1027	Cerebral Blood Flow and Metabolism	Dept. of Med. Physics and Informatics	Prof. Ferenc Bari	2	-	Evaluation(5)	2	-
AOK-KUA261	Chemical Misconceptions	Dept. Of Med. Chemistry	Prof. Gábor Tóth	2	-	Evaluation(5)	2	-
	Criteria Subjects							
AOK-KUA255	Hungarian Language V.*	Dept. of Foreign Lang.	Dr. Éva Demeter	-	3	Term Mark(5)	-	ER:AOK-KUA254

* The completion of the course is obligatory in the semester given.

** SR: AOK-KUA017, AOK-KUA023, AOK-KUA033, AOK-KUA042, AOK-KUA053, AOK-KUA063, AOK-KUA073, AOK-KUA082, AOK-KUA111, AOK-KUA211, AOK-KUA101
ER: AOK-KUA091

6th (spring) semester (9001AK_N_2013) **BASIC AND PRE-CLINICAL MODULE**

	Compulsory Subjects							
AOK-KUA161	Internal Medicine I.	1st Dept. of Int.Med.	Prof. György Ábrahám	3	-	Examination	4	ER:AOK-KUA121
AOK-KUA162	Internal Medicine I.	1st Dept. of Int.Med.	Prof. György Ábrahám	-	2	Signature	-	P:AOK-KUA161
AOK-KUA173	Pathophysiology II.	Dept. of Pathophysiology	Prof. Gyula Szabó	3	-	Comprehensive Exam	5	ER:AOK-KUA171
AOK-KUA174	Pathophysiology II.	Dept. of Pathophysiology	Prof. Gyula Szabó	-	2	Signature	-	P:AOK-KUA173
AOK-KUA203	Pathology II.	Dept. of Pathology	Prof. Béla Iványi	2	-	Comprehensive Exam	6	ER:AOK-KUA201
AOK-KUA204	Pathology II.	Dept. of Pathology	Prof. Béla Iványi	-	4	Signature	-	P:AOK-KUA203
AOK-KUA141	Surgical Propedeutics	Dept. of Surgery	Prof. György Lázár	2	-	Examination	4	ER:AOK-KUA121
AOK-KUA142	Surgical Propedeutics	Dept. of Surgery	Prof. György Lázár	-	2	Signature	-	P:AOK-KUA141
AOK-KUA191	Medical Psychology I.	Dept.of Behavioural Sciences	Dr. Oguz Kelemen	1	-	Signature	-	SR:AOK-KUA081
AOK-KUA192	Medical Psychology I.	Dept.of Behavioural Sciences	Dr. Oguz Kelemen	-	1	Term Mark(5)	2	P:AOK-KUA191
AOK-KUA181	Ethics in Medicine	Dept.of Behavioural Sciences	Dr. Oguz Kelemen	1	-	Examination	3	SR:AOK-KUA081
AOK-KUA182	Ethics in Medicine	Dept.of Behavioural Sciences	Dr. Oguz Kelemen	-	2	Signature	-	P:AOK-KUA181
	Compulsory Elective Subjects							
AOK-KA1461	Advanced Surgical Skills	Inst. of Surgical Research	Prof. Mihály Boros	1	-	Evaluation(5)	2	SR: AOK-KUA111

SUGGESTED STUDY PLAN - MEDICINE - 2017/2018

Course Code	Course	Department	Head of Department	Theory Hrs/week	Practice Hrs/week	Form of exam	Credit	Course Requirement (SR=Subject requirement; ER=Examination requirement; P=Parallel Completion)
AOK-KA1462	Advanced Surgical Skills	Inst. of Surgical Research	Prof. Mihály Boros	-	1	Signature	-	P: AOK-KA1461
AOK-KA881	Molecular Developmental-Biology	Dept. of Biochemistry	Prof. László Dux	2	-	Evaluation(5)	2	SR:AOK-KUA073
AOK-KA821	Microbiological Probems in Med. Practice	Dept. of Med. Microbiology	Dr. Katalin Burián	1	-	Evaluation(5)	1	P:AOK-KUA091
AOK-KA1451	Microsurgery	Inst. of Surgical Research	Prof. Mihály Boros	total: 8	-	Evaluation(5)	2	SR: AOK-KUA111
AOK-KA1452	Microsurgery	Inst. of Surgical Research	Prof. Mihály Boros	-	total: 20	Signature	-	P:AOK-KA1451
AOK-KA831	Pathophysiological Aspects of Laboratory Medicine	Dept. of Laboratory Medicine	Dr. Földesi Imre	2	-	Evaluation(5)	2	SR:AOK-KUA171
AOK-KA671	Gerontology	Dept.of Behavioural Sciences	Dr. Oguz Kelemen	1	-	Evaluation(5)	2	SR:AOK-KUA081, AOK-KUA082
AOK-KA672	Gerontology	Dept.of Behavioural Sciences	Dr. Oguz Kelemen	-	1	Signature	-	P:AOK-KA671
AOK-KA861	Cardiac Electrophysiology as a Basic Property of Cardiac Function	Dept. of Pharmacology	Prof. András Varró	1	-	Evaluation(5)	2	-
AOK-KA862	Cardiac Electrophysiology as a Basic Property of Cardiac Function	Dept. of Pharmacology	Prof. András Varró	-	1	Signature	-	-
	Elective Subjects							
AOK-KA1023	Basic Immunpathology	Inst. of Surgical Research	Prof. Mihály Boros	1	-	Evaluation(5)	1	SR: AOK-KUA091
AOK-KA1711	Biotechnology from a Business Perspective	Dept. of Biotechnology	Prof. Kornél Kovács L.	2	-	Evaluation(5)	2	SR:AOK-KUA073
AOK-KA99051	Mathematical and Statistical Modelling in Medicine Lecture	Dept. of Med. Physics and Informatics	Prof. Ferenc Bari	1	-	Evaluation(5)	2	SR:AOK-KUA053
AOK-KA99052	Mathematical and Statistical Modelling in Medicine Practice	Dept. of Med. Physics and Informatics	Prof. Ferenc Bari	-	1	Signature	-	P:AOK-KA99051
AOK-KUA291	Introduction to Toxicology	Dept. of Med. Chemistry	Prof. Gábor Tóth	2	-	Evaluation(5)	2	SR: AOK-KUA023, AOK-KUA033
	Criteria Subjects							
AOK-KUA256	Hungarian Language VI.*	Dept. of Foreign Languages	Dr. Éva Demeter	-	3	Term Mark(5)	-	SR:AOK-KUA255
AOK-KA9811	Internal Medicine Practice				4x30	Signature	-	P:AOK-KUA161

* The completion of the course is obligatory in the semester given.

7th (fall) semester (9001AK_N_2013) **4th YEAR** **CLINICAL MODULE**

	Compulsory Subjects							
AOK-KA201	Internal Medicine II.	2nd Dept. of Int.Med.	Prof. Tamás Forster	5	-	Examination	5	SR: Basic and Pre-Clinical Module
AOK-KA202	Internal Medicine II.	2nd Dept. of Int.Med.	Prof. Tamás Forster	-	2	Signature	-	P: AOK-KA201
AOK-KA231	Pharmacology I.	Dept. of Pharmacology	Prof. András Varró	3	-	Examination	5	SR: Basic and Pre-Clinical Module
AOK-KA232	Pharmacology I.	Dept. of Pharmacology	Prof. András Varró	-	2	Signature	-	P: AOK-KA231
AOK-KA271	Public Health and Preventive Medicine I.	Department of Public Health	Dr. Edit Paulik	2	-	Examination	3	SR: Basic and Pre-Clinical Module
AOK-KA272	Public Health and Preventive Medicine I.	Department of Public Health	Dr. Edit Paulik	-	2	Signature	-	P: AOK-KA271
AOK-KA291	Orthopedics	Dept. of Orthopedics	Prof. Kálmán Tóth	2	-	Examination	3	SR: Basic and Pre-Clinical Module
AOK-KA292	Orthopedics	Dept. of Orthopedics	Prof. Kálmán Tóth	-	2	Signature	-	P: AOK-KA291
AOK-KA311	Pulmonology	Dept. of Pulmonolgy	Prof. Attila Somfay	1	-	Examination	2	SR: Basic and Pre-Clinical Module
AOK-KA312	Pulmonology	Dept. of Pulmonolgy	Prof. Attila Somfay	-	2	Signature	-	P: AOK-KA311
AOK-KA321	Radiology I.	Dept. of Radiology	Prof. András Palkó	1	-	Evaluation(5)	2	SR:Basic and Pre-Clinical Module
AOK-KA322	Radiology I.	Dept. of Radiology	Prof. András Palkó	-	1	Signature	-	P: AOK-KA321
AOK-KA331	Surgery I.	Dept. of Surgery	Prof. György Lázár	2	-	Evaluation(5)	3	SR: Basic and Pre-Clinical Module
AOK-KA332	Surgery I.	Dept. of Surgery	Prof. György Lázár	-	2	Signature	-	P: AOK-KA331
AOK-KA351	Obstetrics and Gynaecology I.	Dept. of Obstetrics and G.	Dr. Gábor Németh	3	-	Examination	4	SR: Basic and Pre-Clinical Module
AOK-KA352	Obstetrics and Gynaecology I.	Dept. of Obstetrics and G.	Dr. Gábor Németh	-	2	Signature	-	P: AOK-KA351
AOK-KA381	Clinical Oncology	Dept. of Oncology	Prof. Zsuzsanna Kahán	2	-	Examination	2	SR: Basic and Pre-Clinical Module
AOK-KA961	Medical Psychology II.	Dept.of Behavioural Sciences	Dr. Oguz Kelemen	1	-	Evaluation(5)	1	SR: Basic and Pre-Clinical Module
AOK-KA962	Medical Psychology II.	Dept.of Behavioural Sciences	Dr. Oguz Kelemen	-	1	Signature	-	P: AOK-KA962
	Criteria Subjects							
AOK-KA4717	Hungarian Language VII.*	Dept. of Foreign Lang.	Dr. Éva Demeter	-	3	Term Mark(5)	-	SR: Basic and Pre-Clinical Module
AOK-KA681	Doctor-Patient Communication**	Dept.of Behavioural Sciences	Dr. Oguz Kelemen	-	2	Signature	-	SR: Basic and Pre-Clinical Module
AOK-KA353	Delivery-Room**	Dept. of Obstetrics and G.	Dr. Gábor Németh	total 3 days		Signature	-	P: AOK-KA351
AOK-KA591	Examination in Behavioural Sciences	Dept.of Behavioural Sciences	Dr. Oguz Kelemen	-	-	Comprehensive Exam	-	SR: Basic and Pre-Clinical Module

* The completion of the course is obligatory in the semester given.

** Only half of the 4th year students can register in each semester.

	Compulsory Elective Subjects in the Clinical Module, fall semester (semester 7)							
AOK-KA431	Basic Biostatistics	Dept. of Med. Physics and Informatics	Prof. Ferenc Bari	2	-	Evaluation(5)	2	
AOK-KA1561	Introduction to Aviation and Space Medicine	Dept. of Aviation and Space Medicine	Prof. Sándor Szabó	2	-	Evaluation(5)	2	
AOK-KA451	Medical Informatics I.	Dept. of Med. Physics and Informatics	Prof. Ferenc Bari	2	-	Evaluation(5)	2	

SUGGESTED STUDY PLAN - MEDICINE - 2017/2018

Course Code	Course	Department	Head of Department	Theory Hrs/week	Practice Hrs/week	Form of exam	Credit	Course Requirement (SR=Subject requirement; ER=Examination requirement; P=Parallel Completion)
AOK-KA1791	Medical Molecular Biology and Genomics	Dept. of Med. Biology	Prof. Zsolt Boldogkői	1	-	Evaluation(5)	1	
AOK-KA1451	Microsurgery	Inst. of Surgical Research	Prof. Mihály Boros	total 8	-	Evaluation(5)	2	SR: AOK-KUA111
AOK-KA1452	Microsurgery	Inst. of Surgical Research	Prof. Mihály Boros	-	total 20	Signature	-	P: AOK-KA1451K
AOK-KA421	Nuclear Medicine	Dept. of Nuclear Med.	Prof. László Pávics	1	-	Evaluation(5)	1	
AOK-KA1061	Pharmacology Cases I.	Dept. of Pharmacology	Prof. András Varró	-	2	Term Mark(5)	2	
AOK-KA1581	The Language of Effective Doctor-Patient Communication	Dept. of Foreign Lang.	Dr. Éva Demeter	-	2	Term Mark(5)	2	
AOK-KA1921	Electrophysiology: ion channels and ion transport mechanisms in the regulatin of cell functions	Dept. of Pharmacology	Prof. András Varró	3	-	Evaluation(5)	2	-
AOK-KA1922	Electrophysiology: ion channels and ion transport mechanisms in the regulatin of cell functions	Dept. of Pharmacology	Prof. András Varró	-	total 6	Signature	-	-
	Elective Subjects in the Clinical Module, fall semester (semester 7)							
AOK-KA1881	Esthetics of the Face	Department of Operative and Esthetic Dentistry	Dr. Márk Antal	1	-	Evaluation(5)	1	
AOK-KA1831	Illicite Drug Use	Dept. Of Psychiatry	Prof. János Kálmán	2	-	Evaluation(5)	2	
AOK-KA1691	Tropical Medicine	Department of Psychiatry	Prof. János Kálmán	2	-	Evaluation(5)	2	

8th (spring) semester (9001AK_N_2013) **CLINICAL MODULE**

	Compulsory Subjects							
AOK-KA203	Internal Medicine III.	1st Dept. of Internal Med.	Dr. György Ábrahám	5	-	Examination	5	ER:AOK-KA201
AOK-KA204	Internal Medicine III.	1st Dept. of Internal Med.	Dr. György Ábrahám	-	2	Signature	-	P: AOK-KA203
AOK-KA233	Pharmacology II.	Dept. of Pharmacology	Prof. András Varró	4	-	Comprehensive Exam	5	ER: AOK-KA231
AOK-KA234	Pharmacology II.	Dept. of Pharmacology	Prof. András Varró	-	2	Signature	-	P: AOK-KA233
AOK-KA273	Public Health and Preventive Medicine II.	Department of Public Health	Dr. Edit Paulik	2	-	Comprehensive Exam	3	ER:AOK-KA271
AOK-KA274	Public Health and Preventive Medicine II.	Department of Public Health	Dr. Edit Paulik	-	2	Signature	-	P: AOK-KA273
AOK-KA323	Radiology II.	Dept. of Radiology	Prof. András Palkó	1	-	Examination	2	ER:AOK-KA321
AOK-KA324	Radiology II.	Dept. of Radiology	Prof. András Palkó	-	1	Signature	-	P: AOK-KA323
AOK-KA333	Surgery II.	Dept. of Surgery	Prof. György Lázár	2	-	Examination	3	ER: AOK-KA331
AOK-KA334	Surgery II.	Dept. of Surgery	Prof. György Lázár	-	2	Signature	-	P: AOK-KA333
AOK-KA354	Obstetrics and Gynaecology II.	Dept. of Obstetrics and G.	Dr. Gábor Németh	3	-	Evaluation(5)	4	ER: AOK-KA351
AOK-KA355	Obstetrics and Gynaecology II.	Dept. of Obstetrics and G.	Dr. Gábor Németh	-	2	Signature	-	P: AOK-KA354
	Criteria Subjects							
AOK-KA4718	Hungarian Language VIII.*	Dept. of Foreign Lang.	Dr. Éva Demeter	-	3	Comprehensive Exam	-	SR: AOK-KA4717
AOK-KA681	Doctor-Patient Communication**	Dept.of Behavioural Sciences	Dr. Oguz Kelemen	-	2	Signature		SR: Pre-Clinical Module
AOK-KA356	Delivery-Room**	Dept. of Obstetrics and G.	Dr. Gábor Németh	total 3 days		Signature	-	P: AOK-KA354
AOK-KA701	Surgery Summer Practice			-	4x30	Signature	-	SR: Pre-Clinical Module
	Compulsory Elective Subjects in the Clinical Module, spring semester (semester 8)							
AOK-KA4321	Advanced Biostatistics	Dept. of Med. Physics and Informatics	Prof. Ferenc Bari	2	-	Evaluation(5)	2	SR: AOK-KA431
AOK-KA1461	Advanced Surgical Skills	Inst. of Surgical Research	Prof. Mihály Boros	1	-	Evaluation(5)	2	SR: AOK-KUA111
AOK-KA1462	Advanced Surgical Skills	Inst. of Surgical Research	Prof. Mihály Boros	-	1	Signature	-	P: AOK-KA1461
AOK-KA211	Child and Adolescent Psychiatry, Mentalhygiene	Dept. Of Child and Adolescent Psychiatry	Dr. Ágnes Vetró	2	-	Evaluation(5)	2	
AOK-KA491	Clinical Immunology	Dept. of Dermatology	Prof. Lajos Kemény	2	-	Evaluation(5)	2	
AOK-KA501	Laboratory Diagnostics: Use of Laboratory Tests in Practice	Dept. of Laboratory Medicine	Dr. Földesi Imre	2	-	Evaluation(5)	2	
AOK-KA1451	Microsurgery	Inst. of Surgical Research	Prof. Mihály Boros	total 8	-	Evaluation(5)	2	SR: AOK-KUA111
AOK-KA1452	Microsurgery	Inst. of Surgical Research	Prof. Mihály Boros	-	total 20	Signature	-	P: AOK-KA1461
AOK-KA881	Molecular Developmental-Biology	Dept. of Biochemistry	Prof. László Dux	2	-	Evaluation(5)	2	-
AOK-KA1511	Oral and Maxillofacial Surgery	Dept. Of Oral and Maxillofacial Surgery	Prof. József Piffkó	1	-	Evaluation(5)	2	
AOK-KA1521	Oral and Maxillofacial Surgery	Dept. Of Oral and Maxillofacial Surgery	Prof. József Piffkó	-	1	Signature	-	
AOK-KA1062	Pharmacology Cases II.	Dept. of Pharmacology	Prof. András Varró	-	2	Evaluation(5)	2	
AOK-KA981	Social and Health Policy	Dept. of Public Health	Dr. Edit Paulik	2	-	Evaluation(5)	2	
AOK-KA1571	The Clinical Basics of Aviation and Space Medicine	Dept. of Aviation and Space Medicine	Prof. Sándor Szabó	2	-	Evaluation(5)	2	
AOK-KA1582	The Language of Effective Doctor-Patient Communication II.	Dept. of Foreign Lang.	Dr. Éva Demeter	-	2	Term Mark(5)	2	
AOK-KA1211	Tropical Diseases	Department of Clinical Microbiology	Dr. habil Edit Urbán	2	-	Evaluation(5)	2	
AOK-KA861	Cardiac Electrophysiology as a Basic Property of Cardiac Function	Dept. of Pharmacology	Prof. András Varró	1	-	Evaluation(5)	2	-
AOK-KA862	Cardiac Electrophysiology as a Basic Property of Cardiac Function	Dept. of Pharmacology	Prof. András Varró	-	1	Signature	-	-
AOK-KUA301	Sports Medicine	Dept. Of Sports Medicine	Dr. László Török	2	-	Evaluation(5)	2	-
	Elective Subjects in the Clinical Module, spring semester (semester 8)							
AOK-KA1221	Biochemical Basics of Preventive Medicine	Dept. Of Biochemistry	Prof. László Dux	2	-	Evaluation(5)	2	

SUGGESTED STUDY PLAN - MEDICINE - 2017/2018

Course Code	Course	Department	Head of Department	Theory Hrs/week	Practice Hrs/week	Form of exam	Credit	Course Requirement (SR=Subject requirement; ER=Examination requirement; P=Parallel Completion)
AOK-KA1621	Clinical Aspects of Tropical Diseases	Dept. Of Psychiatry	Prof. János Kálmán	2	-	Evaluation(5)	2	
AOK-KA1831	Illicite Drug Use	Dept. Of Psychiatry	Prof. János Kálmán	2	-	Evaluation(5)	2	
AOK-KA1851	Modern Complex Therapy of Malignant Diseases in Clinical Practice	Dept. of Oncology	Prof. Zsuzsanna Kahán	2	-	Term Mark(5)	2	SR: AOK-KA381
AOK-KA1861	Intensive Course on Radiation Oncology	Dept. of Oncology	Prof. Zsuzsanna Kahán	1	-	Evaluation(5)	1	SR: AOK-KA381
AOK-KA1911	Chemical Misconceptions	Dept. Of Medical Chemistry	Prof. Gábor Tóth	2	-	Evaluation(5)	2	
AOK-KUA291	Introduction to Toxicology	Dept. of Med. Chemistry	Prof. Gábor Tóth	2	-	Evaluation(5)	2	SR: AOK-KUA023, AOK-KUA033
AOK-KUA311	Physics in Radiotherapy	Dept. of Oncology	Prof. Zsuzsanna Kahán	-	1	Evaluation(5)	1	SR: AOK-KA381

* The completion of the course is obligatory in the semester given.

** Only half of the 4th year students can register in each semester.

9th (fall) semester (9001AK_N_2013) **5th YEAR** **CLINICAL MODULE**

	Compulsory Subjects							
AOK-KA191	Anesthesiology and Intensive Therapy I.	Dept. of Anesthesiology and Intensive Therapy	Prof. Zsolt Molnár	2	-	Evaluation(5)	1	ER: AOK-KA233
AOK-KA192	Anesthesiology and Intensive Therapy I.	Dept. of Anesthesiology and Intensive Therapy	Prof. Zsolt Molnár	-	1	Signature	-	P: AOK-KA191
AOK-KA205	Internal Medicine IV. Practice	1st Dept. of Int.Med. / 2nd Dept. of Int.Med.	Dr. György Ábrahám / Prof. Tamás Forster	-	2	Signature	0	P: AOK-KA0211
AOK-KA0211	Infectology - Infectious Diseases	1st Dept. of Int.Med. / 2nd Dept. of Int.Med.	Dr. György Ábrahám / Prof. Tamás Forster	2	-	Examination	3	ER:AOK-KA233, P: AOK-KA205
AOK-KA335	Surgery III.	Department of Surgery	Prof. György Lázár	1	-	Evaluation(5)	2	ER: AOK-KA333
AOK-KA336	Surgery III.	Department of Surgery	Prof. György Lázár	-	1	Signature	-	P: AOK-KA335
AOK-KA257	Pediatrics I. Lecture	Department of Pediatrics	Dr. Csaba Bereczki	-	2	Signature	-	P: AOK-KA256, 257
AOK-KA256	Pediatrics I. Seminar	Department of Pediatrics	Dr. Csaba Bereczki	-	2	Term Mark(5)	5	P: AOK-KA255, 257
AOK-KA255	Pediatrics I. Practice	Department of Pediatrics	Dr. Csaba Bereczki	1	-	Signature	-	P: AOK-KA255, 256
AOK-KA281	Neurology I.	Department of Neurology	Prof. László Vécsei	1	-	Examination	3	ER: AOK-KA203, AOK-KA233
AOK-KA282	Neurology I.	Department of Neurology	Prof. László Vécsei	-	2	Signature	-	P: AOK-KA281
AOK-KA301	Psychiatry I.	Department of Psychiatry	Prof. János Kálmán	1	-	Signature	-	ER: AOK-KA203, AOK-KA233
AOK-KA302	Psychiatry I.	Department of Psychiatry	Prof. János Kálmán	-	1	Term Mark(5)	2	P: AOK-KA301
AOK-KA261	Forensic Medicine I.	Department of Forensic Medicine	Dr. Éva Kereszty	1	-	Examination	3	ER: AOK-KA203
AOK-KA262	Forensic Medicine I.	Department of Forensic Medicine	Dr. Éva Kereszty	-	2	Signature	-	P: AOK-KA261
AOK-KA221*	Dermatology	Department of Dermatology	Prof. Lajos Kemény	2	-	Examination	4	ER: AOK-KA203
AOK-KA222*	Dermatology	Department of Dermatology	Prof. Lajos Kemény	-	3	Signature	-	P: AOK-KA221
AOK-KA341*	Ophthalmology	Department of Ophthalmology	Dr. Andrea Facskó	2	-	Examination	3	ER: AOK-KA203
AOK-KA342*	Ophthalmology	Department of Ophthalmology	Dr. Andrea Facskó	-	2	Signature	-	P: AOK-KA341
AOK-KA241**	Oto-Rhino-Laryngology	Department of Oto-Rhino-Laryngology	Dr. László Rovó	2	-	Examination	4	ER: AOK-KA203
AOK-KA242**	Oto-Rhino-Laryngology	Department of Oto-Rhino-Laryngology	Dr. László Rovó	-	3	Signature	-	P: AOK-KA241
AOK-KA371**	Urology	Department of Urology	Dr. Zoltán Bajory	1	-	Examination	2	ER: AOK-KA203
AOK-KA372**	Urology	Department of Urology	Dr. Zoltán Bajory	-	2	Signature	-	P: AOK-KA371
AOK-KASZD201	Thesis plan I.	Faculty of Medicine		-	2	Term Mark(5)	10	Basic and Pre-Clinical Module

*For groups 1, 2, 3, ** for groups 4, 5, 6, 7

	Compulsory Elective Subjects in the Clinical Module, fall semester (semester 9)							
AOK-KA431	Basic Biostatistics	Dept. of Med. Physics and Informatics	Prof. Ferenc Bari	2	-	Evaluation(5)	2	
AOK-KA481	How to use microbiology laboratory results to diagnose and treat infectious diseases; interactive; problem-based case	Department of Clinical Microbiology	Dr. habil Edit Urbán	2	-	Evaluation(5)	2	
AOK-KA1561	Introduction to Aviation and Space Medicine	Dept. of Aviation and Space Medicine	Prof. Sándor Szabó	2	-	Evaluation(5)	2	
AOK-KA451	Medical Informatics I.	Dept. of Med. Physics and Informatics	Prof. Ferenc Bari	2	-	Evaluation(5)	2	
AOK-KA1791	Medical Molecular Biology and Genomics	Dept. of Med. Biology	Prof. Zsolt Boldogkői	1	-	Evaluation(5)	1	
AOK-KA1451	Microsurgery	Inst. of Surgical Research	Prof. Mihály Boros	total 8	-	Evaluation(5)	2	SR: AOK-KUA111
AOK-KA1452	Microsurgery	Inst. of Surgical Research	Prof. Mihály Boros	-	total 20	Signature	-	P: AOK-KA1451K
AOK-KA421	Nuclear Medicine	Dept. of Nuclear Med.	Prof. László Pávics	1	-	Evaluation(5)	1	
AOK-KA1061	Pharmacology Cases I.	Dept. of Pharmacology	Prof. András Varró	-	2	Term Mark(5)	2	
AOK-KA1581	The Language of Effective Doctor-Patient Communication	Dept. of Foreign Lang.	Dr. Éva Demeter	-	2	Term Mark(5)	2	
AOK-KA1691	Tropical Medicine	Department of Psychiatry	Prof. János Kálmán	2	-	Evaluation(5)	2	
AOK-KA531	Rheumatology	Department of Rheumatology and Immunology	Dr. László Kovács	2	-	Evaluation(5)	2	
AOK-KA1921	Electrophysiology: ion channels and ion transport mechanisms in the regulatin of cell functions	Dept. of Pharmacology	Prof. András Varró	3	-	Evaluation(5)	2	-
AOK-KA1922	Electrophysiology: ion channels and ion transport mechanisms in the regulatin of cell functions	Dept. of Pharmacology	Prof. András Varró	-	total 6	Signature	-	-

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Course Code	Course	Department	Head of Department	Theory Hrs/week	Practice Hrs/week	Form of exam	Credit	Course Requirement (SR=Subject requirement; ER=Examination requirement; P=Parallel Completion)
	Elective Subjects in the Clinical Module, fall semester (semester 9)							
AOK-KA1521	Biophysics of Hearing. Objective and Subjective Audiometry	Department of Oto-Rhino-Laryngology	Dr. László Rovó	1	-	Evaluation(5)	1	
AOK-KA1671	Diseases of the Temporomandibular System	Department of Prosthodontics and Oral Biology	Dr. Márta Radnai	1	-	Evaluation(5)	2	
AOK-KA1672	Diseases of the Temporomandibular System	Department of Prosthodontics and Oral Biology	Dr. Márta Radnai	-	1	Signature	-	
AOK-KA1831	Illicite Drug Use	Dept. Of Psychiatry	Prof. János Kálmán	2	-	Evaluation(5)	2	
AOK-KA1191	Sexual Disorders - Gynecological Aspects	Dept. of Obstetrics and G.	Dr. Gábor Németh	1	-	Evaluation(5)	1	
AOK-KA1201	Modern Approach of the Gynecological Laparoscopy	Dept. of Obstetrics and G.	Dr. Gábor Németh	1	-	Evaluation(5)	1	
AOK-KA1841	Medical History Taking in Hungarian I.	Dept. of Foreign Lang.	Dr. Éva Demeter	-	2	Term Mark(5)	2	SR: AOK-KA4718

10th (spring) semester (9001AK_N_2013) **CLINICAL MODULE**

	Compulsory Subjects							
AOK-KA193	Anesthesiology and Intensive Therapy II.	Dept. of Anesthesiology and Intensive Therapy	Prof. Zsolt Molnár	2	-	Examination	2	ER: AOK-KA191
AOK-KA194	Anesthesiology and Intensive Therapy II.	Dept. of Anesthesiology and Intensive Therapy	Prof. Zsolt Molnár	-	1	Signature	-	P: AOK-KA193
AOK-KA207	Internal Medicine V.	1st Dept. of Int.Med. / 2nd Dept. of Int.Med.	Dr. György Ábrahám / Prof. Tamás Forster	2	-	Examination	3	ER:AOK-KA233
AOK-KA208	Internal Medicine V.	1st Dept. of Int.Med. / 2nd Dept. of Int.Med.	Dr. György Ábrahám / Prof. Tamás Forster	-	total 16	Signature	-	P: AOK-KA207
AOK-KA258	Pediatrics II. Practice	Department of Pediatrics	Dr. Csaba Berecki	-	2	Signature	0	SR: AOK-KA257
AOK-KA259	Pediatrics II. Seminar	Department of Pediatrics	Dr. Csaba Berecki	-	2	Term Mark(5)	4	P: AOK-KA258
AOK-KA283	Neurology II.	Department of Neurology	Prof. László Vécsei	1	-	Signature	2	ER: AOK-KA281
AOK-KA284	Neurology II.	Department of Neurology	Prof. László Vécsei	-	1	Term Mark(5)	-	P: AOK-KA283
AOK-KA303	Psychiatry II.	Department of Psychiatry	Prof. János Kálmán	2	-	Examination	3	ER: AOK-KA301
AOK-KA304	Psychiatry II.	Department of Psychiatry	Prof. János Kálmán	-	1	S	-	P: AOK-KA303
AOK-KA263	Forensic Medicine II.	Department of Forensic Medicine	Dr. Éva Kereszty	1	-	Examination	3	ER: AOK-KA261
AOK-KA264	Forensic Medicine II.	Department of Forensic Medicine	Dr. Éva Kereszty	-	2	Signature	-	P: AOK-KA263
AOK-KA221**	Dermatology	Department of Dermatology	Prof. Lajos Kemény	2	-	Examination	4	ER: AOK-KA203
AOK-KA222**	Dermatology	Department of Dermatology	Prof. Lajos Kemény	-	3	Signature	-	P: AOK-KA221
AOK-KA341**	Ophthalmology	Department of Ophthalmology	Dr. Andrea Facskó	2	-	Examination	3	ER: AOK-KA203
AOK-KA342**	Ophthalmology	Department of Ophthalmology	Dr. Andrea Facskó	-	2	Signature	-	P: AOK-KA341
AOK-KA241*	Oto-Rhino-Laryngology	Department of Oto-Rhino-Laryngology	Dr. László Rovó	2	-	Examination	4	ER: AOK-KA203
AOK-KA242*	Oto-Rhino-Laryngology	Department of Oto-Rhino-Laryngology	Dr. László Rovó	-	3	Signature	-	P: AOK-KA241
AOK-KA371*	Urology	Department of Urology	Dr. Zoltán Bajory	1	-	Examination	2	ER: AOK-KA203
AOK-KA372*	Urology	Department of Urology	Dr. Zoltán Bajory	-	2	Signature	-	P: AOK-KA371
AOK-KA361	Traumatology	Department of Traumatology	Prof. Endre Varga	2	-	Examination	3	ER: AOK-KA335
AOK-KA362	Traumatology	Department of Traumatology	Prof. Endre Varga	-	2	Signature	-	P: AOK-KA361
AOK-KUA401	Neurosurgery	Department of Neurosurgery	Prof. Pál Barzó	1	-	Evaluation(5)	2	SR: AOK-KA335, P: AOK-KUA402
AOK-KUA402	Neurosurgery	Department of Neurosurgery	Prof. Pál Barzó	-	1	Signature	-	P: AOK-KUA401
AOK-KASZD202	Thesis Plan II.	Faculty of Medicine		-	2	Term Mark(5)	10	SR: AOK-KASZD201

* For groups 1, 2, 3 ** For groups 4, 5, 6, 7

	Compulsory Elective Subjects in the Clinical Module, spring semester (semester 10)							
AOK-KA411	Clinical Genetics	Department of Medical Genetics	Dr. Széll Márta	2	-	Evaluation(5)	2	SR: 9th sem.
AOK-KA4321	Advanced Biostatistics	Dept. of Med. Physics and Informatics	Prof. Ferenc Bari	2	-	Evaluation(5)	2	SR: AOK-KA431
AOK-KA1461	Advanced Surgical Skills	Inst. of Surgical Research	Prof. Mihály Boros	1	-	Evaluation(5)	2	SR: AOK-KUA111
AOK-KA1462	Advanced Surgical Skills	Inst. of Surgical Research	Prof. Mihály Boros	-	1	Signature	-	P: AOK-KA1461
AOK-KA861	Cardiac Electrophysiology as a Basic Property of Cardiac Function	Dept. of Pharmacology	Prof. András Varró	1	-	Evaluation(5)	2	-
AOK-KA862	Cardiac Electrophysiology as a Basic Property of Cardiac Function	Dept. of Pharmacology	Prof. András Varró	-	1	Signature	-	-
AOK-KA481	How to use microbiology laboratory results to diagnose and treat infectious diseases; interactive; problem-based case	Department of Clinical Microbiology	Dr. habil Edit Urbán	2	-	Evaluation(5)	2	
AOK-KA211	Child and Adolescent Psychiatry, Mentalhygiene	Dept. Of Child and Adolescent Psychiatry	Dr. Ágnes Vetró	2	-	Evaluation(5)	2	
AOK-KA491	Clinical Immunology	Dept. of Dermatology	Prof. Lajos Kemény	2	-	Evaluation(5)	2	
AOK-KA501	Laboratory Diagnostics: Use of Laboratory Tests in Practice	Dept. of Laboratory Medicine	Dr. Földesi Imre	2	-	Evaluation(5)	2	
AOK-KA1451	Microsurgery	Inst. of Surgical Research	Prof. Mihály Boros	total 8	-	Evaluation(5)	2	SR: AOK-KUA111
AOK-KA1452	Microsurgery	Inst. of Surgical Research	Prof. Mihály Boros	-	total 20	Signature	-	P: AOK-KA1461
AOK-KA881	Molecular Developmental-Biology	Dept. of Biochemistry	Prof. László Dux	2	-	Evaluation(5)	2	-
AOK-KA1511	Oral and Maxillofacial Surgery	Maxillofacial Surgery Clinic	Prof. József Piffkó	1	-	Evaluation(5)	2	

SUGGESTED STUDY PLAN - MEDICINE - 2017/2018

Course Code	Course	Department	Head of Department	Theory Hrs/week	Practice Hrs/week	Form of exam	Credit	Course Requirement (SR=Subject requirement; ER=Examination requirement; P=Parallel Completion)
AOK-KA1512	Oral and Maxillofacial Surgery	Maxillofacial Surgery Clinic	Prof. József Piffkó	-	1	Signature	-	
AOK-KA1062	Pharmacology Cases II.	Dept. of Pharmacology	Prof. András Varró	-	2	Evaluation(5)	2	
AOK-KA981	Social and Health Policy	Dept. of Public Health	Dr. Edit Paulik	2	-	Evaluation(5)	2	
AOK-KA1571	The Clinical Basics of Aviation and Space Medicine	Dept. of Aviation and Space Medicine	Prof. Sándor Szabó	2	-	Evaluation(5)	2	
AOK-KA1582	The Language of Effective Doctor-Patient Communication II.	Dept. of Foreign Lang.	Dr. Éva Demeter	-	2	Term Mark(5)	2	
AOK-KA1211	Tropical Diseases	Department of Clinical Microbiology	Dr. habil Edit Urbán	2	-	Evaluation(5)	2	
AOK-KUA301	Sports Medicine	Dept. Of Sports Medicine	Dr. László Török	2	-	Evaluation(5)	2	-
AOK-KUA331	Medical Rehabilitation and Physical Medicine	Dept. Of Medical Rehabiliation and Physical Medicine	Dr. István Kósa	2	-	Evaluation(5)	2	SR: AOK-KUA121, AOK-KUA131
	Elective Subjects in the Clinical Module, spring semester (semester 10)							
AOK-KA1221	Biochemical Basics of Preventive Medicine	Dept. Of Biochemistry	Prof. László Dux	2	-	Evaluation(5)	2	
AOK-KA1621	Clinical Aspects of Tropical Diseases	Dept. Of Psychiatry	Prof. János Kálmán	2	-	Evaluation(5)	2	
AOK-KA1831	Illicite Drug Use	Dept. Of Psychiatry	Prof. János Kálmán	2	-	Evaluation(5)	2	
AOK-KA1842	Medical History Taking in Hungarian II.	Dept. of Foreign Lang.	Dr. Éva Demeter	-	2	Term Mark(5)	2	SR: AOK-KA4718
AOK-KA1851	Modern Complex Therapy of Malignant Diseases in Clinical Practice	Dept. of Oncology	Prof. Zsuzsanna Kahán	2	-	Term Mark(5)	2	SR: AOK-KA381
AOK-KA1861	Intensive Course on Radiation Oncology	Dept. of Oncology	Prof. Zsuzsanna Kahán	1	-	Evaluation(5)	1	SR: AOK-KA381
AOK-KA1911K	Chemical Misconceptions	Dept. Of Medical Chemistry	Prof. Gábor Tóth	2	-	Evaluation(5)	2	
AOK-KA1331	Multidisciplinary Care of Breast Cancer	Dept. of Oncology	Prof. Zsuzsanna Kahán	2		Evaluation(5)	2	
AOK-KUA291	Introduction to Toxicology	Dept. of Med. Chemistry	Prof. Gábor Tóth	2	-	Evaluation(5)	2	SR: AOK-KUA023, AOK-KUA033

(9001AK_N) **6th YEAR** **FINAL MODULE**

	Compulsory Subjects						
AOK-KA901	Internal Medicine	1st Department of Internal Medicine	Dr. György Ábrahám	9 weeks*	Comprehensive Exam	10	Clinical Module
AOK-KA902	General Practice			1 week*	Signature	-	Clinical Module
AOK-KA941	Surgery	Department of Surgery	Prof. György Lázár	7 weeks*	Comprehensive Exam	9	Clinical Module
AOK-KA942	Emergency Medicine	Department of Emergency Medicine	Dr. Zoltán Pető	1 week*	Signature	-	Clinical Module
AOK-KA943	Traumatology	Department of Traumatology	Prof. Endre Varga	1 week*	Signature	-	Clinical Module
AOK-KA921	Neurology	Department of Neurology	Prof. László Vécsei	4 weeks*	Comprehensive Exam	4	Clinical Module
AOK-KA931	Psychiatry	Department of Psychiatry	Prof. János Kálmán	4 weeks*	Comprehensive Exam	4	Clinical Module
AOK-KA951	Obstetrics and Gynaecology	Department of Obstetrics and Gynaecology	Dr. Gábor Németh	5 weeks*	Comprehensive Exam	5	Clinical Module
AOK-KA911	Pediatrics	Department of Pediatrics	Dr. Csaba Berecki	7 weeks*	Comprehensive Exam	8	Clinical Module
AOK-KA912	District Pediatric Consultation			1 week*	Signature	-	Clinical Module
AOK-KA971	Thesis			-	Defence	20	Clinical Module

***1 week = 30 hours**

6 th year (11th and 12th semester)
Academic year 2017/2018

The internships should be accomplished principally at the clinics and hospitals of the University; however, they can be also accomplished abroad, provided the students submit the acceptance letter of the clinic/hospital and have the permission of the Department concerned before starting the practice. The accomplishment of the practices must be verified officially to the Secretariat as the precondition for starting the next practice.

Two practices can be accomplished continuously and the final examinations can be taken in the week following the accomplishment of the practices. In the sixth year interns can be assigned to duty service as physicians.

If the student fails an examination, it must be repeated together with the half of the practice period. The next practice can be started only following a successful examination.

If the student fails to submit the thesis by the deadline given - or fails to submit it by the deadline of postponement (permission for postponement is given by the Program Director), his/her internships and examinations must be suspended.

The State Board Examination consists of: Test (Multiple Choice Questions), Oral examination (theory) and Practical examination (bedside examination).

Further details are available in the relevant Clerkship Guide.

COMPULSORY PRACTICES IN SUMMER

Summer practice:
1st, 3rd and 4th year students are required to complete a four-week compulsory summer practice in a hospital or clinic which must be accredited by the country concerned. At the completion of the practice an "Evaluation form" should be filled in, signed, stamped and sent directly from the hospital/clinic or submitted by the student in a sealed envelope. (The form can be downloaded from our website). A "Letter of Acceptance" issued by the hospital/clinic, furthermore a certificate that the hospital/clinic is accredited by the country concerned has to be presented at the Foreign Students' Secretariat **until May 7, 2018. Please check the relevant Info Sheet for the exact date.**

Students should register for completing a practice at least one month before its beginning. Practice fee must be paid before starting the practice.

1st year medical students have to perform a four-week Nursing practice.

Departments at the University of Szeged:

1st Department of Internal Medicine
2nd Department of Internal Medicine
Obstetrics and Gynecology Department
Department of Surgery
Neurosurgery Department
Neurology Department
Psychiatry Department
Pediatrics Department
Ophthalmology Department
Oto-Rhino-Laryngology and Head-Neck Surgery Department
Urology Department
Pulmonology Department
Traumatology Department

3rd year medical students have to perform a four-week Internal Medicine practice.

Departments at the University of Szeged:

1st Department of Internal Medicine
Division of Endocrinology
2nd Department of Internal Medicine

4th year medical students have to perform a four-week General Surgery practice.

Departments at the University of Szeged:

Department of Surgery

INTERIM PRACTICE

4th year medical students have to complete a three-day Obstetrics and Gynaecology Delivery-Room Practice in one semester.

EXTRACURRICULAR SCIENTIFIC ACTIVITY

Department of Anatomy, Histology and Embryology Department

1. Gene expression in the mammalian central nervous system.
Prof. Dr. Andras Mihaly

2. Role of animal experiments in research of diseases of the central nervous system
Dr. Endre Dobo, PhD

Department of Nuclear Medicine

1. Up to date Nuclear Medicine investigations in neurology and psichiatry
Dr. László Pávics Professor of Nuclear Medicine

2. Experimental validation of new radiopharmaneuticals
Dr. László Pávics Professor of Nuclear Medicine

3. Radiation safety in Nuclear Medicine
Dr. Teréz Séra physicist

4. New Nuclear Medicine investigations in oncology
Dr. Miklós Papós associate professor

Department of Clinical Microbiology

1. ***Clostridium difficile*** **infection (diagnosis and typing).**
Dr. Edit Urbán

2. **The use of MALDI-TOF in clinical microbiology.**
Dr. Edit Urbán

3. **The role of anaerobic bacteria in human infections.**
Dr. Edit Urbán

4. **Climatic changes and emerging viral infections.**
Prof. Dr. Judit Deák

5. **Genetic analysis of** ***Bacteroides*** **spp.**
Dr. József Sóki

6. **Antibiotic resistance mechanisms of anaerobic bacteria**
Dr. József Sóki

7. ESBL-producing bacteria in clinical practice.
Dr. Andrea Lázár

8. NTB mycobacteria in human infections.
Dr. Gabriella Terhes

9. Laboratory diagnosis of arthropod-borne infections.
Dr. Gabriella Terhes

Department of Otolaryngology and Head & Neck Surgery

1. **Pathogenesis and treatment of laryngeal tumors**

2. **Pathophysiology and treatment of vocal cord functional disorders**

Department of Behavioural Sciences

1. **The role of culture in reactions to disease**
   Dr. Bettina Pikó associate professor

Department of Oto-Rhino Laryngology and Head & Neck Surgery

Biophysics of hearing. Objective and subjective audiometry
Dr. Kiss József Géza

Surgical treatment for laryngeal carcinoma and quality of life (QOL)
1st semester, years 4-5
Prof. Czigner Jenő

Department of Forensic Medicine

1. Illegal drug use
Dr. Antia Reka Tóth

2. Laboratory investigation of drug abuse
Dr. László Institoris

3. The role of alcohol in traffic
Prof. Tibor Varga

4. Forensci point of DNA investigations
Dr. Bernadett Csányi

5. Evaluation of permanent disability
Dr. Beáta Havasi

6. Problems of the health legislation
Dr. Éva Kereszty

7. Death detection in the clinical practice
Dr. Éva Kereszty

2nd Department of Internal Medicine

Prognostic factors in multiple myeloma
Szabolcs Modok, MD, PhD

Pharmacologic and interventional treatment of atrial fibrillation
Dr. Róbert Pap

Atrial flutter after open heart surgery
Dr. Attila Makai

Long-term efficacy of slow pathway ablation for atrioventricular nodal reentrant tachycardia
Dr. László Sághy

Heart failure and pacemaker therapy
Dr. Gábor Bencsik

1st Department of Medicine

Dr. Péter Hegyi and Dr. Zoltán Rakonczay

1. The regulation of pancreatic ductal HCO3- secretion. 2
2. The role of pancreatic ducts in the process of acute pancreatitis.
3. Acid secretion from human gastric glands.
4. The regulation of human intestinal ion secretion.
5. Characterisation of lacrimal gland epithelial cells.
6. Viral transfection of epithelial cells.

Department of Pharmacology and Pharmacotherapy

1. **Dr. András Varró MD, DSc**
   The mechanisms of action of antiarrhythmic drugs. Cellular electrophysiology of the cardiac muscle.

2. **Dr. Ágnes Végh DSc**
   Mechanism of the antiarrhythmic effect of preconditioning. Role of endogenous substances.

3. **Dr. István Leprán DSc**
   Investigation of antiarrhythmic mechanisms in rat models

4. **Dr. István Baczkó MD PhD**
   Cellular patomechanisms of congestive heart failure

5. **Dr. István Koncz MD PhD**
   Mechanisms of cardiac arrhythmias.

   Antiarrhythmic drugs.

   Electrical diseases of the heart. Cardiac electrophysiology.

6. **Dr. Laszló Virág PhD and Dr. Norbert Iost PhD**
   Cellular electrophysiological techniques

7. **Dr. András Tóth PhD**
   Regulation of the Ca2+ homeostasis in isolated cardiac cells Cellular mechanism leading to ischemia/ reperfusion injury in cardiac tissue

8. **Dr. Ricza Tamásné Dr. Viktória Venglovecz PhD**
   Role of aquaporins in acute pancreatitis

9. **Dr. Balázs Ördög PhD**
   Molecular biology of cardiac ion channels

10. **Dr. Norbert Nagy PhD**
    Investigation of the cardiac Na+/Ca2+ exchanger mechanism in hypokalaemia induced arrhyhtmias.

    Investigation of the Na+/Ca2+ exchanger mechanism in the pacemaker function of the sinus node.

    The inotropic effect of selective Na+/Ca2+ exchanger inhibition in cardiac muscle.

11. **Dr. Andrea Orosz MD PhD**
    Electrocardiographical investigation of cardiac ventricular repolarization parameters

12. **Dr. János Prorok PhD**
    Investigation of antiarrhythmic drugs in isolated heart model
    Investigation of the role of NCX in the genesis of cardiac arrhythmias

Department of Medical Informatics

1. Oscillation mechanics of the human respiratory system
Prof. Zoltán Hantos

2. Computer analysis of lung sounds
Prof. Zoltán Hantos

3. Studies on regulation of cerebral blood flow
Prof. Ferenc Bari

4. Experimental models for cortical spreading depression
Dr. Eszter Fazekas

5. Computer aided modelling in Pharmacy and Medicine
Dr. János Karsai

6. Investigation of the role of enviromental factors in aetiology of childhood cancers
Dr. Tibor Nyári

7. Investigation of the role of human papilloma virus in cervical carcinoma
Dr. Tibor Nyári

8. Application of biostatistical methods to medical data
Dr. Krisztina Boda

Institute of Surgical Research

1. Pathomechanism of small bowel ischemia-reperfusion. Monitoring of microcirculatory changes with intravital videomicroscopy and OPS technique
Prof. Mihály Boros, M.D., Ph.D., D.Sc.

2. Biological activity of phospholipids in inflammatory diseases
Prof. Mihály Boros, M.D., Ph.D., D.Sc.

3. Protective effects of biological gases in circulatory disorders
Prof. Mihály Boros, M.D., Ph.D., D.Sc.
Dr. József Kaszaki, Ph.D.

4. Neuroprotection in the enteral nervous system
Dr. József Kaszaki, Ph.D.

5. Examination of microcirculation under septic conditions
Dr. József Kaszaki, Ph.D.

6. Assessment of hemodynamic and biochemical consequences of experimental pericardial tamponade
Dr. József Kaszaki, Ph.D.

7. Examination of macro- and microhemodynamic consequences of volume therapy in circulatory shock
Dr. József Kaszaki, Ph.D.

8. Examination of mechanical parameters of the lung under normal and pathologic conditions
Dr. József Kaszaki, Ph.D.
Prof. Zoltán Hantos, Ph.D., D.Sc., Department of Medical Physics and Informatics

9. Assessment of biochemical and microcirculatory consequences of disorders of the locomotor system using intravital videomicroscopy and OPS technique
Dr. Andrea Szabó, M.D., Ph.D.

10. Assessment and treatment of biochemical and microcirculatory consequences of urogenital diseases
Dr. Andrea Szabó, M.D., Ph.D.

11. Assessment and treatment of the oral surgical complications of chronic bisphosphonate exposure
Dr. Andrea Szabó, M.D., Ph.D.

Department of Pathophysiology
Student research program consultant: Prof. Dr. Zoltán Rakonczay, MD, PhD, DSc
telephone number: 62-545-200
E-mail: rakonczay.zoltan@med.u-szeged.hu

Thesis & scientific sircle Topics (TDK)	
Tutor	**Topic**
Gyula Szabó, MD, Ph.D. DSc.	Computer based education of pathophysiology (usage of internet in medical education)
	Investigation of specific opiate ligands in animal experiments
	Elective subject from pathophysiology
Gyula Szabó, MD, Ph.D. DSc. Júlia Szakács M.D.	Study of the behavioral effects of neuropeptides
Zsófia Mezei, M.D., Ph.D.	Effects of peptides on the function of platelets and vessels in chronic alcohol treated rat
	Effects of peptides on the function of platelets and vessels in diabetic rat
	Effects of peptides on the function of platelets and vessels in alzheimer rat
	Effects of peptides on the function of platelets in smoking men
Gyula Telegdy, MD, PhD. DSc. HAS Gyula Szabó, MD, Ph.D. DSc. Miklós Jászberényi, M.D., Ph.D. DSc.	The Pathophysiology of Alzheimer's Disease
	The role of neuropeptide mediators in the control off affective, emotional and cognitive processes
	The Effect of Neuropeptides on the Hypothalamus-Pituitary-Adrenal system
Gyula Telegdy, MD, PhD. DSc. HAS Zsolt Bagosi, M.D., Ph.D.	The role of CRF and urocortins in social interaction

Gyula Szabó, MD, Ph.D. DSc. Zsolt Bagosi, M.D., Ph.D.	The role CRF and urocortins in drug addiction
Zsolt Bagosi, M.D., Ph.D. Miklós Jászberényi, M.D., Ph.D.	The effects of neuropeptides on hypothalamic neurohormones
Zsolt Bagosi, M.D., Ph.D. Krisztina Anna Csabafi, MD, Ph.D.	The effects of neuropeptides on extrahypothalmic neurotransmitters
Krisztina Anna Csabafi, MD, Ph.D.	Role of neuropeptides in anxiety and the development of anxious phenotype
	Effect of neuropeptides on nociception and morphine induced analgesia, tolerance
	The effect of kisspeptin on amyloid-beta neurotoxicity
Zoltán Rakonczay, M.D., Ph.D. DSc. Lorand Kiss Ph.D.	The pathomechanism of experimental acute pancreatitis and therapeutic investigations

Recommended textbooks for first year medical students

It is recommended to purchase the latest edition of the following textbooks!

ANATOMY, HISTOLOGY AND EMBRYOLOGY

I. **Obligatory textbooks:**

- K. Won Chung: **Gross Anatomy**, Lippincott Williams & Wilkins
- Drake, Vogl & Mitchel: **Gray's Anatomy for Students**, Churchill Livingstone
- Drake, Vogl, Mitchell, Tibbitts & Richardson: **Gray's Atlas of Anatomy**, Churchill Livingstone
- McMinn and Abrahams: **Clinical Atlas of Human Anatomy;** *ELSEVIER*
- **Sobotta Atlas of Human Anatomy: Volume 1, 15th ed., English;** *ELSEVIER*
- **Sobotta Atlas of Human Anatomy: Volume 2, 15th ed., English;** *ELSEVIER*
- **Sobotta Atlas of Human Anatomy: Volume 3, 15th ed., English;** *ELSEVIER*
- M. Loukas, B. Benninger, R. S. Tubbs : **Gray's Clinical Photographic Dissector of the Human Body;** *ELSEVIER*
- L. P. Gartner,J. L. Hiatt: **Concise Histology;** *ELSEVIER*
- K. Moore & T. V. N. Persaud: **The Developing Human**; *ELSEVIER*

II. **Recommended textbooks:**

- W. Platzer: **Color Atlas of Human Anatomy, Volume 1**: Locomotor System; *THIEME*
- H. Fritsch, W. Kuehnel: **Color Atlas of Human Anatomy, Volume 2**: Internal Organs; *THIEME*
- W. Kahle, M. Frotscher: **Color Atlas of Human Anatomy, Volume 3**: Nervous System and Sensory Organs; *THIEME*
- M. Schuenke, E. Schulte, U. Schumacher: **THIEME Atlas of Anatomy, Head and Neuroanatomy**; *THIEME*
- M. Schuenke, E. Schulte, U. Schumacher: **THIEME Atlas of Anatomy, General Anatomy and Musculoskeletal System**; *THIEME*
- M. Schuenke, E. Schulte, U. Schumacher: **THIEME Atlas of Anatomy, Neck and Internal Organs**; *THIEME*
- Junqueira, Carneiro, Kelley: **Basic Histology**, Prentice Hall, International Student Edition, Mc Graw-Hill
- Netter, Frank H.: **Atlas of Human Anatomy**, Icon Learning Systems; *ELSEVIER*
- L. R. Cochard: **Netter's Atlas of Human Embryology;** *ELSEVIER*
- Sadler: **Langman's Medical Embryology**, with Simbryo CD, *Lippincott Williams & Wilkins*

CELL BIOLOGY AND MOLECULAR GENETICS

- William K. Purves, Gordon H. Orians: Life: The Science of Biology,W.H. Freeman and Company, New York
- J. Darnell H. Lodish D. Baltimore: Molecular Cell Biology, W.H. Freeman and Company, New York
- B. Alberts, D.B.J. Lewis, M. Raff. K. Roberts, J.D. Watson: Molecular Biology of the Cell, Garland Publishing, Inc. New York

FIRST AID

- Brent, Karren: First Aid for Colleges and Universities, Brady Morton Series

INTRODUCTION TO MEDICINE

- Bettina Pikó : Introduction to Medicine. Basic Principles of Behavioral Sciences and, Preventive Medicine. University of Szeged

INTRODUCTION TO PSYCHOLOGY, BASICS OF NURSING

- Nolen-Hoeksema S., Fredrickson B.L., Loftus G.R., Wagenaar W.A.: *Atkinson and Hilgard's Introduction to Psychology*. Cengage Learning EMEA, 2009.
- János Pilling (ed): *Medical Communication*. Medicina, 2011

MEDICAL CHEMISTRY

Obligatory:

- Ebbing-Hart: General Chemistry /Organic Chemistry, Houghton Mifflin Company

Recommended:
- Harold Hart: Organic Chemistry (A Short Course), Houghton Mifflin Company, Boston
- P. Gergely: Organic and Bioorganic Chemistry for Medical Students, University Medical School of Debrecen,
- John McMurry: Fundamentals of Organic Chemistry, Brooks/Cole Publishing Company, ITP, An International Thomson Publishing Company

MEDICAL PHYSICS AND STATISTICS
- Damjanovich-Fidy-Szöllősi (eds): Medical Biophysics. Medicina, 2009.
- M.J. Campbell, D. Machin: Medical Statistics. A Commonsense Approach. John Wiley & Sons Chichester-New York- Brisbane-Toronto-Singapore , 1993.
- Rice Virtual Lab in Statistics http://onlinestatbook.com/rvls.html

MEDICAL DICTIONARIES
- Mosbey's: Mosbey's Medical, Nursing and Allied Health, Mosbey
- Stedmans: Medical Dictionary, Williams and Wilkins

HUNGARIAN LANGUAGE

- Erzsébet Balogh & Margit Skadra: Multikulti Magyar nyelv külföldieknek – Hungarian for foreigners. ISBN: 978 963 226 599 5. Medicina, 2016

Recommended textbooks for second year medical students

ANATOMY, HISTOLOGY AND EMBRYOLOGY

I. **Obligatory textbooks:**

- K. Won Chung: **Gross Anatomy**, Lippincott Williams & Wilkins
- Douglas J. Gould; James D. Fix: **BRS Neuroanatomy 5th;** Lippincott Williams & Wilkins **ISBN 13:** 9781451176094
- Crossman & Neary: **Neuroanatomy: an Illustrated Colour Text**; *ELSEVIER*
- Mtui, Gruener & Dockery: Fitzgerald's **Clinical Neuroanatomy and Neuroscience;** *ELSEVIER*
- **Sobotta Atlas of Human Anatomy: Volume 1, 15th ed., English;** *ELSEVIER*
- **Sobotta Atlas of Human Anatomy: Volume 2, 15th ed., English;** *ELSEVIER*
- **Sobotta Atlas of Human Anatomy: Volume 3, 15th ed., English;** *ELSEVIER*
- M. Loukas, B. Benninger, R. S. Tubbs : **Gray's Clinical Photographic Dissector of the Human Body;** *ELSEVIER*
- L. P. Gartner,J. L. Hiatt: **Concise Histology;** *ELSEVIER*
- K. Moore & T. V. N. Persaud: **The Developing Human**; *ELSEVIER*

II. **Recommended textbooks:**

- W. Platzer: **Color Atlas of Human Anatomy, Volume 1**: Locomotor System; *THIEME*
- H. Fritsch, W. Kuehnel: **Color Atlas of Human Anatomy, Volume 2**: Internal Organs; *THIEME*
- W. Kahle, M. Frotscher: **Color Atlas of Human Anatomy, Volume 3**: Nervous System and Sensory Organs; *THIEME*
- M. Schuenke, E. Schulte, U. Schumacher: **THIEME Atlas of Anatomy, Head and Neuroanatomy**; *THIEME*
- M. Schuenke, E. Schulte, U. Schumacher: **THIEME Atlas of Anatomy, General Anatomy and Musculoskeletal System**; *THIEME*
- M. Schuenke, E. Schulte, U. Schumacher: **THIEME Atlas of Anatomy, Neck and Internal Organs**; *THIEME*
- Junqueira, Carneiro, Kelley: **Basic Histology**, Prentice Hall, International Student Edition, Mc Graw-Hill
- Netter, Frank H.: **Atlas of Human Anatomy**, Icon Learning Systems; *ELSEVIER*

- L. R. Cochard: **Netter's Atlas of Human Embryology;** *ELSEVIER*
- Sadler: **Langman's Medical Embryology**, with Simbryo CD, *Lippincott Williams & Wilkins*
- Moore, Persaud & Torchia: **Before We Are Born**, Essentials of Embryology and Birth Defects; *ELSEVIER*
- Cochard: **Netter's Atlas of Human Embryology**; *ELSEVIER*

BIOCHEMISTRY, BIOCHEMISTRY SEMINAR

Obligatory:

- Robert K.Murray, Daryl K. Ganner, Peter A. Mayers, Vicot W. Rodwell: Harper's Illustrated Biochemistry 29th Edition 2012 ISBN: 978-0-07-176576-3

Recommended for 1st semester:

- W. J. Marshall, S. K. Bangert
  Clinical Chemistry
  6th Edition 2008
  ISBN:9780723434559

- P.C. Champe, R. A. Harvey
  Lippincott's Illustrated Reviews Biochemistry
  4th Edition 2008
  ISBN-13: 978-07817-6960-0

- J.W. Baynes, M. H. Dominiczak
  Medical Biochemsitry
  4th Edition, 2014-06-04 ISBN: 978-1-4557-4580-7

BIOCHEMICAL BASICS OF PREVENTIVE MEDICINE

- Janet Christian and Janet Greger: Nutrition for Living, Addison-Wesley

CARDIAC ELECTROPHYSIOLOGY AS A BASIC PROPERTY OF CARDIAC FUNCTION

- Macfarlane PW, van Oosterom A, Janse MJ, Camm J, Kligfield P, Pahlm O, eds. Comprehensive Electrocardiology, 2nd Ed. Springer, London

MATHEMATICAL AND STATISTICAL MODELLING IN MEDICINE

- Mark Woodward: Epidemiology –Study design and Data analysis, Chapman & Hall/CRC 1999
- Interesting mathematical problems in every-day life. Electronic handout in Teaching Mathematics and Statistics in Sciences HU-SRB/0901/221/088

MEDICAL ANTHROPOLOGY

- C.G.Helman: Culture, Health and Illness, Oxford University Press

MEDICAL PHYSIOLOGY

- Arthur C.Guyton, John E. Hall: Textbook of Medical Physiology, Elsevier Science
- Kim Barrett, Heddwen Brooks, Scott Biotano, Susan Barman: Ganong's Review of Medical Physiology, McGraw Hill Publishers
- Walter F. Boron, Emile L. Boulpaep: Medical Physiology, Saunders Elsevier
- William F. Ganong: Review of Medical Physiology by The McGraw-Hill Companies Inc.
- Fonyó Attila: Principles of Medical Physiology, Medicina Kiadó Zrt.
- Albert Szent-Györgyi Medical University, Department of Physiology, Physiology Laboratory Manual, (handout)
- Linda S Costanzo Physiology Elsevier

MEDICAL SOCIOLOGY

- A. Giddens: Sociology 2009. Cambridge, Polity Press UK
- W.C. Cockerham: Medical Sociology. 2016. University of Alabama at Birmingham, Routledge.

HUNGARIAN LANGUAGE

- Erzsébet Balogh & Margit Skadra: Multikulti Magyar nyelv külföldieknek – Hungarian for foreigners. ISBN: 978 963 226 599 5. Medicina, 2016

Recommended textbooks for third year medical students

HUNGARIAN LANGUAGE

- GYŐRFFY, Mária: Mi a panasz? Idióma Bt. Pécs, 1999, ISBN 963 04 8860 4

INTERNAL MEDICINE (CLINICAL DIAGNOSTICS)

Obligatory:

- Barbara Bates': A Guide to Physical Examination and History Taking, 8th ed. with bonus CD, Lippincott Williams & Wilkins, ISBN: 078175819X

or

- Bates' Guide to Physical Examination and History Taking, Authors: Lynn S. Bickley, M.D. , Barbara Bates, Peter G. Szilagyi, Peter Gabor Szilagyi, Publication Date: December 2005., ISBN: 0781767180

Recommended:

- Harrison's Principles of Internal Medicine, Authors: Kasper, Dennis L. Braunwald, Eugene Fauci, Anthony Hauser, Stephen Longo, Dan Jameson, J. Larry, ISBN: 0071391401, Publication Date: 2004-07-27, Edition:16
- Te-Chuan Chou: Chou's Electrocardiography Clinical Practice, 5th ed., W.B. Saunders, 2001., ISBN: 0721686974
- Brostoff: Clinical Immunology – An Illustrated Outline, Mosby, 1994, ISBN: 1563756641
- Kumar, Parveen, Clark, Michael: Clinical Medicine, 5th ed., W. B. Saunders, 2002, ISBN: 0702025798
- Current Medical Diagnosis and Treatment 2006, Author(s): Lawrence M. Tierney, Jr., MD; Stephen J. McPhee, MD; Maxine A. Papadakis, MD, ISBN: 0071454101, Publication date: 2005, Edition 45th
- Stone: Current Emergency Diagnosis & Treatment, 5th ed., Appleton & Lange, 2004., ISBN: 0071219757

MEDICAL MICROBIOLOGY AND IMMUNOLOGY

- ABBAS et al., Cellular and Molecular Immunology, Sanders, Elsevier, 6th ed., 2007.
- Greenwood at al., Medical Microbiology; Churchill, Livingstone, Elsevier; 17th ed., 2007.
- Murphy et al., Janeway's Immunology, Garland Science; 7th ed., 2008.
- Murray et al., Medical Microbiology, Elsevier, Mosby 6th ed. 2009.
- Practical Notes (Edited by R. Pusztai, University of Szeged, 2002)

MICROSURGERY

- Szabó, A., Vass, G., Zádor, Z., Boros, M.: Basics of Microsurgery. Manual for Medical Students, Szeged, 2004. (handout)

PATHOLOGY

- Kumar, Abbas, Aster: Robbins Basic Pathology, 9th Edition. W.B. Saunders Company Philadelphia, 2012. ISBN: 9781437717815

PATHOPHYSIOLOGY

Texbooks

- Gayton and Hall: Texbook of Medical Physiology 12th ed. 2011 ISBN: 978-1-4160-4574-8/978-0-8089-2400-5
- Damjanov: Pathophysiology, Elsevier (Saunders title), 2008, ISBN: 978-1-4160-0229-1
- McPhee, Hammer: Pathophysiology of Disease 6th ed., McGraw-Hill Medical, 2009, ISBN- 0071621679/9780071621670
- Silbernagl, Lang: Color Atlas of Pathophysiology, George Thieme Verlag, 2000, ISBN: 9780865778665/9783131165510
- Kumar, Abbas, Fausto, Aster: Robbins & Cotran Pathologic Basis of Disease, 8th ed, Elsevier (Saunders title) 2010, ISBN: 978-1-4160-3121-5
- Goldman, Schafer: Goldman's Cecil Medicine, 24th ed., Elsevier (Saunders title), 2012, ISBN: 978-1-4377-2788-3
- Longo, Fauci, Kasper, Hauser, Jameson, Loscalzo: Harrison's Principles of Internal Medicine, 18th ed., McGraw-Hill Medical, 2012, ISBN 9780071748896/007174889X
- Khan: Rapid ECG Interpretation 3rd ed., Humana Press Inc, 2008, ISBN: 978-1-58829-979-6
- Foster: Twelve-lead electrocardiography: theory and interpretation, 2nd ed., Springer-Verlag, 2007, ISBN-10: 1-84628-592-5 ISBN-13: 978-1-84628-592-9
- Wagner: Marriott's Practical Electrocardiography, 11th ed., Lippincott Williams & Wilkins, 2007, ISBN-10: 0781797381 ISBN-13: 9780781797382
- Bayés de Luna: Basic electrocardiography: normal and abnormal ECG patterns, Blackwell Publishing, 2007,

ISBN: 978-1-4051-7570-8
- Abedin & Conner: ECG Interpretation - The Self-Assessment Approach, 2nd ed., Blackwell Publishing, 2008, ISBN: 978-1-4051-6749-9
- Morris, Edhause, Brady, Camm: ABC of Clinical Electrocardiography, BMJ Publishing Group, 2003, ISBN 0 7279 1536 3

Handouts (for practice)
- Fekete M.: Pathophysiology exercises II. 1987.
- Szabó G.: Introduction to Electrocardiography 1999.

MEDICAL PSYCHOLOGY
- *Lecture handouts* (will be posted on the homepage of the Behavioral Sciences Institute)
- Márta Csabai – Péter Molnár: *Health, Illness, and Care. A textbook of medical psychology.* Budapest, 2000. Springer (available in the library of the Behavioral Sciences Institute)
- Suls J.M. – Davidson, K. – Kaplan, R.M. (eds): *Handbook of Health Psychology and Behavioral Medicine.* The Guilford Press, 2010. (available in the library of the Behavioral Sciences Institute)
- János Pilling (ed): *Medical Communication.* Budapest, 2011. Medicina (available in the library of the Behavioral Sciences Institute)

SURGERY (CLINICAL DIAGNOSTICS)
- Ed.: Norton, Barie, Bollinger, Chang, Lowry, Mulvihill, Pass, Thompson, Shirazi: Surgery: Basic Science and Clinical Evidence (Book with CD-ROM), Springer, 2000., ISBN: 038798447X

BASICS OF EMERGENCY MEDICINE
- Boros, M. (Ed.): Monitoring in Medical Practice. Basic Medical Skills. Innovariant Ltd., Szeged, 2007. ISBN 963-482-787-X
- Boros, M. (Ed.): Practical Skills Syllabus. Innovariant Ltd., Szeged, 2007. ISBN 978-963-482-840-2

MICROSURGERY
- Szabó, A., Vass, G., Zádor, Z., Boros, M.: Basics of Microsurgery. Manual for Medical Students. Szeged, 2004. (handout)
-

BASIC SURGICAL SKILLS, ADVANCED SURGICAL SKILLS
- Boros, M. (Ed.): Surgical Techniques. Medicina, Budapest, 2009. ISBN 978-963-226-256-7
- Boros, M. (Ed.): Practical Skills Syllabus. Innovariant Ltd., Szeged, 2007. ISBN 978-963-482-840-2
- Kirk, R. M.: Basic Surgical Techniques, 6th Edition. Churchill Livingstone, 2010. ISBN: 978-0-7020-3390-2

BASIC IMMUNOPATHOLOGY
- Abbas, A. K., Lichtman, A. H., Pillai, S: Cellular and Molecular Immunology. 7th Edition. Elsevier, Saunders, Philadelphia, 2011. ISBN: 978-0-8089-2425-8

LABORATORY MEDICINE
- William J. Marshall: Clinical Chemistry, 4th, 5th or 6th Edition, MOSBY – Harcourt Publishers Ltd. 2008, ISBN 0-72-34-3159-0

Recommended textbooks for fourth year medical students

ANAESTHESIOLOGY AND INTENSIVE THERAPY

Recommended:

- Keith G. Allman, Iain H. Wilson: Oxford Handbook of Anaesthesia, Oxford University Press, 2006. ISBN 0-19-856606-3
- Tim Craft, Jerry Nolan, Mike Parr: Critical Care, BIOS Scientific Publishers Ltd. 2009. ISBN 1-85996-2229-7

CASES IN CLINICAL MICROBIOLOGY

- Cases in Medical Microbiology and Infectious Diseases, By Gilligan PH, Smiley ML, Shapiro DS, 3rd Edition, ISBN 10: 1555812074 / ISBN 13: 9781555812072, ASM, 2002.
- Problem-Oriented Clinical Microbiology and Infectious Diseases, By Humphreys H, Irving WL, Hart CA, 2nd Edition, ISBN 0198515855, Oxford Medical Publication, 2004.
- Atlas of Tropical Medicine and Parasitology, By Wallace Peters and Geoffrey Pasvol, 6th Edition, ISBN-13: 978 0-323-04364-9, Elsevier Mosby, 2007.

CHILD AND ADOLESCENT PSYCHIATRY

- Robert Goodman and Stephen Scott, Child Psychiatry, 1998

CLINICAL IMMUNOLOGY

- Spickett, Gavin: Oxford Handbook of Clinical Immunology, Oxford University Press, 2006, ISBN:019262721x

CLINICAL ONCOLOGY

- AJCC Cancer Staging Manual, 2002 Springer
- Cancer Management: A Multidisciplinary Approach, 2002 PRR Melvilla NY
- Principles and Practice of Radiation Oncology Editors Carios A. Perez Luther W. Brandy., 1998 Lippincott-Raven
- Radiation Oncology: Management Devisions. Editors K. S. Clifford Chao, Carlos A. Perez., 1999. Lippincott-Raven
- The Washington Manual of Oncology. Editor Ramaswamy Gorindan, 2002 Lippincott

HUNGARIAN LANGUAGE

Obligatory:

- GYŐRFFY, Mária: Mi a panasz?, Idióma Bt. Pécs, 1999, ISBN 963 04 8860 4

INTERNAL MEDICINE

Obligatory:

- Hoffbrand, Moss: Essential Haematology, Wiley, 6th edition
- Harrison's Principles of Internal Medicine (2 Volume Set), Kasper, Dennis L. Braunwald, Eugene Fauci, Anthony Hauser, Stephen Longo, Dan Jameson, J., Larry, 16th ed., 2004, McGraw-Hill, ISBN: 0071391401
- Gibson, Costabel: Respiratory Medicine (2 Volume Set), 3rd ed., W. B. Saunders, 2002., ISBN: 0702026131
- Te-Chuan Chou: Chou's Electrocardiography Clinical Practice, 5th ed., W.B. Saunders, 2001., ISBN: 0721686974
- Forster T., Csanády M.: Atlas of Colour Doppler Echocardiography, Szeged, 1991.,
- I.J. Mazza: Manual of Clinical Hematology, Oxford Textbook of Nephrology JS Cameron, AM Davison et al, Oxford University Press, 2001., ISBN: 078172907
- The Merck Manual of Diagnosis and Therapy, Merck and Co. Inc. 2006., ISBN: 0911910182

Recommended:

- Stone: Harrison's Principles of Internal Medicine: Self Assessment and Board Review: ISE, International Student Edition, McGraw-Hill, 2001., ISBN: 0071203591
- Brostoff: Clinical Immunology – An Illustrated Outline, Mosby, 1994, ISBN: 1563756641
- Stone: Current Emergency Diagnosis & Treatment, 5th ed., Appleton & Lange, 2004., ISBN: 0071219757
- Cheitlin: Clinical Cardiology, 7th ed. (to be published in January 2006), Appleton & Lange, ISBN: 0838513859
- Current Medical Diagnosis and Treatment 2006, Author(s): Lawrence M. Tierney, Jr., MD; Stephen J. McPhee, MD; Maxine A. Papadakis, MD, ISBN: 0071454101, Publication date: 2005, Edition 45th, ISBN: 034061370X

LABORATORY DIAGNOSTICS: USE OF LABORATORY TESTS IN PRACTICE

- William J. Marshall: Clinical Chemistry, 4th , 5th or 6th Edition, MOSBY – Harcourt Publishers Ltd., 2008, ISBN: 0-72-34-3159-0

NUCLEAR MEDICINE

H.J. Biersack and L.M. Freeman. Clinical Nuclear Medicine; Springer 2007, ISBN 978-5-540-28025-5

OBSTETRICS AND GYNAECOLOGY

- M. M. Garrey, A. D. T. Govan, C. Hodge, R. Callander: Obstetrics Illustrated, Fourth Edition, Churchill Livingstone, 1993., ISBN: 0443041806
  - Fundamentals of Obstetrics, Zth ed., 1999, ISBN: 0723431507
  - E. Malcolm Symonds: Essential Obstetrics and Gynaecology, Churchill Livingstone 1992, ISBN: 044304337X
  - Hacker & Moore's Essentials of Obstetrics and Gynecology, 5th Edition ISBN-13: 978-1416059400

ORTHOPAEDICS

- Miklós Szendrői: Orthopedics. Semmelweis, Budapest 2008

PHARMACOLOGY

- Katzung: Basic and Clinical Pharmacology, 10th Edition, McGraw-Hill Medical, 2007., ISBN: 007145136
- Rang & Dale's Pharmacology, 6th ed., Churchill-Livingstone, 2007., ISBN: 0443069115, ISBN-13: 9780443069116

PUBLIC HEALTH AND PREVENTIVE MEDICINE

Obligatory:

- Paulik E (ed.): Public Health and Preventive Medicine. Medicina Publishing House, Budapest, 2013

Recommended:

- Tulchinsky TH, Varavikova EA: The New Public Health. 2nd ed. Elsevier Academic Press, 2009, ISBN: 978-0-12-370890-8
- Donaldson LJ, Donaldson RJ: Essential Public Health. 2nd ed. Petroc Press, 2003, ISBN:1900603B7X

PULMONOLOGY

- Isselbacher: Harrisons's: Principles of Internal Medicine I–II., 14th Edition, McGraw-Hill Book Company, 1998., ISBN: 0071133801
- S.J. Bourke: Lecture Notes On Respiratory Medicine, Sixth Edition, Blackwell Publishing, 2003

RADIOLOGY

- Richard B. Gunderman, Essential Radiology, 3rd edition, Thieme, New Yorik, Stuttgart, 2007

SURGERY

- Ed.: Norton, Barie, Bollinger, Chang, Lowry, Mulvihill, Pass, Thompson, Shirazi: Surgery: Basic Science and Clinical Evidence (Book with CD-ROM), Springer, 2000., ISBN: 038798447X

TROPICAL DISEASES

- Manson's Tropical Diseases Edited by G. C. Cook and A. I. Zumla, 22nd Edition. ISBN: 978-1-4160-4471-0, Saunders Elsevier, 2009

- W. Peters, G. Pasvol. Atlas of Tropical Medicine and Parasitology, 6th Edition. Elsevier-Mosby, 2007 ISBN-13: 978-0-323-04364-9

Recommended textbooks for fifth year medical students

CASES IN MEDICAL MICROBIOLOGY AND INFECTIOUS DISEASES

- Gilligan P.H., Shapiro D.S., Smiley M.L.: Cases in Medical Microbiology and Infectious Diseases. American Society for Microbiology, Washington, DC. Fourth edition (2014)

- Humphreys H., Irving W.L.: Problem-oriented clinical microbiology and infection. Churchill Livingstone, New York Second edition (2004)

CHILD AND ADOLESCENT PSYCHIATRY

- Robert Goodman and Stephen Scott, Child Psychiatry, 1998

CLINICAL GENETICS

- Harper, Peter, S: Practical Genetic Counselling, 2001.
- Goodman, R.M. Golin, R.J: The Malformed Infant and Child, Oxford Univ. Press., 1983., ISBN: 0195032551
- Emery's Elements of Medical Genetics, Mueller RF, Young ID, 11th Edition Churchill Livingstone, 2001
- Genetics, 2nd Edition National Medical Series for Independent Study., Williams and Wilkins, 1995. Friedman JM, Dill FJ, Hayden MR, McGillivray
- Human Genetics . A problem-based approach B.R., Korf. 2nd,2000.

CLINICAL MICROBIOLOGY

- Peter H. Gilligan, Daniel S. Shapiro and M. Lynn Smiley: Cases in Medical Microbiology and Infectios Diseases, Publisher: Amer Society for Microbiology, Published Date: 1992, ISBN 1555810454
- Hilary HUmphreys, William L. Irving: Problem-Oriented-Clinical Microbiolgy and Infection, 2nd Edition, Publisher: Oxford University Press, 2004, ISBN: 0198515855
- W. Peters.H.M.Gilles: Color Atlas of Tropical Medicine and Parasitology, 4th Edition, London, Mosby, Wolfe, 1995, ISBN: 0723420696

CLINICAL PHARMACOLOGY

- Oxford Textbook of clinical pharmacology and drug therapy (Eds. Grahame-Smith, Aronson), Lecture notes on clinical pharmacology (Eds. Reid, Rubin, Whiting)

DERMATOLOGY

- J. A. A. Hunter, J. A. Savin, M. V. Dahl: Clinical Dermatology, Blackwell Scientific Publications 2nd ed., ISBN: 0632037148

FORENSIC MEDICINE

- Richard Shepeherd: Simson's Forensic Medicine 12th edition, 2003 Hodder Arnold and Hachette UK Company ISBN 978 0 340 76422 0
- Lecture Notes of Forensic Medicine (Ed.: P. Sótonyi, E. Keller), Semmelweis Publisher, 2008. ISBN 978 963 9656 92 5

INTERNAL MEDICINE

Obligatory:

- Harrison's Principles of Internal Medicine (2 Volume Set), Kasper, Dennis L. Braunwald, Eugene Fauci, Anthony Hauser, Stephen Longo, Dan, 16th ed., 2004., McGraw-Hill, ISBN: 0071391401
- Te-Chuan Chou: Chou's Electrocardiography Clinical Practice, 5th ed., W.B. Saunders, 2001., ISBN: 0721686974
- Forster T., Csanády M.: Atlas of Colour Doppler Echocardiography, Szeged, 1991.
- I.J. Mazza: Manual of Clinical Hematology, Oxford Textbook of Nephrology JS Cameron, AM Davison et al, Oxford University Press, 2001., ISBN: 078172907
- The Merck Manual of Diagnosis and Therapy, Merck and Co. Inc. 2006., ISBN: 0911910182

Recommended:

- Stone: Harrison's Principles of Internal Medicine: Self Assessment and Board Review: ISE, International Student Edition, McGraw-Hill, 2001., ISBN: 0071203591
- Stone: Current Emergency Diagnosis & Treatment, 5th ed., Appleton & Lange, 2004., ISBN: 0071219757
- Current Medical Diagnosis and Treatment 2006, Author(s): Lawrence M. Tierney, Jr., MD; Stephen J. McPhee, MD; Maxine A. Papadakis, MD, ISBN: 0071454101, Publication date: 2005, Edition 45th

LABORATORY DIAGNOSTICS: USE OF LABORATORY TESTS IN PRACTICE

- William J. Marshall: Clinical Chemistry, 4th , 5th or 6th Edition, MOSBY – Harcourt Publishers Ltd., 2008, ISBN: 0-72-34-3159-0

NEUROLOGY

- Rowland, L.P: Merritt's Textbook of Neurology, Lea and Febiger, Philadelphia, 1995., ISBN: 0683074008
- Simon, R. P., Aminoff, M. J., Greenberg, D. A: Clinical Neurology, Appleton and Lange, 1993., ISBN: 0838514782
- Adams, R., Victor, M: Principles of Neurology, McGraw Hill, 1996., ISBN: 0070674396

NEUROSURGERY

- Andrew Kaye: Essential Neurosurgery, Churchill Livingstone, ISBN: 0443043507, available online: https://archive.org/details/EssentialNeurosurgery
- Mark S. Greenberg – Handbook of Neurosurgery (ISBN: 978-1-60406-326-4)

OPHTHALMOLOGY

- Thieme Flexi Book, Gerhard K. Lang, Ophthalmology, A Pocket Textbook Atlas, Thieme 2000., ISBN: 313126161-7 (GTV), ISBN: 0865779368 (TNY)

- Differiential Diagnosis in Ophthalmology, Stephen A. Vernon, Manson Publishing 1999., ISBN: 1874545901

OTO-RHINO-LARYNGOLOGY

- W. Becker, H.H. Naumann, C.R. Pfaltz: Ear, Nose and Throat Diseases, A Pocket Reference, Georg Thiemes Verlag Stuttgart, New York 1996., ISBN 3-13671201-3
- Sziklai: Oto-Rhino-Laryngology Lecture notes 1994. (handout), Order from: Semmelweis Orvostudományi Egyetem Képzéskutató, Oktatástechnológiai és Dokumentációs Központ, Budapest
- Carl RudolfPfaltz: Ear, Nose and Throat Diseases –A Pocket Reference, Thieme Medical Publishers, Inc., 1994., ISBN: 3136712021
- Simson Hall, Bernard H. Colman: Diseases of the Nose, Throat and Ear, A Handbook for Students and Practitioners, 1992., ISBN: 0443045631

PAEDIATRICS

- Karen Marcdante, MD and Robert M. Kliegman, MD: Nelson Essentials of Pediatrics, 7th Edition 2015, ISBN: 978-1-4557-5980-4
- Tom Lissauer, Graham Clayden: Illustrated Textbook of Pediatrics, Mosby 2nd ed. 2001., ISBN: 0723431787

PSYCHIATRY

- Please See the list of recommended textbooks here: http://www.klinikaikozpont.u-szeged.hu/psych/en

RHEUMATOLOGY

- Harrison's Principles of Internal Medicine (2 Volume Set), Kasper, Dennis L. Braunwald, Eugene Fauci, Anthony Hauser, Stephen Longo, Dan Jameson, J., Larry, 16th ed., 2004, McGraw-Hill, ISBN: 0071391401

SURGERY

- Ed.: Norton, Barie, Bollinger, Chang, Lowry, Mulvihill, Pass, Thompson, Shirazi: Surgery: Basic Science and Clinical Evidence (Book with CD-ROM), Springer, 2000., ISBN: 038798447X

UROLOGY

- Smith: General Urology, Appleton and Lange, 14th ed. 1994., ISBN: 0838586139

TRAUMATOLOGY

- James D. Hardy: Hardy's Textbook of Surgery, J.B. Lippincott Company, Philadelphia, 1990, ISBN: 0397508182
- Dr. Endre Varga, Dr. Kristóf Boa: Traumatology - concept of the first hour of management (*https://elearning.szte.hu*)
- Klaus Dresing, Peter Trafton, Jos Engelen (Cast Technician): Casts, Splints, and Support Bandages - Nonoperative Treatmnet and Perioperative Protection, Thieme, ISBN: 9783131753410
- Joseph Schatzker, Marvin Tile: The Rationale of Operative Fracture Care, Second Edition, Springer, 1996, ISBN: 3-540-59388-2

BASIC AND PRECLINICAL MODULE

ANATOMY, HISTOLOGY AND EMBRYOLOGY

1st semester *(updated: 28.08.2017)*

	ANATOMY LECTURE	DISSECTION PRACTICE	ANATOMY SEMINAR
1.	Terminology (planes, directions, main terms). General osteology. General syndesmology. *(Prof. Dr. Nógrádi A.)*	*Dissection room regulations.* Dissection of the upper limb: bones.	Bones and joints of the upper limb.
2.	General myology. General angiology. *(Prof. Dr. Nógrádi A.)*	Dissection of the upper limb: joints.	Anatomy of muscles of the UL.
3.	General neuroanatomy, spinal cord segment. Anatomy of the brachial plexus and lumbosacral plexus. *(Prof. Dr. Nógrádi A.)*	Dissection of the upper limb: muscles.	Arteries and veins of the UL. Branches of the axillary artery. Lymph vessels of the UL.
4.	Epithelial and connective tissues. *(Prof. Dr. Nógrádi A.)*	Dissection of the upper limb: blood vessels.	Branches of the brachial plexus on the UL. Nerve injuries on the UL.
5.	Cartilage and bone tissues. *(Prof. Dr. Nógrádi A.)*	1st MTO: *Anatomy of the Upper limb* Dissection of the upper limb: blood nerves.	Bones of the pelvic girdle and the lower limb.
6.	Functional- and clinical anatomy of the UL. *(Prof. Dr. Nógrádi A.)*	2nd MTO: Dissection of the bones and joints of the LL.	Anatomy of the pelvis and joints of the LL.
7.	Muscle tissues. *(Prof. Dr. Nógrádi A.)*	Dissection of the pelvis and joints of the LL.	Muscles of the hip and the pelvis. Muscles of the LL.
8.	General embryology. Development of the embryo: gastrulation and neurulation. Development of the amnion and the yolk sac. *(Prof. Dr. Nógrádi A.)*	Dissection of the muscles and the blood vessels of the LL. *The practice of Gr# 4;5;6;9;10. has been cancelled*	Anatomy of the blood and lymphatic vessels and the nerves of the LL. *The seminar of Gr# 9 - 12. has been cancelled*
9.	Functional- and clinical anatomy of the LL. *(Prof. Dr. Nógrádi A.)*	Dissection of the blood vessels and nerves of the LL. *The practice of Gr# 7;8;11;12. has been cancelled*	Bones and joints of the trunk. *The seminar of Gr# 5 - 8. has been cancelled*
10.	Anatomy and histology of the upper airway. *(Prof. Dr. Nógrádi A.)*	3rd MTO: Anatomy of the bones, joints of the trunk. Anatomy of the chest.	Thoracohumeral muscles. Superficial and deep back muscles. The diaphragm.
11.	Anatomy and histology of the lung. Development of the respiratory system. *(Prof. Dr. Nógrádi A.)*	Thoracohumeral muscles. Superficial and deep back muscles. The diaphragm. Hip and gluteal muscles.	Layers of the chest wall. Anatomical projection of the organs of the chest. Anatomy of the mediastinum.

12.	Functional and sectional anatomy of the thorax. *(Prof. Dr. Nógrádi A.)*	Anatomy of the thoracic cavity. Anatomical projection of the organs of the chest. Dissection of the superior/supracardiac mediastinum.	Anatomy and topology of the lung, bronchial tree and pleura.
13.	Nerve tissue I. *(Prof. Dr. Nógrádi A.)*	Anatomy of the nasal cavity, paranasal sinuses, larynx, lungs and the pleura.	General recapitulation Repetition
14.	Nerve tissue II. *(Prof. Dr. Nógrádi A.)*	4th MTO: *Anatomy of the trunk, the mediastinum and the respiratory system.*	Discussion of the topics of the semester. General recapitulation Repetition

2nd semester

	LECTURE (2 hrs/week)	DISSECTION PRACTICE (3 hrs/week)	HISTOLOGY PRACTICE (2 hrs/week)
1.	**Alimentary System** The anatomy and histology of the oral cavity; teeth, large salivary glands, and the tongue.	**Thoracic Cavity, Cardiovascular and Respiratory System** The anatomy of the mediastinum. Dissection of the superior mediastinum.	Basic tissues I.: Epithelial tissues: *Kidney (HE)* *Trachea (HE)* *Esophagus (HE)* *Skin (HE)*
2.	The anatomy and histology of the, pharynx and the oesophagus. The anatomy of the peritoneum.	The anatomy of the heart and the pericardium.	Basic tissues II.: Connective and supporting tissues: *Skin (HE)* *Ear (Orcein)* *Bone (ground section)* *Enchondral ossification (HE)*
3.	The anatomy and histology of the stomach, small intestine, large intestine and the rectum. The topography, anatomy and histology of the spleen.	Removal and dissection of the lungs and the bronchial tree. Dissection of the posterior mediastinum and the intercostal space.	Basic tissues III.: Muscle tissues and nervous tissue *Smooth muscle (HE)* *Skeletal muscle (HE)* *Cardiac muscle (HE)* *Peripherial nerve (HE)* *Sensory ganglion (HE)*
4.	The anatomy, blood circulation and histology of the liver and the gall bladder. The anatomy and histology of the pancreas.	The anatomy of the nasal cavity, nasopharynx and the paranasal sinuses. The anatomy of the larynx.	Histology of the blood vessels and the respiratory system *Aorta (resorcin-fuchsin)* *Artery & Vein (HE)* *Trachea (HE)* *Lung (HE)*
5.	Blood supply, lymphatic drainage and innervation of the organs of the abdominal cavity. Topography of the abdominal organs.	**Practical assessment: Anatomy of the thoracic cavity, mediastinum, heart, and the respiratory system. (nasal cavity, larynx, trachea and lungs)**	Histology of the digestive system I. *Lip (HE)* *Dorsum linguae (HE)* *Circumvallate papilla (HE)* *Parotid gland (HE)* *Submandibular gland (HE)*

6.	**<u>Urogenital System</u>** Gross anatomy, blood supply and histology of the kidney. Anatomy and histology of the ureter, urinary bladder and the urethra.	**<u>Abdominal Cavity and the Digestive System</u>** Abdominal regions, abdominal situs and projection of the viscera. Opening of the abdominal cavity, inspection of the viscera. Dissection of the lesser and greater omentum, the omental bursa, the recesses of the peritoneum.	Histology of the digestive system II. Esophagus (HE) Cardia (HE) Fundus, corpus (HE) Duodenum (HE) Jejunum (HE) Jejunum (PAS) Ileum (HE)
7.	The anatomy and histology of the male genital organs.	Dissection of the stomach, the small and large intestines. Examination of the liver and the pancreas. Dissection of the hepatoduodenal ligament.	Histology of the digestive system III. Large intestine (HE) Vermiform appendix (HE) Anal canal (HE)
8.	The anatomy and histology of the female genital organs.	Dissection of the retroperitoneum: kidneys, ureters, posterior abdominal wall.	**<u>Practical assessment:</u>** **Histology of the heart and blood vessels** **Histology of the respiratory and digestive systems**
9.	The anatomy of the male and female perineum. Topography of the lesser pelvis.	**<u>Practical assessment:</u>** **Anatomy of the alimentary tract and the abdominal cavity.**	Histology of the liver and the pancreas *Liver (HE)* *Liver (Kupffer-cells)* *Gall bladder (HE)* *Pancreas (HE)*
10.	**<u>Blood, Hematopoies and the Lymphatic System</u>** Histology of the blood. Hematopoiesis	**<u>Lesser Pelvis and Perineum</u>** Dissection of the scrotum, testis and epididymis. Topography of the male pelvis.	Uropoietic system: *Kidney (HE)* *Ureter (HE)* *Urinary bladder (HE)* *Urethra (HE)*
11.	Histology of the immune system and lymphoid organs.	Dissection of the female genital organs. Topography of the female pelvis.	Male genital organs I.: *Testis-epididymis(HE)* *Spermatic cord(HE)* *Seminal vesicle(HE)* *Prostate (HE)* *Penis(HE)*
12.	**<u>Endocrine System</u>** The pituitary gland and the neuroendocrine regulation.	Dissection of the male and female perineum. Ischiorectal fossa, pudendal canal.	Female genital organs: *Ovary (HE)* *Oviduct(HE)* *Uterus(HE)* *Uterine cervix(HE)*
13.	The anatomy and histology of the thyroid and parathyroid glands. The endocrine pancreas and the enteroendokrin system.	**<u>Practical assessment:</u>** **Anatomy of the lesser pelvis and urogenital organs**	General recapitulation Repetition
14.	The suprarenal gland, and the endocrine cells of the gonads. Histology of the diffuse neuroendocrine system.	General recapitulation Repetition	**<u>Practical assessment:</u>** **Histology of the urogenital system** **Histology of the liver and the pancreas**

3rd semester

	LECTURE (2 hrs/week)	DISSECTION PRACTICE (3 hrs/week)	HISTOLOGY PRACTICE (2 hrs/week)
1.	Fine structure of the grey matter of the spinal cord. Tracts of the white matter. (Prof. Dr. Mihály A.)	*Rules, regulations of the dissection room.* **CNS.** Opening of the skull, removal of the brain, duplicatures of the dura mater, meningeal spaces. Vertebral canal preparation, meninges of the spinal cord, spinal cord preparation. *(ppt: meninges, spaces, vertebral canal, spinal cord)*	*General information, rules and regulations.* Blood smear (MGG) Red bone marrow (HE) Thymus (HE)
2.	Fine structure of the medulla oblongata, pons, mesencephalon. Reticular formation. (Prof. Dr. Mihály A.)	Hemispheres, gyri, sulci, lateral ventricles. Circle of Willis, blood supply of the hemispheres. *(ppt: Hemispheres, lobes, gyri, sulci, WILLIS-circle)*	Lymphnode (HE) Spleen (HE) Palatine tonsill (HE) Root of the tongue (HE)
3.	Synaptology, histology of the cerebellum. Neuroanatomy of the cerebellar motion regulation. (Prof. Dr. Mihály A.)	Anatomy of the diencephalon, III. ventricle, FLECHSIG's section, internal capsule, basal ganglia. *(ppt: III.ventricle, diencephalon, FLECHSIG,basal ganglia)*	**CNS SEMINAR:** Cross-sections of the brainstem I., classification of cranial nerve nuclei(ppt)
4.	Diencephalon: fine structure of the thalamus and the hypothalamus. Neurosecretion. (Prof. Dr. Mihály A.)	Brainstem, IV. ventricle, romboid fossa. Exit of the cranial nerves (brainstem, skull). *(ppt: macroscopy of the brainstem, cranial nerves)*	**CNS SEMINAR:** Cross-sections of the brainstem II.,brainstem nuclei. Branchings of the cranial nerves. (ppt)
5.	Basal ganglia, extrapyramidal system. (Prof. Dr. Mihály A.)	Anatomy and topography of the cerebellum. Cerebellar nuclei. *(ppt: cerebellum)*	**CNS SEMINAR:** Summary of the ascending and descending pathways.(ppt)
6.	Neocortex, allocortex: function, histology, transmitters. Commissural, associational pathways. Rhinencephalon, limbic system. (Prof. Dr. Mihály A.)	**1st MTO:** Anatomy of the CNS.	Sensory nerve ending (HE) Sensory nerve ending (Ag) Spinal cord (HE) Cerebellum (HE) Neocortex (HE)
7.	Meninges. Blood supply of the CNS, ventricles, CSF circulation. (Prof. Dr. Mihály A.)	External, internal base of the skull. Summary of the cavities of the skull. *(ppt: skull summary)*	**1st MTO:** Blood, haemopoesis, lymphatic system, nervous system,
8.	Anatomy, histology of the eye. Structure, blood supply of the retina. Accessory organs, muscles of the eye. (Prof. Dr. Nógrádi A.)	**HEAD and NECK** Muscles of mastication- and facial expression. Muscles of the neck. *(ppt: Muscles of mastication- and facial expression. Muscles of the neck, muscle triangles.)*	Hypophysis (HE) Thyroid gland(HE) Parathyroid gland (HE) Adrenal gland (HE) Corpus luteum (HE) Pancreas (HE)

9.	Neuroanatomy of the visual pathway. Light reflex of the pupil. Eye movements – pathways. (Prof. Dr. Nógrádi A.)	Arteries, veins, lymphatics of the head, neck *(ppt:circulation of the head & neck.)*	Eye (HE) Eyelid (HE) Lacrimalgland (HE)
10.	Anatomy, histology of the external and middle ear. Anatomy of the inner ear: osseous, membranaceous labyrinth. (Prof. Dr. Nógrádi A.)	Cervical plexus, skin innervation of the head & neck *(ppt: innervation of the head & neck)*	Skin (HE) Hairy skin (HE)
11.	Organ of Corti: fine structure of the cristae, maculae. Auditory, vestibular pathways. (Prof. Dr. Nógrádi A.)	Topography of the head & neck. Dissection of the paranasal sinuses. Mediansagittal section of the head & neck. *(ppt:topographical summary, fasciae, tissue spaces)*	Placenta (HE) Mammary gland(HE)
12.	Ovulation, fertilisation. Cleavage, blastocyst, implantation, formation of the placenta. (Prof. Dr. Nógrádi A.)	Topography of the cranial base, orbita, tympanic cavity. *(ppt: topography of the cranial base.)*	**Histology consultation for the anatomy final exam**
13.	Developement of the embryo: gastrulation and neurulation. Developement of the amnion and the yolk sac. The folding of the embryo. (Prof. Dr. Nógrádi A.)	**2nd MTO:** Head & neck, periferial branches of the cranial nerves, sense organs.	**Histology consultation for the anatomy final exam**
14.	The formation of the branchial apparatus: blood and nerve supply, derivatives. Summary of the main points of the embryonal and fetal periods. (Prof. Dr. Nógrádi A.)	**Dissection room consultation for the final exam**	**2nd MTO:** Endocrine system, sense organs, skin, mammary gland, placenta

BIOCHEMISTRY

3rd semester

	LECTURE (3 hrs/week)	**PRACTICE (2 hrs/week)**
*	Proteins and bioenergetics: structure and function of proteins, thermodynamics of living systems	General information, work safety and laboratory work
*	Enzymology: enzyme classes, coenzymes, characterisation of enzymes, isoenzymes, multienzyme systems	Substrate specificity and temperature optimum of amylase enzyme activity
*	Enzymology: molecular mechanism of catalysis, enzyme kinetics, modulation and regulation of enzyme activity	Determination of protein concentration

*	Carbohydrate metabolism: Digestion and absorption of carbohydrates, glycolysis, gluconeogenesis, pyruvate dehydrogenase enzyme complex	Seminar: proteins and enzymes*
*	Carbohydrate metabolism: glycogen metabolism, pentose phosphate cycle and glucuronide shunt	Assay of activity of alkalnine phosphatase
*	Carbohydrate metabolism: Fructose and galactose metabolism, glycoproteins, regulation of blood glucose level, diabetes mellitus	Seminar: carbohydrate metabolism*
*	Lipid metabolism: Digestion and absorption of lipids, lipoprotein metabolism, lipid mobilisation, oxidation of fatty acids, ketone bodies	Determination of glucose-6-phosphatase enzyme activity
*	Lipid metabolism: Synthesis of fatty acids, synthesis of triacyl glycerols and sphingolipids, cholesterol and steroid metabolism	Seminar: lipid metabolism*
*	Amino acid metabolism: Digestion and absorption of proteins, catabolism of amino acids, fate of amino group, urea cycle	MTO
*	Amino acid metabolism: catabolism of amino acids, fate of carbon skeleton of amino acids, one-carbon units, glutathione	Determination of uric acid concentration
*	Synthesis of hem and porphyrine, enterohepatic circulation of hem degradation products	Seminar: amino acid metabolism*
*	Nucleotide metabolism: synthesis and degradation of purine and pirimidine nucleotides, salvage pathways, synthesis of deoxyribonucleotides	Investigation of oxygen consumption of isolated mitochondria
*	Citric acid cycle: steps and regulation of the cycle, relationship between the cycle and other metabolic pathways	Seminar: nucleotide metabolism, citric acid cycle, respiratory chain, oxidative phosphorylation*
*	Mitochondrial transport systems, mechanism of respiratory chain and oxidative phosphorylation	Consultation

4th semester

	LECTURE	SEMINAR	PRACTICE
*	Proteins and bioenergetics: structure and function of proteins, thermodynamics of living systems		General information, work safety, principles of lab work
*	Enzymology: enzyme classes, coenzymes, characterisation of enzymes, isoenzymes, multienzyme systems		**Determination of protein concentration**
*	Enzymology: molecular mechanism of catalysis, enzyme kinetics, modulation and regulation of enzyme activity		Substrate specificity and temperature optimum of amylase enzyme activity

*	Carbohydrate metabolism: Digestion and absorption of carbohydrates, glycolysis, pyruvate dehydrogenase enzyme complex, gluconeogenesis	**SEMINAR (proteins, enzymes)**	
*	Carbohydrate metabolism: Fructose and galactose metabolism, glycogen metabolism, pentose phosphate cycle and glucuronide shunt		**Assay of activity of alkaline phosphatase**
*	Carbohydrate metabolism: regulation of blood glucose level, glycoproteins Lipid metabolism: Eicosanoids, digestion and absorption of lipids, lipoprotein metabolism	**SEMINAR (carbohydrate metabolism)**	
*	Lipid metabolism: lipid mobilisation, oxidation of fatty acids, ketone bodies, diabetes mellitus		**Determination of glucose-6-phosphatase activity**
*	Lipid metabolism: Synthesis of fatty acids, synthesis of triacyl glycerols and phospholipids, sphingolipids, cholesterol and steroid metabolism	**1st MTO**	
*	Amino acid metabolism: Digestion and absorption of proteins, catabolism of essential amino acids, fate of amino group, urea cycle	SEMINAR (lipid metabolism)	
*	Amino acid metabolism: metabolism of non-essential amino acids, fate of carbon skeleton of amino acids, one-carbon units, glutathione		Determination of triacyl glycerol and cholesterol
*	Amino acid metabolism: **Synthesis of hem and porphyrine, enterohepatic circulation of hem degradation products**	SEMINAR (amino acid metabolism)	
*	Citric acid cycle: steps and regulation of the cycle, relationship between the cycle and other metabolic pathways	**SEMINAR (citric acid cycle, respiratory chain, oxidative phosphorylation)** 2nd MTO	
*	Mitochondrial transport systems, mechanism of respiratory chain and oxidative phosphorylation		**Investigation of the oxygen consumption of isolated mitochondria**
*	Nucleotide metabolism: synthesis and degradation of purine and pirimidine nucleotides, salvage pathways, synthesis of deoxyribonucleotides		Nucleotide metabolism Determination of uric acid concentration

CELL BIOLOGY AND MOLECULAR GENETICS

1st semester

	LECTURE (2 hrs/week)	**PRACTICE (2 hrs/week)**
*	Structure and operation of the cell	Handling of technical devices
*	The DNA	Microscopy-1
*	Transcription, translation & proteins	Microscopy-2
*	Mutation &jumping genes	DNA and RNA purification
*	Bacterial genetics	Genetic exercises
*	Genetic regulation in eukaryotes	Separation techniques
*	Mendelian and non-Mendelian genetics	Lac operon & consultation
*	Epigenetics	
*	Genes and traits	
*	Genetic diseases	
*	Evolution	
*	Cytoskeleton & membrane processes	
*	Molecular biology of viruses	
*	Frontiers of molecular and cell biology	

2nd semester

	LECTURE (2 hrs/week)	**PRACTICE (2 hrs/week)**
*	Human genome	Molecular cloning
*	Genetically modified organisms & cloning	PCR & DNA sequencing
*	Cell cycle & tumor formation	Detection of DNA and RNA
*	Molecular medicine	Detection of proteins
*	Cell signalling-1	DNA and protein chips, DNA finger printing
*	Cell-signalling-2	Genetic exercises
*	Cell communication & tissue differentiation	Reporter genes & consultation
*	Genetic regulation of ontogenesis	
*	Neural communication & consciousness	
*	Molecular biology of sensation	
*	Immunogenetics	
*	Molecular evolution	
*	Genetics of behaviour	
*	Genetic disease of brain and psyche	

BASIC LIFE SUPPORT

1st semester

	PRACTICE (2 hrs/week)
*	Principles of first aid. Emergency situations. Victim assessment routine. Assessing respiration and pulses. Normal and abnormal pulse rates per minute.
*	The unresponsive patient. Terms of position. Extrication of the injured patient (Rautek manoeuvre).
*	Basic life support. Victim assessment and positioning. Determine unresponsiveness. Assess for breathlessness. Provide rescue breathing. Circulation. Esmarch-Heiberg manoeuvre.
*	BLS (one-person CPR, two-person CPR)
*	Obstructed airway emergencies. Heimlich manoeuvre.
*	Paediatric basic life support.
*	Bleeding (haemorrhage). Bleeding from an artery, from a vein. General procedures for controlling bleeding. Direct and indirect pressure. Arterial pulse points.
*	Recognition of patients with shock condition. Body positioning for preventing shock.
*	Classification of open wounds. Bandaging.
*	Burn injuries. Electrical injuries. Heat and cold emergencies. Water accident.
*	Mechanism of injury. Types of injury to joints and bones. Splints. Head injuries. Injuries to the spine. Injuries to the chest. Injuries to the abdomen.
*	Poisoning.
*	Heart attack. Respiratory emergencies.
*	Revision of BLS.

MEDICAL CHEMISTRY

1st semester (14 weeks)

	LECTURE (3 hrs/week)	**SEMINAR (1 hr/week)**	**PRACTICE (2 hrs/week)**
1.	Basic terms. The mole concept. Basic structure of atoms. Electronic structure of atoms. Atomic theories. The periodic table. Explanation of periodic properties.	Important terms: atomic mass, molar mass, moles, chemical formulas. Chemical reactions, stoichiometry, SI units, simple chemical calculations involving Avogadro's number and moles.	Review of laboratory requirements. Fire and safety precautions. Demonstration of laboratory equipments.

2.	Chemical bonding. Octet rule. Ionic bonding. Ionic solids, monatomic and polyatomic ions. Metallic bonding. Covalent bonds. Characterization of molecules. Dipole moment. Molecular geometry.	Atomic models, electronic configuration of atoms. Chemical calculations: concentration of solutions.	Background of volumetric analysis. Using a pipette and a burette. Titration calculations.
3.	Intermolecular forces: hydrogen bonding and van der Waals forces (dipole-dipole and London forces). Introduction to inorganic chemistry. Properties of the most important metals and their compounds. Biological importance and usage. Complex ions.	The application of the periodic table. Continuation of practicing simple chemical calculations.	The principle of photometry, Lambert-Beer law.
4.	Properties of the most important nonmetals and their compounds. Biological importance and usage. Formation and physiological effects of free radicals. Types of metathesis reactions.	Intra- and intermolecular chemical bonds. Continuation of practicing simple chemical calculations.	Potentiometry, pH measurements.
5.	States of matter. Gas laws and Avogadro's law. Properties of liquids, dependence of phase changes on pressure and temperature. Properties of solids, types of crystalline lattice. Homogenous and heterogenous systems. Colloids. Solutions. Types of solutions. The solution process. Ways of expressing concentration. Colligative properties. Osmosis and its biological importance.	Metals and nonmetals and their compounds. Complexes. Summary of inorganic chemical reactions.	During weeks 5 to 12 students work in rotation and conduct one of the following experiments each week: I) Quantitative determination of HCl content by titration with NaOH solution. II) Determination of pKa of a known concentration weak acid solution through the preparation of different buffers. III) Measurement of buffer capacity. IV) Qualitative analysis (2 weeks). V) Quantitative determination of Fe(II)-content by
6.	Chemical equilibrium. LeChatelier's principle. Electrolytic dissociation, strong and weak electrolytes. Acid-base concepts. Equilibrium in electrolytes, pH and pOH. Acid-base ionization equilibrium. Salts. Solubility of electrolytes. Hydrolysis of salts.	Solutions. Osmosis.	

7.	Acidic and basic anhydrides. Acid-base titration. Buffers and their biological importance. Thermochemistry. Basic terms. First, second and third laws of thermodynamics.	Chemical equilibrium. Application of LeChatelier's principle. Acid-base concepts. Simple pH calculations.	permanganometric titration measuring the redox potential. VI) Complexometric determination of calcium and magnesium.
8.	Entropy and disorder. Change in Gibb's free energy and spontaneity of a reaction. Electrochemistry. Oxidation-reduction reactions. Electrical work and free energy change.	Buffers, calculations involving buffers.	VII) Photometric determination of iron. VIII) Photometric determination of glucose.
9.	Voltaic cells, types of electrodes. Reference electrodes. Glass electrodes, measurement of pH. Electrolysis. Reaction kinetics. Rate, order, molecularity and mechanism of reactions. Complex chemical reactions. Catalysis. Enzymes as biocatalysts.	Brief summary of chemical thermodynamics. Electrochemistry. Electrode potential. Balancing redox reaction equations.	
10.	General principles of organic chemistry. Classification of organic compounds. Functional groups. Types of organic chemical reactions: substitution, addition, and elimination. Types of isomerism. Alkanes (paraffin hydrocarbons). Cycloalkanes.	Voltaic cells. Calculations involving the Nernst equation. Reaction kinetics. Catalysis.	
11.	Alkenes. Alkynes. Isoprene, mevalonic acid, terpenes. Carotinoids. Vitamin A. The photochemistry of vision. Polarization in organic compounds: inductive and conjugation effects. Structure of conjugated dienes. Absorption of light, color compounds.	Saturated hydrocarbons: alkanes and cycloalkanes. Unsaturated hydrocarbons: alkenes and alkynes.	
12.	Aromatic hydrocarbons. Structure and reactions of benzene and its derivatives.	Inductive and conjugation effects in organic compounds.	Weeks 12 and 14: make-up laboratory practicals.
13.	Organic halogen compounds. Hydroxyl group containing organic compounds: alcohols, enols and phenols. Classification, nomenclature and chemical properties of alcohols. Some important alcohols.	Aromatic hydrocarbons.	

14.	Esters of alcohols formed with inorganic acids. Phenols. Acidity of phenols. Nomenclature and chemical reactions of phenols. Oxidation of phenols, quinones. Ethers. Thioalcohols, thioethers, sulfoxides and sulfones.	Organic halogen compounds. Alcohols and phenols. Ethers and sulfur-containing organic compounds.	

2nd smester (14 weeks)

	LECTURE (3 hrs/week)	**SEMINAR (1 hr/week)**	**PRACTICE (2 hrs/week)**
1.	Three-dimensional structure of molecules: constitution, configuration and conformation. Optical isomerism. Enantiomers, racemates. Configuration: D-L and R-S systems. Molecules with more than one chiral centers. Diastereomers.	Summary of organic chemical reactions.	Demonstration of laboratory equipments used for preparative organic chemistry. Examination of some important functional groups: - detection of the double bond - electrophilic substitution of aromatic compounds - reactions of alcohols
2.	Classification and nomenclature of amines. Basicity of amines, salt formation. Biologically important amines and aminoalcohols. Amines as neurotransmitters. Reactions of amines. Azodyes, sulfonamides and their chemotherapy. Classification and nomenclature of heterocyclic compounds. Three- and four-membered heterocycles: beta-lactams. Five-membered heterocycles with one and two heteroatoms.	Chirality, optical isomerism.	Modeling of chirality.
3.	Six-membered heterocycles with one heteroatom: nicotinamide, flavonoids. Six-membered heterocycles with two heteroatoms: pyrimidines, barbituric acid and barbiturates. Purines. Uric acid. Oxo compounds. Structure of the carbonyl group. Chemical reactions of aldehydes and ketones: addition and condenzation reactions.	Amines.	Examination of some important functional groups: - reactions of amines - reactions of oxo compounds - acidity and basicity of organic compounds

4.	Enol-oxo tautomerism and aldol dimerization of oxo compounds. The role of these reactions in biochemical processes. Oxidation and reduction reactions. Important oxo compounds: quinones, coenzyme Q and vitamin K. Classification and nomenclature of carboxylic acids. Acidity, salt formation. Homologous series of saturated and unsaturated carboxylic acids. Fatty acids. The role of eicosapentaenic and docosahexaenic acids in biological membranes. Prostaglandines.	Heterocyclic compounds.	During weeks 4 to 11 students work in rotation and conduct one of the following experiments each week: I) Complexometric determination of calcium and magnesium. II) Photometric determination of iron. III) Photometric determination of glucose. IV) Kinetic examination of the hydrolysis of an ester. V) Polarimetric determination of sugar. VI) Quantitative determination of a protein by photometric method. VII) Photometric cholesterol determination. VIII) Quantitative determination of vitamin C content by bromatometric titration.
5.	Dicarboxylic acids. Unsaturated and hydroxy carboxylic acids. Oxo acids, "ketone bodies". Derivatives of carbonic acid: urea, guanidine, creatine, phosphocreatine. Carboxylic acid derivatives: esters, thioesters, acyl halides, anhydrides, amides. Acylation reaction, acylating agents.	Aldehydes, ketones, and quinones.	
6.	Acid-catalyzed esterification and hydrolysis of esters. Soaps, detergents. Phosphoglycerydes. Plasmalogens. Sphingolipids. The structure of biological membranes. Classification and nomenclature of amino acids. Proteinogenic amino acids. Amphoteric character: isoelectric points. Essential amino acids, biological importance.	Carboxylic acids. Substituted carboxylic acids.	
7.	Qualitative tests, preparation and separation of amino acids. Chemical properties. Peptides. Stereochemistry of the peptide bond. Principles of sequence analysis. Synthesis of peptides.	Carboxylic acid derivatives. Lipids.	

8.	Biological importance of peptides. Naturally occurring peptides. Important peptide hormones, analogues and peptide antibiotics. Structure and function of proteins. Physical and chemical properties, purification and classification of proteins. Qualitative tests. The three-dimensional structure of proteins. Protein folding. Denaturation of proteins. Biological importance of proteins: transport, contractile, structural, nutrient, storage, defense and regulation proteins. Mechanism of enzyme reactions.	Amino acids.	
9.	Classification of carbohydrates. Configuration. D-glucose, mutarotation, anomers. Cyclic structures. Chemical properties of monosaccharides: oxidation, reduction, formation of ethers and esters, formation of O- and N-glycosides.	Peptides and proteins.	
10.	Important monosaccharides: aldoses and ketoses and their derivatives. Structure of disaccharides. Nonreducing disaccharides: sucrose and trehalose. Reducing disaccharides: maltose, cellobiose, lactose. Oligosaccharides. Complex oligosaccharides. Mucopolysaccharides: hyaluronic acid, chondroitin and its sulfate, dermatane sulfate and heparine.	Mono- and disaccharides.	
11.	Polysaccharides: starch, glycogen, cellulose. Structure of bacterial cell wall. Steroids. Classification of steroids. Cholesterol, cholesterolesters. Ergosterol. Vitamins D2 and D3. Bile acids and their detergent effect. Steroid hormones. Corticosteroids: mineralo- and glucocorticosteroids. Sex hormones.	Oligo- and polysaccharides.	Bioorganic chemistry: some chemical reactions of proteins and carbohydrates.

12.	Structure and properties of nucleosides and nucleotides. Nucleic acid bases (uracil, thymine, cytosine, adenine, guanine). Nucleotide coenzymes:NAD and NADH. Nucleic acids: RNA and DNA. Hydrolysis, purification and properties of nucleic acids. Sequence analysis and synthesis of nucleic acids. Structure of DNA: double helix. B-DNA, A-DNA and Z-DNA. Denaturation of DNA. DNA-protein complexes.	Steroids.	Weeks 12 to 14: make-up laboratory practicals.
13.	Biological importance of nucleic acids. Classification of RNA. Molecular mechanism of protein biosynthesis, genetic code. Water-soluble vitamins and their coenzymes. Fat-soluble vitamines. Hypo- and hypervitaminosis.	Nucleosides, nucleotides, nucleic acids.	
14.	Alkaloids, most important representatives. Antibiosis. Classification of antibiotics. Most important antibiotics. Porphin-ring containing compounds. Protoporphyrin-IX and heme. Structure and biological importance of hemoglobin and myoglobin. Intermediates of heme: biliverdin and bilirubin. Chlorophyll.	Vitamins.	

MEDICAL PHYSICS AND STATISTICS

1st semester

	LECTURE (2+1 hours a week)	**SEMINAR (2 hours every 2nd week)**	**PRACTICE (2 hours every 2nd week)**
	Introduction: the significance of physics in the medical profession Introduction. Course requirements, training objectives, subject, structure. Introductory examples. Types of data	Fundamentals of mechanics 1	Introduction to the use of the Biopac measurement system
	Mechanics of the human body 1 Population and sample characteristics. Definitions, examples, distribution of a sample, measures of the centre and		

variability, and their properties. Displaying data		
Mechanics of the human body 2 The basics of probability theory. Experiments, events, operations with events, the concept of probability, rules of probability calculus in special cases. Conditional probability, measures of a diagnostic test	Fundamentals of mechanics 2	Anthropometric measurements. Fundamental aspects of measurements: derived quantities, measurement error
Muscle function Distribution of variables, some important distributions (uniform, binomial, Poisson, exponential, normal).		
Mechanical oscillations in the living organism Statistical estimation, confidence interval. The standard error of mean	Oscillations and waves	Sound as a mechanical wave
Fundamentals of wave theory. Doppler effect. Sound – ultrasound: describing the physical process, interaction of ultrasound with human tissue, medical applications The aim and steps of hypothesis testing, one-sample t-test		
Principles of fluid mechanics 1 Paired t-test, two-sample t-tests. Assumptions. F test for testing equality of variances	Flow of fluids	Blood pressure measurement principles and their application
Principles of fluid mechanics 2 Statistical errors, ANOVA models		
Physics of biological membranes, diffusion, osmosis Correlation, models of linear and nonlinear regression. The significance of the correlation coefficient, hypothesis tests for the coefficients of regression line	Thermodynamics	Analysis of blood pressure data
Thermal interaction between the human body and its environment. Temperature, its measurement, heat, heat transport Contingency table. The chi-square test for independence		
Thermodynamic aspects of transport processes Special case: a 2 × 2 table. Odds ratio, relative risk, measuring agreement using kappa statistic		
Eyesight, corrections. Optical instruments in medicine	Optics	Optics of the eye

Non-parametric tests using ranks		
Biophysics of the senses: hearing and vision Survival analysis, life tables, Kaplan-Meier method		

2nd semester

LECTURE (2+1 hours a week)	**SEMINAR (2 hours every 2nd week)**	**PRACTICE (2 hours every 2nd week)**
Electricity	Electricity	Measurement of lung volumes (spirometry)
Magnetism and electromagnetism		
Bioelectric phenomena	Magnetism, electromagnetism, bioelectricity	Electrophysiology 1: Electromyography
Signals, signal processing and data visualisation		
Quantum physical phenomena in life (and medical) sciences	The electromagnetic spectrum. Spectroscopy. Lasers	Electrophysiology 2: Electrocardiography
Spectroscopy (optical, with an outlook to general spectroscopy). Atomic physics. Atomic spectra. Electromagnetic radiation. Luminescence		
X-rays: general properties, use in diagnostics. Absorption of X-radiation. Producing X-rays, interaction with living substances	X-rays	Spectroscopy
Nuclear physics. Radioactivity. Nuclear radiation, dosimetry		
Practical application of radioactive isotopes. Particle accelerators in medical practice.	Nuclear physics; radioactivity	Medical imaging techniques 1: tomography
Principles of the laser. Medical applications of lasers		
Medical imaging techniques: ultrasound, CT, MRI/NMR, PET, infrared diagnostics	Imaging and therapeutic methods	Medical imaging techniques 2: ultrasound
Physical basis of therapeutic methods: laser-, light, radio-, heat therapy, therapeutic use of electricity		
Physical methods in physiological research: microscopy (optical-, scanning-, electron-), mass spectrometry		
Molecular and cellular diagnostics: sedimentation, electrophoretic methods, flow cytometry		

MEDICAL PHYSIOLOGY

3rd semester

	LECTURE (4 hrs/week)	PRACTICE (2 hrs/week)
*	Membrane physiology: membrane transport, signalling systems, cellular electrophysiology	Membrane electrophysiology (computer simulation)
*	Nerve and muscle physiology: primary sensory neurons, autonomic nervous system, motor neurons, striated muscle and smooth muscle.	Electromyography (EMG)
*	Blood physiology: fluid compartments, blood plasma, erythropoesis and degradation of red blood cells, ABO and Rh blood groups	Blood tests: RBC, WBC, platelet counts, differential leucocyte count, reticulocyte count, ABO/Rh blood groups, bleeding time, clotting time, prothrombin time, INR. RBC osmotic resistance, RBC sedimentation rate
*	Respiratory physiology: ventilation, gas exchange, regulation	Human spirometry
*	Cardiovascular physiology: the cardiac cycle, cellular electrophysiology and ECG, hemodynamics, the microcirculation, autonomic and hormonal regulation of the systemic and local circulation.	Experiments using the isolated rat heart (Langendorff's perfusion)
*	Renal physiology	Electrocardiography Sphygmomanometry, determination of pulse qualities with palpation, cold pressor test

4th semester

	LECTURE (6 hrs/week)	PRACTICE (2 hrs/week)
*	Physiology of the gastrointestinal tract	Study of cardiovascular adaptation to physical exercise
*	Metabolism and nutrition.	Urine tests: physical examination, microscopic investigation of urine sediment, detection of protein, calcium, glucose, ketone bodies, bile pigments, blood and pus in the urine. Strip tests.
*	Endocrine systems: hypophysis, thyroid gland, adrenal gland endocrine pancreas	GI tract: study of the saliva: pH, protein content, digestion. Study of gastric juice.
*	Integrative physiology: regulation of energy metabolism, osmoregulation, volume regulation, potassium, calcium, pH homeostasis, Thermoregulation.	Endocrinology: Oral glucose tolerance test, demonstration of the antidiuretic effect of vasopressin, pregnancy tests.
*	Sports physiology	Determination of motor reaction time to visual and auditory stimulation, polygraphy. Study of human motor reflexes.

*	Reproductive physiology: sexual function, physiology of pregnancy, parturition, growth and development.	Sensory systems: threshold audiometry, tuning fork tests, otoscopy. Study of gustatory and olfactory perception. Study of somatosensory systems: study of different modalities, determining two point discrimination threshold, demonstration of Weber's 3 basin test. Study of vision: determination of visual acuity, visual field, critical flicker fusion frequency. Study of accommodation, pupil light reflex, light adaptation, color vision, and eye movements (postrotatory and optokinetic nystagmus
*	CNS physiology: introduction, the cerebral circulation	Study of human EEG
*	Sensory systems: somatosensory system, pain, vision, hearing, olfaction and taste:	Cognitive tests
*	Motor systems: spinal, brainstem, cortical integration of motor functions. The vestibular system. The role of the cerebellum and the basal ganglia in motor functions.	
*	Sleep/wake cycle, the EEG. Circadian rhythms.	
*	Physiology of emotions, motivation, reward and punishment.	
*	Physiology of learning and memory. Physiology of speech	

HUNGARIAN LANGUAGE

1st semester

PRACTICE (4 hrs/week)	
1.	Introduction. Basic expressions. Vowels, consonants, vowel harmony. The Hungarian alphabet.
2.	Definite and indefinite articles. Numbers. Money and measurements.
3.	Personal pronouns; *to be* present tense; the *–nak*, *-nek* ending. Nationalities, jobs, adjectives. Greetings, address forms.
4.	Usage of the verb *van*; the *–ban*, *-ben* ending; the *–n*, *-on*, *-en*, *-ön* ending; telling the time. Buildings, places and venues; expressions with the verb *van*.
5.	Revision 1
6.	TEST 1
7.	Indefinite conjugation 1 (present tense); the *–t* ending; yes-no questions. Subjects, food, drinks, vegetables, fruits.
8.	Indefinite conjugation 2; the *–val*, *-vel* ending. Cooked food. Some Hungarian dishes.
9.	Revision 2
10.	Verb formation; the infinitive *–ni* and its usage; the *–ul*, *-ül* ending; the *–lak*, *-lek* ending. Verbs, modal verbs. Festivals, fairs, events.

11.	Conjugation of *jönni* and *menni* (present tense); the –*ba*, -*be* and –*ra*, -*re* endings; the –*ból*, -*ből* and –*ról*, -*ről* endings. Means of transportation, other words in connection with transportation. Public transport in cities, travelling in Hungary.
12.	Revision 3
13.	TEST 2
14.	Oral tests

2nd semester

PRACTICE (4 hrs/week)	
1.	General revision
2.	The possessive endings. Body parts, time expressions (past tense).
3.	The verb *fáj(t)*; *to be* past tense.
4.	Past tense (first person singular only, indefinite conjugation); the –*kor* ending; the –*tól*, -*től* and the –*ig* endings.
5.	The –s, -*os*, -*as*, -*es*, -*ös* ending; linking words. Word formation. Holidays.
6.	Revision 4
7.	TEST 1
8.	Question words; ordinal numbers. The house.
9.	The –n, -*on*, -*en*, -*ön* ending (meaning on). Rooms and furniture.
10.	Indefinite conjugation (past tense). Postpositions.
11.	Usage of postpositions of place and time. Geography.
12.	Revision 5
13.	TEST 2
14.	Oral tests

3rd semester

PRACTICE (4 hrs/week)	
1.	General revision
2.	The –nál, nél, -hoz, -hez, -höz, -tól, -től endings.
3.	Jobs, family.
4.	Comparative and superlative forms of adjectives. Clothing, colours.
5.	The possessive structure; the plural –k ending. Describing what somebody looks like.
6.	Revision 6
7.	TEST 1
8.	Verbs.
9.	Definite conjugation (present tense).
10.	Verbal prefixes.
11.	Usage of verbal prefixes.
12.	Revision 7
13.	TEST 2
14.	Oral tests

4th semester

PRACTICE (4 hrs/week)	
1.	General revision
2.	Definite conjugation (past tense). Accusative case of personal pronouns.
3.	Medical specialties.
4.	Daily routine of hospitals.
5.	Body weight, height, blood pressure, temperature, pulse.
6.	The most common problems and complaints.
7.	The most common problems and complaints.
8.	TEST 1.
9.	SPRING BREAK
10.	Giving advice, -hat/het.
11.	Imperative.
12.	Most common medications.
13.	Revision of grammar and vocabulary.
14.	Practising role-play and picture description.
15.	Practising role-play and picture description.

5th semester

PRACTICE (2 hrs/week)	
*	Introduction to the course. The name of various clinical departments, the medical and nursing staff working there. Revision of the Present Tense.
*	Introduction to history taking. The parts of the case history. Asking and answering questions concerning present condition and pain: location, type, and duration, aggravating and relieving factors. Yes/No questions.
*	Asking the patients about previous hospitalisation and operations, major health problems, childhood diseases and vaccination. Revision of the Past Tense. Wh-questions.
*	Taking family and social history. Revising family relations, marital status, harmful habits (e.g. smoking, uncontrolled alcohol consumption, illegal drugs, excessive caffeine intake). Revising numbers and measurements.
*	Practising basic doctor-patient situations: role-play, history taking. Asking about presenting symptoms/ present complaints, past history, family and social history.
*	Asking the patient about dizziness, sweating, nausea or vomiting. Revision of Adjectives and Adverbs. Practising the Comparative and the Superlative.
*	Interviewing the patient about dyspnoea, cough and sputum. Revision of the Future Tense. Mid-term test.
*	Questions and answers concerning heart complaints and oedema of the legs. Revision of the Definite and Indefinite Articles.
*	Practising doctor-patient situations: role-play, history taking. Briefing simple English case histories in Hungarian.
*	Asking the patient about appetite, stools and urine. Revision of Modifiers and Quantifiers, and the vocabulary concerning food and drinks.
*	Questioning the patient about changes in his/her temperature. Questions about having fever, measuring fever and decreasing high temperature. Revising the vocabulary concerning the main parts of the body.
*	General instructions to patients during physical examination. The polite way of giving instructions. Revision of the Imperative Voice.

*	The most common conditions and diseases in Internal Medicine in Hungary: diseases of the digestive, cardiovascular and respiratory systems.
*	Practising doctor-patient situations: role-play, history taking. Briefing English case histories taken from the field of Internal Medicine in Hungarian. Final tests (written and oral).

6th semester

	PRACTICE **(2 hrs/week)**
*	The type of drugs/medicines. Internally and externally administered drugs. Vocabulary expansion concerning forms of medicines and their containers.
*	The effect of drugs. Most common adverse effects. Explaining to patients how to take the prescribed medicines. General instructions.
*	Practising doctor-patient communication: role-play, history taking and giving advice to patients concerning medication. Reading simple Hungarian case histories taken from the field of Internal Medicine.
*	Surgery. Interviewing the patient at the Surgery Department. General and more specific questions. Parts of the digestive tract.
*	The most common problems of the digestive tract. Role-play, history taking of patients with oesophageal problems. Interviewing a patient with gallbladder complaints.
*	Interviewing patients with abdominal complaints. Discussing case histories involving acute intestinal problems: appendicitis and ileus. Physical examination of the patient with acute abdominal complaints.
*	Interviewing patients with complaints referring to herniation. Chronic conditions in the colon: tumours of the large intestine and rectum. Sending patients for further investigations. Vocabulary concerning basic imaging techniques. Mid-term test.
*	Practising doctor-patient communication at the Surgery department: role-play, history taking and discussing possible surgical intervention with the patient. Revising the Conditional Mood. Briefing simple English case histories taken from the field of Surgery in Hungarian.
*	Interviewing patients who suffer from problems of the thyroid gland. Interviewing patients with breast cancer. Giving advice concerning life style. Revising Auxiliary Verbs.
*	Discussing the most common vascular problems. Interviewing patients with hypertension, vasoconstriction and varicose veins. Giving instructions concerning life style and medication. Discussing and arguing with patients.
*	Acute cases of the vascular system: embolism and thrombosis. Interviewing patients presenting with symptoms of embolism and thrombosis. Management of acute cases.
*	Patients at the Traumatology department. Home, road and sports accidents. Asking patients about conditions caused by accidents. Explaining medical procedures and giving advice to patients.
*	Practising doctor-patient communication: role-play, history taking and giving advice to patients concerning treatment and medication. Reading simple Hungarian case histories taken from the field of Surgery and Traumatology.
*	Revision. Practising doctor-patient situations that can emerge in the Internal Medicine, Surgery and Traumatology department. Interviewing and examining patients, sending them for further investigations, giving advice on diet, life style and medication. Final tests (written and oral).

LATIN

1st semester

	PRACTICE (2 hrs/week)
*	The role of the Latin language in medicine. Pronunciation. Groups of nouns - typical forms.
*	1st declension. Grammatical gender. Noun - adjective agreement. Cases - Possession. Praes. Imp. Act. Forms of the verb „to be".
*	2nd declension. Examples from anatomy. Prepositions.
*	The verb.
*	Miscellaneous exercises on the covered subjects.
*	Mid-term test.
*	3rd declension. Nouns. Typical endings, typical gender.
*	3rd declension nouns + adjectives ending in -us, -a -um.
*	Adjectives ending in -is, -e, -ns. Adjective formation.
*	Noun + adjective use (examples from anatomy).
*	Cardinals, their use. Clinical and pathological diagnoses.
*	Miscellaneous exercises on the covered subjects.
*	Final test.
*	Evaluation.

2nd semester

	PRACTICE (2 hrs/week)
*	Revision. Picking topics for weekly student presentations.
*	4th declension. Greek prefixes.
*	5th declension. Greek suffixes.
*	Comparison of adjectives. Examples from anatomy, pathology, physiology, clinical subjects.
*	Verbs in medicine, in medical prescription. Imperative. Greek elements in medicine.
*	Miscellaneous exercises.
*	Mid-term test.
*	Medical prescription. Formules. Abbreviations
*	Greek elements in medicine. Latin - Greek equivalents.
*	Diagnoses - clinical and pathological. Miscellaneous exercises.
*	Analysis of disease names with Greek and Latin elements. Miscellaneous exercises.
*	Revision.
*	Final test.

BIOCHEMICAL BASICS OF PREVENTIVE MEDICINE

4th semester

	LECTURE (2 hrs/week)
*	Introduction to preventive medicine (importance of nutrition, physical activity and stress in the development of „civilization diseases")
*	Biochemistry of oxidative stress and its importance in physiological and pathological processes (formation of free radicals and their effects)
*	Antioxidant mechanisms (vitamins, vitaminlike substances, enzymes and their cofactors involved in antioxidant protection)
*	Stress adaptation of the heart (early and late preconditioning)
*	General importance of balanced nutrition (macro- and micronutrients, alimentary fibers; additives)
*	Pathobiochemistry of atherosclerosis and possibilities of prevention
*	Role of oxidative stress in respiratory diseases
*	Role of free radicals and antioxidant protective mechanisms in physiological and pathological brain function
*	Background and prevention of obesity, metabolic syndrome and diabetes mellitus
*	Altered requirements for nutrients in physiological and pathological conditions; diets (theory and practice)
*	Sport biochemistry: general importance of physical activity (oxidative stress and role of antioxidants; changes in blood plasma parameters)
*	Psychological stress, oxidative stress, and importance of stress management
*	Biochemical basics of preventive medicine in the light of the most recent medical literature (interactive seminar and test)
*	Biochemical basics of preventive medicine in the light of the most recent medical literature (interactive seminar and test)

BIOCHEMISTRY SEMINAR

1st semester (not announced in 2017/2018)

	LECTURE (2 hrs/week)
*	Characterization of proteins (protein structure, folding, chaperones, and central role of heat shock proteins)
*	Enzimology (molecular mechanism of enzyme action, regaulation of enzyme activity, enzyme classes, isoenzymes, coenzymes)
*	Carbohydrate metabolism (alternative pathways, metabolism of galactose and fructose, patobiochemical aspects, glucuronic acid shunt)
*	Carbohydrate metabolism (regulation of carbohydrate metabolism, regulation of blood glucose level, glucoproteins)
*	Lipid metabolism (metabolism of phospholipids and sphyngolipids, detailed characterization of fatty acids, eiokazoids)
*	Lipid metabolism (metabolism of cholesterol and its derivative, transport of cholesterol,

	cardiovascular risk factors)
*	Amino acid metabolism (N balance in human body, specialized products derived from amino acids)
*	Amino acid metabolism (inherited disorders affecting amino acids and their diagnostics)
*	Nucleic acid metabolism (drugs influencing nucleotide metabolism and patobiochemical aspects)
*	Consultation.
*	Citric acid cycle (central role in the metabolism, connection to other metabolic pathways)
*	Terminal oxidation and oxidative phosphorylation
*	Summary of metabolism

2nd semester

	LECTURE (2 hrs/week)
*	General information
*	Biochemistry of blood (pathobiochemistry of plasma proteins and biochemical background of blood coagulation)
*	Biochemistry of blood (ion determination and blood-gas analysis)
*	Inherited metabolic disorders
*	Pathobiochemical aspects of connective tissue.
*	Pathobiochemical aspects of adhesion receptors and cytoskeleton.
*	Biochemical background of risk factors of cardiovascular diseases.
*	Biochemistry of vision.
*	Pathobiochemistry and diagnostics of liver.
*	Pathobiochemistry and diagnostics of diabetes mellitus.
*	Signaling
*	Biochemistry of nutrition
*	Molecular biology diagnostics
*	Exam

BIOINORGANIC CHEMISTRY

2nd semester

	LECTURE (1 hr/week)
*	Macro and micro elements. Alkali metals and their compounds. Complexes of alkali metals. Function of Na-K pump. Biological role of lithium, sodium and potassium ions. Important alkaline earth metals. Calcium signal. Calcium binding proteins. Calcium transport systems.
*	Characterization of d-transition metals. Complex formation. Chelate complexes. Role of complexes in biological systems.
*	Iron and its compounds. Biological role of iron: heme, carrying of oxygen. Electron transport and cytochromes. Catalase, peroxidase. Metabolism of iron. Metabolism problems.
*	Copper and its compounds. Copper-metalloenzymes and their role: cytochrome oxidase, superoxide dismutase, amine oxidases. Hemocyanin. Problems in the metabolism of copper.
*	Zinc and its compounds. Role of zinc metalloenzymes in hydrolytic reactions. Carbonic anhydrase, carbopeptidase, alcohol dehydrogenase, alkaline phosphatase. Zinc-finger protein and their binding to DNA. Zinc-peptide complexes, zinc-insulin. Poisoning effect of cadmium and mercury.

*	Molybdenum and its complexes, molybdenum metalloenzymes (aldehyde oxydase, xanthine oxydase and dehydrogenase). Manganese and its compounds, role of manganese in photosynthesis. Vanadium, vanadates and bone formation. Toxic effect of chromium. Cobalt and its complexes: vitamin B-12.
*	Hydrogen and its compounds. Isotopes of hydrogen. Application of radioactive isotopes: tracing, isotope dilution analysis. Medical therapy and diagnosis: application of technetium and iodine isotopes. Iradiation therapy.
*	Boron and its compounds. Bactericid and fungicid effects of boron. Aluminum and its compounds, medical usage. Toxic effect of aluminium ions. Lead and its compounds, toxic effect, lead poisoning and its therapy. Tin and its compounds.
*	Carbon. Carbon monoxide, carbon dioxide, carbonic acid, carbonates. Hydrogen cyanide, cyanides. Silicon and its compounds. Effect of silicates in the development of diseases, silicosis. Application of silicates in medicine.
*	Halogens and their compounds. Biological role of fluoride ion, fluoroapatite. Biological role of chloride ions, chloride transport. Medical usage of iodine and its compounds.
*	Nitrogen and its compounds. Nitrogen oxides: Medical usage of dinitrogen monoxide in medicine, biological role of nitrogen monoxide. Nitric and nitrous acids. Nitrates, nitrites, detection, toxic effect.
*	Phosphorus and its poisoning effect. Phosphoric acids. The role of high-energy phosphate bonds in the energy production of cells.
*	Oxygen and ozone. Oxides, peroxides. Reactive particles formed from oxygen. Oxygen activating enzymes, oxygenases and oxydases. Formation, toxic effect and elimination of oxygen radicals in biological systems. Oxygen poisoning
*	Sulphur. Hydrogen sulphide and sulphides. Sulphur dioxide and trioxide, sulphurous and sulphuric acids, sulphites and sulphates. Selenium and its compounds. Selenium as an essential micro element.

CARDIAC ELECTROPHYSIOLOGY AS A BASIC PROPERTY OF CARDIAC FUNCTION

4th and 8th semester

	LECTURE AND PRACTICE (2 hrs/week)
*	Introduction.
*	Basic principles of electrophysiology, the impulse propagation in the heart I.
*	Basic principles of electrophysiology, the impulse propagation in the heart II.
*	The action potential of myocytes and the ionic channels determining the action potential I.
*	The action potential of myocytes and the ionic channels determining the action potential II.
*	Methods and techniques in cardiac electrophysiology.
*	Electro-mechanical coupling in the heart I.
*	Genetic background of ion-channel disturbances in the heart.
*	Electro-mechanical coupling in the heart II.
*	The mechanism of developing cardiac arrhythmias
*	Electrophysiological changes after the disturbances in blood supply to the myocardium.
*	Experimental methods and clinical relevance to investigate cardiac arrhythmias.
*	Investigational techniques in cardiac cellular electrophysiology
*	Practical and consultation

CYTOMORPHOLOGY AND MICROTECHNICS

1st semester, 3rd and 5th semester

	LECTURE (2 hrs/week)
*	Evolution of cellular organisms. General morphology of the eukaryotic cell: size, shape. Research methods for structural cell biology.
*	Intracellular compartmentalization. Structure of the cell membrane. The endomembranes. Membrane dynamics (membrane fusion and fission).
*	Membrane modifications: cell surface modification (microvilli, stereocilia, cilia), coupling structures (belt-, spot-, hemidesmosome), impermeable junction (tight junction), communication junctions (gap junction, chemical synapse).
*	Structure and functions of the extracellular matrix. The lamina basalis. Cell adhesion molecules.
*	Structure and functions of the cytoskeleton. General characteristics of cytoskeletal proteins. Actin filaments/microfilaments. Microtubules and intermedier filaments.
*	Light- and electron microscopic structure of the cell nucleus and nucleolus. Organization of the chromatin. Chromosomes.
*	The cell cycle. Growth and division of the cell. Mitotic and meiotic cell divisions.
*	The endomembranes: endoplasmic reticular systems, Golgi complex. Targeted intracellular transport of ptoteins. The vesicular transport and secretion.
*	Transport across membranes. Internalization of macromolecules and viruses. Phagocytosis. Receptor-indiced endocytosis, exocytosis, transcytosis. The lysosomes.
*	Mitochondria: general characteristics and types.
*	Cyto- and histotechnics I. Nuclear / chromatin staining methods. Light- and electron microscopic enzyme histochemical methods.
*	Cyto- and histotechnics II. Light- and electron microscopic immunocytochemical and – histochemical methods.
*	Scanning electron microscopic techniques (freeze-etching, freeze-fracturing, etc.).

INTRODUCTION TO ANALYTICAL CHEMISTRY

1st semester

	LECTURE (1 hr/week)
*	Definition of quantitative and qualitative analysis. Application of analytical chemistry: environment protection, clinical diagnosis, pharmacology, bioanalysis.
*	SI Units, prefixes and base units. Types of concentration of solutions. Methods of analytical error calculation.
*	Inaccuracy of measurement. Sources of inaccuracy. Systematic error. Minimizing systematic error. Reduction of accidental error.
*	Characteristics of analytical methods: accuracy, precision, average, median. Standard deviation. Distribution of the result.
*	Accuracy of measurement. Selectivity. Factors that influence selectivity. Analytical interference. Example. Prediction and avoidance of analytical interference.
*	Sensitivity of analytical methods. Definition. Sensitivity of different analytical methods.
*	Choosing of the appropriate analytical method. Measuring of low concentrations. Steps of quantitative analysis. Sampling.
*	Gravimetry. Definition, steps, example. Advantages and drawbacks of gravimetric analysis.
*	Volumetric analysis (titrimetry). Definition. Possible reactions, examples. Indication of the end-point of titration. Standardized solution.
*	Types of titration. Acid-base titration. Measuring of pH during titration. Titration curve,

	equivalence point.
*	Titration of weak acids by strong bases. Titration of polyprotic acids. Acid-base indicators. Indicator error.
*	Complexometry. Formation of a complex. Stability of complexes. Metal indicators. Titration curve. Example.
*	Redox titration. Types of redox titration: permanganometry, chromatometry, cerimetry, bromatometry, iodometry. Application.
*	Precipitate formation titrations. Argentometry. Application.

INTRODUCTION TO INFORMATICS

1st semester

	LECTURE (1 hr/week)	**PRACTICE (2 hrs/week)**
	Why do we learn and teach medical informatics?	Hardware and software environment (login, rights, sharing resources) of the practice. ETR CooSpace. Creating presentation: IT in health care.
	The information system of the health.	
	History of computing hardware. (From the mechanical devices to supercomputers).	Examination of medical data with spreadsheets (validation, sorting, filtering).
	Software. The operating system, viruses.	Evaluation of medical data with spreadsheets (calculations).
	Computer networks, internet, data protection.	Evaluation of health information (functions, sub-total tables).
	Development and integration of software application. Data presentation, documents handling, spreadsheets, data analysis and reports.	Health data presentation (tables, charts, graphs, images).
	Internet browsers, search engines, metadata, web documents, Web 2.0	1st practical test
	Virtual reality. Telemedicine.	Literature reference; well-known databases and queries.
	Integrated IT support of scientific research.	Documents
	Data and information in health care. Health care data types: text, signs, images, sounds, videos, codes, medical code systems.	Formatting large documents templates and styles.
	Integrated hospital information systems. (Database and standards). Digital medical image communication systems and standards (PACS, DICOM).	Advances document editing, embedding tables, graphs and images.
	Digital medical images, basic image processing.	2nd practical test
	New trends in medical informatics. Advanced systems	Conclusion remarks and discussion of practical marks

INTRODUCTION TO MEDICINE

1st semester *(updated 25.7.2017)*

	LECTURE/PRACTICE (1 hr/week)/(1 hr/week)
1.	Introduction to the course.
2.	History of Medicine I. Earliest medicine, antique times
3.	History of Medicine II. Medicine in middle ages, Renaissance, Enlightenment
4.	History of Medicine III. Science and technology in the 19th-20th centuries
5.	Health philosophy and behavioral Medicine I. Health and disease
6.	Health philosophy and behavioral Medicine II. What influences health?
7.	Health philosophy and behavioral Medicine III. Stress, coping, culture and lifestyle
8.	Preventive Medicine I. Community diagnosis. Descriptive epidemiology
9.	Preventive Medicine II. Analytic epidemiology. Risk perception
10.	Preventive Medicine III. Prevention, health promotion, health education, screening
11.	Medical Ethics I. The Hippocratic oath.
12.	Medical Ethics II. Ethics, morality and ethical theories
13.	Medical Ethics III. Basic principles of bioethics
14.	WRITTEN TEST EXAM

INTRODUCTION TO PSYCHOLOGY, BASICS OF NURSING

2nd semester

	LECTURE (1 hr/week)	**COMMUNICATION SKILLS (PRACTICE) (2 hrs/week)**
*	Scope of psychology. Contemporary themes, perspectives of psychology	* Introduction, technical details
*	Making sense of the physical environment. Sensation, perception, schemas, top-down processes	* Basic elements of communication
*	Attention and memory	* Factors which disturb the communicational process I.
*	Making sense of the social environment. Elements of the social perception	* Factors which disturb the communicational process II.
*	The psychology of social interactions	* Verbal communication I.
*	Attitudes and persuasion	* Verbal communication II.
*	Motivation (drives, Maslow's hierarchy of needs). Emotions	* Nonverbal communication I.
*	The mechanism of human behavior (classical conditioning, and it's practical utility)	* Nonverbal communication II.
*	The mechanism of human behavior (instrumental, observational, and complex learning, and it's practical utility)	* Cultural presentation I.
*	Intelligence	* Cultural presentation II.
*	The personality. Behaviorist, cognitive approaches	* Skill lab practice
*	The personality. Psychoanalytic, humanistic approaches	* Skill lab practice

*	Aspects of human development	* Summary
		* Closing

MEDICAL ANTHROPOLOGY

4th semester

	PRACTICE (1 hr/week)
*	Introduction to cultural and medical anthropology
*	Cultural anthropology of anatomy and physiology (lay beliefs)
*	Medical anthropology of stress and stress-related disease
*	Medical anthropology of pain and nutrition
*	Medical anthropology of sexuality and gynecology
*	Cultural aspects of health care
*	Medical anthropology of death and dying

MEDICAL SOCIOLOGY

3rd semester

	PRACTICE (2 hrs/week)
*	What is sociology? Theories and perspectives in sociology.
*	Role of behavioural sciences and medical sociology in medical education. Development, division, research fields of medical sociology.
*	The medical profession.
*	Professional socialisation among medical students.
*	Gender differences among medical students in their professional socialisation. Role conflicts between family and professional roles.
*	Doctor-patient interaction, models of the doctor-patient relationship. Parsons' concept of the sick- and doctor roles.
*	Illness behaviour. Going to the doctor.
*	Sociology of disability.
*	Labelling and stigma. Illness as deviance, primary, secondary deviance.
*	Deviance behaviours. Theories of deviance: biological, physical, psychological, sociological theories.
*	Stratification and class. Social mobility. Social causes of illness, social patterns of illness (social aetiology of disease).
*	Global inequality. Race, etnicity and migration. Social inequalities and health. Poverty, social exclusion and welfare.
*	Families and intimate relationships. The life-course.
*	Practice of medical sociological research methods. Strategy and research methods of medical sociology.

MOLECULAR CYTOLOGY AND HISTOLOGY

1st semester

	LECTURE (2 hrs/week)
*	Connective tissue fibers: types, synthesis, occurrence in various organs and in the basement membrane. Staining of connective tissue fibers for routine histology and pathology.
*	Muscle tissue: light- and electron-microscopical properties, and molecular composition. Endocrine function of muscle tissue.
*	Blood - and lymphatic vessels: light- and electron-microscopical properties. Ultrastructure of capillaries in various organs.
*	The kidney, the testis and the ovarium: light- and electron-microscopical properties. Development of the ovarian follicles. Ultrastructure of spermatozoon.
*	Formed elements of blood: light- and electron-microscopical properties. Haemopoiesis. Types of lymphocytes. Antigen-presenting cells. Electron-microscopical features of lymphoid organs.
*	The teeth, the major salivary glands and the tounge: functional histology and electron-microscopical features. Innervation of salivary glands.
*	The stomach and the intestines: light- and electron-microscopical properties, and microcirculation. Immune system of the alimentary tract.
*	The liver, the bile system and the pancreas: functional histology and electron-microscopical features. Microcirculation and lymphatics of the liver. Innervation of the liver and the pancreas.
*	The respiratory system: functional histology and electron-microscopical features. The blood-air barrier. Tissue-specific macrophages in the lung. Innervation, blood circulation and lymphatic drainage of the bronchial tree and the pleura.
*	The endocrine system: functional histology and electron-microscopical features. Modulations of the hormone release. Neurosecretion.

MOLECULAR DEVELOPMENTAL BIOLOGY

4th semester

	LECTURE (2 hrs/week)
*	The molecular developmental aspect of medical biology
*	General mechanisms of embryonic development
*	The formation of body pattern (polarity, segment polarity, body domains) and appendix development
*	Seminary (lectures 1-3)
*	Cell movement and body formation in vertebrates, neural development
*	The formation of the epiderm and its renewal from stem cells. Sensory epithel, airway system, gut and liver development.
*	Seminary (lectures 5,6)
*	Blood vesels and endothel cells, multipotent stem cells, blood cell renewal. Fibroblasts and their transformations. The movement and muscle types. The origin a nd potency of stem cells.
*	Seminary (lecture 8)
*	The cancer as a microevolutionary process.
*	Tumor formation nand its molecular background
*	Seminary (lecture 10,11)
*	The molecular biology of nutrition and life span
*	Seminary (lecture 13)

NEUROCYTOLOGY

2nd semester

	LECTURE (2 hrs/week)
*	History: discovery of the neuron and glial cells, neuron theory, the discovery of synapses and synaptic transmission
*	Immunohistochemistry, in situ hybridization: pheno- and genotyping of neurons and glial cells
*	The cytology of glial cells: astrocytes, oligodendrocyte, microglia, ependyma and choroid epithelium, Schwann cells, myelin sheath
*	The morphology of the blood-brain barrier: ultrastructure of cerebral vessels, the regulation of cerebral circulation
*	The structure of the neuron: axontransport, dendrite-transport, neurosecretion and neuroresorption
*	Basic neuropathological processes: chromatolysis, Wallerian degeneration, hypoxia, neuronal damage
*	The ultrastructure and types of synapses: chemical and electric synapses, types of vesicle, transmitters and receptors, the mechanism of the exocytotis of the synaptic vesicles
*	Glutamate as a neurotransmitter: immunocytochemical identification, types of receptors, molecular structure and distribution
*	The cholinergic system:cholinergic nuclei, neurotransmission, receptors, pathology, Alzheimer's disease
*	Neuroimmunology
*	Functional neuroradiology
*	Neurocytology of the peripheral nervous system: distribution and cytochemical anatomy of the nerve and glial cells in the peripheral nervous system

ANIMAL EXPERIMENTS IN MEDICINE

3rd, 4th, 5th, 6th, 7th, 8th, 9th or 10th semester

	LECTURE (2 hrs/week for 11 weeks)
*	Introduction, general information. The theoretical background, history and significance of animal experiments in research. Animal models in biomedical research
*	Ethical aspects and legal regulation of animal experiments
*	Keeping, care, handling and transport of experimental animals. Biology, microbiological quality and diseases of the most frequently used laboratory mammals
*	General and local anesthesia, analgesia. Principles of invasive and surgical interventions, postoperative care. Euthanasia
*	Planning and evaluation of experiments. Processing and analysis of experimental data. Statistical methods. Publication of results. Basic experimental techniques: Methods and animal models of circulation research
*	Methods and animal models of respiration research. Methods and animal models of gastrointestinal research
*	Methods and animal models of microcirculation research
*	Methods and animal models of neurobiological research
*	Research methods of pharmacodynamics. Research methods and animal models of the reproductive system
*	Methods and animal models of dermatological research. Biocompatibility examinations.

	Alternative methods for the replacement of animal experiments. *In vitro* techniques and models
*	Outbred, inbred and genetically modified animals, cloning. Animal models in immunobiology
*	Written test exam

BODY DEVELOPMENT AND DISEASES - A MOLECULAR BIOLOGICAL BACKGROUND

4th semester

	LECTURE (2 hrs/week)
*	The general mechanisms of animal development. Siamese twins, embryo deformities
*	The formation of body pattern (polarity, segment polarity, homeotic genes), organ formation and appendages. Molecular base of appendage abnormalities
*	Cell movements and body formation of vertebrates. The formation of body axis (situs inversus totalis).
*	The neural development. The axonal growth cone, formation of the visual and auditory map, formation and processing of the synapse.
*	The formation of the epidermis and its renewal from stem cells. Definition of stem cells, types of stem cells, use for therapies.
*	The sensory epithelial development. Molecular evidence for renewal of connections between olfactory neurons and the bulbus. The characteristics of renewal of auditory neurons and retinal neurons.
*	The airways and the gut development. The mucociliary escalator and its connection with situs inversus. The renewal of intestine epithelial layer. The connection between the size of the liver and the whole body.
*	Blood vessels and endothelial cells, the molecular drive of angiogenesis, VHL syndrome and hemangioblastoma.
*	Renewal by multipotent stem cells: blood cell formation. Pathological migration of crista neuralis cells.
*	Genesis, modulation and regeneration of skeletal muscle. Muscle size and quality, myopathies with functional defects, secondary muscle defects.
*	Fibroblasts and their transformations: the connective-tissue cell family. Leptins and obesity, bone abnormalities, achondroplasia.
*	Stem-cell origin and engineering, the main questions of stem cell therapy, the special renewal of the heart and brain.
*	Cancer as a micro evolutionary process, features making cancer diagnosis problematic.
*	The molecular base of cancer formation, the character of tumour cell formation, the definition of tumour, the contradictive nature of tumour stem cell.
*	Nutrition and life span, the rules of proper nutrition, the likely genetic background of metabolic syndrome, genes influencing life span.

MATHEMATICAL AND STATISTICAL MODELLING IN MEDICINE

4th semester

	LECTURE (1 hr/week)	**PRACTICE (1 hr/week)**
*	Elementary mathematical functions (The logarithm and exponential functions). Definitions and graphs. Geometric meaning of the derivative and definite integral.	Elementary mathematical functions (The logarithm and exponential functions). Definitions and graphs. Geometric meaning of the derivative and definite integral.
*	Discrete (Poisson–) and continuous (exponential, Weibull–, normal and t-) distributions	Discrete (Poisson–) and continuous (exponential, Weibull–, normal and t-) distributions
*	Ratios, proportions and rates in epidemiology	Ratios, proportions and rates in epidemiology
*	Conditional probability, testing proportions: the relative difference	Conditional probability, testing proportions: the relative difference
*	One- and Two-way ANOVA	One- and Two-way ANOVA
*	Repeated measurement ANOVA	Repeated measurement ANOVA
*	Nonparametric ANOVA. Kruskall-Wallis, Jonckheere-Terpstra and Nemenyi tests	Nonparametric ANOVA. Kruskall-Wallis, Jonckheere-Terpstra and Nemenyi tests
*	Linear-by-linear method. Kendall tau statistic. Logrank test	Linear-by-linear method. Kendall tau statistic. Logrank test
*	Logistic and Poisson regression models (ROC curves)	Logistic and Poisson regression models (ROC curves)
*	Harmonic trend and·seasonality (Edward and Walter-Elwood test, logistic regression and Cosinor method)	Harmonic trend and·seasonality (Edward and Walter-Elwood test, logistic regression and Cosinor method)
*	Area under curve methods	Area under curve methods
*	Non-linear regression models (Michaelis–Menten kinetics, RIA, Scatchard plots)	Non-linear regression models (Michaelis–Menten kinetics, RIA, Scatchard plots)
*	Internal and external quality control methods	Internal and external quality control methods
*	Decision and cost-effectiveness analysis with probabilities.	Exam

MOLECULAR MEDICINE

5th semester

	LECTURE (2 hr/week)
*	Molecular genetic and cell biology methods in diagnosis and therapy.
*	Diagnostic methods based on immunological techniques (RIA, ELISA, Western blot analysis, immunocytology, citotoxicity tests, etc.).
*	Diagnostic methods beased on nucleic acid hybridization (Northern and Southern analysis, in situ hybidization, DNA chip technology, etc.).
*	Diagnostic methods based on specific endonuclease activity (fragment length polymorphism, pedigree analysis, etc.).
*	Gene sequencing and analysis, genomic and proteomic techniques. Cell and tissue culture methods.
*	Antisense pharmacology. RNA interference/silencing. Small interfering RNAs. Molecular chaperons.
*	Gene therapy, viral vectors, DNA-liposome complexes.

*	Molecular markers in human disorders. Biomarkers for neurological and psychiatric disorders.
*	Molecular interactions between pathogens and host.
*	Stem cell therapy. Embryonal and adult stem cells. Induced pluripotent stem cells. Neuronal stem cells.
*	In vitro differentiation of stem cells to the desired phenotype. Transfection of stem cells.
*	Regulation of cell cycle and cell differentiation. Regulation of transcriptional and translational control of gene expression.
*	Telomerase-directed molecular therapy.
*	Immunotherapy. Antitumour immune responses.
*	Bioinformatic and computer-assisted methods in diagnosis and therapy: functional genomics and proteomics.

MICROBIOLOGY I.

4th semester

	LECTURE (3hrs/week)	**PRACTICE (2 hrs/weeks)**
*	Introduction to microbiology. Characterization and classification of bacteria Structure of bacteria. Growth and nutrition of bacteria.	Introduction to microbiology. Laboratory Safety. Aspetic techniques- Wet-mount preparation.
*	General Characteristics of viruses, viral replication, antiviral therapy Structure of viruses and classification	Preparatio of bacterial smear. Simple and Gram staining.
*	Herpesviriade	Ziehl-Neelsen, Schaffer-Fulton and Neisser staining
*	Papilloma and polyoma viruses Poxviridae, Rhabdoviridae	Methods of sterilization. Sterility testing
*	Orthomyxoviridae, Paramyxoviridae Togaviridae, adenoviridae	Methods for counting bacteria. Methods for disinfection
*	Retroviridae Picornaviridae	Serological reactions I. (precipitation, CFT)
*	HIV Reoviridae, Astroviridae, Coronaviridae	Serological reactions II. Agglutination, ELISA. Laboratory methods for detection of cellular immunity
*	„Slow" viruses. Parvoviridae, Bunyaviridae	MTO
*	Hepatitis viruses, Flaviviridae Arenaviridae, Filoviridae	Bacteriophages, Molecular methods
*	Oncoviruses Growth and nutrition of bacteria	Virology I. Cultivation of viruses Signs of Viral replication
*	Mivrobial genetics Immune response against pathogens	Virology II. Quantification of viruses Virus
*	Pathogenesis of bacterial infection Immune response against pathogens	Virology III. HAG, ELISA, IF Neutralization test
*	Antimicrobial chemotherapy I., II.	Antimicrobial susceptibility testing

*	Antimicrobial chemotherapy III. Microbial antigens	Consultation

IMMUNOLOGY I.

4th semester

	LECTURE (2hrs/week)
*	Introduction to immunology. Basic principles
*	Phagocytic cells, phagocytosis. Innate immunity
*	The structure and activation of the complement system
*	Ontogeny of B cells. Antigen recognition
*	B cell activation. Humoral immune response
*	Ontogeny of T cells. Antigen recognition
*	Major histocompatibility complex (MHC)
*	Antigen processing
*	Cytokines I.
*	Cytokines II.
*	Hypersensitivity reactions
*	Tumonrimmunity
*	Transplantation immunity
*	Tolerance, autoimmunity

CLINICAL DIAGNOSTICS I. – INTERNAL MEDICINE

5th semester

	LECTURE Basics of Haematology (2 hrs/week)	**PRACTICE (2 hrs/week)**
*	Case history, documentation	General introduction and guide to the practicals in internal medicine
*	Fever, pulse, blood pressure	Documentation, taking history
*	Inspection, palpation	Elements of physical examination: practical aspects of inspection, palpation
*	Physical examination of the chest and the lungs	Elements of physical examination: practical aspects of percussio and auscultation
*	Heart sounds, murmurs, physical findings in heart diseases	Elements of physical examination: feeling pulse, checking blood pressure, taking temperature
*	Electrocardiography	Listening to the heart and chest
*	Imaging techniques in cardiology	Basic aspects of electrocardiography. Developing skills in PE
*	Clinical presentation of left and right ventricular failure	Practical electrocardiography. Developing skills in PE
*	Physical signs of endocrine disorders	Practical electrocardiography. Developing skills in PE

*	Physical examination of the abdomen and abdominal sonography	Practical echocardiography. Developing skills in PE
*	Physical examination of the musculoskeletal system	Practical echocardiography. Developing skills in PE
*	Physical and laboratory investigation in clinical haematology	Abdominal sonography
*	Physical examination in neurology	Physical examination in neurology. Developing skills in PE
*	Consultation	Consultation

CLINICAL DIAGNOSTICS II. – SURGERY

6th semester

	LECTURE	**PRACTICE/SEMINAR**
*	The origins and development of surgery	Demonstration and investigation of surgical patients
*	Observation and documentation of surgical patients	"
*	The shock. Basic mechanism and clinical profile	"
*	The circulatory shock	"
*	The basis of fluid and electrolyte therapy in surgical patients	"
*	Blood transfusion	"
*	Bleeding and haemostasis	"
*	The significance and role of asepsis and antisepsis in the practice of surgery	"
*	Surgical infections. Modern antibiotic treatment	"
*	Types of wounds and the basic principles of wound healing	"
*	Perioperative complications	"
*	Parenteral feeding	"
*	Surgical oncology	"
*	The possibilities and practice of organ transplantation	"
*	Video demonstration of surgical procedures	"
*	Test	

ETHICS IN MEDICINE

6th semester *(updated 25.7.2017)*

	LECTURE (1 hr/week)	**PRACTICE (2 hrs/week)**
*	Introduction: Basic Moral Concepts	Ethical theories; Ethical principles of health care ethics
*	Introduction to Medical Etics. Laws and Morals	Informed consent
*	Basic Ethical Theories, Principles of Bioethics	Moral status of foetuses; Ethical issues of human reproduction
*	Informed Consent	Ethical problems of medical genetics

*	Moral dilemmas in reproductive medicine. Family planning	Ethical issues of organ transplantation and brain death
*	Reproductive medicine (cont.)	End-of-life decisions
*	Ethical aspects of medical genetics	
*	Ethics of organ transplantation	
*	Euthanasia – a non-medical approach	
*	AIDS	
*	Cloning	
*	Research on human subjects. Patients' rights and health care system	
*	Neuroethics and neuroenhancement	

INTERNAL MEDICINE I.

6th semester

	LECTURE (4 hrs/week)	**PRACTICE (2 hrs/week)**
*	Gastroesophageal Reflux Disease (GERD) Diagnostic endoscopy	Problem oriented evaluation of the symptoms of patients with esophageal disorders
*	Extraesophageal manifestations of GERD, esophageal motility disorders Barrett's oesophagus, esophageal malignancies	Practical aspects of the functional evaluation of patients with esophageal disorders (esophageal manometry, 24 h pH-metry, evaluation of the biliary reflux)
*	Gastroduodenal ulcer disease (H.pylori, NSAID) Gastric malignancies	Upper gastrointestinal endoscopy
*	Functional Dyspepsia (EPS, PDS) Irritable Bowel Syndrome (IBS)	Symptomatic evaluation of the liver patient. Problem oriented laboratory investigation of the liver patient.
*	Chronic hepatitis Endosonography	Symptoms of biliary obstruction, investigative methods for patients with biliary obstruction (symptoms, biochemistry, ultrasonography, ERCP)
*	Cirrhosis of the liver Diseases of the gallbladder and the biliary tract	Symptoms of patients with acute pancreatitis Diagnostic work up of patients with acute pancreatitis
*	Tumors of the liver and other liver diseases Acute pancreatitis	Diagnostic work up of patients with chronic pancreatitis and pancreatic cancer
*	Chronic pancreatitis, maldigestion Pancreatic cancer	Diagnostic work up of patients with CU and Crohn's disease.
*	Crohn's disease Ulcerative colitis	Early identification of patients with colorectal cancer. Diagnostic methods.
*	Malabsorption syndrome Gastrointestinal bleeding	Symptoms of malabsorption, maldigestion, Diagnostic workup: Hydrogen, c13 urea and starch breath tests
*	Nutritional support Tumors of the large intestine	Practical aspects of the diagnosis and therapy of patients with diabetes mellitus; the patient education.
*	Chronic constipation Colonic diverticular disease, Anorectal Hyperuricemia, gout	Practical aspects of insulin therapy. Treatment of dyslipoproteinemias

*	Therapeutic endoscopy Gastrointestinal manifestations of systemic diseases	Physical examination of patients with rheumatoid diseases
*	Translational pancreatology	Consultation

MEDICAL PSYCHOLOGY I.

6th semester *(updated 25.7.2017)*

	LECTURE (1 hr/week)	**PRACTICE (1 hr/week)**
1.	Introduction: Medical psychology and border areas	Technical briefing.
2.	Suggestion – Persuasion	Patient-centered medicine, Biopsychosocial approach to illness
3.	Factors of nonadaptive behavior	Understanding the Whole Person
4.	Symptoms and illness – Perception (pain, placebo)	Skill lab practice
5.	Health and illness related beliefs. The psychological process of becoming ill	Enhancing the Patient-Doctor Relationship, CLASS modell
6.	Health protective behavior	Finding Common Grund
7.	Health promotion	Being realistic, Burnout prevention
8.	Adherence in the patient–physician relationship	
9.	Stress and Health	
10.	The prevention and management of burnout among health professionals	
11.	Chronic illness, death, dying	
12.	The role of personality in the changes of health status	
13.	The effect of the family in medicine	
14.	Written test exam	

MICROBIOLOGY II.

5th semester

	LECTURE (3 hrs/week)	**PRACTICE (2 hrs/week)**
*	Brucella. Listeria Yersinia. Francisella. Human pathogenic Salmonellae	Safety rules, Yersinina, Salmonellae, Shigellae
*	Vibrio cholerae. Campylobacter. Helicobacter. Burkholderia, Pseudomonas	Pseudomonas, Camplyobacter, Heliobacter
*	Anaerobic bacteria.	Listeria, Bacillus
*	Corynebacterium	
*	Mycobacterium, Legionella Bordetella, Haemophilus	Mycobacterium, Haemophilus

*	Treponema, Leptospira, Borrelia Bacillus	Corynebacterium, Bordetella
*	Mycoplasma, Chlamydia. Rickettsia.	Bacteroides. Clostridium. Mycoplasma. Leptospira.
*	General characteristics of viruses, viral replication, antiviral chemotherapy. Structure of viruses and classification	Bacteriophages. Molecular methods
*	Herpesviridae Papilloma and plyoma viruses	Clinical bacteriology
*	Orthomyxoviridae, Paramyxoviridae Togaviridae, adenoviridae	Vaccination
*	Retroviridae, HIV Poxviridae, Rhabdoviridae	Virology I. Cultivation of viruses Signs of Viral Replication
*	Hepatitis viruses, Flaviviridae Slow viruses.	Virology II. Quantification of viruses Virus serology (HAG, ELISA, IF) Neutralization test
*	Human pathogenic protozoa. Picornaviridae	Bunyaviridae, Filoviridae, Arenaviridae, Parvoviridae
*	Human pathogenic helminthes.	Protozoa, helminthes.
*	Important human pathogenic fungi. Reoviridae, Astroviridae, Coronaviridae	Mycology

PATHOLOGY

5th semester

	LECTURE (3 hrs/week)	**SEMINAR (1 hour/week)**	**PRACTICE (2 hrs/week)**
*	Pathology of cellular injury and death (necrosis, apoptosis, degenerations). Cellular adaptations of growth and differentiation (hyperplasia, hypertrophy, atrophy, metaplasia). Calcification. Oedema, hyperaemia, congestion. Haemorrhage.	Cellular injury and death. Cellular adaptations of growth and differentiation. Oedema, hyperaemia, congestion. Haemorrhage.	Histopathology of cellular injury and death/Autopsy
*	Disseminated intravascular coagulation. Thrombosis. Embolism. Shock. Consequences of vascular occlusion. Infarction.	Thrombosis. Embolism. Shock. Consequences of vascular occlusion. Infarction.	Autopsy/Histopathology of cellular injury and death/
*	Pathology of inflammation I. Pathology of inflammation II.	Pathology of inflammation	Histopathology of degeneration/Autopsy
*	Pathology of inflammation III. Pathology of inflammation IV. Tissue repair. Wound healing.	Pathology of inflammation	Autopsy/Histopathology of degeneration
*	Immunopathology I. Immunopathology II.	Immunopathology	Histopathology of degeneration/Autopsy

*	Immunopathology III. Pathology of transplant rejection. Neoplasia I.	Immunopathology	Autopsy/Histopathology of degeneration
*	Neoplasia II. Carcinogenesis. Amyloidosis. Cystic fibrosis. Pathology of bed rest. Pathology of alcohol abuse. Pathology of smoking.	Neoplasia.	Histopathology of circulation disorders/Autopsy
*	Diabetes. Pathology of obesity. Diseases of the blood vessels I.	Carcinogenesis. Pathology of alcohol abuse. Pathology of smoking. Diabetes. Pathology of obesity.	Autopsy/Histopathology of circulation disorders
*	Diseases of the blood vessels II. Diseases of the heart I.	Diseases of the blood vessels	Autopsy/Oncohistopathology
*	Diseases of the heart II. Essential hypertension. Nephropathology I.	Diseases of the heart	Oncohistopathology/Autopsy
*	Nephropathology II. Nephropathology III.	Diseases of the heart	Autopsy/Repetition
*	Nephropathology IV. Diseases of the lung I.	Nephropathology	Repetition/Autopsy
*	Diseases of the lung. II. Diseases of the lung III.	Diseases of the lung	Autopsy/Repetition
*	Oral pathology Gastrointestinal pathology	Gastrointestinal pathology	Repetition/Autopsy

6th semester

	LECTURE (2 hrs/week)	**SEMINAR (1 hr/week)**	**PRACTICE (3 hrs/week)**
*	Gastrointestinal pathology.	Gastrointestinal pathology.	Histopathology of the cardiovascular system/Autopsy
*	Pathology of the liver.	Pathology of the liver.	Histopathology of the respiratory tract/Autopsy
*	Pathology of the biliary tract and pancreas.	Pathology of the biliary tract and pancreas.	Histopathology of the gastrointestinal system/Autopsy
*	Pathology of soft tissue tumours. Pathology of the bones, joints and muscles.	Pathology of soft tissue tumours. Pathology of the bones, joints and muscles.	Histopathology of the liver and pancreas/Autopsy
*	Endocrine pathology I.	Endocrine pathology	Haematohistopathology/ Autopsy
*	Endocrine pathology II.	Endocrine pathology	Histopathology of the urogenital tract/Autopsy
*	Pathology of female genital system I.	Pathology of female genital system	Histopathology of the female genital tract/Autopsy
*	Pathology of female genital system II. Breast pathology.	Pathology of female genital system. Breast pathology.	Histopathology of the breast/Autopsy

*	Neuropathology I.	Neuropathology	Endocrine histopathology/Autopsy
*	Neuropathology II.	Neuropathology	Histopathology of the bones, joints and muscles/Autopsy
*	Immune pathology	Immune pathology.	Histopathology of the nervous system/Autopsy
*	Pathology of male genital system.	Pathology of male genital system.	Repetition/Autopsy
*	Haematopathology I.	Haematopathology	Repetition/Autopsy
*	Haematopathology II.	Haematopathology	Repetition/Autopsy

PATHOPHYSIOLOGY

5th semester

	LECTURE (3 hrs/week)	**PRACTICE/SEMINAR (2 hrs/week)**
*	**Introduction to Pathophysiology; Basics of ECG**	Safety regulations. Review of physiologic background of circulation. Registration of ECG Determination of spirometric parameters.
*	**Inflammation I.:** Definition, causes and forms of inflammation. Mediators of acute inflammation.	Review of physiologic background of normal ECG. Registration and analysis of ECG Determination of spirometric parameters. (Lecture topic of the 1st week).
*	**Inflammation II.:** Cellular elements of acute inflammation. Regulation and outcome of acute inflammation.	**Seminar:** Inflammation I. (Lecture topic of the 2nd week).
*	**Inflammation III.:** Chronic inflammation. Local and generalized reactions of inflammation: fever, inflammatory pain.	**Seminar:** Inflammation II. (Lecture topic of the 3rd week).
*	**Pathophysiology of leukocytes I.:** **Immunology I.:** *In vivo* allergic reactions, autoimmunity, immunodeficiencies, oncogenesis. **Arrhythmia I.:** Development, mechanisms and classification of arrhythmias. Premature beats.	**Seminar:** Inflammation III. (Lecture topic of the 4th week).
*	**Endocrinology I.:** Diseases of hypothalamus, adenohypophysis, thyroid, and adrenal (cortex and medulla) glands.	**Seminar:** Pathophysiology of leukocytes I.: Immunology Arrhythmias I.(Lecture topic of the 5th week)
*	**Endocrinology II.:** Male and female reproductive endocrinology. Diseases of neurohypophysis and parathyroid glands. Hypo- and hypercalcemias. **Arrhythmia II.:** Bradyarrhythmias and blocks.	**Seminar:** Endocrinology I. (Lecture topic of the 6th week).
*	**Starvation and obesity. Diabetes mellitus I**: definition, diagnosis and classification.	**Seminar:** Endocrinology II. Arrhythmias II. (Lecture topic of the 7th week).

*	**Diabetes mellitus II:** Type 1 and 2 diabetes mellitus pathogenesis and consequences. Hypoglycemia. **Arrhythmia III.**: Tachyarrhythmias.	**Seminar:** Starvation, obesity Diabetes mellitus (Lecture topic of the 8thweek).
*	**Cardiovascular system I.:** Pathophysiology of plasma lipoprotein metabolism. Atherosclerosis (development and consequences).	**Seminar:** Diabetes mellitus, hypoglycemia. Arrhythmias III. (Lecture topic of the 9th week).
*	**Cardiovascular system II.:** Pathophysiology and ECG of acute coronary syndromes: angina pectoris, myocardial infarction, sudden ischemic death.	**Seminar:** Cardiovascular system I. (Lecture topic of the 10th week).
*	**Cardiovascular system III.:** Hypertension (essential & secondary) development, risk factors and consequences. Congenital heart diseases I.	**Seminar:** Cardiovascular system II. **ECG:** Myocardial ischemia, injury and infarction (Lecture topic of the 11th week).
*	**Cardiovascular system IV.:** Congenital heart diseases II. Adaptation of the heart, hypertrophy. Mitral, aortic stenosis and regurgitation. Compensated and decompensated heart function, left, right and combined heart failure.	**Seminar:** Cardiovascular system III. (Lecture topic of the 12th week). **ECG**: Hypertrophy and repetition of ECG
*	**Peripheral circulatory diseases:** Volume depletion. Syncope. Circulatory shock (development, stages). Multiple organ dysfunctions in shock. Hypotension.	**Seminar:** Cardiovascular system IV. (Lecture topic of the 13th week).

6th semester

	LECTURE **(3 hrs/week)**	**PRACTICE/SEMINAR** **(2 hrs/week)**
*	**Pathophysiology of kidney diseases I.:** Kidney stones. Polyuria, oliguria and anuria. Acute renal failure and tubulointerstitial nephropathies.	Safety regulations. **Seminar:** Thermoregulation. (Please download and study the material from our website or coospace, before class).
*	**Pathophysiology of kidney diseases II.:** Major glomerular diseases: nephrotic and nephritic syndrome, RPGN, asymptomatic and chronic GN. Chronic renal failure. Tubular transport diseases. **Pathophysiology of salt-water balance I.** hyper- and hyponatremia	**Seminar:** Kidney diseases I., Pathophysiology of salt-water balance I. (Lecture topic of the 1st week) **In the practice room:** Investigation of urine and renal function: proteinuria, hematuria, pyuria, hemoglobinuria, ketone bodies, urobilinogen, urine sediment and casts.
*	**Pathophysiology of salt-water balance II.** Volume excess, development of edemas. Changes of potassium, calcium, magnesium, phosphate, chloride and trace elements under pathological conditions; ECG signs of electrolyte disturbances.	**Seminar:** Pathophysiology of salt-water balance I (Lecture topic of the 2nd week) **In the practice room:** Investigation of urine and renal function: proteinuria, hematuria, pyuria, hemoglobinuria, ketone bodies, urobilinogen, urine sediment and casts.

*	**Pulmonary diseases I:** Abnormal breathing patterns, dyspneas. Obstructive pulmonary diseases: CODP, asthma bronchiale, cystic fibrosis, bronchiectasis, bronchiolitis acuta.	**Seminar:** Pathophysiology of salt-water balance II (Lecture topic of the 3rd week)
*	**Pulmonary diseases II:** Restrictive pulmonary diseases**,** hypoxias, disorders of pleura, pulmonary edema, hypertension, embolisation, hypoxic conditions, respiratory failure. Cor pulmonale.	**Seminar:** Pathophysiology of pulmonary diseases I. (Lecture topic of the 4th week).
*	**Disturbances of acid-base metabolism:** Laboratory changes in acid-base diseases. Respiratory acidosis and alkalosis. Normo- and hyperchloremic metabolic acidosis. Chloride responsive and non-responsive metabolic alkalosis.	**Seminar:** Pathophysiology of pulmonary diseases II. (Lecture topic of the 5th week).
*	**Gastrointestinal diseases I.:** Nausea, vomiting, dysphagia. Abnormalities of gastric juice secretion, peptic ulcer.	**Seminar:** Disturbances of acid-base metabolism (Lecture topic of the 6th week).
*	**Gastrointestinal diseases II.:** Diseases of absorption**,** diarrhea, constipation: Irritable bowel syndrome. Intestinal obstruction. Acute and chronic pancreatitis.	**Seminar:** Gastroenterology I. (Lecture topic of the 7th week).
*	**Diseases of liver and biliary tract:** Abnormal liver function. Diseases of bilirubin metabolism: hemolytic, hepatocellular and obstructive jaundice. Cirrhosis hepatic. Liver failure. Alcoholic, immune and genetic liver diseases. Cholelithiasis.	**Seminar:** Gastroenterology II. (Lecture topic of the 8th week).
*	**Pathophysiology of leukocytes II.:** Leucopenia. Proliferative diseases: reactive and malignant diseases (leukemias, lymphomas).	**Seminar:** Pathophysiology of liver diseases (Lecture topic of the 10th week).
*	**Red blood cell diseases I.:** Anemias - ineffective erythropoesis, blood loss, hemolysis.	**Seminar:** Pathophysiology of leucocytes II. (Lecture topic of the 11th week)
*	**Hemostasis:** Bleeding disorders (platelet, vascular, clotting factor disturbances), thrombosis and embolism.	**Seminar:** Anemias (Lecture topic of the 12th week). **In the practice room:** Determination of WBC, RBC, platelet, eosinophyl and reticulocyte count. Staining and analysis of blood smear.
*	**Pathophysiology of the CNS I.:** Multiple sclerosis, neurodegenerative diseases: Alzheimer's, Parkinson's and Huntington's disease. Circulatory diseases of the CNS.	**Seminar:** Hemostasis (Lecture topic of the 13th week). **In the practice room:** Determination of WBC, RBC, platelet, eosinophyl and reticulocyte count. Staining and analysis of blood smear.
*	**Pathophysiology of the CNS II.:** Cerebral edema. Pain, headaches, seizures and epilepsy.	**Seminar:** Pathophysiology of the CNS. (Lecture topic of the 14th week).

ADVANCED SURGICAL SKILLS

5th, 6th, 7th, 8th, 9th or 10th semester

	LECTURE (2 hrs/week)	**PRACTICE (4 hrs/gr./every 2nd week)**
*	Laparotomy I. Abdominal pain. History of abdominal surgery. Technical background and basic principles of abdominal incisions. Anatomy, vessels and nerves of the abdominal wall. Factors affecting wound healing. Prevention of wound complications. Surgical intervention: anesthesia, positioning, skin preparation, draping, incisions, supplies	Scrubbing. Basic knotting and suturing techniques. (2 hours) (Surgical theatre, computer room)
*	Laparotomy II. Abdominal incisions. Major types, characteristics, advantages, disadvantages. Wound dehiscence (characteristics, types, repair). Basic gastrointestinal operations. Appendectomy (history, anatomy). Open appendectomy. Laparoscopic appendectomy.	Advanced suturing techniques. Would closure techniques with multiple layers. Enterotomy. Intestinal anastomosis. (2 hours) (Surgical theatre)
*	Advances suturing methods. Anastomoses (types, factors influencing healing). Anastomosis techniques. Intestinal anastomoses. Indications, principles and steps of bowel resection and anastomosis. Mechanical anastomosis – staplers. Postoperative care. Conicotomry. Tacheostomy.	The Minor Skin Procedures computer program. Local anesthesia. Ellipse excision of skin. Removal of encapsulated structures (cysts, tunors). Incision of abscesses. Minimally invasive surgery. (4 hours) (Surgical theatre, computer room)
*	Surgical hemostasis. Basics of vascular surgery. Fast tract surgery. Itraoperative endoscopy.	
*	Minimally invasive surgery I. Technical background. Equipments and instruments. Robotic and fetoscopic surgery	Advanced forms of surgical hemostasis and suturing techniques on a large animal model. Tracheostomy. Laparotomy. (4 hours) (Surgical theatre)
*	Minimally invasive surgery II. Pneumoperitoneum (pathophysiology, complications, diagnosis, treatment). Gastro-enteroanastomoses. Laparoscopic surgery. Laparoscopic cholecystectomy	

BASICS OF EMERGENCY MEDICINE

6th semester

	LECTURE (2 hrs/week)	**PRACTICE (4 hrs/gr./every 2nd week)**
*	Bioinstrumentation. Bioengineering. Medical devices (risk classes, therapeutic and monitoring devices). Basic metrology. Types, categories and definitions of measurements. Monitoring (guidelines, monitor categories). Non-invasive cardiovascular monitoring. Clinical observations. Pulse examination, indirect blood pressure measurement, pulse pressure, electrocardiography, pulse-oximetry. The Doppler-technique: flowmetry, echocardiography	Injections. Puncture and cannulation of veins (braunule). Taking blood samples. Venous cut-down *ex vivo*. The Seldinger technique. Practising on phantoms and a Virtual Reality simulator (Cathsim). Fluid therapy in practice. Infusions, infusion pumps

*	Invasive cardiovascular monitoring. Direct (invasive) blood pressure measurements: arterial pressure, central venous pressure, pulmonary artery pressure (sites for cannulation, Seldinger technique, Swan-Ganz catheter, methods, equipment, indications, complications). Blood flow, cardiac output measurements. Oxygen delivery, saturation and consumption measurement (central and mixed venous O_2). Heart contractility	Injections. Puncture and cannulation of veins (braunule). Taking blood samples. Venous cut-down *ex vivo*. The Seldinger technique. Practising on phantoms and a Virtual Reality simulator (Cathsim). Fluid therapy in practice. Infusions, infusion pumps
*	Monitoring of respiration and gas exchange. Clinical respiratory patterns. Spirometry. Airway gas (CO_2) monitoring (capnography, capnometry). Air embolism, pulmonary embolism (diagnosis, prevention, treatment)	Invasive cardiovascular monitoring. Securing of central vein (dissection of veins, introduction of central venous catheter using the Seldinger technique). Measurement of central venous pressure. Dissection of arteries, direct measurement of arterial pressure. Determination of cardiac output using the transpulmonary thermodilution method. Arterial blood flow measurements. Monitoring of pulmonary circulation. Introduction of Swan-Ganz catheter into the pulmonary artery, pressure measurements. Thermodilution cardiac output measurement with the aid of Swan-Ganz catheter
*	Monitoring of oxygenation and hypoxia. Inadequate external respiration, O_2 transport, internal respiration. Hypoxemia, tissue hypoxia, subcellular hypoxia (etiology, pathophysiology, clinical signs and symptoms). Tissue oxygenation and wound healing. Clinical assessment of tissue hypoxia. Diagnostic assessment of oxygen delivery, extraction, requirement and consumption. Monitors of hypoperfusion-associated hypoxia and tissue oxygenation (tissue oxymeter, Clark electrode, near infrared spectroscopy); organ perfusion (macrocirculation: angiography and flowmetry; microcirculation: intravital microscopy, orthogonal polarization spectral imaging) and mucosal pCO_2 (clinical tonometry). Blood acid-base status, blood gas analysis. Extracorporal membrane oxygenation	Invasive cardiovascular monitoring. Securing of central vein (dissection of veins, introduction of central venous catheter using the Seldinger technique). Measurement of central venous pressure. Dissection of arteries, direct measurement of arterial pressure. Determination of cardiac output using the transpulmonary thermodilution method. Arterial blood flow measurements. Monitoring of pulmonary circulation. Introduction of Swan-Ganz catheter into the pulmonary artery, pressure measurements. Thermodilution cardiac output measurement with the aid of Swan-Ganz catheter
*	Monitoring of urinary system. Catheters. Analysis of urine. Blood laboratory parameters indicating renal function. Imaging techniques. Urinary bladder pressure. Monitoring of central nervous system. Measurement of intracranial pressure (ICP), cerebral blood flow and cerebral perfusion pressure. Increased ICP (etiology, pathology, diagnosis, treatment). Monitoring of temperature (sites, methods). Hyperthermia, hypothermia (pathophysiology, clinical signs, treatment)	Complex monitoring. Monitoring of respiratory system. Endotracheal intubation; monitoring of respiratory rate, rhythm and airway gases (capnography, capnometry). Pulse oxymetry. Blood gas analysis. Mechanical ventilation. Monitoring of gastrointestinal tract. Indirect (gastric, intestinal and sublingual) tonometry. Monitoring of microcirculation (intravital videomicroscopy, orthogonal polarization spectral imaging). Monitoring of urinary system. Catheterization of the urinary bladder (male, female)

*	Monitoring of gastrointestinal tract. Measurement of intrabdominal pressure (direct, indirect methods; intravesical pressure), abdominal compartment syndrome (etiology, pathopysiology). Monitoring of nutrition (anamnesis, clinical assessment, anthropometry, laboratory analysis, calorimetry). Feeding (indications, nutrients). Enteral feeding. Gastric intubation, nasogastric and orogastric tubes (types, indications, contraindications, tube insertion). Gastrostomy, jejunostomy. Feeding formulas, methods, complications. Parenteral feeding. Indications, nutrient solutions, complications (postagression syndromes). Enemas, laxation	Complex monitoring. Monitoring of respiratory system. Endotracheal intubation; monitoring of respiratory rate, rhythm and airway gases (capnography, capnometry). Pulse oxymetry. Blood gas analysis. Mechanical ventilation. Monitoring of gastrointestinal tract. Indirect (gastric, intestinal and sublingual) tonometry. Monitoring of microcirculation (intravital videomicroscopy, orthogonal polarization spectral imaging). Monitoring of urinary system. Catheterization of the urinary bladder (male, female)
*	Written test exam	Practical exam

MICROSURGERY

5th, 6th, 7th, 8th, 9th or 10th semester

	LECTURE (TOTAL: 8 hrs)	**PRACTICE (TOTAL: 20 hrs)**
*	General information. introduction to microsurgery (1 hrs)	Appropriate posture at the operating microscope and the adjustment of the microscope. Movement coordination of the hands: interlacing threads under microscope (1 hr)
*	Indications of microsurgery. Clinical applications of microsurgery I. (2 hours)	Tying basic microsurgical knots under macroscopic and microscopic conditions (2 hrs)
*	Clinical applications of microsurgery (2 hrs)	Stitching and tying knots with microsurgical instruments on rubber gloves (3 and 2 hrs)
*	The operating microscope (1 hr)	Suture of tubes (2 x 3 hrs)
*	Basic suturing techniques, sutures of vessels and nerves (2 hrs)	End-to-end anastomosis of rat carotid artery *ex vivo* (2 x 3 hrs)

MOLECULAR MEDICINE

5th semester

	LECTURE (2 hrs/week)
*	Molecular genetic and cell biology methods in diagnosis and therapy.
*	Diagnostic methods based on immunologic techniques (RIA, ELISA, Western blot analysis, immunocytology, citotoxicity tests, etc.).
*	Diagnostic methods beased on nucleic acid hybridization (Northern and Southern analysis, in situ hybidization, DNA chip technology, etc.).
*	Diagnostic methods based on specific endonuclease activity (fragment length polymorphism, pedigree analysis, etc.).
*	Gene sequencing and analysis, genomic and proteomic techniques, cell and tissue culture

	methods.
*	Antisense pharmacology. Small interfering RNA. Molecular chaperons.
*	Gene therapy, viral vectors, DNA-liposome complexes.
*	Molecular markers in human disorders.
*	Biomarkers for neurologic and psychiatric disorders.
*	Molecular interactions between pathogens and host.
*	Stem cell therapy. Embryonal and adult stem cells.
*	In vitro differentiation of stem cells to the desired phenotype. Transfection of stem cells.
*	Regulation of cell cycle and cell differentiation. Regulation of transcriptional and translational control of gene expression.
*	Telomerase-directed molecular therapy.
*	Immunotherapy. Antitumour immune responses.
*	Bioinformatic and computer-assisted methods in diagnosis and therapy: functional genomics and proteomics.

PATHOPHYSIOLOGICAL ASPECTS OF LABORATORY MEDICINE

6th semester

	LECTURE (2 hrs/week)
*	Introduction to laboratory medicine Preanalytical processes, test requesting, sampling, common preanalytical errors Analytical processes: quality control, traceability of measurements, precision, biological variation, reference range, point of care testing. Postanalytical processes: interpretation of results, sensitivity, specificity, predictive values, pre- and post-test probability, clinically significant change values, alarming or critical values, evidence based laboratory medicine
*	Visit at the Department of Laboratory Medicine
*	Acid-base balance disorders
*	Laboratory diagnosis of coagulation disorders
	Basic coagulation tests, monitoring of anticoagulant therapy, testing for congenital and acquired thrombophilias
*	Laboratory diagnosis of sodium and water metabolism Hypo- and hypernatremia: causes and differential diagnosis, SIADH, diabetes insipidus, laboratory diagnosis of oedema. Effect of diuretics on sodium and water balance, disorders of osmolar regulation
*	Disorders of potassium metabolism Hypo-, and hyperkalemia: causes and differential diagnosis, diagnostic algorithms and treatment
*	Laboratory diagnosis of liver diseases
*	Endocrinology I. Laboratory diagnosis of disorders of endocrine regulation. Diseases of hypothalamus, hypophysis, thyroid and parathyroid glands.
*	Endocrinology II. Laboratory diagnosis of disorders of the adrenal gland and the reproductive system

*	Laboratory diagnosis of disorders of lipid metabolism Primary, and secondary hyperlipidemia, clinical significance of cholesterol, TG, HDL-C, LDL-C, classification of hyperlipidemias. Risks of atherosclerosis: clinical significance of ApoA, ApoB, Lp (a), homocystein, fibrinogen.
*	Laboratory diagnosis and monitoring of diabetes mellitus
*	Laboratory diagnosis of renal diseases Laboratory tests of glomerular and tubular functions, laboratory diagnosis of proteinuria, acute and chronic renal failure, nephrosis syndrome, differentiation of distal and proximal renal tubular acidosis
*	Laboratory diagnosis of myocardial infarction and acut coronary syndrome Classical markers: CK, LDH isoenzymes, myoglobin. New markers: Troponin I, Troponin T, significance of point of care testing, diagnostic algorithms.

BASIC SURGICAL SKILLS

4th semester

	LECTURE **(2 hrs/every 2nd week)**	**PRACTICE** **(2 hrs/gr./every 2nd week)**
*	Asepsis and antisepsis. Historical background. Surgical infections, sources of infections. Types, classification, risks and prevention of wound contaminations. Sterilization, disinfection. Preparation of the patient before operation: scrub preparation and isolation of the surgical site. Scrubbing, disinfection, gowning and gloving of the operating team. Personnel attire and movement. Basic rules of asepsis in the operating room. Postoperative wound management. Surgical antisepsis. Design and equipments of the operating room, basic technical background. Operating room personnel and their duties. Positioning of the patient on the operating table. Positioning.	1- 2. General information. Scrubbing, gowning and gloving. Practical rules of asepsis in the operating room. Behavior and movement in the operating room
*	Surgical instruments. Basic surgical instruments, special surgical tools and technologies, suture materials. Wound closure (sutures, clips, adhesive strips). Imperfections of suturing techniques. Removal of sutures. Drainage.	2 – 3. Basic surgical instruments, suture materials, textiles. Scrubbing, gowning and gloving. Scrub preparation and draping of the surgical site. Making incisions (on skin pad), wound closure with sutures or clips. Practicing instrument knots by means of the Suture Tutor program.
*	The operation. Basic surgical interventions. Indications for an operation, informed consent, operative risk, the surgeon's responsibility. Preoperative investigations. Preoperative preparation of the patient. Basics of minimally invasive surgical interventions. Historical background. Components of the laparoscopic tower, laparoscopic instruments. Local anesthesia (drugs, types of local anesthesia, complications). Perioperative fluid balance, fluid requirements and fluid therapy.	4 – 5. Tying surgical knots. Tying surgical knots (hand and instrument knots). Knotting under tension and in cavities.

*	Wounds. Types and classification of accidental wounds. Wound healing, scar formation. Surgical wounds. Wound closure and its complications. Management of accidental wounds. Dressings, types of bandages. Innovations in wound treatment.	6 – 7. Skin incision, handling bleeding, closing wounds in separate layers with sutures or with wound clips. Draining of wounds. Knotting with an instruments using the Suture Tutor program.
*	Bleeding. Types and classification of hemorrhage. Signs and consequences of blood loss. Bleeding in surgery (pre-, intra- and postoperative bleeding). Factors influencing operative blood loss. Surgical hemostasis (mechanical, thermal, chemical-biological methods). Blood replacement in surgery, autotransfusion.	8 – 9. Management of accidental wounds. Dressing, types of dressing. Changing dressing under aseptic conditions. Removal of sutures.
*	Complications. Definition and classification of complications. Complications of anaesthesia. Complications of wound healing. Complications related to surgery. Haemorrhagic complications. Pathophysiology, signs and treatment of hemorrhagic shock	10 – 11. Basics of minimally invasive surgery. Components of the laparoscopic tower, laparoscopic instruments. Eupractic movements, handling of laparoscopic instruments, knotting.
*		12 – 13. Practical exam. (1) Surgical scrubbing and gowning (2) Knotting under tension and in a deep cavity (3) Surgical suture (mounting of a needle holder, closure of a 5 cm-long incision with Donati-stitches, instrumental knotting (max. 15 min)

BASIC IMMUNOPATHOLOGY

6th semester

	LECTURE (2 hrs/every 2nd week)
*	General informations. Introduction to immunopathology. Transplantation immunology: transplantation antigens, allogeneic recognition, effector mechanisms of graft rejection
*	Histocompatibility testing. Immunological investigations before and after transplantation.
*	Immunosuppressive therapy
*	Immunology of organ transplantation. Immunology of bone marrow transplantation: graft-versus-host disease. Xenogeneic transplantation
*	Reproductive immunology
*	Tumor immunology: tumor antigens, antitumor immune responses. Evasion of immune responses by tumors. Immunotherapy for tumors
*	Immunological tolerance. Self tolerance: central and peripheral tolerance. Mehanisms of T and B cell tolerance
*	Pathomechanisms of autoimmunity: failure of self tolerance, genetic factors, role of infections and other factors; effector mechanisms. Systemic and organ specific autoimmune diseases
*	Written test exam

CEREBRAL BLOOD FLOW AND METABOLISM

5th semester

	LECTURE (2 hrs/week)
*	Introduction – requirements-general view
*	Methods for investigation of cerebral blood flow and metabolism
*	The physiology of the cerebrovascular smooth muscle
*	Regulation of the cerebrovascular tone * the role of the endothelium
*	Regulation of the cerebrovascular tone * the neural components
*	Regulation of the cerebrovascular tone * the metabolic components
*	Blood supply and basal metabolic processes in the brain
*	The neurovascular coupling
*	The transport to the brain-the blood brain barrier
*	The blood supply of the dura mater cerebri
*	The regulation of the cerebral blood flow in the neonate
*	Ageing and cerebral blood flow
*	Basic pathomechanism of the stroke
*	Exam

GERONTOLOGY

6th semester

	LECTURE/PRACTICE (1 hr/week, 1 hr/week)
*	General principles of geriatric medicine
*	History taking with elderly patients
*	Physical examination
*	Mental status examination
*	Evaluation of functional capacity in him elderly
*	Laboratory examination
*	Progressive constriction of each organ systems
*	Intellectual impairment
*	Immobility
*	Iatrogenic drug reactions
*	Community of care
*	Quality of life and therapeutic objectives
*	Legal and ethical issues
*	Care of the dying patient

CLINICAL MODULE

ANAESTHESIOLOGY AND INTENSIVE THERAPY

9th semester (Basics, anaesthesiology)

LECTURE/PRACTICE (2 hrs/week, 1 hr/week)	
1.	Introducing anaesthesiology and intensive therapy
2.	Applied physiology – I. Breathing, oxygen therapy
3.	Applied physiology – II. Circulation, circulation management
4.	Applied physiology – III. Acid-base balance, blood-gas analysis
5.	Monitoring airway, circulation, sleep in the operating room
6.	Methods of air flow management
7.	Fluid therapy – fluid resuscitation
8.	Assessment of operation hazards, preoperative preparation
9.	Respirator, respiratory system
10.	General anaesthesia, anaesthetics
11.	Regional anaesthesia, local anesthetics
12.	Postoperative patient care, postoperative complications, significance of PACU
13.	Postoperative and acute analgesia

10th semester (acute care, intensive therapy)

LECTURE/PRACTICE (2 hrs/week, 1 hr/week)	
1.	Theory of sudden death and resuscitation (BLS, ALS)
2.	Methods of invasive hemodynamic measurement
3.	The respirator
4.	Infection, infection control
5.	Severe sepsis, septic shock
6.	Acute respiratory dysfunction and ARDS
7.	Acute metabolic dysfunction and their treatment
8.	Recognition and treatment of acute cardiovascular diseases
9.	Low GCS, coma, brain death
10.	Basics of clinical nutrition
11.	Main aspects in the acute treatment of polytraumatized patient
11.	Acute treatment of intoxicated patient
12.	Chronic pain, pain clinic
13.	Recognition and acute treatment of multi-organ dysfunction

CLINICAL ONCOLOGY

7th semester

LECTURE (2 hrs/week)	
*	Cancer etiology, epidemiology. Tumor prevention
*	The basics of Radiotherapy
*	The importance of pathology and diagnostic imaging in oncology; AJC/UICC TNM system
*	Practical aspects of Radiotherapy
*	Medical therapies: chemotherapy, endocrine therapy, biological therapies
*	Supportive, palliative therapy and the holistic approach; psychooncology
*	Breast cancer and gynecological malignancies
*	The complex therapy of head and neck, oesophagus and gastric cancers
*	The complex therapy of liver, pancreas and colorectal tumors Genitourinary malignancies Lung cancer and mesenchymal tumors
*	Central nervous system, childhood and skin malignancies
*	Multidisciplinary team-work
*	EXAM

DERMATOLOGY

9th semester

	LECTURE (3 hrs/week)	**PRACTICE (2 hrs/week)**
*	Introduction. The anatomy and physiology of the skin. Types of skin lesions.	Examination of patients with dermatological diseases. Case presentations.
*	Basic immunpathologic reactions. Urticaria. Drug allergy.	Primary and secondary lesions. Case presentations.
*	Atopic dermatitis. Contact der-matitis and other eczematous reactions. Viral diseases.	Special tools and techniques in Dermatology (Wood-lights, diascopy, dermatoscopy) Case presentations.
*	Bacterial diseases with cutan involvement. Fungal diseases with cutaneous involvement.	Special tests in Dermatology I.In vitro and in vivo (skin) tests in allergic disorders. Case presentations.
*	Tuberculosis of the skin. Sexually transmitted diseases. Syphilis. Gonorrhoea.	Special tests in Dermatology II. Diagnosis of infectious diseases. Case presentations.
*	AIDS. Scabies, pediculosis. Tropical skin diseases.	Special tests in Dermatology. Diagnosis and treatment of STD. Case presentations.
*	Psoriasis. Papulosquamosus diseases. Thermally injured skin.	Special tests in Dermatology III. Diagnosis of autoimmune diseases. Case presentations.
*	Vesiculobullosus diseases. Acne, rosacea, perioral dermatitis.	Skin biopsy, histological examinations in Dermatology. Case presentations.

*	Disorders of collagen and tissue. Vasculitis, purpuric conditions.	Topical therapy in Dermatology. Case presentations.
*	Cutaneous manifestations in metabolic disorders. Benign malign tumours of the skin.	Physical therapies in Dermatology I. Surgical excision, currettage, electrodessication, cryotherapy, radiotherapy. Case presentations.
*	Tumours of mesodermal origin. Melanoma malignum. Differential diagnosis of pigmented lesions.	Physical therapies in Dermatology II. Phototherapy, lasertherapy. Case presentations.
*	Disorders of the vasculature. Granulomas. Disorders with abnormal keratinization. The skin in systemic disease.	Physical therapies of venous and lymphatic insufficienties. Case presentations.
*	Disorders of the hair and nails. UV-induced dermatoses. Laser therapy in dermatology.	Systemic therapy in Dermatology. Case presentations.
*	Local therapy in dermatology. Systemic therapy in dermatology. Dermatosurgery.	Case presentations and discussions.

FORENSIC MEDICINE

9th semester

	LECTURE (1 hr/week)	**PRACTICE (2 hrs/week)**
1.	Introduction. Essential law	Time of death Changes after death
2.	-	How to fill out a death certificate?
3.	What to do with a dead body? Recommendation on autopsy rules	Autopsy
4.	-	Hystology (vitality signs)
5.	Types of injuries I. (blunt force, sharp object injuries)	Classification of wounds
6.	-	Autopsy
7.	Types of injuries II. (heat, cold, shot wounds)	Scene investigation, sample collection
8.	-	Toxicology
9.	**Fall break**	
10.	Midterm demonstration (written) Scientific session	Autopsy
11.	Forensic psychiatry	Poisoning
12.		Suicide
13.	Forensic aspects of alcohol consumption	Autopsy
14.		Consultation
15.	Asphyxia, drowning	Supplementary practice

10th semester

	LECTURE (2 hrs/every second week)	PRACTICE (2 hrs/week)
1.	Traffic accidents I.	Hystology (sudden death in adults)
2.	**-**	Toxicology
3.	Traffic accidents II.	Autopsy
4.	**-**	Malpractice
5.	Forensic aspects of drug abuse	Reconstruction of accidents and criminal cases
6.	**-**	Autopsy
7.	Medical duties in relation to custody	Midterm demonstration
8.	**-**	Visit in the county jail
9.	Social insurance systems	Use of DNA in forensic medicine
10.	**Spring break**	
11.	Identification of the living and of the dead	Autopsy
12.	**-**	Identification
13.	Sexual offences. Battered child, infanticide	Assessment of working ability and disability
14.	**-**	Autopsy
15.	Consultation	Autopsy

INTERNAL MEDICINE

7th semester

	LECTURE (5 hrs/week)	PRACTICE (2 hrs/week)
*	Echocardiography	Methods in echocardiography, reading an echocardiographic record.
*	Infective endocarditis. Tumors of the heart	Taking the case history the physical examination.
*	Hypertension in cardiologic aspect. Aortic dissection	Performing percussion, auscultation.
*	Aortic stenosis +Aortic incompetence.	Performing percussion, auscultation.
*	Mitral stenosis + Mitral incompetence	Performing percussion, auscultation.
*	Tricuspid stenosis and incompetence. Combined valvular heart disease. Prosthetic valve.	Performing percussion, auscultation.
*	Rheumatic fever. Myocardtitis and pericarditis	The physical findings of rheumatic fever and inflammatory diseases.
*	Adult congenital heart diseases	Performing percussion, auscultation.
*	Hypertrophic and dilatative cardiomyopathy: diagnosis and treatment	Performing percussion, auscultation. The physical findings of cardiomyopathies.
*	Electrocardiography	Reading ECG records.
*	Cardiac arrhythmias	Reading ECG records learning modern antiarrhythmic treatment and procedures.
*	Ischemic heart diseases	Non invasive and invasive technics in the diagnosis of ischemic heart disease.
*	Invasive diagnostic and theraputic methods in cardiology	Non invasive and invasive technics in the diagnosis of ischemic heart disease.

*	Restrictive and obliterative cardiomyopathy. Chronic heart failure	Performing percussion, auscultation. The physical findings of cardiomyopathies and chronic heart failure.
*	Pulmonary embolism. Pulmonary hypertension.	Physical findings of pulmonary embolism and hypertension.
*	Cardiac rehabilitation	Possibilities in rehabilitation program.
*	Special cardiac conditions: women, athletics, elders. Cardiac risk stratification in non cardiac surgery	Non invasive and invasive technics in cardiology.
*	Acute heart failure. Failure of periferial circulation	The signs and treatment of heart failure and periferial circulation disturbances.
*	Revascularization in cardiac surgery	Visiting at operation theatre.
*	Basic hematology	Evaluation of laboratory data
*	Anemias	Inspection of patients with anaemia
*	Anemias. Hemolytic anemia	Microscopic evaluation of red cells morphology
*	Pancytopenias (Myelodysplastic	Bone marrow smears examination, physical signs of pancytopenic patients
*	syndromes. Aplastic anemia)	
*	Acut leukemia	Examination of blood and bone marrow smears with acute leukemias
*	Stem cell transplantation	Discussion of indications for stem cell transplantation
*	Myeloproliferative diseases	Palpation of spleens and enlarged livers
*	Malignant lymphomas.	Lymp nodes palpation
*	(Classification, Hodgkin disease)	
*	Aggressive lymphomas	Examination of blood and bone marrow smears with lymphomatic infiltration
*	Malignant lymphomas.	X ray consultation, physical examinations
*	(Indolent lymphomas, multiple myeloma)	
*	Coagulation abnormalities. (Thrombophilias)	Bleeding manifestations

8th semester

	LECTURE (5 hrs/week)	**PRACTICE (2 hrs/week)**
*	Investigative methods	Problem oriented evaluation of the symptoms of patients with esophageal disorders
*	Nephrosis syndrome, non proliferative glomerulonephritises Proliferative glomerulonephritises	Practical aspects of the functional evaluation of patients with esophageal disorders (esophageal manometry, 24 h pH-metry, evaluation of the biliary reflux)
*	Hypertension I: etiology and pathomechanism Renal failure (acute, chronic, dialysis treatment)	Upper gastrointestinal endoscopy
*	Hypertension II: therapy and complications Tubulointerstitial nephritis (bacterial, non bacterial), polycystic kidney disease	Symptomatic evaluation of the liver patient. Problem oriented laboratory investigation of the liver patient.
*	Renal involvement in systemic diseases, kidnes neoplasias Pregnancy and nephropathy	Symptoms of biliary obstruction, investigative methods for patients with biliary obstruction (symptoms, biochemistry, ultrasonography, ERCP)
*	Hyperlipidaemia Diabetes mellitus	Symptoms of patients with acute pancreatitis Diagnostic work up of patients with acute pancreatitis
*	Diabetes mellitus (acute and chronic complications)	Diagnostic work up of patients with chronic pancreatitis and pancreatic cancer

	Diabetes mellitus (therapy) Introduction to endocrinology. Endocrine regulation. Anterior pituitary	Diagnostic work up of patients with CU and Crohn's disease.
*	Neurohypophysis	
*	Thyroid: developmental errors, inflammation, normofunctional goiter, tumors	Early identification of patients with colorectal cancer. Diagnostic methods.
*	Thyrotoxicosis	
*	Hypothyroidism	Symptoms of malabsorption, maldigestion, Diagnostic workup: Hydrogen, c13 urea and starch breath tests
*	Spring Holiday	Practical aspects of the diagnosis and therapy of patients with diabetes mellitus; the patient education.
*	Parathyroid disorders	
*	Adrenal cortex: hypadrenia	Practical aspects of insulin therapy. Treatment of dyslipoproteinemias
*	Adrenal cortex: Cushing and Conn	
*	Obesity	Physical examination of patients with rheumatoid diseases
*	Hypogonadism	
*	Multiple endocrine neoplasias, paraneoplastic endocrinopathies,	
*	polyglandular autoimmune syndrome, Carcinoid syndrome	
*	Adrenal cortex: adrenogenital syndrome	
*	Osteoporosis	
*	Consultation	

INTERNAL MEDICINE: INFECTIOLOGY

9th semester

	LECTURE (2 hrs/week)	**PRACTICE (2 hrs/week)**
*	Introduction. History, principles, classification of infectious diseases. Antibiotic prophylaxis, antibiotic policy	History, principles, distribution of infectious diseases. Epidemiological problems. Pathogenetic agents.
*	Tropical diseases	Pathophysiology and diagnosis of infectious diseases.
*	Infection control	Infections of the respiratory organs.
*	Exanthematous infectious diseases	Infections of the gastrointestinal tract
*	Gastrointestinal and abdominal infections	Neuroinfections
*	Sexually transmitted, gynecologial and urinary tract infections	Hepatitis
*	Infections of the respiratory organs	AIDS
*	Antropozoonoses, Bioterrorism	Sepsis
*	Joint and bone infections. Fungal infections.	Prevention of infectious diseases
*	Cardiovascular infections. Infections and their prophylaxis during interventions.	Exanthematous infectious diseases

*	Neuroinfections. Skin and soft tissue infections.	Antropozoonoses (Lyssa, Brucellosis, Tularemia etc.)
*	Infections in immunosuppression. AIDS. Vaccination.	Antimicrobal therapy
*	Sepsis, septic shock	Nosocomial infections
*	Antimicrobal therapy, antibiotic policy	Tropical diseases

10th semester

	LECTURE (2 hrs/week)	**PRACTICE (total 16 hrs)**
*	Degenerative diseases of the spine, gout	Medical thinking, general principles of differential diagnostics
*	Spondylarthritis	Differential diagnostics of diarrhea and constipation
*	Rheumatoid arthritis	Differential diagnostics in patients with abdominal pain
*	Systemic lupus erythematodes, antiphospholipid sy., principles of immunsuppressive therapy	Differential diagnostics of ascites
*	Fever, ion abnormalities	Differential diagnostics of occult and manifest gastrointestinal bleedings
*	Sjögren's syndrome, myositises, systemic sclerosis (scleroderma)	Differential diagnostics of jaundice
*	Edema, hematuria, proteinuria	Differential diagnostics of the gastrointestinal motility disorders
*	Cyanosis, dyspnea	differential diagnostics of hypertension
*	Chest pain, syncope	differential diagnostics of chest pain and syncope
*	Spring Holiday	differential diagnostics of edema, cyanosis, dyspnoe
*	Anaemia, lymphadenomegaly, hematologic disorders	differential diagnostics of anaemias and lymph node enlargement
*	Abdominal pain, acute abdomen	differential diagnostics in patients with renal diseases
*	National holiday	selected differential diagnostic problems, consultation
*	Jaundice, ascites	selected differential diagnostic problems, consultation
*	Diarrhoea, constipation, GI motility disorders	

MEDICAL PSYCHOLOGY II.

7th semester

LECTURE/PRACTICE
(1 hr/week, 1 hr/week)

*

Introduction. Body – Mind
Psycho-neuro-immunology, Psychosomatic Perspective
Personality Disorders
Psychological Aspects of Somatic Disorders
Psychooncology, Psychological factors
Death – Dying – Grief
Suggestion – Persuasion
Communication Problems and Medical Decision Making
Communication in Pediatric Care
Psychological Interventions I.
Psychological Interventions II.
Psychological Interventions III.
OFFICIAL BREAK

*	**Topics of practice**	
	Week 1.	Technical briefing
	Week 2.	Psychosocial factors and family background as causes of morbidity and health risks
	Week 3.	Communication with relatives and friends of the patient. Problems with referring patients to psychiatrist, psychologist
	Week 4.	Communication with aggressive patient
	Week 5.	Psychological aspects of helping chronic patients. Patients in crisis.
	Week 6.	Breaking bad news
	Week 7.	Difficulties in the medical team-work. The drawbacks of hierarchy. Summary

NEUROLOGY

9th semester

	LECTURE **(1 hr/week)**	**PRACTICE** **(2 hrs/week)**
*	a. Introduction. History of neurology. b. Physical examination. Neurological status.	Neurological investigation related to the lecture
*	a. The organization of the sensory system. b. Pain.	Neurological investigation related to the lecture
*	The organization of the motor system.	Neurological investigation related to the lecture
*	Spinal cord. Neurological localization.	Neurological investigation related to the lecture
*	Brainstem. Neurological localization.	Neurological investigation related to the lecture

*	Cerebellum. Neurological localization.	Neurological investigation related to the lecture
*	Cerebral cortex. Frontal lobe. Neurological localization.	Neurological investigation related to the lecture
*	Temporal lobe. Neurological localization.	Neurological investigation related to the lecture
*	a./ Parietal and occipital lobes. Neurological localization. b./ Vegetative nervous system.	Neurological investigation related to the lecture
*	Cerebrospinal fluid. Diagnostic methods.	Neurological investigation related to the lecture
*	Neurovascular system. Neurological localization.	Neurological investigation related to the lecture
*	Extrapyramidal system. Neurologicallocalization.	Neurological investigation related to the lecture
*	a./ Electrical activity and examination of muscles and nerves b./ Modern neuroradiological diagnostic methods.	Neurological investigation related to the lecture
*	Review of basic neurology knowledge	Neurological investigation related to the lecture

10th semester

	LECTURE (1 hr/week)	**PRACTICE (1 hr/week)**
*	Cerebrovascular disorders I.	Neurological investigation related to the lecture
*	Cerebrovascular disorders II.	
*	Epilepsies. Epilepsies. Sleep disturbances.	Neurological investigation related to the lecture
*	Muscle and motoneuron disorders.	Neurological investigation related to the lecture
*	Neuroinflammatory disorders.	
*	Multiple sclerosis	
*	Extrapyramidal disorders I.	
*	Extrapyramidal disorders II.	Neurological investigation related to the lecture
*	Intensive neurology. Tumors of the central nervous system.	Neurological investigation related to the lecture
*	Neurorehabilitation.	
*	Diagnosis and treatment of headaches.	Neurological investigation related to the lecture
*	Pathomechanism of neurodegenerative disorders.	
*	Dementias. Neurology in general medical practice. Novel therapies in neurology.	Neurological investigation related to the lecture

OBSTETRICS AND GYNAECOLOGY

7th semester

	LECTURE (3 hrs/week)	**PRACTICE (2 hrs/week)**
*	Introduction. Concepts of obstetrics and gynaecology and its role in modern medicine. Historical review.	Prenatal care. Obstetrical history, physical examination.
*	Development and function of the placenta. Development of the fetus.	Pregnancy tests
*	Endocrinology of pregnancy.	Induction of labour
*	Obstetrical anatomy. Diagnosis of pregnancy.	Ultrasonography
*	Genital and extragenital changes during pregnancy.	Follow up examinations during pregnancy
*	Signs of the fetal life. The mature placenta, umbilical cord, membranes and amniotic fluid.	Genetics, CVS, AC, Cordocentesis
*	Intrauterine position of the fetus.	Preparation for labour
*	Antenatal care and examinations.	CTG, OCT, AS, X ray
*	Normal mechanism of labour.	Normal delivery
*	Patient care during labour.	Induced abortion. Surgical aspects.
*	Pharmacokinetics in pregnancy. Registration of the uterine activity.	Forceps delivery, vacuum extraction
*	Diseases of the trophoblast.	Breech presentation
*	Monitoring of the fetus and placenta.	Postpartal hemorrhage
*	Physiology of the uterus.	Caesarean section
*	Obstetrical ultrasonography.	
*	The newborn. Care and management. The puerperium.	
*	Abortion.	
*	Ectopic pregnancy.	
*	EPH-gestosis.	
*	Breech presentation and delivery.	
*	Multiple pregnancy.	
*	Premature labour.	
*	Management of delivery. Induction of labour.	
*	Intrauterine death. Postmaturity. Dysmaturity.	
*	Alternative delivery methods.	

8th semester

	LECTURE (3 hrs/week)	**PRACTICE (2 hrs/week)**
*	Uterine rupture, postpartal haemorrhage, abnormal puerperium.	Gynaecological history taking, physical and pelvic examinations.
*	Causes of 3rd trimester bleeding (premature separation of the placenta, DIC, plac. praevia).	Screening methods for cervical cancer: cytology.
*	Dysmaturity. Hyperemesis.	Screening methods for cervical cancer: colposcopy.
*	Erythroblastosis fetalis.	Curettage, cervical biopsy, electrocauterisation, conisation.
*	Dystocia (difficult labor) pelvic dystocia due to uterine dysfunction, dystocia of fetal origin, dystocia of placental origigin.	Female infertility, diagnostic procedures.
*	Infectious diseases and pregnancy.	Infertility study of the male partner.
*	Respiratory, renal, neurologic, endocrine and metabolic diseases.	Labor procedures of infertility.
*	Benign tumors of the uterus.	Conception control.
*	Diseases of the cervix. Cancer screening.	Endoscopy.
*	Pelvic inflammatory diseases. Diseases of the Fallopian tube.	Abdominal gynaecological operations.
*	Medical complications during pregnancy. (Heart, haematologic, gastrointestinal diseases.)	Vaginal surgical procedures.
*	Genetic disorders.	Adolescent gynaecology.
*	Birth control. Contraception.	Physiotherapy in gynaecology.
*	Abnormalities of the menstruation.	Radio- and chemotherapy.
*	Climacteric.	Psychosexual diseases.
*	Ethical aspects of Obstetrics-Gynaecology.	
*	Endometriosis.	
*	Assisted fertilization in the female.	
*	Gynaecological endoscopy.	
*	Infertility of the female.	
*	Benign ovarian tumors.	
*	Malignant ovarian tumors.	
*	Adolescent gynaecology.	
*	Infertility of the male.	
*	Diseases of the vulva and vagina.	

OPHTALMOLOGY

10th semester

	LECTURE (2 hrs/week)	PRACTICE (2 hrs/week)
*	The eye and systemic diseases	General Practical
*	Essentials of anatomy and physiology, Optics and refraction	General Practical
*	The lids and the lacrimal system, The conjuctiva	General Practical
*	The cornea, The lens	Angiography and laser therapy
*	The iris, The choroid	Pediatric ophthalmology
*	The retina	Contact lens
*	The vitreous, Retinal detachment	Ultrasound in ophthalmology
*	Optic nerve diseases, Neuroophthalmology	Elektrophysiology
*	Strabismus, The child with suspected eye disease	MTO
*	Glaucoma, The Sclera, the orbita	Eximer laser surgery
*	Acute painless visual disturbance, Chronic loss of vision	General Practical
*	Chronic ocular unease, The acute red eyes	General Practical
*	Ocular injuries	General Practical
*	Ophthalmology through on the world	General Practical

ORTHOPAEDICS

7th semester

	LECTURE (2 hrs/week)	PRACTICE (2 hrs/week)
*	Field of orthopaedics, history. Diagnosis and treatment of orthopaedic disorders.	The course of the examination of the patients with locomotor system diseases. Diagnostic means. X-ray demonstration. Case report.
*	Disorders of the spine in childhood. Scoliosis.	Examination of the neck and cervical spine. Disorders of the neck and cervical spine. X-ray demonstration. Case report.
	General affections of the skeleton	Examination of the trunk and spine. Disorders of the trunk and spine. X-ray demonstration. Case report.
*	Congenital deformities and disabilities	Examination of the scoliosis. Diagnostic means. X-ray demonstration. Case report.
*	Disorders of the foot (congenital club foot, pes planovalgus)	Examination of the shoulder and elbow. Disorders of the shoulder and elbow. X-ray demonstration. Case report.
*	Arthritis, osteomyelitis, tuberculous arthritis	Examination of the forearm, wrist and the hand. Disorders of the forearm, wrist and the hand. X-ray demonstration. Case report.
*	Bone tumors	Examination of the hip regio. Disorders of the hip. Messuring the length of the limbs. X-ray demonstration. Case report.
*	Infections and degenerative disorders of the spine. Spondylolysis, spondylolisthesis.	Examination of the osteoarthritis of the hip and of the knee. X-ray demonstration. Case report.
*	Disorders of the neck and upper limbs	Examination of the knee. Disorders of the knee. X-ray demonstration. Case report.

*	Congenital dislocation and dysplasia of the hip	Examination of the leg, ankle and foot. Disorders of the leg, ankle and foot. X-ray demonstration. Case report.
*	Other hip disorders in childhood (Perthes disease, slipped upper femoral epiphysis. Transient arthritis of the hip.)	Infections of the bone. Arthritis. Bone tumors. X-ray demonstration. Case report.
*	Osteoarthritis of the hip. Idiopathical necrosis capitis femoris.	Osteoarthrosis. General affections of the skeleton. (Neurological disorders). X-ray demonstration. Case report.
*	Disorders of the knee.	
*	Neuromuscular diseases, general affections of the skeleton	

OTO-RHINO-LARYNGOLOGY

9th semester

	LECTURE (2 hrs/week)	**PRACTICE (3 hrs/week)**
*	Oto-rhino-laryngology in medicine.	Examination equipment in oto-rhino-laryngology.
*	History of oto-rhino-laryngology.	
*	Anatomy and physiology of the ear.	Practice in use of forehead mirror and ear speculum.
*	Diseases of the external ear and their treatment.	Examination of the external auditoy meatus and eardrum.
*	Acute inflammation of the middle ear.	Practice in cleaning the external meatus. Diseases of the external meatus. Ear drops. Examination of the Eustachian tube.
*	Complications of acute otitis media.	Demonstration of eardrum perforations and various ear diseases.
*	Non-suppurative diseases of the middle ear.	X-ray, CT, MR pictures of the ear.
*	Chronic otitis media. Complications of chronic otitis media.	Examination of hearing by means of tuning forks.
*	Reconstruction of the hearing mechanism.	Measurement of hearing loss. The usual method of recording hearing by audiometer. Demonstration of various types of pure-tone audiograms. Hearing aids.
*	Anatomy of the inner ear. The vestibular and cochlear system.	Demonstrations of otoneurological examinations.
*	Examination of hearing and the vestibular system.	Clinical examination of the nose and nasal cavity. Practice in using nasal speculum. Posterior rhinoscopy. Demonstration of diseases of nasal cavity. Treatment of nasal injuries.
*	Diseases of the inner ear: toxic damage to the ear, inflammatory and vascular lesions of the inner ear. Acoustic trauma. Meniere's disease.	Haemorrhage from the nose. Treatment of epistaxis.. Demonstration of Bellocq pack.

*	Diseases of the inner ear: acoustic neuroma, temporal bone fractures.	Treatment of sinusitis. Nasal drops. X-ray, CT, MR pictures of nasal sinuses. Demonstration of puncture of the maxillary sinus. Differential diagnosis of headache.
*	Anatomy of the nose and nasal sinuses.	Examination of the mouth and pharynx. Demonstration of pharyngeal diseases.
*	Diseases of the external nose and the nasal cavity.	Demonstration of tumors in the larynx and hypopharynx.
*	Sinusitis. Treatment and complications. Fractures of the sinuses.	Examination of the larynx. Demonstration of laryngeal diseases. Anaesthesia in oto-rhino-laryngology.
*	Haemorrhage from the nose. Tumors of the nose and paranasal sinuses.	Demonstration of patients after tracheostomy. Cleaning of tracheostomy tube.
*	Anatomy of the pharynx. Diseases of the nasopharynx.	Demonstration of esophagoscopes and bronchoscopes. The method of introducing the naso-esophageal nutrition tube. Differential diagnosis of neck nodes in practice.
*	Adenoid hyperplasia. Benign and malignant nasopharyngeal tumors.	
*	Acute and chronic inflammatory diseases of the pharynx.	
*	Acute and chronic tonsillitis. Peritonsillar abscess and complications.	
*	Indications of tonsillectomy. Tumors of mesopharynx.	
*	Functional anatomy of the larynx. Acute and chronic diseases of the larynx.	
*	Injuries of the larynx. Paralysis of the larynx.	
*	Tumors of the hypopharynx and the larynx.	
*	Classifications of malignant laryngeal tumors.	
*	Treatment of laryngeal tumors.	
*	Diseases of the oesophagus and the inferior respiratory tract.	
*	Differential diagnosis of neck nodes.	

PEDIATRICS

9th semester

	LECTURE (3 hrs/week)	PRACTICE (2 hrs/week)
*	The ill child and his doctor	History taking, Iatrogenic infections
*	The interview, The problems, Mortality	Examination of the child and infant, Rickets, tetany
*	Genes	Newborn, preterm and small for dates infants
*	Chromosomes and chromosome abnormalities, Common autosomal abnormalities, Common sex chromosome abnormalities, Single gene (Mendelian) inheritance, Multifactorial (polygenic) inheritance, Recent advances in molecular genetics, Genetic counselling	O2, incubator, mechanical ventillation
*	Fetus	Paediatric surgery: malformations
*	Periconceptional medicine, The placenta, Examination of the fetus, Drugs which cross the placenta, Fetal transplacental infections, Infections acquired during passage through the birth canal, Maternal immunoglobulins	Developmental and nutritional state
*	Newborn	Healthy babies' care and nutrition
*	Routine examination of the newborn, Birth injuries, Birth asphyxia, Size at birth, Respiratory problems in the newborn, Jaundice in the newborn, Gastrointestinal problems, Neural tube anomalies, Cleft lip and palate, Neonatal infections, Neonatal convulsions and jitters	Prevention and treatment of infections
*	Nutrition	Immunological procedures, tuberculin test
*	Breast feeding, Artificial feeding, Feeding problems, Nutritional deficiencies, Malnutrition, Obesity	Management of the poisoned child
*	Infection	Treatment of burns, shock, unconsciousness
*	Measles, Rubella, Mumps, Chicken pox (Varicella), Herpes simplex infections, Glandular fever, Kawasaki disease (mucocutaneous lymph node syndrome), Erythema infectiosum (5th disease), Roseola infantum (Exanthema subitum), Hand, foot and mouth disease, Hepatitis A (infectious jaundice), Poliomyelitis, Diphtheria, Pertussis (whooping cough), Scarlet fever, Tuberculosis, Malaria, Human immunodeficiency virus, Immunisation, Immune deficiency	Respiratory tract diseases, Asthma, Allergens and respiratory function testing
*	Hazards	Examination: murmurs, heart failure, congenital heart disease
*	Injuries, Burns and scalds, Drowning, Choking, Poisoning, Other hazard	Cardiological diagnostics
*	Airways and lungs	Dehydration, Infusion therapy, Malabsorption, Liver diseases
*	Upper respiratory tract infections, Upper airway obstruction, Lower respiratory tract infections, Cystic fibrosis, Asthma	Paediatric surgery: appendicitis, inguinal hernias and disorders of the testes
*	Heart	Diagnosis and treatment of UT, renal diseases

*	Acyanotic lesions with a left to right shunt, Atrial septal defect (Ostium secundum), Atrial septal defect (Ostium primum), Ventricular septal defect, Patent ductus arteriosus, Pulmonary hypertension, Obstructive lesions, Aortic stenosis, Coarctation of the aorta, Hypoplastic left heart, Pulmonary stenosis, Cyanotic heart disease, Fallot tetralogy, Transposition of the great arteries, Cardiac arrhythmias, Subacute bacterial endocarditis, Rheumatic fever, Hypertension Hyperlipoproteinaemia	Emergency treatment, resuscitation, intensive care
*	Gut	Blood and bone marrow diagnostics, anaemia, bleeding disorders, Transfusion
*	Acute abdominal pain, Recurrent abdominal pain, Gastroenteritis, Malabsorption, Chronic diarrhoea, Intestinal parasites, Constipation, Liver disease, Liver enzyme deficiencies	
*	Urinary tract and testes	
*	Renal function tests, Urinary tract malformations, Urinary tract infections, Haematuria, Acute nephritic syndrome, Nephrotic syndrome, Renal tubular disorders, Acute renal failure, Chronic renal failure, The testes, The prepuce	
*	Blood	
*	Iron deficiency anaemia, Aplastic anaemia, Haemolytic anaemias, Bleeding disorders	

10th semester

	LECTURE/PRACTICE (2 hrs/week, 2 hrs/week)
*	Malignancy
*	The management of children with cancer, Acute leukaemia, Lymphomas, Neuroblastoma, Brain and spinal tumors, Soft tissue sarcomas, Renal tumors, Germ cell tumors, Bone tumors, Other tumors, Histiocytic disorders
*	Growth
*	Head growth, Height and weight, Short stature, Excessive height
*	Endocrine
*	Puberty, Disorders of sexual differentiation, Adrenal glands, Thyroid, Parathyroid glands, Diabetes, Hypoglycaemia
*	Skin
*	Rashes of early infancy, Atopic eczema, Infections and infestations, Congenital skin lesions, Other common skin disorders
*	Bone and joint
*	Arthritis, Osteomyelitis, Normal postural variations, Scoliosis, Hip disorders, Knee disorders, Talipes (clubfoot), Genetic bone and joint disorders, Bone tumors and allied disorders
*	Brain, cord, nerve, muscle
*	Intracranial infection, Encephalitis, Epilepsy and convulsions, Neuromuscular disorders, Headache, Ataxia, Cerebral palsy
*	Vision, hearing, speech
*	Hearing, Speech and language
*	Mental handicap
*	The identification and treatment of mentally handicapped children, Mentabolic and other cerebral degenerative disorders, Specific treatment and general management
*	Emotions and behavior
*	Brain disorders, The interaction between the child and his world, Behavioral problems, Emotional disorders, Management, The maltreatment of children

PHARMACOLOGY

7th semester

	LECTURE (3 hrs/week)	PRACTICE (2 hrs/week)
*	Introduction into pharmacology. Pharmacokinetics I: Absorption. Passage across body membranes.	Receptor theory.
*	Pharmacokinetics II: Distribution.	Computer Lab: Drug-receptor interactions.
*	Pharmacokinetics III: Elimination - Metabolism and excretion. Individual drug responses: Pharmacogenetics. Allergy. Age, diet, and diseases.	Computer Lab: Pharmacokinetics.
*	Safety and effectiveness. Therapeutic index. Development of new drugs. Tolerance and drug dependence. Drug interactions.	Computer Lab: Repeated drug administration.
*	Autonomic nervous system: Introduction. Ganglion stimulants, inhibitors. Cholinomimetics.	MTO: General pharmacology.
*	Cholinolytic drugs. Sympathomimetic drugs.	MTO-GPH Discussion
*	Alpha-adrenoceptor blockers. Beta-adrenoceptor blockers. Adrenergic neuron blocking agents.	Computer Lab: Parasympathetic nervous system.
*	Peripheral muscle relaxants. Antihistamines. Serotonin, kinin, PG, LT antagonists.	Computer Lab: Sympathetic nervous system.
*	Smooth muscle relaxants. Treatment of asthma bronchiale.	Computer Lab: Skeletal muscle and smooth muscle relaxants.
*	Local anaesthetics. Antiinflammatory drugs. Glucocorticoids.	MTO: Autonomic nervous system.
*	Chemotherapy I. Cell wall synthesis inhibitors. Protein synthesis inhibitors.	MTO: Autonomic nervous system - Discussion.
*	Chemotherapy II. Sulfonamids. Kinolones. Anthelmintic agents. Antiseptics, desinfectants.	Prescripton writing.
*	Chemotherapy III. Macrolid-antibiotics. Chemotherapy of neoplastic diseases.	Treatment of mycobacterium infections (TBC).
*	Chemotherapy IV: Antiviral and antifungal agents. Treatment of protozoon infections (malaria).	To recapitulate: Chemotherapy.

8th semester

	LECTURE (4 hrs/week)	PRACTICE (2 hrs/week)
*	Psychostimulants. Anorectics. Hallucinogenics. Anxiolytics. Sedatohypnotics.	Introduction.
*	Pharmacology of general anaesthesia. Opioid analgetics.	Contemporary drug abuse.
*	Antidepressants. Antiparkinson drugs. Central muscle relaxants.	To recapitulate: General anaesthesia.
*	Antipsychotic drugs. Antiepileptic drugs.	Pharmacotherapy of pain.
*	Antiarrhythmic drugs.	To recapitulate: CNS
*	Antianginal drugs.	MTO: CNS.
*	Diuretic drugs. Pharmacotherapy of hyperlipoproteinemias.	Therapy of AMI.
*	Cardiotonics.	Computer lab - CVS
*	Antihypertensive drugs. Drugs acting on the blood.	Therapy of migraine.

*	Stroke (prevention and treatment). Diabetes mellitus. Hyperthyreosis.	Therapy of anaemias.
*	Hormones. Vitamines.	MTO: CVS.
*	Drugs that influence the GIT. Toxicology I.	Discussion - CVS.
*	Toxicology II.	Principles of immunopharmacology.
*	Toxicology of doping.	Prepare for the final exam.

PSYCHIATRY

9th semester

	LECTURE **1 hr/week**	**PRACTICE** **1hr/week**
*	Introduction to Psychiatry	Psychiatric patient examination related to the lecture
*	Disorders of Attachment	Psychiatric patient examination related to the lecture
*	Attention-Deficit /Hyperactivity Disorder	Psychiatric patient examination related to the lecture
*	Obsessive-Compulsive and Related Disorders	Psychiatric patient examination related to the lecture
*	Sleep-Wake Disorders	Psychiatric patient examination related to the lecture
*	Trauma and Stressor-Related Disorders	Psychiatric patient examination related to the lecture
*	Disruptive, Impulse-Control, and Conduct Disorders	Psychiatric patient examination related to the lecture
*	Autism Spectrum Disorder	Psychiatric patient examination related to the lecture
*	Delusional Disorder	Psychiatric patient examination related to the lecture
*	Schizophrenia Spectrum and Other Psychotic Disorders	Psychiatric patient examination related to the lecture
*	Bipolar and Related Disorders	Psychiatric patient examination related to the lecture
*	Dissociative Disorders	Psychiatric patient examination related to the lecture
*	Forensic and Ethical Issues in Psychiatry	Psychiatric patient examination related to the lecture
*	Personality Disorders	Psychiatric patient examination related to the lecture

10th semester

	LECTURE (2 hrs/week)	PRACTICE (1 hr/week)
*	Anxiety Disorders	Psychiatric patient examination related to the lecture
*	Personality Disorders	Psychiatric patient examination related to the lecture
*	Depressive Disorders	Psychiatric patient examination related to the lecture
*	Suicide Behavior	Psychiatric patient examination related to the lecture
*	Alcohol Related Disorders	Psychiatric patient examination related to the lecture
*	Schizophrenia Spectrum and Other Psychotic Disorders	Psychiatric patient examination related to the lecture
*	Delirium Syndrome	Psychiatric patient examination related to the lecture
*	Neurocognitive Disorders	Psychiatric patient examination related to the lecture
*	Behavioral and Psychological Symptoms of Dementia	Psychiatric patient examination related to the lecture
*	Psychiatric Aspects of Pain	Psychiatric patient examination related to the lecture
*	Substance Related and Addictive Disorders	Psychiatric patient examination related to the lecture
*	Feeding and Eating Disorders	Psychiatric patient examination related to the lecture
*	Somatoform Disorders	Psychiatric patient examination related to the lecture
*	Sexual Dysfunction	Psychiatric patient examination related to the lecture

PUBLIC HEALTH AND PREVENTIVE MEDICINE I.

7th semester

	LECTURE (2 hrs/week)	PRACTICE (2 hrs/week)
*	The history of preventive medicine and public health. The levels of prevention. Measuring health status of a population; the theoretical basis of demography and epidemiology.	Requirements of the semester. Introduction into demography. Demographic indexes and their use. Analysis of statistical data-bases.
*	The global health situation; priorities in global health. Epidemiology of chronic diseases – cardiovascular diseases.	Measuring mortality; standardization. Measuring morbidity. Analysis of statistical data-bases.
*	Epidemiology of chronic diseases – respiratory diseases. Epidemiology of chronic diseases – tumors.	Epidemiological studies: ecological, cross sectional, case-control and cohort studies.

*	Epidemiology of chronic diseases – metabolic and musculoskeletal diseases. Epidemiology of mental disorders, suicide and accidents.	Epidemiological studies: interventional studies. Planning and preparation of epidemiological surveys.
*	Epidemiology of chronic diseases – gastrointestinal diseases. Health status of high-risk populations (elderly people, prisoners, military and homeless people).	Practical aspects of the prevention of cardiovascular diseases.
*	General epidemiology of infectious diseases. Epidemiology of health care associated infections (infection control, nosocomial surveillance).	The role of screening in the prevention of selected chronic diseases. Practical aspects of the prevention of selected chronic conditions.
*	Antimicrobial resistance, bioterrorism. Epidemiology of infectious diseases: enteric diseases	Practical aspects of vaccination.
*	Epidemiology of infectious diseases: toxicoinfections. Epidemiology of infectious diseases: airborne diseases.	Sterilization, disinfection (hand hygiene), disinsection, deratisation.
*	**HOLIDAY**	Practical aspects of the prevention of selected infectious diseases I. Enteric and airborne diseases. Case studies.
*	Epidemiology of infectious diseases: hematogenic, cutaneous and sexually transmitted diseases.	**Demonstration.** Practical aspects of the prevention of selected infectious diseases II. Hepatitis infections, tick-borne diseases. Case studies.

PUBLIC HEALTH AND PREVENTIVE MEDICINE II.

8th semester

	LECTURE (2 hrs/week)	**PRACTICE (2 hrs/week)**
*	Health influencing factors – life style, environment, health care, genetics. Nutrition in public health. Basics of nutrition. Diet-related chronic diseases.	Requirements, questionnaire. Measuring nutritional status. Dietary guidelines, healthy nutrition.
*	Malnutritions. Food quality and safety. Treatment of obesity.	The role of diet in the prevention of diet-related diseases; special dietary requirements of certain chronic diseases I. (Students' presentations)
*	Epidemiology of smoking. Epidemiology of alcohol consumption	The role of diet in the prevention of diet-related diseases; special dietary requirements of certain chronic diseases II. (Students' presentations)
*	Role of physical activity in the prevention of chronic diseases. Epidemiology of drug consumption.	Smoking cessation guidelines for health professionals. Prevention of alcohol and drug consumption.
*	Human ecology; global warming; air pollutants and their effects on human health (indoor and outdoor). General toxicology.	Heath influencing factors. Health promotion in various settings (community, workplace, school).
*	Water pollutants and their effects on human health. Sewage, soil pollutions, waste management. Toxicology of metals, solvents and gases.	Environmental epidemiology: examining health damaging effects of air pollution.
*	Toxicology of persistent organic pollutants, plastics and agrochemicals.	**Demonstration.** Environmental epidemiology: examining health damaging effects of surface and drinking water pollution

*	Occupational health. Occupational safety, accident prevention. Occupational diseases caused by physical exposures.	Case studies about health effects of certain chemicals.
*	Occupational diseases caused by biological, ergonomic and psychosocial exposures. Health effects of dusts, occupational pneumoconiosis.	Practical aspects of occupational health.
*	Structure and operation of health systems I. – general aspects***.***	Health effects of workplace-related exposures. Occupational hazards in health care (case studies).

PULMONOLOGY

7th semester

	LECTURE (1 hr/week)	**PRACTICE (2 hrs/week)**
*	Main clinical features of lung diseases	Morphology and roentgen anatomy of lung. Physical examination.
*	COPD (Chronic bronchitis.Emphysema.)	Characteristic X-ray findings.
*	Respiratory function. Spirometry.	Chronic bronchitis. "Pink puffers" and "blue bloaters".
*	Pharmacospirometry. Provocation.	Lung function tests. Pharmacospirometry.
*	Asthma bronchiale	Diagnosis of asthma bronchiale. Aspecific provocation tests, skin test, IgE.
*	Malignant neoplasm of lung	Bronchoscopy, Thoracoscopy, mediastinoscopy.
*	Pneumonia lung abscess	Radiographic findings of lung cancer. Transthoracic needle-biopsy. Cytology. TNM classification.
*	Breathing mechanics. Blood gases.	Radiographic findings of pneumonia. Sputum examination. Treatment.
*	Interstitial lung diseases	Pletysmography. Diffusing capacity. Cardiopulmonary exercise test.
*	Diseases of pleura	Aetiology of pleural effusions. Aspiration of the pleural effusion. Laboratory findings.
*	Pulmonary thromboembolism, cor pulmonale chronicum	X-ray findings in tuberculosis.
*	Tuberculosis	Sputum examination in tuberculosis. Tuberculin test. Treatment.
*	Occupational lung diseases. Fungal infections.	Cor pulmonale. Differential diagnosis of disseminated lung diseases.
*	Respiratory failure. Sleep apnoea syndrome.	

RADIOLOGY

7th semester

	LECTURE (1 hr/week)	**PRACTICE (1 hr/week)**
*	Imaging diagnostics: role, development, present and future	Imaging diagnostics: role, development, present and future
*	Conventional radiology	Conventional radiology
*	Contrast agents	Contrast agents
*	Ultrasound	Ultrasound
*	Computed tomography and magnetic resonance imaging	Computed tomography and magnetic resonance imaging
*	Interventional radiology	Interventional radiology
*	Gastroenterology I.(esophagus, stomach, duodenum)	Gastroenterology I.
*	Gastroenterology II. (mesenteric small bowels large intestine)	Gastroenterology II.
*	Joints	Joints
*	Bones	Bones
*	Chest I. (lung)	Chest I. (lung)
*	Chest II. (mediastinum)	Chest II. (mediastinum)
*	Heart and peripheric vessels	Heart and peripheric vessels
*	Head and neck	Head and neck

8th semester

	LECTURE (1 hr/week)	**PRACTICE (1 hr/week)**
*	Radiology of the breasts and female reproductive system	Radiology of the breasts
*	Radiology of the liver	Radiology of the liver
*	Radiology of the biliary tract	Radiology of the biliary tract
*	Radiology of the pancreas & spleen	Radiology of the pancreas & spleen
*	Neuroradiology I. (image modalities, congenital anomalies and vascular lesions of the head)	Neuroradiology I.
*	Neuroradiology II. (Tumours, infections, trauma of the head)	Neuroradiology II.
*	Neuroradiology III. (Spinal diseases)	Neuroradiology III.
*	Pediatric radiology	Pediatric radiology
*	Radiology of the kidneys & the urinay tract	Radiology of the kidneys & the urinay tract
*	Radiology of the retroperitoneal space	Radiology of the retroperitoneal space
*	Radiology of the pelvis and the male reproductive organs	Radiology of the pelvis and the male reproductive organs
*	Radiological aspects of emergency	Radiological aspects of emergency
*	Radiological aspects of trauma	Radiological aspects of trauma

SURGERY

7th semester

	LECTURE (2 hrs/week)	PRACTICE (2 hrs/week)
*	Surgery of abdominal wall	The syllabus of the practicals are synchronized with the lectures.
*	Surgery of the mediastinum	The patients examinations and the discussion of the symptoms and illnesses follow the topics of the lectures.
*	Surgery of the thorax	The practicals take place in the Department of Surgery.
*	Surgery of the lung cancer	
*	Vascular surgery	
*	Vascular surgery	
*	Vascular surgery	
*	Cardiac Surgery	
*	Cardiac Surgery	
*	Cardiac Surgery	
*	Benign diseases of the breast	
*	Surgery of the breast cancer	
*	Breast-reconstruction. Oncoplastic surgery in the surgical treatment of breast cancer	

8th semester

	LECTURE (2 hrs/week)	PRACTICE (2 hrs/week)
*	Surgery of the pancreas I.	The syllabus of the practicals are synchronized with the lectures.
*	Surgery of pancreas II.	The patients examinations and the discussion of the symptoms and illnesses follow the topics of the lectures.
*	Benign diseases of the oesophagus	The practicals take place in the Department of Surgery.
*	The malignant disease of oesophagus	
*	Gastric surgery. Malignant disease	
*	Gastric surgery. Benign disease	
*	Surgery of gallbladder and biliary ways	
*	Surgery of the liver	
*	Surgery of the spleen	
*	Bleeding of the GI tract	
*	Benign diseases of the colon and rectum	
*	Malignant diseases of the colon and rectum	
*	Proctology, the care of patients wearing of intestional stoma	
*	Test	

9th semester

	LECTURE (1 hr/week)	**PRACTICE (1 hr/week)**
*	Endocrine surgery I.	The syllabus of the practicals are synchronized with the lectures.
*	Endocrine surgery II.	The patients examinations and the discussion of the symptoms and illnesses follow the topics of the lectures.
*	Surgical immunology	The practicals take place in the Department of Surgery.
*	Peritonitis	
*	Appendicitis	
*	Organ Transplantation	
*	Minimal invasive surgery	
*	Ileus	
*	Bedside exercise	

TRAUMATOLOGY

10th semester

	LECTURE (2 hrs/week)	**PRACTICE (2 hrs/week)**
*	General traumatology. Injuries of soft tissues. Types of fractures. Bone bealing. Methods of managing fractures. Early and late complications of the fractures and dislocations.	Clinical examination of the injured patient. Additional clinical investigations. X-ray examination.
*	Fractures and dislocations about the shoulder, humerus and elbow.	Principles of fracture treatment. First aid. Treatment of uncomplicated closed fractures.
*	Fractures of the olecranon, radius and ulna. General hand surgery. Fractures and dislocations of the hand.	Plaster technique. Synthetic splinting. Other external splints.
*	Surgical management of soft tissue injuries. Treatment of tendon injuries. Skin ijuries. Treatment of skin defects. Plastic reconstructive surgery of the hand.	Operative treatment of fractures. Presentation of cases.
*	Injuries of the peripheral nerves. Nerve degeneration and regeneration. Microsurgical treatment of peripheral nerve injuries. Amputations. Replantation, revascularisation and microvascular plastic surgical methods.	Complications of fractures. Delayed union. Non-union. Avasular necrosis. Osteoarthritis. Reflex sympathetic dystrophy.
*	Injuries of the vertebral column with and without neurological spinal cord defect. Surgical stabilization of the vertebral fractures.	Joint injuries. Dislocation and subluxation. Diagnosis, complications, treatment.
*	Head injuries. Fractures, epidural, subdural and intracerebral hematomas. First aid diagnosis and treatment.	Head injuries. Diagnosis, treatment. Visit at the intensive care unit.
*	Fractures of the hip joint, intracapsular fractures of the femoral head. Intertrochanteric fractures. Fractures of the femur and patella.	Spine injuries. Cervical spine injuries. Halo-thoracic support. Paraplegia and tetraplegia.

*	Pelvic injuries. Fractures of the acetabulum. Examination of the knee joint. Injuries of the knee joint. Ligamentous injuries. Meniscal ruptures. Arthroscopy of the knee joint. Sport traumatology.	Shoulder, upper arm and elbow injuries.
*	Fractures of the tibial condyles. Closed and open injuries of the tibial shaft. Complications.	Forearm, wrist and hand. Fractures and soft tissue injuries.
*	Fractures and dislocations about the ankle and foot.	Peripheral nerve injuries. Microsurgical treatment. Brachial plexus injuries.
*	Politraumatization and multiple injuries. First aid and transportation. Priorities in polytrauma. Primary and secondary treatment of fractures.	Plevic fractures. Fractures of the femoral neck. Intertrochaenteric fractures. Treatment of the femoral fractures.
*	Thoracic and abdominal injuries. Treatment of open and blunt traumas. Intensive therapy of injured patients.	Knee injuries. Arthroscopy. Meniscal tear. Rupture of ACL.
*		Leg, ankle and foot injuries. Methods of treatment. Special fractures in children.

UROLOGY

10th semester

	LECTURE (1hr/week)	**PRACTICE (2hrs/week)**
*	Signs and symptoms urological diseases. Case history and the physical examination.	Case history, physical examination. Case presentation.
*	Congenital anomalies.	Signs and symptoms of the urology patient. Case presentation.
*	Urolithiasis.	Catheters and endoscopic instruments.
*	Incontinency.	Endoscopy.
*	Urotraumatology.	Percutaneous epicystostomy and nephrostomy.
*	Acute and chronic renal failure.	ESWL.
*	Nonspecific infections in the urology.	Uro-radiology.
*	Tumors of the kidney and ureter.	Physical examinations of patients.
*	Tumors of the bladder.	Laboratory investigations in the urology.
*	Tumors of the external male genitalia.	Biopsy from bladder, prostate and testis.
*	Tumors of the prostate.	Evaluation of sonography.
*	BPH.	Physical examinations. Case reports.
*	Acute urology.	Visit to operating theatre.
*	Consultation	Acute urology

DOCTOR-PATIENT COMMUNICATION

7th or 8th semester

	The aim of the subject:
	Students attain the skills needed for doctor-patient consultation and for selecting from the appropriate consultation models.
	By the end of the course students will be aware of the importance of doctor-patient communication and its critical points.
	They should acquire the ethical principles of doctor-patient communication and they should be able to integrate them into their consultation behaviour. Students should know the ethical and communication methods of commitment to providing medical information.
	They should be able to carry out a 10-minute doctor-patient consultation, and afterwards to analyse and evaluate their performance from the video recording at a group meeting. They should be able to elaborate a medical case.

HUNGARIAN LANGUAGE

7th semester

	PRACTICE (3 hrs/week)
*	Gynaecology. The external and internal female genital organs. Revising the Possessive Structure.
*	The most frequent complaints and diseases in the field of gynaecology. Practising basic doctor-patient situations: role-play, history taking in Gynaecology.
*	Asking the patient about her menstruation cycle and history. Revision of Wh-questions.
*	Obstetrics. Taking history concerning previous pregnancies. Deliveries and abortions. Complaints during pregnancy.
*	Patient examination at the Department of Obstetrics and Gynaecology. General and specific instructions to patients. Sending the patient for further investigations.
*	Practising basic doctor-patient situations: role-play, history taking in Obstetrics and Gynaecology. Revising the Indefinite Pronouns.
*	Practising doctor-patient communication: role-play, history taking and giving advice to patients concerning treatment and medication.
*	Urology. The most common conditions and diseases in the field of Urology: cystitis, kidney stones, pyelonephritis.
*	Patient examination in Urology. Giving instructions and sending the patient for further investigations. Revising Adverbs of Manner.
*	Practising doctor-patient situations: role-play, history taking in Urology.
*	Briefing English case histories taken from the field of Urology in Hungarian. Final tests (written and oral).
*	Pulmonology. The structure of the respiratory system. Revising the name of body parts.
*	The most frequent abnormal conditions and diseases in Pulmonology. Revising the vocabulary of breathing problems, coughing and sputum.
*	History taking, patient examination and specific instructions in the field of Pulmonology.
*	Practising doctor-patient communication: role-play, history taking and examination of patients with respiratory problems. Giving advice to patients concerning medication. Reading simple Hungarian case histories taken from the field of Pulmonology and Urology.

8th semester

	PRACTICE (3 hrs/week)
*	Neurology. Parts of the nervous system. Revising Time Clauses.
*	Some diseases of the nervous system. Most frequent patient complaints at the Neurology Department. Symptoms and signs of certain neurological conditions.
*	History taking and patient examination in Neurology. Giving specific instructions to patients. Mid-term test.
*	Practising doctor-patient communication at the Neurology Department: role-playing history taking and discussing possible treatment methods with the patient. Revising the Conditional Mood.
*	Briefing simple English case histories taken from the field of Neurology in Hungarian.
*	Final exam practice: written.
*	Final exam practice: oral.
*	Paediatrics. Locomotor, cognitive, emotional and social development. The most important milestones.
*	Paediatrics. Asking the child's parents about symptoms and signs. Giving advice concerning treatment options. Revising the Auxiliary Verbs.
*	The most common paediatric problems. Discussing and arguing with parents. Revising vocabulary in connection with delivery and breast feeding.
*	Acute cases in the field of paediatrics. Interviewing parents presenting their child with accidents, meningitis or febrile convulsion. Management of acute cases.
*	Practising doctor-patient communication: role-play, history taking and giving advice to patients' parents concerning treatment and medication. Reading simple Hungarian case histories taken from the field of Paediatrics. Explaining medical procedures and giving advice to patients.
*	General revision. Practising doctor-patient dialogues in all covered medical fields.
*	Revision. Practising doctor-patient situations that can emerge at medical and surgical departments. Interviewing and examining patients, sending them for further investigations, giving advice on diet, life style and medication. Final test.

ADVANCED BIOSTATISTICS

8th, 10th semester

	LECTURE (1 hr/week)	**PRACTICE (1 hr/week)**
*	Introduction: summary of basic biostatistics	The mean concepts of ogisticccs. Statistical computer systems.
*	Nonparametric methods for two ore more dependent or independent data	The choice of the appropriate statistical method and its evaluation
*	Multiple linear regression, linear models	Data sets with several independent variables (i.e., risc factors)
*	Comparison of several independent group-means: two-way ANOVA	Data sets and problems when two-way ANOVA is appropriate
*	Two-way ANOVA with interaction	Understanding the concept of interaction
*	Comparison of several related group-menad: repeated measures ANOVA	Data sets and problems for repeated measurements ANOVA
*	Summary	TEST I: solving two problems, main results and interpretation
*	Diagnostic tests. Specificity, sensitivity, PPV, NPV, Accuracy	Calculation of the diagnostic measures
*	Biostatistical methods in epidemiology, relative risk, odds ratio	Calculation of RR and OR by hand and by computer. Comparison of methods.
*	Logistic regression: equation, use, meaning	Simple logistic regression problem soving by computer program

*	Logistic regression: ogisticc accuracy ROC curve	Examples from the medical literature: the use of ogistic regression to find risc factors of an illness.
*	Multivariate methods: discriminant analysis	Examples from the medical literature: decision making by computer
*	Multivariate methods: cluster analysis	Examples from the medical literature: classification of cases or variables
*	Summary	TEST II: solving two simple problems, main results and interpretation.

BASIC BIOSTATISTICS

7th, 9th semester

	LECTURE (1 hr/week)	**PRACTICE (1 hr/week)**
*	Data definition, types of data, displaying data. Sample characteristics.	Bar chart, histogram. Calculation of the mean and standard deviation.
*	Probability, random variables and their types, distributions.	Calculation of ogisticccs. The use of a computer program.
*	Binomial, Poisson, uniform and normal distribution and their properties.	The use of statistical tables – standard normal distribution.
*	Statistical estimation, confidence intervals.	Calculation of the confidence interval for a population mean. The use of the t-table.
*	Testing hypotheses, significance. One-sample t-test.	Practice of one-sample t-test using experimental data.
*	Paired and Independent samples t-tests.	Practice of t-tests using experimental data. The meaning of significance, p-value.
*	Errors in hypothesis tests	TEST I.
*	Comparing the mean of several gourps: one-way analysis of variance.	Independent t-tests and one-way ANOVA. Multiple comparisons.
*	Relationship between continuous variables, correlation, linear regression.	Scatterplot, trend-line in EXCEL. http://www.ruf.rice.edu/~lane/stat_sim/reg_by_eye
*	Relationship between categorical variables: the chi-square test for independence	Evaluation of a 2x2 table by hand calculation and by computer
*	The use of 2x2 tables in diagnostic tests. The chi-square-test for goodness of fit.	Calculation of sensutitvity, specificity, positive and negative predictive value.
*	Nonparametric methods.	Statistical tests on ranks.
*	Summary	TEST II.
*	Examples from the literature	Practical questions of applied biostatistics.

CASES IN CLINICAL MICROBIOLOGY

8th or 10th semester

	LECTURE (2 hrs/week)
*	How to take samples for microbiology? Cases will be discussed where these procedures have a great influence on the outcome of the laboratory investigations and the fate of the patient.
*	Upper and lower respiratory infections. Causative agents in different age groups. Cases will be discussed with community-acquired and nosocomial pneumonia. How to select appropriate antibiotic treatment empirically? The value of microbiological tests.
*	Upper and lower urinary tract infections. Differences in antibiotic resistance of pathogens causing urinary tract infections. Pitfalls in the laboratory tests.
*	Differences in gastrointestinal diseases caused by bacteria, viruses and parasites. The possibilities of the laboratory diagnosis and treatment
*	Infection or colonization. How to distinguish them through laboratory tests? Cases caused by fungi will be discussed. Systemic or local fungal infections? Difficulties in laboratory tests
*	Nosocomial infections. Nosocomial epidemics. Which methods are suitable to diagnose the spread of nosocomial pathogens in a hospital environment? Cases involved in nosocomial epidemics will be discussed, together with the measures that can be taken to stop the spread of nosocomial pathogens.
*	Neuroinfections and joint infections. The main pathogens causing these kind of infections, and how to diagnose them will be discussed. Direct and indirect methods to reach a microbiological diagnosis and special aspects in the selection of antibiotic treatment will be discussed through the cases.
*	Infections of immunosuppressed patients. Special aspects of infections of haematology patients will be discussed . The role of facultative and non-pathogenic bacteria in infections of immunosuppressed patients and the problems in the laboratory diagnosis of such clinical situations will be discussed through the cases.
*	Sexually transmitted diseases and their consequences. Classical and newly recognized sexually transmitted infections (STI) and sexually transmitted diseases (STD). Diagnostic possibilities. Sexual abuse of children and adolescents. How to choose antibiotic treatment? How can we recognise HIV infected and AIDS patients. Cases caused by STI and STDs.
*	Infections caused by anaerobic bacteria. Diagnostic problems and how to take samples to be able to isolate anaerobic pathogens will be discussed? Special aspects of clostridial infections as well as cases where anaerobic bacteria were involved will be discussed together with the special aspects of antibiotic treatment of such cases.
*	Sepsis and its consequences. How blood culture techniques help in the diagnosis of sepsis. Determination of false-positive and false-negative blood cultures and the sensitivity and specificity of this technique will be discussed through clinical cases. Treatment options selecting the best antibiotic should be determined. Antibiotics. How to use antibiotics in prophylaxis and in treatment? The spread of antibiotic resistance worldwide, in different countries, and in hospitals/wards. Development of resistance to special antibiotics during patient therapy. Cases demonstrating the consequences of the correct and incorrect choice of antibiotics during treatment will be discussed
*	How to take samples in virus infections? Which laboratory tests can help in their diagnosis? Cases caused by viruses and their differential diagnostics will be discussed. Emerging and re-emerging viral infections. Prevention and treatment of viral infections. Possibilities of antiviral therapies.
*	How to use molecular biological methods in routine clinical microbiological diagnostics? The value of these methods? Quality control problems. Cases will be discussed where molecular techniques can be helpful in the diagnosis.
*	Cases caused by parasites and their clinical diagnosis and laboratory detection will be discussed

CHILD AND ADOLESCENT PSYCHIATRY

8th or 10th semester

	LECTURE (2hr/week)
*	Introduction
*	Assessment, formulation
*	Classification
*	Psychological examinations
*	Normal child development, risk and protective factors in childhood psychiatric disorders
*	Conduct disorder
*	Juvenile delinquency, School non-attendance
*	Hyperactivity / ADHD
*	Emotional disorders: Anxiety disorders I. Separation anxiety, Generalized anxiety
*	Anxiety disorders II. Specific phobias, Social anxiety, Panic disorder
*	Anxiety disorders III. PTSD
*	Anxiety disorders IV. OCD
*	Affective disorders
*	Cognitive Behavior Therapy for depression-PASCET
*	Suicide and deliberate self- harm
*	Pervasive developmental disorders
*	Psychoses of childhood and adolescence
*	Eating disorders
*	Enuresis
*	Encopresis,
*	Tic disorders, Tourette' syndrome
*	Selective mutism
*	Behavior therapy-case presentation (SM)
*	Speech and learning disorders
*	Mental retardation
*	Psychosomatics disorders-Recurrent abdominal pain, chronic fatigue syndrome, conversion disorder
*	The child and adolescent in hospital
*	Maltreatment of children
*	Consultation
*	Exam

CLINICAL GENETICS AND CLINICAL GENOMICS

10th semester

	LECTURE (2 hrs/week)
*	Genetics in medicine. Human genome, epigenome. Genome programs, postgenomic era.
*	Epigenetic control of gene expression. Genomic imprinting, X chromosome inactivation, tissue specific imprinting. Teratogenesis. Teratogens in clinical praxis.
*	Reproductive genetics. Prenatal genetic screening. Prenatal genetic diagnostics. Fetal programming.
*	Dominant and recessive pattern of inheritance in clinical praxis.
*	Chromosome anomalies in clinical practice. Dysmorphology. Facial dysmorphism.
*	Genetic counseling, genetic screening. Ethical considerations. Genetic law. Local aspects in EC, U.S. and Hungary
*	Genetics therapy. Stem cell therapy. Artificial chromosome. Pharmacogenetics, pharmacogenomics.
*	Cancer genetics and genomics.
*	Mitochondrial inheritance. Multifactorial inheritance. Genetic background of complex diseases, gene-environment interactions.
*	Clinical Genomics. Changing paradigm in common disease.
*	The significance of genomic knowledge in the diagnosis, therapy and prevention of human diseases. Summary. Assessment of the semester.

CLINICAL IMMUNOLOGY

8th, 10th semester

	LECTURE (2 hrs/week)
*	The structure and the functions of the immune system. The biological significance of the self recognition.
*	Methods for clinical immunological investigations.
*	Immune-mediated tissue damage. The role of cytokines.
*	Immunology of allergic diseases.
*	Autoimmunity - Health and disease. The autoimmune diseases.
*	Immunhaematology.
*	Connective tissue disorders and joint diseases.
*	Organ specific autoimmune diseases.
*	Detection of histocompatibility antigens and their pathogenetic significance. Transplantation immunology. Reproductive immunology.
*	Immundeficiencies. The immunology of HIV infection.
*	Tumor immunology.
*	Neuroimmunology.
*	Immune manipulation.

INTRODUCTION TO AVIATION AND SPACE MEDICINE

7th or 9th semester

* The history, subject, position and role of aviation and space medicine in medical sciences.
* The effect of the dynamic factors of aviation on the pilot's body. The pilot's life-saving equipment.
* The effects of noise and vibration on the human body during flight.
* The basics of aerodynamics. The composition, layers and main physical properties of the atmosphere.
* The medical qualification of pilots and parachuters. The ergonomical characters of the cockpit of an aircraft.
* The effects of short- and long-range flights from the passenger's point of view.
* Medical Evacuation by Air (MEDEVAC) Transportation of Sick and Wounded Patients by Air.
* The pilot's lifestyle, nutrition and sports.
* The adverse effects of changes in baropressure on the human body. The effect of reduction in partial oxygen pressure on the human body, its importance in aviation. Pressure oxygen breathing. The pressurized cabin.
* The psychophysiological characters of the pilot's personality. The fatigue and overload of aircrews
* Decompression sickness.
* Spatial alertness in flight, flight illusions. Motion sickness in aviation.
* The physiological effects of space flight on the human body. The basic principles of astronaut selection and training.

THE CLINICAL BASICS OF AVIATION AND SPACE MEDICINE

8th or 10th semester

* The aeromedical qualification system in civilian and military practice.
* Functional diagnostic examinations in practical aviation medicine.
* Aeromedical problems in pulmonology and gastroenterology.
* The cardiological aspects of aviation medicine.
* Excess temperature in aviation.
* Neurological and psychiatricalproblems in aviation medicine.
* Ophtalmology in aviation medicine.
* Emphasized aeromedical issues in oto-rhino-Iaryngology.
* The comparison of experiences gained in the MiG-29 and the Gripen.
* The issues of alcoholism in aviation medicine.
* Rheumatological aspects of aviation.
* The medical background of the International Space Station (ISS). Medical care during long-term space flights.
* Energy drinks in aviation?

LABORATORY DIAGNOSTICS: USE OF LABORATORY TESTS IN PRACTICE

8th, 10th semester

	TUTORIAL (2 hours/week): Solving and discussing clinical cases
*	Introduction to laboratory diagnostics
*	Visit at the Department of Laboratory Medicine
*	Acid-base balance disorders: diagnosis and treatment of acute cases, combined acid-base disorders, discussion of complex cases
*	Disorders of water, sodium and potassium balance: diagnosis and treatment of osmoregulatory defects and hypo-, and hyperkalaemia and -natraemia
*	Bone and calcium metabolism: Causes of hypo- and hypercalcaemia, diagnostic algorithms
*	Laboratory diagnosis of renal diseases: Managing patients with acute and chronic renal failure, diagnosis of impaired glomerular and tubular function. Differential diagnosis of proteinuria
*	Laboratory diagnosis of diabetes mellitus: diagnosis and treatment of acute cases, problems with the laboratory monitoring of long-term outcomes
*	Cardiovascular risk assessment and laboratory management of patients with cardiovascular diseases: case discussions – Evidence-based practice of AMI, acute coronary syndrome and congestive heart failure. Differential diagnosis of acute chest pain and dyspnoea.
*	The role of laboratory in oncology: tumor markers and their use in practice
*	Case presentations in endocrinology – a case oriented approach: Functional tests and diagnostic algorithms in the investigation of endocrine abnormalities
*	Laboratory diagnosis of coagulation disorders: Cases on the diagnosis of thrombo-embolic events (DVT, PE, congenital thrombophilias, lupus anticoagulant and anti-phospholipid syndrome) and bleeding disorders
*	Haematology cases: differential diagnosis of anaemia, diagnosis of monoclonal gammopathies, use of flow cytometry in haemato-oncology
*	Therapeutic drug monitoring: Role of TDM in patients treated with lithium, digoxin, antibiotics and immunosuppressive medications.
*	Toxicology: Cases on drug overdose and ingestion of toxic substances.

NEUROSURGERY

10th semester

	LECTURE (1 hr/week)	**PRACTICE (1 hr/week)**
*	Introduction to neurosurgery. History, main topics, diagnostic procedures.	Material of the lectures in practice.
*	Head injury. Head trauma, biomechanics, skull fractures, early and late complications, management, outcome.	Material of the lectures in practice.
*	Tumors of the CNS. Increased intracranial pressure, brain oedema, signs and symptoms of space-occupying lesions.	Material of the lectures in practice.
*	Supratentorial tumors.	Material of the lectures in practice.

*	Axial-tumors, tumors of the posterior fossa.	Material of the lectures in practice.
*	Tumors of the spine and spinal cord, metastatic tumors.	Material of the lectures in practice.
*	Vascular disorders of the brain. Pathophysiology of cerebral circulation, occlusive cerebrovascular diseases, operative versus conservative treatment, intracerebral haemorrhage.	Material of the lectures in practice.
*	Subarachnoid bleeding, cerebral aneurysms, early and late surgery, arteriovenous malformations cavernomas of the brain, venous anomalies.	Material of the lectures in practice.
*	Spinal trauma. Biomechanics, acute pathology, early and late surgery versus conservative treatment, peripheral nerve injuries.	Material of the lectures in practice.
*	Cervicobrachial syndromes. Herniation of the intervertebral disc in the cervical region, cervical spondylosis, narrowed spinal canal, surgical versus conservative therapy.	Material of the lectures in practice.
*	Lumbar syndromes. Low back pain, lumbar disc prolaps, spondylosis of the lumbar region, failed back syndrome.	Material of the lectures in practice.
*	Congenital anomalies. CSF circulatory disturbances, hydrocephalus, meningoceles, Chiari-malformation, pediatric neurosurgery.	Material of the lectures in practice.
*	Main topics of functional neurosurgery	Material of the lectures in practice.
*	Exam	

NUCLEAR MEDICINE

7th semester

	LECTURE (1 hr/week)
*	Nuclear medicine physics History Basic principles of nuclear physics and radiation biology
*	Instrumentation of nuclear medicine Radiation detector systems Gamma camera Single photon emission computed tomography Positron emission computed tomography (PET), PET/CT
*	Radiopharmacology Tracer principle Production of radionuclides Radiopharmaceutical chemistry
*	Nuclear medicine in disorders of bones and joints Bone scintigraphy Joint scintigraphy Bone marrow scintigraphy Complementary investigations of the bones and joints
*	Nuclear cardiology I. Myocardial perfusion studies

*	Nuclear cardiology II. Radionuclide ventriculography (RNV) at rest RNV during stress ECG-gated RNV with SPECT Miscellaneous nuclear cardiological methods
*	Nuclear medicine investigations of the respiratory system Lung perfusion investigation Lung ventilation investigations Diagnosis of pulmonary embolism
*	Nuclear medicine in gastroenterology Hepatobiliary scintigraphy Differential diagnostics of focal liver lesions Scintigraphy of the salivary glands Oesophagus passage study Gastric motility study Gastrointestinal bleeding site detected by radioisotopes Meckel's diverticulum detection Investigations of intestinal inflammations Investigations in malabsorption (Schilling test)
*	In vitro nuclear medicine assays with radionuclides Principles of immunoassays Clinical applications of immunoassays
*	Endocrinological aspects of nuclear medicine Thyroid scintigraphy Parathyroid scintigraphy Adrenal scintigraphy Neuroendocrine tumor imaging techniques
*	Nuclear medicine in urogenital disorders Static renal scintigraphy Dynamic studies Vesicoureteric reflux study Evaluation of renal transplants Scrotum scintigraphy Radionuclide hysterosalpingography
*	Nuclear medicine of the central nervous system (CNS) Brain angioscintigraphy and blood-brain barrier scintigraphy Cerebrospinal fluid scintigraphy Brain SPECT studies Neuroreceptor SPECT Brain tumors evaluated by SPECT Brain PET studies
*	Nuclear oncology Tumour markers Tumouraffin radiopharmaceuticals and their applications Oncological aspects of bone marrow scintigraphy Scintigraphy of the lymphatic system, sentinel lymph node detection Oncological aspects of PET, PET/CT and SPECT/CT studies
*	Nuclear medicine in therapy Thyroid disorders treated with radioisotopes Radiosynovectomy Palliative treatment of bone metastases Possibilities in radioimmunotherapy Neuroendocrine tumours treated with 131-I-MIBG 32-P treatment in polycythaemia vera

ORAL AND MAXILLOFACIAL SURGERY

8th and 10th semester

	LECTURE (2 hrs/week)
*	Cardiac risk patients in dental practice
*	Antibiotics in dentistry and oral surgery
*	Internal medicine questions in dental practice
*	Dental treatment of patients with bleeding disorders
*	Dental treatment of patients following radio/chemotherapy
*	Maxillary sinus diseases and their management
*	Stomato-oncological screening
*	Differential diagnosis of neck masses
*	Differential diagnosis of facial pain
*	Head and neck skin tumors
*	Odontogenic tumors
*	Sedoanelgesia
*	Written exam

SOCIAL AND HEALTH POLICY

8th, 10th semester

	LECTURE (2 hrs/week)
*	Introduction to health policy. The influence of international organisations (WHO, World Bank etc.) on national health policies.
*	Health and health policy in the European Union.
*	The basic principles of health care systems.
*	Health care services in selected European countries.
*	Health care services in North American countries.
*	Quality assurance in health care.
*	Human resource management in health care.
*	Introduction to social policy. The aim and task of social policy. The basic values and principles of social policy.
*	Social policy in welfare states.
*	The structure and function of social policy in the European Union. Social policy in developing countries.
*	Poverty, deprivation, patterns of inequalities.
*	Social policy of high-risk populations I. (immigrant, ethnicity, unemployed).
*	Social policy of high-risk populations II. (disabled, chronic diseased, elderly).
*	The evaluation of the social and health care reforms from the beginning of ’90s – world tendencies (Final evaluation).

THE LANGUAGE OF EFFECTIVE DOCTOR-PATIENT COMMUNICATION I.

7th or 9th semester

	PRACTICE (2 hrs/week)	
*	An introduction to physician – patient communication 1	An overview of communication. Identifying the elements that make up communication
*	An introduction to physician – patient communication 2	The patient centered approach: patient friendly language in history taking, instructing patients during examinations and discussing treatment options.
*	Gastroenterology 1	Receiving patients: greeting them and putting them at ease. Introducing yourself as the attending physician and explaining your role.
*	Gastroenterology 2	The presenting complaint. Encouraging patients to describe their problems in their own words.
*	Gynecology and obstetrics 1	Asking for history of menstruation Encouraging withdrawn patients to speak
*	Gynecology and obstetrics 2	Taking obstetric history: previous pregnancies, complications, deliveries, asking for present complaints
*	Orthopedics	Patient's past medical history. Discussing family medical history. Taking effective notes during the interview.
*	Endocrinology	Explaining medical terminology to a patient Updating patient notes
*	Surgery 1	Giving results: explaining results to patients, giving a prognosis
*	Surgery 2	Planning surgical treatment: explaining treatments/ surgical interventions to a patient, discussing options
*	Surgery 3	Describing benefits and side effects, negotiating treatment Informed decision making
*	Pulmonology	Delivering bad news Writing concise and accurate notes
*	Dental care	Preparing and reassuring the patient during the examination. Negotiating the treatment.
*	Test/exam	

THE LANGUAGE OF EFFECTIVE DOCTOR-PATIENT COMMUNICATION II.

8th or 10th semester

	PRACTICE (2 hrs/week)	
*	Cardiology	Enquiring about patient's social history. Asking about life-style and environmental health
*	Anesthesiology and intensive care	Anesthesiological assessment of a patient Describing types of anesthesia Postoperative care
*	Oncology	Educating and counseling patients and their families Revision of the written documentation of patient care
*	Dermatology	Discussing treatment options Showing sensitivity and respect to patients

*	Pediatrics 1	Communicating with children and adolescents. Establishing and developing rapport with a child.
*	Pediatrics 2	Reassuring a child. Child-friendly instructions. Asking about substance use.
*	Psychology	Encouraging withdrawn patients to speak. Calming aggressive or angry patients.
*	Neurology 1	Reassuring a patient or relative. Showing empathy.
*	Neurology 2	Techniques for communicating with patients with neurological problems. Language to show sensitivity.
*	Rheumatology	Encouraging patients to express their fears and concerns. Giving a prognosis.
*	Oto-rhino-laryngology	Summarizing and structuring the interview Communicating with elderly patients
*	Ophthalmology	Handling complaints Managing unrealistic requests (saying no)
*	Urology	Encouraging patients to express their fears and concerns Advising on lifestyle
*	Test/exam	

TROPICAL DISEASES

8th or 10th semester

	LECTURE (2 hrs/week)
*	General aspects of tropical diseases. Characteristic diseases of the gastrointestinal tract focusing on bacterial infections frequently seen in tropical areas. Pathogenesis, clinical and laboratory diagnosis, and therapeutic options. Travellers' diarrhoea. Pathogenesis, clinical and laboratory diagnosis.
*	Diarrhoea caused by protozoa: entamoebiasis, cryptosporidiasis, giardiasis, and diseases caused by *Isospora*, *Balantidium*, and *Capillaria*. Pathogenesis, clinical and laboratory diagnosis, and therapy. Epidemiology, life cycles clinical and laboratory diagnosis. Therapy.
*	Special aspects of viral infections in tropical areas. Geographical distribution, pathogenesis, clinical and laboratory diagnosis of arboviruses. Pathogenesis, clinical and laboratory diagnosis of viral haemorrhagic fevers; Marburg and Ebola viruses. Importance of the early diagnosis of imported viral infections in non-tropical countries. .
*	Arthropod-borne infections caused by various bacteria, and spirochetes in tropical areas. Distribution of various vectors which may influence the emergence of a disease. Plague. Clinical and laboratory diagnosis, and therapy.
*	SARS, avian flu, rabies, West Nile virus- and other rare viral infections characteristic in some tropical countries. Slow viruses. Clinical picture, pathogenesis, and diagnostic possibilities.
*	Malaria, schistosomiasis. Causative agents, distribution of vectors, pathogenesis, clinical and laboratory diagnosis, and therapy
*	Tuberculosis, leprosy, and other bacterial infections with special emphasis on tropical areas (meningitis caused by *N. meningitidis*, and rhinoscleroma). Clinical and laboratory diagnosis. Differences in clinical picture in the tropical areas compared to other countries. Therapy.

*	Sexually transmitted infections and diseases. Differences in the presentation of various bacterial and viral STDs in tropical areas. AIDS in Africa and in other undeveloped countries. Clinical symptoms, epidemiology, laboratory diagnosis, and therapy. AIDS-related infections and therapy.
*	A physician's experiences in the tropical area I.
*	Viral exanthemas and central nervous system infections in the tropical area. Clinical symptoms, epidemiology, laboratory diagnosis, and therapy.
*	A physician's experiences in the tropical area II.
*	Infections associated with immunosuppression and HIV. Clinical symptoms, epidemiology, pathogenesis, and laboratory diagnosis.
*	Lesser known viral infections in the tropical area. Clinical manifestation, pathogenesis, and diagnostic possibilities.
*	Written exam.

RHEUMATOLOGY

9th semester

LECTURE
(2 hrs/week)

The course „Rheumatology" covers the whole spectrum of musculoskeletal diseases including the immune-mediated internal medical systemic inflammatory diseases. The aim of the course is to provide a more detailed and practical overview of various types of arthritis and systemic autoimmune diseases, in addition to the limited topics covered within the clinical immunology section of the Internal Medicine course. The immunological basis of the diseases, novel treatment paradigms, the principles of immunosuppressive therapy, the innovative biological therapies, and the systematic diagnostic work-up of patients with arthritis, and other immune-mediated manifestations, such as Raynaud's phenomenon, skin, renal, pulmonary, neurological, etc. involvements typical of systemic autoimmune diseases are detailed within the course „Rheumatology". The topics are delivered in lectures and practicals at the Department of Rheumatology.

*	Introduction into rheumatology (basics, history, immunopathological principles)
*	Rheumatoid arthritis – therapeutic principles, new paradigms, biological therapies
*	Systemic lupus erythematosus, antiphospholipid syndrome.
*	Practical
*	Systemic sclerosis (scleroderma), Mixed connective tissue disease (MCTD).
*	Systemic vasculitides (terminology, general overview of the clinical spectrum)
*	ANCA-associated vasculitides
*	Polymyalgia rheumatica, giant cell arteritis, Takayasu arteritis
*	Practical
*	Spondyloarthritides (ankylosing spondylitis, psoriatic arthritis, reactive arthritis, enteropathicarthritis)
*	Consultation

CARDIAC ELECTROPHYSIOLOGY AS A BASIC PROPERTY OF CARDIAC FUNCTION

4th and 8th semester

	LECTURE AND PRACTICE (2 hrs/week)
*	Introduction.
*	Basic principles of electrophysiology, the impulse propagation in the heart I.
*	Basic principles of electrophysiology, the impulse propagation in the heart II.
*	The action potential of myocytes and the ionic channels determining the action potential I.
*	The action potential of myocytes and the ionic channels determining the action potential II.
*	Methods and techniques in cardiac electrophysiology.
*	Electro-mechanical coupling in the heart I.
*	Genetic background of ion-channel disturbances in the heart.
*	Electro-mechanical coupling in the heart II.
*	The mechanism of developing cardiac arrhythmias
*	Electrophysiological changes after the disturbances in blood supply to the myocardium.
*	Experimental methods and clinical relevance to investigate cardiac arrhythmias.
*	Investigational techniques in cardiac cellular electrophysiology
*	Practical and consultation

CASES IN MEDICAL MICROBIOLOGY AND INFECTIOUS DISEASES

Lecture 1. Introduction. It will be discussed the way how the lectures will be structured and the cases will be distributed to the students, which should be presented by them during the semester.

Lecture 2. How to take samples to diagnose an infectious disease by microbiological methods? Cases will be discussed where these procedures have a great influence on the outcome of results of the laboratory investigations and the fate of the patient. Cases will be discussed where **sepsis is the final diagnosis**; how to choose antibiotic treatment. Microbiological diagnostic methods, their sensitivity and specificity, as well as the difficulties how to decide whether they show true of false positive or negative results will be shown through real cases.

Lecture 3. Upper and lower urinary tract infections. Differences in antibiotic resistance of pathogens causing urinary tract infections will be discussed. Why do we have pitfalls in the laboratory tests. Cases to show the differences in **gastrointestinal diseases** caused by bacteria, viruses and parasites will be discussed.

Lecture 4. Infections caused by anaerobic bacteria. Diagnostic problems compared to infections where aerobic bacteria are involved. How to take samples to be able to isolate anaerobic pathogens? Special aspects of clostridial infections, other than *C. difficile* will be discussed. Frequent and unusual cases where anaerobic bacteria were involved and special aspects of antibiotic treatment of such cases will be discussed. (The lecture will be given by associate professor Edit Urbán)

Lecture 5. Cases belonging to **upper and lower respiratory tract infections** will be discussed. Causative agents in different age groups will be shown. We will cover community-acquired and nosocomial pneumonia cases and other respiratory tract infections. How to select appropriate antibiotic treatment empirically? The value of microbiological tests will also be discussed.

Lecture 6. Central nervous system infections and joint infections. The main pathogens and how to diagnose them will be discussed. Direct and indirect methods which can be used to reach a microbiological diagnosis will be shown. Through case discussions special aspects of selection proper antibiotic therapy will be discussed.

Lecture 7. Differentiation between infection and colonization. How to distinguish them through laboratory tests? Cases caused by fungi will be discussed. How to differentiate systemic or local **fungal infections**? Which are the difficulties in laboratory tests to diagnose fungal diseases will be discussed.

Lecture 8. Sexually transmitted diseases and their consequences. Classical and new STD pathogens and the possibilities of diagnostics will be shown. How to choose antibiotic treatment? Beside the prevalence of AIDS in Hungary and in the world, AIDS related infections will also be discussed.

Lecture 9. Nosocomial infections and nosocomial epidemics. Which methods are suitable to diagnose the spread of nosocomial pathogens in hospital environment? Why *C. difficile* is considered one of the emerging infections causing nosocomial outbreaks. Cases involved in nosocomial epidemics will be discussed, together with the measures that can be taken to stop the spread of bacteria or viruses.

Lecture 10. Infections of immuncompromised patients. Special aspects of infections of haematology patients, the role of facultative and non-pathogenic bacteria in infections of immunosuppressed patients and the problems in the laboratory diagnosis of such clinical situations will be discussed.

Lecture 11. Molecular diagnostic methods in clinical microbiology. How to use molecular biological methods in routine clinical microbiological diagnostics? What is the value of these methods? Are there quality control problems? Cases will be discussed where molecular techniques can be helpful in the diagnosis.

Lecture 12. Congenital, perinatal and central nervous system infections caused by viruses will be discussed through case studies. Special aspects of sample taking if virus diagnosis is requested will be explained. (The lecture will be given by professor Judith Deák).

Lecture 13. Interesting recent infectious disease cases from the practice of the Institute of Clinical Microbiology, where the methods used for the diagnostics is unique, or we had differential diagnostic problems, or problems to suggest proper therapy due to multi-resistance of the isolated pathogen.

PHYSICS IN RADIOTHERAPY

8th Semester

	LECTURE (1 hr/Week)
*	Basic Radiation Physics, electron interactions, photon interactions
*	Radiation dosimeters, Ionization chambers, Film dosimetry, Semiconductors
*	Treatment machines for external beam radiotherapy, LINACs, Calibration photon and electron beams
*	Commissioning of linear accelerators, quality assurance and quality control in RT
*	Clinical treatment planning in external photon beam radiotherapy
*	The role of imaging procedures in radiation therapy
*	Special procedures and techniques in radiotherapy, conformal radiotherapy. Intensity-modulated radiation therpy, Image-guided radiotherapy

Faculty of Pharmacy

GENERAL INFORMATION REGARDING THE CREDIT SYSTEM AT THE FACULTY OF PHARMACY

I. STRUCTURE OF STUDIES

Students have to acquire **300 credits** in order to obtain the Doctor of Pharmacy degree. Credits have to be acquired according to the following scheme:

Compulsory subjects: **240 credits**
Compulsory elective subjects: **44 credits**

- Subjects of the ninth semester: one has to acquire min. **12 credits**
- Students have to submit a thesis in the tenth semester (**10 credits**)
- 6 months of compulsory pharmacy practice, including 1 month of hospital practice (**22 credits**)

Elective subjects: **16 credits**

Students have to obtain min. **80 credits** until the end of the fourth semester.

SUGGESTED STUDY PLAN - PHARMACY - 2017/2018

1st (fall) semester — 1st YEAR

Course Code	Course	Department	Lecturer	Theory Hrs/week	Practice Hrs/week	Form of exam	Credit	Course Requirement (SR=Subject requirement; ER=Examination requirement; P=Parallel Completion)
	Compulsory Subjects							
GYTKKAM041	Physics-Biophysics I.	Experimental Physics Department	Dr. GÁBOR LACZKÓ associate professor	2	-	Exam	2	-
GYTKKAM011	History of Pharmacy and Pharmaceutical Propedeutics	Institute of Pharmaceutical Technology and Regulatory Affairs	Dr. TAMÁS SOVÁNY assistant lecturer, Dr. GÉZA REGDON associate professor	3	-	Exam	3	-
GYTKKAM021	Mathematics	Faculty of Science and Informatics, Bolyai Institute	Dr. JÁNOS KARSAI associate professor	2	-	Exam	3	-
GYTKKAM022	Mathematics	Faculty of Science and Informatics, Bolyai Institute	Dr. JÓZSEF ELLER senior research associate	-	2	Term Mark	2	-
GYTKKAM031	Informatics	Dept. of Med. Physics and Informatics	Dr. FERENC PETÁK associate professor	-	2	Term Mark	2	-
GYTKKM051	General Chemistry	Department of Physical Chemistry and Materials Science	Dr. ÁRPÁD SZŰCS associate professor	2	-	Exam	3	-
GYTKKAM052	General Chemistry	Department of Physical Chemistry and Materials Science	Dr. OTTÓ BERKESI associate professor	-	4	Term Mark	3	-
GYTKKAM071	Pharmaceutical Biology	Medical Genetics Department	Prof. habil. MÁRTA SZÉLL Head of Department, Dr. habil. ZSUZSANNA LÁSZLÓ associate professor	3	-	Exam	3	-
GYTKKAM111	Anatomy I.	Anatomy Department	Dr. ERIKA BÁLINT assistant professor	2	-	Exam	2	-
GYTKKAM491	English Language I.	Department of Foreign Languages	Dr. ÉVA DEMETER language teacher, Head of Department	-	2	Term Mark	0	-
GYTKKAM981	Latin Language	Department of Foreign Languages	Dr. ÉVA DEMETER language teacher, Head of Department	-	2	Term Mark	2	-
GYTKKAM551	Hungarian Language I.	Department of Foreign Languages	Dr. ÉVA DEMETER language teacher, Head of Department	-	4	Term Mark	2	-
	Criteria Subjects							
XT0011-PHE	Physical Education*	Sport Center	Andrea Böröcz Hézsőné	-	2	Signature	0	-

* One has to complete 2 semesters of Physical Education until the end of the 5th year.

2nd (spring) semester — 1st YEAR

	Compulsory Subjects							
GYTKKAM042	Physics-Biophysics II.	Experimental Physics Department	Dr. GÁBOR LACZKÓ associate professor	2	-	Exam	3	Physics-Biophysics I.
GYTKKAM043	Physics-Biophysics II.	Experimental Physics Department	Dr. GÁBOR LACZKÓ associate professor	-	2	Term Mark	2	Physics-Biophysics I.
GYTKKAM061	Inorganic Chemistry	Institute of Pharmaceutical Analysis	Prof. habil. TAMÁS MARTINEK professor, Head of Department, Prof. habil. GYÖRGY DOMBI professor, Dr. GERDA SZAKONYI assistant professor	3	-	Exam	4	General Chemistry exam, practice
GYTKKAM091	Qualitative Chemical Analysis	Institute of Pharmaceutical Chemistry	Dr. ISTVÁN MÁNDITY assistant professor	2	-	Exam	3	General Chemistry exam, practice
GYTKKAM092	Qualitative Chemical Analysis	Institute of Pharmaceutical Chemistry	Dr. ISTVÁN SZATMÁRI assistant professor	-	4	Term Mark	4	General Chemistry exam, practice
GYTKKAM101	Quantitative Chemical Analysis	Department of Inorganic and Analytical Chemistry	Dr. ATTILA JANCSÓ assistant professor	4	-	Exam	6	General Chemistry exam, practice
GYTKKAM113	Anatomy II.	Anatomy Department	Dr. ERIKA BÁLINT assistant professor	2	-	Exam	2	Anatomy I. exam
GYTKKAM541	Biostatistics	Dept. of Medical Physics and Informatics	Dr. KRISZTINA BODA associate professor	1	-	Exam	3	Mathematics exam, practice
GYTKKAM542	Biostatistics	Dept. of Medical Physics and Informatics	Dr. KRISZTINA BODA associate professor	-	1	Signature	0	Mathematics exam, practice
GYTKKAM531	First Aid and Resuscitation	National Ambulance Service	Dr. ANDREA CSERJÉS head physician	1	-	Signature	0	-
GYTKKAM532	First Aid and Resuscitation	National Ambulance Service	Dr. ANDREA CSERJÉS head physician	-	1	Term Mark	2	-
GYTKKAM492	English Language II.	Department of Foreign Languages	Dr. ÉVA DEMETER language teacher, Head of Department	-	2	Term Mark	0	English Language I.
GYTKKAM552	Hungarian Language II.	Department of Foreign Languages	Dr. ÉVA DEMETER language teacher, Head of Department	-	4	Term Mark	2	Hungarian Language I.
	Criteria Subjects							
XT0011-2PHE	Physical Education*	Sport Center	Andrea Böröcz Hézsőné	-	2	S	0	-

* One has to complete 2 semesters of Physical Education until the end of the 5th year.

SUGGESTED STUDY PLAN - PHARMACY - 2017/2018

Course Code	Course	Department	Lecturer	Theory Hrs/week	Practice Hrs/week	Form of exam	Credit	Course Requirement (SR=Subject requirement; ER=Examination requirement; P=Parallel Completion)
3rd (fall) semester								**2nd YEAR**
	Compulsory Subjects							
GYTKKA103	Quantitative Chemical Analysis II.	Department of Inorganic and Analytical Chemistry	Dr. habil. GÁBOR GALBÁCS associate professor, Head of Department	2	-	CE	4	Quant. Chem. Anal. I.
GYTKKA104	Quantitative Chemical Analysis II.	Department of Inorganic and Analytical Chemistry	Dr. TAMÁS JAKUSCH assistant professor	-	6	Term Mark	4	Quant. Chem. Anal. I.
GYTKKA105	Quantitative Chemical Analysis - Calculation	Department of Inorganic and Analytical Chemistry	Dr. ÉVA ANNA ENYEDI assistant professor	1	-	Evaluation	1	Quant. Chem. Anal. I.
GYTKKA121	Organic Chemistry I.	Institute of Pharmaceutical Chemistry	Dr. LÓRÁND KISS associate professor	2	-	Exam	4	General Chem., Qual. Chem. Analysis
GYTKKA122	Organic Chemistry I.	Institute of Pharmaceutical Chemistry	Dr. LÓRÁND KISS associate professor	-	2	Term Mark	3	General Chem., Qual. Chem. Analysis
GYTKKA151	Physiology I.	Physiology Department	Prof. habil. GYÖNGYI HORVÁTH professor	4	-	Exam	4	Anatomy II. exam
GYTKKA152	Physiology I.	Physiology Department	Dr. BALÁZS BODOSI assistant professor	-	2	Term Mark	2	Anatomy II. exam
GYTKKA131	Physical Chemistry I.	Department of Physical Chemistry and Materials Science	Dr. GÁBOR PEINTLER associate professor	2	-	Exam	2	Math. (exam, pract.), General Chem. (exam, pract.)
GYTKKA132	Physical Chemistry Calculation	Department of Physical Chemistry and Materials Science	Dr. GÁBOR PEINTLER associate professor	-	1	Term Mark	1	Math. (exam, pract.), General Chem. (exam, pract.)
GYTKKA161	Colloid Chemistry	Department of Physical Chemistry and Materials Science	Dr. ZOLTÁN KIRÁLY associate professor	2	-	Exam	3	Math. (exam), Gen. Chem. (exam, pr.), Quant. Chem.(pr.), Phys.-Biophys.
GYTKKA553	Hungarian Language III.	Department of Foreign Languages	Dr. ÉVA DEMETER language teacher, Head of Department	-	4	Term Mark	0	Hung. Lang. II.
	Criteria Subjects							
XT0011-PHE	Physical Education*	Sport Center	Andrea Böröcz Hézsőné		1	S	0	-

* One has to complete 2 semesters of Physical Education until the end of the 5th year.

4th (spring) semester								**2nd YEAR**
	Compulsory Subjects							
GYTKKA133	Physical and Colloid Chemistry practice	Department of Physical Chemistry and Materials Science	Dr. GÁBOR PEINTLER associate professor	-	5	Term Mark	4	Phys. Chem. I. exam, Calculation, Colloid Chemistry exam
GYTKKA123	Organic Chemistry II.	Institute of Pharmaceutical Chemistry	Dr. LÓRÁND KISS associate professor	3	-	CE	5	Organic Chem. I. exam, practice
GYTKKA142	Pharmaceutical Botany II.	Department of Pharmacognosy	Dr. ZSUZSANNA HAJDÚ associate professor	2	-	Exam	5	-
GYTKKA143	Pharmaceutical Botany II.	Department of Pharmacognosy	Dr. ZSUZSANNA HAJDÚ associate professor	-	2	Term Mark	2	-
GYTKKA153	Physiology II.	Physiology Department	Prof. habil. GYÖNGYI HORVÁTH professor	4	-	CE	6	Physiology I. (exam, practice)
GYTKKA154	Physiology II.	Physiology Department	Dr. BALÁZS BODOSI assistant professor	-	2	Signature	0	Physiology I. (exam, practice)
GYTKKA171	Biochemistry	Biochemistry Department	Prof. habil. LÁSZLÓ DUX professor, Head of Department	4	-	Exam	4	Organic Chemistry I. Organic Chemistry II. (parallel) Physiology I. (exam, pract.)
GYTKKA591	Pharmaceutical Propedeutics	Institute of Pharmaceutical Technology and Regulatory Affairs	ifj. Dr. GÉZA REGDON associate professor	2	-	Exam	3	-
GYTKKA554	Hungarian Language IV.	Department of Foreign Languages	Dr. ÉVA DEMETER language teacher, Head of Department	-	4	Term Mark	0	Hung. Lang. III.
	Criteria Subjects							
GYTKKA511	Summer Practice after 2nd year	Institute of Pharmaceutical Technology and Regulatory Affairs	Dr. ERZSÉBET CSÁNYI associate professor	-	total 35	Signature	0	
XT0011-2PHE	Physical Education*	Sport Center	Andrea Böröcz Hézsőné	-	1	Signature	0	-

* One has to complete 2 semesters of Physical Education until the end of the 5th year.

SUGGESTED STUDY PLAN - PHARMACY - 2017/2018

5th (fall) semester — 3rd YEAR

Course Code	Course	Department	Lecturer	Theory Hrs/week	Practice Hrs/week	Form of exam	Credit	Course Requirement (SR=Subject requirement; ER=Examination requirement; P=Parallel Completion)
	Compulsory Subjects							
GYTKKA181	Pharmacognosy I.	Department of Pharmacognosy	Dr. ATTILA HUNYADI associate professor, Prof. habil.IMRE MÁTHÉ professor emeritus	3	-	Exam	3	Organic Chem. II. exam, Botany II. (exam, pract.)
GYTKKA182	Pharmacognosy I.	Department of Pharmacognosy	Dr. ATTILA HUNYADI associate professor	-	4	Term Mark	3	Botany II. (exam, pract.)
GYTKKA231	Pharmaceutical Chemistry I.	Institute of Pharmaceutical Chemistry	Prof. habil. FERENC FÜLÖP professor, Head of Department, Dr. LÁSZLÓ LÁZÁR associate professor	4	-	Exam	5	Qual. Chem., Quant. Chem.II., Organic Chem. II.
GYTKKA232	Pharmaceutical Chemistry I.	Institute of Pharmaceutical Chemistry	Dr. ZSOLT SZAKONYI associate professor	-	6	Term Mark	5	Qual. Chem., Organic Chem. I. practice, Organic Chem. II. lecture
GYTKKA221	Pharmaceutical Technology I.	Institute of Pharmaceutical Technology and Regulatory Affairs	Dr. habil. ILDIKÓ CSÓKA associate professor, Head of Institute	2	-	Signature	0	Phys. Chem., Phys. Chem. calc., Colloid Chem.
GYTKKA201	Microbiology and Immunology	Microbiology Department	Prof. habil. YVETTE MÁNDI professor, Head of Department	4	-	Exam	4	Biol.exam, Anat.II., Phys. II. exam, pr., Biochemistry
GYTKKA202	Microbiology and Immunology	Microbiology Department	Prof. habil. YVETTE MÁNDI professor, Head of Department	-	2	Term Mark	0	Biology exam, Anatomy II., Physiology II. exam, Biochemistry
GYTKKA191	Pathophysiology I.	Pathophysiology Department	Prof. habil. GYULA SZABÓ professor, Head of Department	2	-	Exam	3	Anatomy II. exam, Physiology II. exam, pr., Biochem. exam
GYTKKA192	Pathophysiology I.	Pathophysiology Department	Prof. habil. GYULA SZABÓ professor, Head of Department	-	2	Signature	0	Anatomy II. exam, Physiology II. exam, pr., Biochem. exam
GYTKKA555	Hungarian Language V.	Department of Foreign Languages	Dr. ÉVA DEMETER language teacher, Head of Department	-	3	Term Mark	0	Hung. Lang. IV.
	Criteria Subjects							
XT0011-PHE	Physical Education*	Sport Center	Andrea Böröcz Hézsőné	-	1	Signature	0	

* One has to complete 2 semesters of Physical Education until the end of the 5th year.

6th (spring) semester — 3rd YEAR

Course Code	Course	Department	Lecturer	Theory Hrs/week	Practice Hrs/week	Form of exam	Credit	Course Requirement (SR=Subject requirement; ER=Examination requirement; P=Parallel Completion)
	Compulsory Subjects							
GYTKKA183	Pharmacognosy II.	Department of Pharmacognosy	Prof. habil. IMRE MÁTHÉ professor emeritus, Dr. ATTILA HUNYADI associate professor	2	-	CE	3	Pharmacognosy I. exam
GYTKKA184	Pharmacognosy II.	Department of Pharmacognosy	Dr. ATTILA HUNYADI associate professor	-	4	Term Mark	3	Pharmacognosy I. exam, practice
GYTKKA233	Pharmaceutical Chemistry II.	Institute of Pharmaceutical Chemistry	Prof. habil. FERENC FÜLÖP professor, Head of Department, Dr. LÁSZLÓ LÁZÁR associate professor, Dr. ZSOLT SZAKONYI associate professor	4	-	CE	5	Pharm. Chem. I. exam, practice
GYTKKA234	Pharmaceutical Chemistry II.	Institute of Pharmaceutical Chemistry	Dr. ISTVÁN MÁNDITY assistant professor	-	6	Term Mark	5	Pharm. Chem. I. exam, practice
GYTKKA222	Pharmaceutical Technology II.	Institute of Pharmaceutical Technology and Regulatory Affairs	Dr. ZOLTÁN AIGNER associate professor	2	-	Exam	3	Pharm. Techn. I.
GYTKKA223	Pharmaceutical Technology Prescription Pharmacy I.	Institute of Pharmaceutical Technology and Regulatory Affairs	Dr. ERZSÉBET CSÁNYI associate professor	-	3	Term Mark	3	Pharm. Techn. I.
GYTKKA224	Pharmaceutical Technology Galenic Prep. and Their Manufacture	Institute of Pharmaceutical Technology and Regulatory Affairs	Dr. GÁBOR KATONA assistant lecturer	-	3	Term Mark	3	Pharm. Techn. I.
GYTKKA193	Pathophysiology II.	Pathophysiology Department	Prof. habil. GYULA SZABÓ professor, Head of Department	2	-	Exam	4	Pathophys. I., Immunology
GYTKKA194	Pathophysiology II.	Pathophysiology Department	Prof. habil. GYULA SZABÓ professor, Head of Department	-	2	Signature	0	Pathophys. I. (exam, pr.)
GYTKKA241	Biopharmacy	Institute of Pharmacodynamics and Biopharmacy	Dr. ISTVÁN ZUPKÓ associate professor	2	-	Exam	2	Mathematics, Physiology II. exam, Biochemistry
GYTKKA242	Biopharmacy	Institute of Pharmacodynamics and Biopharmacy	Dr. RENÁNA MINORICS assistant proferssor, Dr. ANITA SZTOJKOV-IVANOV assistant professor	-	3	Term Mark	2	Mathematics, Physiology II., Biochemistry
GYTKKA556	Hungarian Language VI.	Department of Foreign Languages	Dr. ÉVA DEMETER language teacher, Head of Department	-	3	Term Mark	0	Hung. Lang. V.
	Criteria Subjects							
GYTKKA512	Summer Practice after 3rd year	Institute of Pharmaceutical Technology and Regulatory Affairs	Dr. ERZSÉBET CSÁNYI associate professor	-	total 35	Signature	0	
XT0011-2PHE	Physical Education*	Sport Center	Andrea Böröcz Hézsőné	-	1	Signature	0	

* One has to complete 2 semesters of Physical Education until the end of the 5th year.

SUGGESTED STUDY PLAN - PHARMACY - 2017/2018

Course Code	Course	Department	Lecturer	Theory Hrs/week	Practice Hrs/week	Form of exam	Credit	Course Requirement (SR=Subject requirement; ER=Examination requirement; P=Parallel Completion)
7th (fall) semester								**4th YEAR**
	Compulsory Subjects							
GYTKKA261	Pharmaceutical Analysis	Institute of Pharmaceutical Analysis	Prof. habil. GYÖRGY DOMBI professor, Prof. habil. TAMÁS MARTINEK professor, Head of Department, Dr. GERDA SZAKONYI assistant professor	2	-	Exam	3	Pharm. Chem. II. (theory, practice)
GYTKKA262	Pharmaceutical Analysis	Institute of Pharmaceutical Analysis	Dr. GERDA SZAKONYI assistant professor	-	5	Term Mark	4	Pharm. Chem. II. (theory, practice)
GYTKKA225	Pharmaceutical Technology III.	Institute of Pharmaceutical Technology and Regulatory Affairs	Dr. ERZSÉBET CSÁNYI associate professor	2	-	Signature	0	Pharm. Techn. II.
GYTKKA226	Pharmaceutical Technology Prescription Pharmacy II.	Institute of Pharmaceutical Technology and Regulatory Affairs	Dr. ERZSÉBET CSÁNYI associate professor	-	3	Term Mark	5	Pharm. Techn. II., Prescr. Pharm. I.
GYTKKA227	Pharmaceutical Technology Sterile and Aseptic Drug Formulations	Institute of Pharmaceutical Technology and Regulatory Affairs	Dr. ZOLTÁN AIGNER associate professor	-	3	Term Mark	3	Pharm. Techn. II.
GYTKKA251	Pharmacodynamics I.	Institute of Pharmacodynamics and Biopharmacy	Dr. ISTVÁN ZUPKÓ associate professor	3	-	Exam	3	Pathophys. II., Biopharmacy
GYTKKA252	Pharmacodynamics I.	Institute of Pharmacodynamics and Biopharmacy	Dr. JUDIT HAJAGOS-TÓTH assistant lecturer, Dr.ÁRPÁD MÁRKI assistant professor	-	3	Term Mark	2	Pathophys. II. (th., pr.), Biopharmacy (th., pr.)
GYTKKA271	Public Health and Preventive Medicine	Department of Public Health	Dr. habil. EDIT PAULIK associate professor, Head of Department	2	-	Exam	2	Physiology II. (th., pr.), Pathophys. II., Microbiology, Immunology
GYTKKA281	Ethics in Pharmacy	Institute of Pharmaceutical Technology and Regulatory Affairs	Dr. EDINA PALLAGI	2	-	Exam	2	Pharm. Techn. II.
GYTKKA291	Regulatory Affairs I. Introduction to Law	Institute of Pharmaceutical Technology and Regulatory Affairs	Dr. ANITA KOVÁCS assistant lecturer	2	-	Exam	2	Pharm. Techn. II.
GYTKKA301	Regulatory Affairs II. Introduction to Economics	Institute of Pharmaceutical Technology and Regulatory Affairs	Dr. habil. ILDIKÓ CSÓKA associate professor, Head of Institute	2	-	Exam	2	Pharm. Techn. II.
GYTKKA557	Hungarian Language VII.	Department of Foreign Languages	Dr. ÉVA DEMETER language teacher, Head of Department	-	2	Term Mark	0	Hung. Lang. VI.
GYTKKA1211	Preparation of Diploma Work I.			-	total10	Signature	0	-
	Criteria Subjects							
XT0011-PHE	Physical Education*	Sport Center	Andrea Böröcz Hézsőné	-	1	Signature	0	

* One has to complete 2 semesters of Physical Education until the end of the 5th year.

8th (spring) semester								**4th YEAR**
	Compulsory Subjects							
GYTKKA228	Pharmaceutical Technology IV.	Institute of Pharmaceutical Technology and Regulatory Affairs	Dr. habil. ILDIKÓ CSÓKA associate professor, Head of Institute	2	-	CE	4	Pharm. Techn. III.
GYTKKA229	Pharmaceutical Technology Prescription Pharmacy III.	Institute of Pharmaceutical Technology and Regulatory Affairs	Dr. CSILLA BARTOS assistant lecturer	-	3	Term Mark	2	Pharm. Techn. III., Prescr. Pharm. II.
GYTKKA595	Pharmaceutical Technology - Tablet and Tablet Coating	Institute of Pharmaceutical Technology and Regulatory Affairs	Dr. TAMÁS SOVÁNY assistant professor	-	5	Term Mark	2	Pharm. Techn. III.
GYTKKA596	Pharmaceutical Technology - Investigation of Dosage Forms	Institute of Pharmaceutical Technology and Regulatory Affairs	Dr. RITA AMBRUS assistant professor	-	4	Term Mark	3	Pharm. Techn. III.
GYTKKA253	Pharmacodynamics Toxicology II.	Institute of Pharmacodynamics and Biopharmacy	Dr. RÓBERT GÁSPÁR associate professor, Head of Department	3	-	Exam	3	Pharmacodynamics I. (th., pr.)
GYTKKA254	Pharmacodynamics Toxicology II.	Institute of Pharmacodynamics and Biopharmacy	Dr. JUDIT HAJAGOS-TÓTH assistant lecturer	-	3	Term Mark	2	Pharmacodynamics I. (th., pr.)
GYTKKA311	Drug Regulatory Affairs III.	Institute of Pharmaceutical Technology and Regulatory Affairs	Dr. habil. TAMÁS PAÁL professor	3	-	Exam	6	Intro. to Law, Intro. to Economy
GYTKKA481	Clinical Laboratory Practice	Institute of Pharmacodynamics and Biopharmacy	Dr. ESZTER DUCZA assistant professor	2	-	Exam	2	Physiology II., Pathophys. II.
GYTKKA482	Clinical Laboratory Practice	Institute of Pharmacodynamics and Biopharmacy	Dr. ADRIENN SERES assistant lecturer	-	2	Signature	0	Physiology II., Pathophys. II.
GYTKKA991	Pharmacy Administration	Department of Clinical Pharmacy	Dr. PÉTER DORÓ associate professor, Head of Department	-	1	Term Mark	2	Intro. to Law, Intro. to Economy
GYTKKA461	Phythotherapy	Department of Pharmacognosy	Dr. DEZSŐ CSUPOR associate professor	2	-	Exam	2	Pharmacognosy II. exam
GYTKKA558	Hungarian Language VIII.	Department of Foreign Languages	Dr. ÉVA DEMETER language teacher, Head of Department	-	2	CE	0	Hung. Lang. VII.
GYTKKA1221	Preparation of Diploma Work II.			-	total 10	Signature	0	Preparation of Diplomawork I.
	Criteria Subjects							
XT0011-2PHE	Physical Education*	Sport Center	Andrea Böröcz Hézsőné	-	1	Signature	0	

SUGGESTED STUDY PLAN - PHARMACY - 2017/2018

Course Code	Course	Department	Lecturer	Theory Hrs/week	Practice Hrs/week	Form of exam	Credit	Course Requirement (SR=Subject requirement; ER=Examination requirement; P=Parallel Completion)

* One has to complete 2 semesters of Physical Education until the end of the 5th year.

9th (fall) semester — 5th YEAR

	Compulsory Subjects							
GYTKKA331	Basic Clinical Disciplines	2nd Department of Internal Medicine	Dr. NOÉMI GRUBER associate professor	3	-	Exam	4	Phys. II., Pathophys. II., Pharmacodyn. II.
GYTKKA341	Clinical Pharmacy	Department of Clinical Pharmacy	Dr. PÉTER DORÓ associate professor, Head of Department, Prof. habil. GYÖNGYVÉR SOÓS professor	2	-	Exam	3	Pathophys. II., Biopharm., Public Health and Prev. Med.
GYTKKA255	Pharmacodynamics III.	Insitute of Pharmacodynamics and Biopharmacy	Dr. RÓBERT GÁSPÁR associate professor, Head of Department	3	-	CE	5	Pharmacodyn. II. (th., pr.)
GYTKKA256	Pharmacodynamics III.	Insitute of Pharmacodynamics and Biopharmacy	Dr. RENÁTA MINORICS assistant professor	-	3	Term Mark	2	Pharmacodyn. II. (th., pr.)
GYTKKA351	Pharmaceutical Care	Department of Clinical Pharmacy	Dr. PÉTER DORÓ associate professor, Head of Department	-	3	Term Mark	2	Pathophys. II., Biopharm., Public Health and Prev. Med.
GYTKKA371	Natural Treatments	Insitute of Pharmacodynamics and Biopharmacy	Dr. RÓBERT GÁSPÁR associate professor, Head of Department	2	-	Exam	2	Phys.-Biophys. II., Pharmacognosy II., Pathophys. II., Pharmacodyn. II.
GYTKKA411	Biotechnology	Institute of Pharmaceutical Analysis	Dr. GERDA SZAKONYI assistant professor, Dr. ZSÓFIA HEGEDÜS junior assistant professor	2		Exam	2	
GYTKKA521	Pharmacy Practice I. (2 months)	Institute of Pharmaceutical Technology and Regulatory Affairs	Dr. ERZSÉBET CSÁNYI associate professor	-	40 hrs	Term Mark	6	Completion of the 4th year subjects
GYTKKA1231	Preparation of Diplomawork III.			-	total 10	Signature	0	Preparation of Diplomawork II.
	Compulsory Elective Subjects							
GTYKKA471	Clinical Pharmacy II. Ward Pharmacy	Department of Clinical Pharmacy	Dr. PÉTER DORÓ associate professor, Head of Department	2	-	Exam	2	Pathophys. II., Biopharm., Pharmacodyn. II.
GYTKKA451	Pharmaceutical Psychology	Dept. Of Behavioural Sciences	Dr. CSABA HAMVAI intern	2	-	Exam	2	Physiology II., Pathophys. II., par: Pharmacodyn. III.
GYTKKA321	Veterinary Pharmacy	Institute of Pharmacodynamics and Biopharmacy	Dr. ESZTER DUCZA assistant professor	2	-	Exam	2	Biopharmacy
GYTKKA421	Quality Assurance	Institute of Pharmaceutical Technology and Regulatory Affairs	Prof. TAMÁS PAÁL professor	3	-	Exam	3	Regulatory Affairs III.
GYTKKA571	Everyday Dermatology	Department of Clinical Pharmacy	Prof. Dr. GYÖNGYVÉR SOÓS professor	2	-	Exam	2	-
GYTKKA1331	Evidence-based prevention and health promotion	Department of Public Health	Dr. habil Edit Paulik associate professor, Head of the Department	2		Exam	2	Public Health and Preventive Medicine
GYTKKA1341	Biopharmaceuticals	Institute of Pharmaceutical Analysis	Dr. GERDA SZAKONYI assistant professor	2		Evalution	2	Pharmaceutical Biology Lecture, Biochemistry
GYTKKA1351	Pharmaceutical psychology and communication	Institute of Pharmaceutical Technology and Regulatory Affairs	Dr. habil. ILDIKÓ CSÓKA associate professor, Head of Institute	2		Exam	2	Pharmacodynamics - Toxicology II. Lecture, Pharmaceutical Propedeutics
	Criteria Subjects							
XT0011-PHE	Physical Education*	Sport Center	Andrea Böröcz Hézsőné	-	1	Signature	0	

10th (spring) semester — 5th YEAR

	Compulsory Subjects							
GYTKKA522	Pharmacy Practice II. (4 months)	Institute of Pharmaceutical Technology and Regulatory Affairs	Dr. ERZSÉBET CSÁNYI associate professor		40 hrs	Term Mark	16	
GYTKKA391	Thesis					Defence	10	

*One has to complete 2 semesters of Physical Education until the end of the 5th year.

SUGGESTED STUDY PLAN - PHARMACY - 2017/2018

Course Code	Course	Department	Lecturer	Theory Hrs/week	Practice Hrs/week	Form of exam	Credit	Course Requirement (SR=Subject requirement; ER=Examination requirement; P=Parallel Completion)
Elective Subjects in the years 1-4								
GYTKKA901	General Laws in Chemistry	Institute of Pharmaceutical Analysis	Prof. habil. GYÖRGY DOMBI professor, Dr. GERDA SZAKONYI assistant professor	2	-	Evaluation	2	-
GYTKKA1041	Short History of Hungary I.	Dept. of Behavioural Sciences	SERFŐZŐNÉ Dr. ADÉL TÓTH assistant professor	2	-	Evaluation	2	-
GYTKKA891	Radiochemistry	Institute of Pharmaceutical Analysis	Prof. habil. GYÖRGY DOMBI professor, Dr. GERDA SZAKONYI assistant professor	2	-	Evaluation	2	-
GYTKKA1042	Short History of Hungary II.	Dept. of Behavioural Sciences	SERFŐZŐNÉ Dr. ADÉL TÓTH assistant professor	2	-	Evaluation	2	Short History of Hungary I.
GYTKKA1081	The Role of Nutrition in the Prevention and Treatment of Diseases	Institute of Pharmacodynamics and Biopharmacy	Dr. RÓBERT GÁSPÁR associate professor	2	-	Evaluation	2	-
GYTKKA841	Communication in Pharmacy Practice	Institute of Pharmaceutical Technology and Regulatory Affairs	Dr. EDINA PALLAGI	-	2	Evaluation	2	-
GYTKKA1071	The Harms of Smoking and Strategies to Quit	Institute of Pharmacodynamincs and Biopharmacy	Dr. RÓBERT GÁSPÁR associate professor, Head of Department	2	-	Evaluation	2	-
GYTKKA780	Computer Literature	Institute of Pharmaceutical Chemistry	Dr. ZSOLT SZAKONYI associate professor	-	2	Evaluation	2	Physiology I. (theory and practice), Organic Chemistry II.
GYTKKA441	Tropical Medicine	Psychiatry Department	Prof. habil. GÁBOR BÁLINT professor	2	-	Exam	2	Physiology II., Pathophys. II., Biopharm.
GYTKKA1031	Illicite Drug Use	Psychiatry Department	Prof. habil. GÁBOR BÁLINT professor	2	-	Exam	2	-
GYTKKA1181	Biopharmaceuticals	Institute of Pharmaceutical Analysis	Dr. GERDA SZAKONYI assistant professor	2	-	Evaluation	2	Biology, Biochemistry
GYTKKA1190	Clinical Aspects of Tropical Diseases	Psychiatry Department	Prof. habil. GÁBOR BÁLINT professor	2	-	Evaluation	2	-
GYTKKA511	Basic Clinical Pharmacology	Psychiatry Department	Prof. habil. GÁBOR BÁLINT professor	2	-	Evaluation	2	-

Recommended textbooks for first year pharmacy students

It is recommended to purchase the latest edition of the following textbooks!

PHYSICS-BIOPHYSICS

Recommended:
- Péter Makra: *Physics-biophysics* (handout, see http://www.noise.physx.u-szeged.hu/MP/Education/PhysicsBiophysics/, also available on CooSpace)
- Péter Makra (ed): *Physics-biophysics practicals* (handout, see http://www.noise.physx.u-szeged.hu/MP/Education/PhysicsBiophysics/, also available on CooSpace)
- Damjanovich Sándor - Fidy Judit - Szöllősi János: Medical biophysics (3rd edition). Medicina Könyvkiadó Rt
- Serway R A, Jewett J W. Physics for scientists and engineers. Thomson Brooks/Cole
- G.B. Arfken et al: *University Physics,* Academic Press, Inc.
- Tarján ed. *An introduction to Biophysics with medical orientation,* Budapest: Akadémiai Kiadó
- Á. Süli: *Physics for students of pharmacy* (handout)
- P. Simon: *Practical Physics* (handout)

HISTORY OF PHARMACY
- Lajos Simon: History of Pharmacy (handout)

MATHEMATICS

MATHEMATICS (available on: www.model.u-szeged.hu/Education-courses/mathematics for pharmacy students)
- Janos Karsai: Basic Math for Life Sciences (interactive presentations)
- Janos Karsai: Interactive lecture presentations for Mathematics in Pharmacy
- Janos Karsai: Exercises and problems in Mathematics (handout)
- Janos Karsai et al: Exercises for the Mathematics practical for Pharmacy students (handout)
- Krisztina Boda and Janos Karsai: Mathematics Problems, Exercises for Pharmacy students (handout)
- Tibor Asztalos: Mathematics for 1st year Pharmacy students (handout)

- Krisztina Boda and János Karsai: *Mathematics Problems, Exercises for Pharmacy students* (handout)
- Tibor Asztalos: *Mathematics for 1st year Pharmacy students* (handout)
- János Karsai: *Exercises and problems in Mathematics* (handout)
- János Karsai et al: *Exercises for the Mathematics practical for Pharmacy students* (handout) www.model.u-szeged.hu/Education-courses/mathematics for pharmacy students or http://www.model.u-szeged.hu/user/karsai/math/mathgytk/math-english.html

GENERAL CHEMISTRY
- Árpád Szűcs: *General Chemistry* (handout, PDF)
- Árpád Szűcs: *Calculations in General Chemistry* (handout, PDF)
- Árpád Szűcs: *Practices in General Chemistry* (handout, PDF)

PHARMACEUTICAL BIOLOGY
- *Cell Biology and Molecular Genetics I.*
- *Cell Biology and Molecular Genetics II.*
- *Life* (textbook)

ANATOMY
- András Mihály, MD, DSc: *Human Anatomy, Histology and Development,* Handout for Pharmacy Students at University of Szeged

INORGANIC CHEMISTRY
- N.N. Greenwood and A. Eranshaw: *Chemistry of the Elements*, 1st ed., Pergamon Press Ltd.

QUALITATIVE CHEMICAL ANALYSIS
- Vogel's *Qualitative Inorganic Analysis*, 7th ed. Longman

QUANTITATIVE CHEMICAL ANALYSIS

Theory

Obligatory:
- D. A. Skoog, D. M. West, F. J. Holler and S. R. Crouch: *Fundamentals of Analytical Chemistry*, Brooks/Cole

Recommended:
- D. A. Skoog, F. J. Holler and T. A. Nieman: *Principles of Instrumental Analysis*, Saunders College Publishing
- Daniel C. Harris, Quantitative chemical analysis, 7th edition
- Kellner, Mermet, Otto, Widmer: Analytical chemistry, Wiley-VCH
- H. H. Willard et al.: *Instrumental Methods of Analysis*, Wadsworth Publ. Co.
- J. S. Fritz and G. H. Schenk: *Quantitative Analytical Chemistry*, Allin and Bacon

Practice

Obligatory:
- G. Galbács, K. Gajda-Srantz: *Laboratory Manual for Pharmacy Students in Quantitative Analytical Chemistry* (manual in manuscript form, currently available for the students in handout form)
- Csikkel-Szolnoki, K. Jáky: *Problems in Quantitative Analytical Chemistry for Pharmacy Students* (ed. By G. Ács) Szeged, JATE Press

BIOSTATISTICS
- Lecture notes: http://www.szote.u-szeged.hu/dmi/
- Arnold Naiman, Robert Rosenfeld, Gene Zirkel: Understanding Statistics. McGraw-Hill International Editions
- M.J.Campbell, D.Machin: Medical Statistics. John Wiley & Sons
- Station A Glantz: Primer of Biostatistics. McGraw-Hill

Recommended:
- Arnold Naiman, Robert Rosenfeld, Gene Zirkel: *Understanding Statistics*. McGraw-Hill International Editions
- Station A Glantz: *Primer of Biostatistics*. McGraw-Hill
- M.J.Campbell, D.Machin: *Medical Statistics*. John Wiley & Sons
- Rice *Virtual Lab in Statistics*. http://onlinestatbook.com/rvls.html

FIRST AID AND RESUSCITATION
- Brent, Karren: First Aid for Colleges and Universities, Brady Morton Series

SHORT HISTORY OF HUNGARY (elective)
- Kiss-Dózsai, András: A History of the Hungarian People. SZOTE, Szeged, 1987
- Lázár, I: Hungary – A Brief History. Corvina, Budapest, 1989
- Lázár, I: An Illustrated History of Hungary, Corvina, Budapest, 1998
- Csorba Cs, Estók J. Karádi: Illustrated History of Hungary, Helikon Kiadó, 2005

GENERAL LAWS IN CHEMISTRY (elective)
- Lecture notes (handout)

RADIOCHEMISTRY (elective)
- Lecture notes (handout)

Recommended textbooks for second year pharmacy students

It is recommended to purchase the latest edition of the following textbooks!

ORGANIC CHEMISTRY
- Dr. Árpád Molnár: *Basic Organic Chemistry I. and II.* (handout)
- J. McMurry: *Fundamentals of Organic Chemistry*, Brooks/Cole Publishing Company
- Solomons-Fryhle: *Organic Chemistry*

PHARMACEUTICAL BOTANY
- Fahn: *Plant Anatomy*, Pergamon Press

PHYSIOLOGY
- William F. Ganong: *Review of Medical Physiology* from 22nd ed. by The McGraw-Hill Companies, Inc.
- Dr. Mária Dux: *Physiology Laboratory Manual* (handout)

PHYSICAL CHEMISTRY
- *Physical Chemistry* (handout), 1987, SZOTE
- *Physico Chemical Experiments* (handout), 1987, SZOTE

COLLOID CHEMISTRY

Theory

Obligatory:

- Etelka Tombácz: *Colloid Chemistry for Pharmaceutical Students*. JatePress, Szeged 1988.
- Lecture notes: http://koll1.chem.u-szeged.hu/colloids/staff/zoli/Pharmacy/

Recommended:

- D. F. Evans, H. Wennerström: *The Colloidal Domain: Where Physics, Chemistry, Biology and Technology Meet.* Wiley-VCH , New York 2nd Ed., 1999.
- D. H. Everett: *Basic Principles of Colloid Science*. The Royal Society of Chemistry, London 1988.
- D. J. Shaw: *Introduction to Colloid and Surface Chemistry*, Butterworth-Heinemann, Oxford 4th Ed. 2007
- R. J. Hunter: *Foundations of Colloid Science*. Vol. 1., Clarendon, Oxford 2001.

Laboratory Practice

Obligatory:

- Etelka Tombácz: *Laboratory Manual of Colloid Chemistry for Pharmaceutical Students*. JatePress, Szeged 1987.

BIOCHEMISTRY

- Pamela C. Champe, Richard A. Harvey: *Lippincott's Illustrated Reviews,* BIOCHEMISTRY, 4th edition, Wolters Kluwer/Lippincott Williams&Wilkins
- Robert K. Murray, Daryl K. Granner, Peter A. Mayes, Vicot W. Rodwell**:** *Harper's Illustrated Biochemistry,* 25th edition Lange (International Edition)

BASIC COMMUNICATION (elective course)

- Lecture presentations: www.pharm.u-szeged.hu/gyfi/eng

PRACTICAL OPTICAL SPECTROSCOPY (elective)

- Lecture notes

THE ROLE OF NUTRITION IN THE PREVENTION AND TREATMENT OF DISEASES (elective)

- Lecture notes

Recommended textbooks for third year pharmacy students

It is recommended to purchase the latest edition of the following textbooks!

PHARMACOGNOSY

Obligatory:

- Tóth, László: *Pharmacognosy I-II*
- Gellért, Mária: *Pharmacognosy Practice*

Recommended:

- Bruneton, Jean: *Pharmacognosy Phytochemistry Medicinal Plants*, 2nd edition, Lavoisier Publishing, Paris 1999
- Eavens, William Charles: *Pharmacognosy*, W. B. Saunders, Edinburgh 15th edition 2009

PHARMACEUTICAL CHEMISTRY

- David G. Watson (ed.), *Pharmaceutical Chemistry*, Churchill Livingstone – Elsevier, Edinburgh, 2011
- Graham L. Patrick, *An Introduction to Medicinal Chemistry*, 5th Edition, Oxford University Press, Oxford, 2013
- Thomas L. Lemke, David A. Williams, Victoria F. Roche, S. William Zito (eds.): *Foye's Principles of Medicinal Chemistry*, 7th Edition, Wolters Kluwer- Lippincott Williams & Wilkins, Philadelphia, 2013
- Zsolt Szakonyi, László Lázár, Ferenc Fülöp (eds.), *Practicals of Pharmaceutical Chemistry*, University of Szeged, Szeged, 2015

PHARMACEUTICAL TECHNOLOGY

Obligatory:

- M.E. Aulton: *Aulton's Pharmaceutics.The Design and Manufacture of Medicines*, Churchill Livingstone

Recommended:

- M.J. Groves: *Parenteral Technology Manual*, Interpharm Press
- S. Wu-Pong, A.B.C. Yu: *Applied Biopharmaceutics & Pharmacokinetics*, McGraw-Hill
- Infield, I. Edafiogho: Calculations for Pharmaceutical Practice, Churchill Livingstone

- M. Vecsernyés et al.: Practicals in Pharmaceutical Technology - Prescription Pharmacy, e-book, University of Debrecen, 2011

MICROBIOLOGY
- Levinson: *Rewiews of Medical Microbiology and Immunology*. Lange Med. Publ. 11th, Ed.: 2010,
- *Practical Notes* Edited by R. Pusztai, SZOTE, 2002

IMMUNOLOGY
- A.K. Abbas et. al.: *Basic Immunology*, 2nd ed. (2006-2007), ELSEVIER Saunders

PATHOPHYSIOLOGY

Texbooks
- Gayton and Hall: Texbook of Medical Physiology 12th ed. 2011
  ISBN: 978-1-4160-4574-8/978-0-8089-2400-5
- Damjanov: Pathophysiology, Elsevier (Saunders title), 2008,
  ISBN: 978-1-4160-0229-1
- McPhee, Hammer: Pathophysiology of Disease 6th ed., McGraw-Hill Medical, 2009,
  ISBN- 0071621679/9780071621670
- Silbernagl, Lang: Color Atlas of Pathophysiology, George Thieme Verlag, 2000,
  ISBN: 9780865778665/9783131165510
- Kumar, Abbas, Fausto, Aster: Robbins & Cotran Pathologic Basis of Disease, 8th ed, Elsevier (Saunders title) 2010, ISBN: 978-1-4160-3121-5
- Goldman, Schafer: Goldman's Cecil Medicine, 24th ed., Elsevier (Saunders title), 2012,
  ISBN: 978-1-4377-2788-3
- Longo, Fauci, Kasper, Hauser, Jameson, Loscalzo: Harrison's Principles of Internal Medicine, 18th ed., McGraw-Hill Medical, 2012, ISBN 9780071748896/007174889X

Handouts (for practice)
- Fekete M.: Pathophysiology exercises II. 1987.
- Szabó G.: Introduction to Electrocardiography 1999.

BIOPHARMACY
- Leon Shargel and Andrew Yu: *Applied Biopharmaceutics and Pharmacokinetics*, Appleton and Lange, 5th edition 2004
- M.E. Burton., L.M. Shaw, J.J. Schentag, W.E. Evans: *Applied Pharmacokinetics and Pharmacodynamics. Principles of Drug Monitoring*, 4th ed., Lippincott Williams and Wilkins, 2006

COMMUNICATION IN PHARMACY PRACTICE (elective)
- W. N. Tindall, R. S. Beardsley, C. L. Kimberlin: *Communication Skills in Pharmacy Practice*,., Lippincott Williams&Wilkins, 4th Ed. 2007

COMPUTER LITERATURE (elective)
- handout provided by the university

THE HARMS OF SMOKING AND STRATEGIES TO QUIT (elective)
- Lecture notes

BIOPHARMACEUTICALS (compulsory elective)
- Lecture notes

Recommended textbooks for fourth year pharmacy students

It is recommended to purchase the latest edition of the following textbooks!

PHARMACEUTICAL ANALYSIS
- Kenneth A. Connors: *A Textbook of Pharmaceutical Analysis*, John Wiley and Sons 3rd ed, 2007
- Szakonyi G and Dombi G: *Pharmaceutical Analysis Practice e-book.*

PHARMACODYNAMICS
- Bertram G. Katzung: *Basic and Clinical Pharmacology*, Prentice-Hall International Inc.,11th ed. 2009

PUBLIC HEALTH
- Paulik E (ed.): Public Health and Preventive Medicine. Medicina Publishing House, Budapest, 2013

ETHICS IN PHARMACY
- Lecture presentations: www.pharm.u-szeged.hu/gyfi/eng

INTRODUCTION TO LAW
- Lecture presentations: www.pharm.u-szeged.hu/gyfi/eng

INTRODUCTION TO ECONOMICS
- Paul Heyne: *The Economic Way of Thinking*, Prentice-Hall, 9th ed, 1999
- Lecture handouts from Coospace (based on selected chapters of above book)

DRUG REGULATORY AFFAIRS
- Lecture presentations: www.pharm.u-szeged.hu/gyfi/eng

CLINICAL LABORATORY PRACTICE
- William J Mashall, Stephen K Bangert: Clinical chemistry, sixth edition, Elsevier, 2008

PHARMACY ADMINISTRATION
- Gordon E. Appelbe, Joy Wingfield: Dale and Appelbe's Pharmacy Law and Ethics, 10th edition, published by Pharmaceutical Press, 2013
-

INVESTIGATION OF DOSAGE FORMS
- Instrumental analysis of pharmaceutical ingredients, excipients and dosage forms (Practical workbook) e-book, 2015
- Analysis of pharmaceutical ingredients, excipients and dosage forms (Practical workbook) e-book, 2015

Recommended textbooks for fifth year pharmacy students

It is recommended to purchase the latest edition of the following textbooks!

CLINICAL PHARMACY
- Walker R., Whittlesea K.: Clinical Pharmacy and Therapeutics, Published by Churchill Livingstone, 5th edition 2011

PHARMACODYNAMICS
- Bertram G. Katzung: *Basic and Clinical Pharmacology*, Prentice-Hall International Inc.,11th ed. 2009

NATURAL TREATMENTS
- S. Fulder: *The handbook of alternative and complementary medicine*, 3rd ed., Oxford Univ. Press, 1996
- *Fundamentals of complementary and alternative medicine*. Ed. By M.S. Micozzi, Churchill Livingstone 1996

PHARMACEUTICAL PSYCHOLOGY
- Beardsley R.S., Kimberlin C.L., Tindall W.N. (2008): *Communication skills in Pharmacy Practice: a practical guide for students and practitionres*. Wolters Kluwer/Lippincott Williams and Wilkins
- Csabai M., Molnár P. (2000): *Health, Illness and Care*. Springer Orvosi Kiadó Kft.
- Nolen_hoeksema S., Fredrickson B.L., Loftus G.R., Wagenaar W.A. (2009): *Atkinson and Hilgard's Introduction to Psychology*. Cengage Learning EMEA

QUALITY ASSURANCE
- Lecture presentations: www.pharm.u-szeged.hu/gyfi/eng

PHARMACEUTICAL CARE
- Clive Edwards, Paul Stillman: Minor Illness or Major Disease?, 5th edition, Published by Pharmaceutical Press, 2012

WARD PHARMACY (compulsory elective)
- British National Formulary 69 March 2015, Published jointly by BMJ Publishing Group Ltd and Royal Pharmaceutical Society, 2015

- BNF for Children 2014-2015, Published jointly by the British Medical Association, Royal Pharmaceutical Society, the Royal College of Paediatrics and Child Health, and the Neonatal and Paediatric Pharmacists Group, 2014

VETERINARY PHARMACY (compulsory elective)

- Steven B Kayne, Michael H Jepson: Veterinary Pharmacy, Pharmaceutical Press 2004

PHYTOTHERAPY(compulsory elective)

- F. Capasso, T. S. Gaginella, G. Grandolini, A. A. Izzo: Phytotherapy – A Quick Reference to Herbal Medicine. Springer, 2003

EVERYDAY DERMATOLOGY(compulsory elective)

- W.H.C. Burgdorf, G. Plewig, H.H. Wolff, M. Landthaler: Braun-Falco ’s Dermatology, 3rd edition, Published by Springer, 2009

BIOTECHNOLOGY (compulsory elective)

- Hegedus Z., Szucs HD, Szakonyi G.: *Pharmaceutical Biotechnology e-book.*
- Lecture notes

SYLLABUSES FOR 1ST YEAR PHARMACY STUDENTS

PHYSICS-BIOPHYSICS

1st semester

LECTURE
Flow of fluids. Flow of incompressible fluids: the equation of continuity. Flow of ideal fluids: Bernoulli's law. Flow of viscous fluids: Newton's law and the Hagen–Poiseulle law. Laminar and turbulent flow. Intermittent flow in tubes with elastic walls. Non-Newtonian fluids
Diffusion. Fick's first law. Generalised equation of continuity. Fick's second law. The oxygen supply of tissues
Heat transport. Heat conduction. Heat convection. Heat radiation. Newton's law of cooling. Evaporation. Heat exchange between the human body and its environment
Transport through biological membranes. Passive diffusion. Facilitated diffusion; the kinetics of facilitated diffusion: the Michaelis–Menten equation. Active transport
Membrane balance of neutral particles: osmosis. Van't Hoff's law. The physiological significance of osmosis. The Starling effect. Dialysis
Membrane potential. Origin of the membrane potential. Diffusion potential. Determining the membrane potential experimentally. Resting potential. Action potential
The experimental basis of quantum mechanics. Laws of thermal radiation. Photoelectric effect. The Franck-Hertz experiment. The spectrum of the hydrogen atom and the Bohr model. Particle-wave duality. Heisenberg's uncertainty principle. Atomic orbitals

2nd semester

LECTURE	PRACTICE
Optical spectroscopy. The energy-level structure of molecules: Born–Oppenheimer approximation; Jablonski diagram. Luminescence properties: absorption, fluorescence and phosporescence spectra; efficiency, polarisation and life time of radiation. Experimental methods of molecular spectroscopy: atomic absorption, atomic fluorescence, molecular absorption and molecular fluorescence spectroscopy	Statistical evaluation of experimental data
Lasers. Special properties of laser radiation. Physical principles of laser operation: Einstein coefficients and optical gain. Population inversion. Laser oscillators. Laser types. Lasers in medical practice	Viscometry
X-rays. General properties of X-rays. X-ray sources. X-ray spectra: *Bremstrahlung* and characteristic radiation. The attenuation of X-rays in a medium. Medical applications of X-rays: the basics of tomography. Determining molecular structure with the help of X-ray diffraction	Electrical conductance. Conductometry
Nuclear radiation. Models of the nucleus. Radioactive decay law, radioactive dating. Types of nucleus decay: alpha decay, beta decay, positron decay, K-electron capture, gamma radiation. Absorption of nuclear radiation in a medium. Dosimetry. Ionising radiation and the human being: effects of radiation, hit theories, radiation protection. Radiation meters: ionisation	Refractometry

chambers, the Geiger–Müller counter, scintillators, gamma camera. Nuclear medicine	
	Optical imaging
	Optical absorption spectroscopy
	Kinetics of heating and cooling
	Chirality optical activity. Polarimetry
	Recording time-dependent electric signals
	Electronic amplifiers
	Absorption of nuclear radiation
	Optical emission spectroscopy

HISTORY OF PHARMACY

* Medicinal treatments and medicines in ancient societies: in prehistoric times, in Mesopotamia, Egypt, India, China, Hellas and in the Roman Empire.
* The rise of Chistianity. Nestorius and Nestorians. Monasticism.
* Medieval medicine. Medicine under Islam. The establishment of the first pharmacy.
* Crusades. The rise of universities (Salerno, Montpellier and other European universities).
* The first medical decree. Foundation of the first medical faculty.
* Renaissance. Art and science in the Renaissance. The time of alchemy.
* The emergence of medicinal chemistry (iatrichemistry), Paracelsus.
* The formation of the European pharmacy, foundation of pharmacies.
* The "Age of Scientific Revolution", medicine and pharmacy in the 17th century.
* Innovations in the 17th century. The story of Cinchona bark.
* Medicine and pharmacy in the 18th century. Innovation in the 18th century.
* Medicine and pharmacy in the 19th and 20th centuries. Formation of pharmaceutical industry.
* The history of medical and pharmaceutical education. History of the Hungarian pharmaceutical education and postgraduate training of pharmacists.
* Dispensatoriums, Antidotariums.
* Pharmacopoeias, national and international pharmacopoeias, Ph.Hg.VII.
* National and international standards of drugs.
* Definition and classification of drug. Expiry date. Drugs and doses. Dosage forms.
* The principles of efficacy, safety of drug use. The therapeutic index and the margin of safety.
* Drug utilization: monitoring of drug consumption. Regulation and control of drug consumption. Tolerance, physical dependence and drug abuse.
* Naming of medical substances: Latinized and licensed (trade) names. The forms dispensation. Formula Magistralis, Normalis, Originalis, Nosocomialis. The three levels of drug production.
* Public, clinical and hospital pharmacies. The conditions of a working pharmacy. Administration work in pharmacies.
* The development of drug control. Drug control and quality assurance (GMP, GLP, GXP). Drug trade and the drug supply in Hungary. Pharmaceutical societies and chambers.
* International organization of health care. World Health Organization (WHO). International Red Cross (Red Crescent, Red Half-Moon). Commission of Narcotic Drugs. International Pharmaceutical Federation (FIP). International Federation of Pharmaceutical Manufactures Association (IPFMA). European Federation of Pharmaceutical Manufacturers Association (EPFMA).

MATHEMATICS

	LECTURE	PRACTICE
*	Basic concepts: sets, numbers, intervals, relations, functions. Elementary properties of functions: domain, range, graph, even/odd functions, periodicity, boundedness, monotonicity, concavity, maxima and minima.	Exercises and solutions of problems in the topics of the corresponding lectures.
	Compositions, one-to-one functions, inverse function.	
*	Elementary functions in the life sciences: Arithmetical and geometrical growth, power functions, exponential and logarithmic functions, trigonometric functions.	
*	Graphical study of functions and practical processes: elementary and logarithmic transformations, logarithmic plots.	
*	Applications of Calculus in life sciences: Intuitive concept of limits; Continuity Instantaneous growth rate, derivative: definition, general and geometrical meaning, equation of the tangent line. Second derivative, acceleration and concavity. Differentiation rules	
*	Applications: Relation between the growth and concavity and the derivatives, graphical and numerical study. Find maxima, minima and the maximal growth rate. Investigation processes in Pharmacy.	
*	Antiderivative, indefinite integral: inversion of	
	differentiation, understanding vector fields. simple integration methods and rules	
*	Definite integral: geometric meaning (area under curve), and formal definition. Elementary properties and rules. The integral mean value. Simple numerical methods of integration. Area function, Newton-Leibniz formula. Applications in Pharmacy.	
*	Functions of two variables: graphical methods, partial derivatives and their geometrical meaning. Local minima and maxima.	
*	Curve fitting with the least square method, linear regression.	
*	Differential equations in Pharmacy: basic properties, vector fields, initial value problems, equilibria. Autonomous systems. Graphical study. Solution in case of separable right hand sides. Linear equations, exponential decay. Logistic equations. Some external effects and their meaning in life sciences. Equations of drug elimination, dosing, infusion, population dynamics.	

INFORMATICS

1st semester

	PRACTICE (2 hrs/week)
*	Basic concepts of informatics in life sciences. Terminology used in informatics and computer techniques. The role of the human component.
*	Local and Network drives; File and folder operations on physical and logical drives. Overview of computer architecture. Hardware and software. Problems with national languages - solutions.
*	Operating systems. Overview of distributed and real-time operating systems, multitasking. Computer networks: Novell Netware, Internet. Resource management, network communication.
*	Creating formatted documents; stand-alone and shareble versions. Compatibility problems. PDF files.
*	Manual and automatic text editing and formatting. The use of templates and styles.
*	Simple vs. complex documents in life sciences. Tables, charts, ClipArt, WordArt, hypertext.
*	Elements of desktop publishing. Paper and screen oriented versions.
*	1st practical test.
*	Data types in the pharmacological sciences. Number, date, time, money, dimensions, etc.
*	Practices on formulae, useful spreadsheet functions in life sciences.
*	Statistical evaluation and graphical presentation of medical/pharmacological data.
*	Slide presentation softwares.
*	2nd practical test.
*	Computer aided measurement of bioelectrical signals. Data and image processing.
*	Seeking medical/pharmacological Web-sites. Fine tuning of Internet browsers.

BIOSTATISTICS

* Data definition, types of data, displaying data. Characteristics of discrete and continuous distributions. Probability, random variables and their types, distributions. Some important distributions: binomial, Poisson, uniform and normal distribution and their properties.
* Statistical estimation, confidence intervals. Testing hypotheses, significance. Errors in hypothesis tests. One-sample t-test, paired and Independent samples t-tests. One-way analysis of variance. Relationship between continuous variables, correlation, linear regression. Relationship between categorical variables: contingency tables and c2 test, The c2 test for goodness of fit. Nonparametric methods.

GENERAL CHEMISTRY

1st semester

	LECTURE	**PRACTICE**
*	The science of chemistry	Chemical calculations
*	Chemistry as physical science. Measurements and units in chemistry.	The properties of gases. Concentration of solutions. The physical properties of solutions. Thermochemistry. Stoichiometry. Electrochemistry. Chemical equilibrium. Chemical equilibrium in solutions. Rate of chemical reactions.
*	The language of chemistry	Laboratory experiments

*	Atoms, molecules and formulas. The law of constant composition. The law of multiple proportions. Chemical formulas and names. Balanced chemical equations. Important types of chemical reactions. States of substances. Net ionic equations. Energy changes in chemical processes.	Separation of NaCl-CaCO3 mixture by solvation and filtration. Preparation of distilled water and its comparison with tap water by simple analysis.
*	Stoichiometry	Separation of the components of a mixture by sublimation. Undercooling.
*	States of matter	Preparation of solutions. Solubility studies.
*	States of matter. Vapour pressure. The gaseous state. The ideal gas equation. Dalton's law of partial pressure. The kinetic theory of gases. Derivation of Boyle's law. Kinetic energy and temperature. Effusion and diffusion. Molecular speeds. Real gases. Critical phenomena.	Study on the phenomenon of osmosis. Purification of crystalline potassium-aluminium sulphate by recrystallization.
*	The structure of atoms	Determination of the equivalent mass of magnesium. Determination of the molar volume of gases.
*	The development of the atomic theory. The electron. X-rays and radioactivity. The nuclear atom. The development of the quantum theory. The photoelectronic effect. The Bohr model of the hydrogen atom. Waves and particles. The quantum mechanical description of the hydrogen atom.	Determination of the equivalent mass of zinc. Titration of NaOH solution with oxalic acid solution.
*	Atoms, electrons, the periodic table	Preparation of different types of chemical compounds. Preparation of a double salt.
*	The quantum mechanical description of the hydrogen atom. Electronic configuration of multielectron atoms. Electrons in multielectron atoms. Ionization energy. Electron affinity. The periodic table of elements. Periodic trends in atomic sizes. A group trend exemplified: the alkali metals. Periodic trends in the oxides, hydrides and haloides of elements.	Study of heat of the solution. Determination of the heat capacity and the approximate atomic mass of a metal.
*	The chemical bond	Electrochemical reactions. Transformation of chemical energy into electrical energy.
*	Ionic bonds. The covalent bond. Electronegativity and bonding. Lewis structures. Resonance. Overlap of atomic orbitals. The molecular orbital method. Oxidation number. Weak interactions.	Oxidation of iodide ions to iodine. Oxidation reactions by KMnO4.
*	Molecular structure and stability	Oxidation reactions by Fe(III) ions. Oxidation reaction by H2O2.
*	Molecular properties and geometry. Thermochemistry.	Effect of concentration on the rate of reaction. Oscillating reactions. Temperature dependence of reaction rate. Effect of catalysts on reaction rate.
*	The properties of solutions	Equilibrium constant. Hydrolysis of salt. Effect of temperature on the hydrolysis. Buffer solutions. Solubility of NaCl.
*	Terminology. Expressions of concentrations. Solubility. Vapour pressure of solutions. Boiling point and freezing point of solutions. Osmotic pressure. Solutions of electrolytes. Colloids.	

*	Chemical equilibrium
*	The equilibrium state and the equilibrium constant. The principle of Le Chatelier. Calculation of gas phase equilibrium constant. Solutions of sparingly soluble substances: the solubility product. Qualitative analysis by selective precipitation.
*	Acids and bases
*	Definitions of acids and bases. Strength of acids and bases. Acid and base strength and chemical structure. Acid and base reactions in aqueous solution. Weak acids and weak bases. Neutralization and titration. Buffers. Polyprotic acids.
*	Oxidation-reduction
*	Oxidation-reduction reactions. Oxidation-reduction processes in aqueous solution. Electrolysis and Faraday's laws. Galvanic cells. Cell potentials. Electrode potentials. Potential and concentration. The nernst equation. Some important electron transfer processes.
*	Chemical kinetics
*	Rate of reaction. Reaction rate and concentration. Rate law and reaction mechanism. Reaction rate and temperature. Reaction rate and equilibrium. Catalysis.
*	Coordination chemistry
*	Structure of coordination compounds. Isomerism of coordination compounds. Bonding of coordination compounds. Lability and stability of coordination chemistry. Complex ions in aqueous equilibria. Some applications of coordination chemistry.

INORGANIC CHEMISTRY

2nd semester

	Classification of the elements based on the periodic table. Physical properties of the elements. Occurrence of the elements, isotopes. Synthesis and purification of the elements. General reaction routes of the elements.
*	HYDROGEN Its place in the periodic table, electron configuration, physical properties, ortho and para hydrogen, isotopes of hydrogen, occurrence, synthesis and use of it. Its chemical properties, reactions, synthesis and use of some important compounds containing it (hydrides).
*	NOBLE GASES Their place in the periodic table, electron configuration, physical properties, occurrence, synthesis and use of them. Their chemical properties, reactions, synthesis and use of some important compounds containing them.
*	ALKALINE METALS Their place in the periodic table, electron configuration, physical properties, occurrence, synthesis and use of them. Ammonia solution of alkaline metals. Their chemical properties, reactions, synthesis and use of some important compounds containing

	them (alkaline hydrides; oxydes; hydroxides; halogenides; complex compounds; cryptates; biological importance).
*	ALKALINE EARTH METALS Their place in the periodic table, electron configuration, physical properties, occurrence, synthesis and use of them. Their chemical properties, reactions, synthesis and use of some important compounds containing them (calcium oxide; hydroxide; chloride; sulphate; EDTA complex; barium chloride, sulphate).
*	BERYLLIUM Its place in the periodic table, electron configuration, physical properties, occurrence, synthesis and use of it. Its chemical properties, reactions, synthesis and use of some important compounds containing it.
*	BORON Its place in the periodic table, electron configuration, physical properties, occurrence, synthesis and use of it. Its chemical properties, reactions, synthesis and use of some important compounds containing it (borides; boron halogenides; boranes; borax; boric acid).
*	MAGNESIUM Its place in the periodic table, electron configuration, physical properties, occurrence, synthesis and use of it. Its chemical properties, reactions, synthesis and use of some important compounds containing it (oxyde; carbonate; sulphate; chlorophyll; Grignard compounds).
*	ALUMINIUM Its place in the periodic table, electron configuration, physical properties, occurrence, synthesis and use of it. Its chemical properties, reactions, synthesis and use of some important compounds containing them (oxyde; sulphate; trichloride; hydroxide; alumen).
*	SILICON Its place in the periodic table, electron configuration, physical properties, occurrence, synthesis and use of it (glasses). Its chemical properties, reactions, synthesis and use of some important compounds containing it (oxydes; silicic acid; silicates; halogenides; silicons; siloxanes).
*	GERMANIUM, ARSENIC, ANTIMONY Their place in the periodic table, electron configuration, physical properties, occurrence, synthesis and use of them. Their chemical properties, reactions, synthesis and use of some important compounds containing them (arsenic oxydes; acids; antimony pentafluoride - super acids; antimony pentasulphide; bismuth nitrate).
*	COPPER, SILVER AND GOLD Their place in the periodic table, electron configuration, physical properties, occurrence, synthesis and use of them. Their chemical properties, reactions, synthesis and use of some important compounds containing them (copper sulphate; halogenides; silver nitrate; silver halogenides-photochemistry; gold chlorides).
*	ZINC, CADMIUM AND MERCURY Their place in the periodic table, electron configuration, physical properties, occurrence, synthesis and use of them. Their chemical properties, reactions, synthesis and use of some important compounds containing them (zinc oxyde; chloride; sulphate; metals dissolved in mercury; mercury chlorides; oxyde).
*	TIN, LEAD AND BISMUTH Their place in the periodic table, electron configuration, physical properties, occurrence, synthesis and use of them (radiation protection). Their chemical properties, reactions, synthesis and use of some important compounds containing them (oxydes; acetate).
*	TRANSITION METALS General physical and chemical properties, electron configuration, occurrence, synthesis, use of them, important compounds (hydrides; Cr-oxydes, acids; Mn-oxydes, acids and bases; Fe-oxydes, hydroxydes, complex compounds; Ni, Pd, Pt, Rh, Ir-catalysis).
*	IRON Its place in the periodic table, electron configuration, physical properties, occurrence, synthesis and use of it. Its chemical properties, reactions, synthesis and use of some important compounds containing it (iron; iron trichloride; sulphate; hemoglobine).
*	RARE EARTH METALS General physical and chemical properties, electron configuration, occurrence, synthesis, use of them, important compounds (Ce-oxydation; Sm-pharmaceutical use; Th-physical properties; U-

separation of the isotopes).

* FLUORINE
  Its place in the periodic table, electron configuration, physical properties, occurrence, synthesis and use of it. Its chemical properties, reactions, synthesis and use of some important compounds containing it (hydrogen fluoride, fluorides- caries prevention).
* CHLORINE
  Its place in the periodic table, electron configuration, physical properties, occurrence, synthesis and use of it. Its chemical properties, reactions, synthesis and use of some important compounds containing it (chlorine water; acids; salts of the acids).
* BROMINE AND IODINE
  Their chemical properties, reactions, synthesis and use of some important compounds containing them (bromine water; hydrogen bromide, bromides-sedatives; oxoacids and salts; iodine solutions; pseudohalogenides; biological importance of iodine).
* OXYGEN
  Its place in the periodic table, electron configuration, physical properties, occurrence, synthesis and use of it. Water (natural-, deionised, distilled water; physical properties; water as solvant). Its chemical properties, reactions, synthesis and use of some important compounds containing it. Substances for oxydation (peroxides, permanganates, chlorine water, iodine etc.)
* SULFUR
  Its place in the periodic table, electron configuration, physical properties, occurrence, synthesis and use of it (ozone, natural, deionised and distilled water, hardness of water, hydrogen peroxyde). Its chemical properties, reactions, synthesis and use of some important compounds containing it (sulfides; acids; salts and acid derivatives containing sulfur).
* NITROGEN
  Its place in the periodic table, electron configuration, physical properties, occurrence, synthesis and use of it. Its chemical properties, reactions, synthesis and use of some important compounds containing it (ammonia, ammonium salts; oxides; acids; hydrazine; carbamide; azides).
* PHOSPHORUS
  Its place in the periodic table, electron configuration, physical properties, occurrence, synthesis and use of it. Its chemical properties, reactions, synthesis and use of some important compounds containing it (oxydes, acids, salts and their biological importance).
* CARBON
  Its place in the periodic table, electron configuration, physical properties, isotopes of carbons, occurrence, synthesis and use of it (charcoal). Its chemical properties, reactions, synthesis and use of some important compounds containing it (carbides; carbon monoxide; carbon dioxide; acids; carbonates; hydrogen-carbonates; antacid substances).

PHARMACEUTICAL BIOLOGY

* Structure and biological functions of large macromolecules: lipids,carbohydrates, proteins, nucleic acids.
* Comparison of eukaryotic and prokaryotic cells. Organization and biological function of nuclei, endoplasmic reticulum, ribosomes, Golgi complex, secretion vesicules, mitochondria and peroxisomes.
* Components of cytoskeleton. Cellular movement. Cell adhesion and cell junctions.
* DNA, gene, genom epigenome and chromosomes.
* Replication and cell division.
* Mendelian genetics, dominant- recessive, sex-linked mode of inheritance. Most frequent genetic disorders linked to autosomes and X chromosomes in humans.
* Prokaryotic and eukaryotic geneexpression stratagies: transcription posttranscriptional processing, translation posttranslational modifications.
* Regulation of geneexpression in prokaryotes and eukaryotes.
* Principles of molecular biological technics: molecular cloning, RFLP, PCR, blottings, FISH.

*	The cell cycle and its regulation, cellular aging and programmed cell death
*	Molecular biology of cancer formation.
*	Biology of the immune system.
*	The most common signaltransduction pathways and their role in cellular functions.
*	Basics of pharmacogenomics: history of Gleevec, Herceptin.

ANATOMY

1st semester

LECTURE (2 hrs/week)	
*	Morphology of the cell I.
*	Morphology of the cell II.
*	Morphology of the cell III.
*	Epithelial tissues
*	Connective tissues
*	Bone and cartilage
*	Muscle tissues
*	Nervous tissue
*	The parts of the human body
*	The bones of the human body
*	The joints of the human body
*	The main skeletal muscles
*	The anatomy of the heart and large vessels
*	The anatomy of the respiratory tract (nasal cavity, larynx and lungs)

2nd semester

LECTURE (2 hrs/week)	
*	The anatomy of the digestive system I.
*	The anatomy of the digestive system II.
*	The anatomy of the kidney and other organs of the urinary tract
*	The anatomy of the female genital organs
*	The anatomy of the male genital organs
*	The histology of the ovary and testis (gametogenesis)
*	The anatomy of the andocrine glands (principles of endocrine regulation)
*	The anatomy of the central nervous system: the spinal cord
*	The anatomy of the central nervous system: the brain stem and the cerebellum
*	The anatomy of the central nervous system: diencephalon, basal ganglia, cortex cerebri
*	The anatomy of the meninges and the cerebral ventricles
*	The anatomy of the peripheral nervous system
*	Human development I.
*	Human development II.

QUALITATIVE CHEMICAL ANALYSIS

* Concepts, aims and general methods. Ions.
* Classification of reactions.
* Redox reactions. (Oxidation number /oxidation state/. Oxidation and reduction.) Acid-base reactions. Reactions involving precipitation. Complex-formation reaction (Complex cations. Complex anions. Neutral complexes. Chelates.)
* Reaction sensitivity
* Reaction specificity
* Groups of cations
* Group 1: Hydrogen sulphide group. Group reaction. Reagents. General characterization of group 1.
* Group 1A (hydrochloric acid sub-group): Silver(I), reaction with hydrogen sulphide, hydrochloric acid, bromides and iodides, alkali hydroxides, ammonia, chromates. Lead(II), reaction with hydrogen sulphide, chlorides, iodides, sulphates, alkali hydroxides or ammonia, chromates. Mercury(I), reaction with sulphides, chlorides, ammonia, alkali hydroxides, iodides, metallic copper.
* Group 1B (copper sub-group): Mercury(II), reaction with sulphides, ammonia, alkali hydroxides, tin(II) chloride, iodides, metallic copper. Copper(II), reaction with sulphides, ammonia, alkali hydroxides, hexacyanoferrate(II), cyanides, iodides, metallic iron or zinc, flame coloration. Bismuth, reaction with sulphides, alkali hydroxides or ammonia, water, hydrolysis, tetrahydroxostannate(II), iodides. Cadmium(II), reaction with sulphides, alkali hydroxides, ammonia, cyanides.
* Simple analysis of cation group 1.
* Group 2 (arsenic group): Group reaction. Reagents. Arsenite arsenic(III), reaction with sulphides, silver ions, iodine, Marsh reaction, Bettendorf reaction, Gutzeit test, Sanger-Black test, heating test. Arsenate arsenic(V), reaction with sulphides, silver ions, Marsh, Bettendorf, Sanger-Black and Gutzeit reactions, magnesia mixture. Antimony(III), reaction with sulphides, water, hydrolysis, alkali hydroxides or ammonia, metallic zinc or iron, Marsh, Sanger-Black and Gutzeit test. Antimony(V), reaction with sulphides, iodides. Tin(II), reaction with sulphides, mercury(II), alkali hydroxides, metallic zinc, luminescence test. Tin(IV), reaction with sulphides, alkali hydroxides, metallic zinc, metallic iron.
* Simple analysis of cation group 2.
* Group 3 (ammonium sulphide group): Group reaction. Reagents. Cobalt(II), reaction with ammonium sulphide, alkali hydroxides, ammonia, cyanides, thiocyanates, nitrites, Borax-bead test. Nickel(II), reaction with ammonium sulphide, ammonia, alkali hydroxides, cyanides, dimethylglyoxime. Iron(II), reaction with ammonium sulphide, alkali hydroxides or ammonia, hexacyanoferrate(III), ,-dipyridyl, permanganate. Iron(III), reaction with ammonium sulphide, hydrogen sulphide, ammonia or alkali hydroxides, sodium acetate, hexacyanoferrate(II), thiocyanate, iodides. Chromium(III), reaction with ammonium sulphide, ammonia, alkali hydroxides, hydrogenperoxide. Oxidation to chromate in melt phase. Chromate, reaction with sulphides, ethanol, silver ion, barium ions, peroxichromate reaction. Aluminium(III), reaction with ammonium sulphide, ammonia, alkali hydroxides, alizarinsulphonate, Thénard-blue test. Zinc(II), reaction with ammonium sulphide, ammonia, alkali hydroxide, hexacyanoferrate(II), Rinmann-green test. Manganese(II), reaction with ammonium sulphide, ammonia or alkali hydroxides. Oxidation to permanganate with lead(IV). Oxidation to permanganate with persulphate. Oxidation in the melt phase. Permanganate, reaction with sulphides, peroxides, ethanol.
* Simple analysis of cation group 3.
* Group 4, alkaline earth (ammonium carbonate) group: Group reaction. Reagents. Calcium(II), reaction with ammonium carbonate and carbonates, sulphates, oxalates, phosphates, hexacyanoferrate(II), chromate. Visible spectrum. Strontium(II), reaction with ammonium carbonate and carbonates, sulphates, lime water, oxalate, phosphates, chromate. Visible spectrum, flame coloration. Barium(II), reaction with ammonium carbonate and carbonates,

	sulphates, calcium or strontium sulphate, oxalates, phosphates, chromate or dichromate. Visible spectrum, flame coloration.
*	Simple analysis of cation group 4.
*	Group 5, magnesium and alkali metal group (soluble group): Group reaction. Magnesium(II), reaction with ammonia, alkali hydroxides, ammonium carbonate, phosphates, quinalizarine. Sodium(I), reaction with antimonate, zinc uranylacetate. Visible spectrum, flame coloration. Potassium(I), reaction with tartaric acid, hexanitrocobaltate(III), perchloric acid, tetraphenylboron. Visible spectrum, flame coloration. Ammonium(I), reaction with tartaric acid, hexanitrocobaltate(III), tetraphenylboron, strong bases, Nessler reaction. Lithium(I), reaction with ammonium carbonate, phosphates. Visible spectrum, flame coloration.
*	Simple analysis of cation group 5.
*	Groups of anions.
*	Group 1: Carbonate, reaction with acids, hydrolysis (phenolphthalein), magnesium sulphate. Hydrogencarbonate, reaction with acids, hydrolysis, magnesium ions. Sulphite, reaction with acids, barium ions, silver ions, iodine. Thiosulphate, reaction with acids, silver ions, iodine. Heating in flame. Sulphide, reaction with acids, nitroprusside, Hepar-reaction. Polysulphide, reaction with acids. Silicate, reaction with dilute acids, molybdate. Tetrafluoride test. Hypochlorite, formation and reaction with acids.
*	Group 2: Group reaction. Sulphate, reaction with barium ions, lead ions, Hepar reaction. Water-insoluble sulphates. Phosphate, reaction with barium ions, silver ions, magnesia mixture, molybdates. Borate, reaction with barium ions, silver ions. Turmeric paper reaction. Flame coloration. Fluoride, reaction with barium ions, calcium ions, silver ions, sulphuric acids, thiocyanates. Tetrafluoride test. Bromate, reaction with barium ions, silver ions, bromides, concd. hydrochloric acid, metallic zinc. Iodate, reaction with barium ions, silver ions, iodides, concd. hydrochloric acid, metallic zinc.
*	Group 3: Group reaction. Chloride, reaction with silver ions, Chromyl chloride reaction, Berg reaction, oxidative agents. Bromide, reaction with silver ions, chlorine water, permanganate. Iodide, reaction with silver ions, chlorine water, iron(III) ions, oxidants.
*	Cyanide, reaction with silver ions, hexacyanoferrate(II) reaction, acids (HC1), iodine or bromine. Thiocyanate, reaction with silver ions, iron(III) ions.
*	Group 4: Group reaction. Nitrate. Brown-ring test. Reduction with metallic zinc in alkaline medium. Nitrite, reaction with strong acids, iron(II) ions, Griess-Ilosvay reaction, urea, permanganate oxidation, iodide, metallic zinc. Acetate, reaction with strong acids, iron(III) ions. Esterification. Decarboxylation with calcium oxide. Chlorate, reaction with strong acids, disproportionation by heating, concd. sulphuric acid, iodides, metallic zinc. Perchlorate, reaction with iodides, metallic zinc, potassium ions. Methylene blue reaction.
*	Total analysis of solids for cations and anions: physical appearance, color, preliminary tests, heating, flame coloration, preparation of solution, analysis for cations and anions.
*	Identification of anions in mixtures: Chloride, bromide and iodide. Chloride and iodide. Bromide, iodide and nitrate. Nitrite and nitrate.

QUANTITATIVE CHEMICAL ANALYSIS

2nd semester

	LECTURE	PRACTICE
*	The nature, role and importance of quantitative analytical chemistry in the industry, research and medical practice. The fundamental concepts and methods of analytical chemistry.	Introduction:
*	The measuring equipment and their calibration used in analytical chemistry. The sampling, sample treatment and preparations, techniques in component concentration and separation. Dissolving, fusion, mineralization of the samples.	Health and accident prevention regulations.

*	Basic principles of gravimetry solubility of precipitates, factors influencing the solubility of pracipitates. Mechanism and conditions of analytical precipitation. Impurities in precipitates. Techniques used in precipitation. Washing, filtering, thermal treatment and weighing of precipitates. Calculating the gravimetric results. Gravimetric determination of cations and anions. Precipitates formed by organic reagents.	The use of volumetric glassware.
*	Principles of titrimetric methods. Volumetric glassware and their calibration. Preparation and standardization of titrants. End-point determination techniques in titrimetry. Calculation of results, error calculation and their sources.	Procedure of chemical analysis.
*	Acid-base theories, ionization of strong and weak acids, bases and their salts, calculation of pH. Classification and characterization of solvent used in acid-base titration. Construction of titration curves. Detection of end-point, mechanism of indication, indicator exponent. Preparation and standardization of titrants in acid-base titration. Titration of strong and weak acids, bases and their salts. Titration of alkali carbonate, bicarbonate and hydroxide mixture. The hardness of natural waters. The role of acid-base titrationin analysis of trigycerids (fats and oils). Acid-base titration in nonaqueous solution.	Calculation of analytical results and solving of problems.
*	Principles of precipitate forming titration. Calculation of solubility and construction of titration curves. End-point detection methods in precipitate forming titration. Preparation and standardization of silver nitrate titrant. Determination of silver ions, halogenides and pseudohalogenides.	Gravimetry:
*	Complex equilibrium in analytical chemistry, theory of complexometric titration. Influence of pH and the presence of other complex forming reagents on stability of complexes. The selectivity of complex forming titration. Indication of end-point by visual and instrumental methods. Preparation and standardization of EDTA solution. Direct, indirect and back titration in complexometry. Determination of hardness of waters.	Gravimetric determination of sulfate ion in form of $BaSO_4$.
*	Redox equilibrium in analytical chemistry. Influencing factors on redox potential. Calculation of redox potential change during the titration, construction of titration curve. Role of induced reactions and catalysis in redox titrations. Indication methods of end-point, mechanism of indications, influencing factors on redox indicators.	Gravimetric determination of and calcium ion sin form of $CaC_2O_4*H_2O$.
*	Preparation and standardization of potassium permanganate solution. Direct, indirect and back titration in permanganometry.	Acidi- and alkalimetry:
*	Preparation and standardization of the titrants in	Preparation and standardization of

	cerimetry and chromatometry. Cerimetric and chromatometric determination of iron(II), hydrogen-peroxide, alcohols and organic acids. Determination of chemical oxygen demand of natural waters.	hydrochloric acid and sodium hydroxide standard solution.
*	Influencing factorsin bromatometric redox systems. Preparation of titrant in bromatometry. Determinations based on addition and substitution reactions of organic compounds with bromine. Direct titration with potassium bromate standard solution determination of As(III), ascorbic-acid, azophenum. Back titrations in bromatometry. Determination with brominechloride.	Titration of week acids (acetic acid).
*	Preparation and standardization of iodine and sodium-thiosulfate standard solution. End point indication in iodometry and iodimetry. pH dependence on iodometric titrations. Determination of oxidizing agents titration of halogens, hypohalogenides, halogenites, halogenates and metallic oxides. Determination of dissolved oxygen in waters. Determination of reducing agents titration of sulfides, sulfites, aldehydes, saccharides. Water determination by Karl Fischer methods.	Titration of a mixture of strong and week acids (sulphuric and boric acid).
*	Reductometric methods titanometry, ascorbinometry.	Determination of sodium thiosulphate (multiplying procedure).
*	Instrumental methods of chemical analysis, classification and importance of instrumental analysis.	Determination of amonia in amonium salts by destilation.
*	Electrochemical methods potentiometry (membrane-type and special electrodes) and potentiometric titrations, electrolytic methods (polarography, volt-ammetric titrations), coulombmetry and measurements based on electric conductivity.	Determination of potassium ion by ion exchange separation.
*	Spectrometric methods in instrumental analysis, interaction of electromagnetic radiation with matter. General rules of light absorption and emission. Excitation methods in atomic emission spectroscopy. Principles and applications of atomic absorption. Ultraviolet visible and infrared spectrophotometry. Fluorometric methods.	Argentometry:
*	Separation methods of instrumental analysis. Principles and applications of gas chromatography, high performance liquid chromatography and ionchromatography.	Preparation and standardization of silver nitrate and potassium thiocyanate titrant.
*	Basic principles of resonance methods (NMR, ESR) and mass spectrometry.	Titration of bromide ion by *Volhard* method (back titration).
*		Instrumental analysis:
*		Spectrophotometry: determination of salicylic acid
*		Flame photometry: determination of alkaline ions

FIRST AID AND RESUSCITATION

* The principles of first aid and emergency situation. Constantin's cross. Victim assessment. Rescuing technique.
* Rautek's manoeuvre, log-roll technique, KED, paramedic-EMC-NIC introducing, helmet removing.
* Unconscious patients, BLS, XBLS, AED
* Unconscious patients, BLS, XBLS, AED – practice
* Obstructed airway emergencies. Choking. Submersion. Respiratory distress.
* Heimlich manoeuvre. Stable position (Gabor's manoeuvre). Esmarch-Heiberg manoeuvre. Laryngeal mask, ET.
* Bleeding. Mechanism of injuries (joints, bones). Pain relief. Recognition of patients with shock conditions.
* Capeline bandage. Dessault dressing. Art. pressure points. Art. pressure bandages. Venous pressure dressings. Stifneck, VM, pneumatic splints. Scoop strecher.
* Mechanism of injuries. Type of wounds. Burn injuries. Electrical accident.
* Rescuing technique. First aid technique.
* Recognition of poisoning. First aid on the scene.
* Repeat: BLS, opening airways, ventilation, chest compression, stopping the bleeding, application of bandage, splinting technique, immobilization technique, Trendelenburg position, log-roll, Rautek, Heimlich, helmet removing, stabilization of body.
* Final examination.

ENGLISH

1st semester

PRACTICE
(2 hrs/week)

* Introduction and group discussion. Interviewing: asking and answering Yes/No and Wh-questions.
* Reading comprehension: skimming texts, understanding the essence of texts. Reading and discussing articles about hot issues on diseases and their cures.
* Vocabulary expansion, reading about recent advances in pharmacology. Video watching and discussion on the same topic.
* Writing tasks: how to write an essay/composition. Briefing task: reading a longer text (n=1500) on chemistry and summarizing it in 500 words. The use of connectors in writing.
* Listening skills: listening to a recording on vitamins and their effects, note taking exercise. Practising the Passive Voice.
* Speaking skills: preparing talks and mini-presentations. Paraphrasing and the use of references in presenting mini-projects. The use of Modal Verbs.
* Revision of the Past Simple and the Present Perfect Tenses. Presenting research methods and results. Mid-term test.
* Guided note taking. Listening to a recording on pathogens and taking notes. Comparing and discussing notes. Identifying main points. Semantic markers.
* Reading skills: preparing study notes from lengthy texts, identifying most important facts. Description, cause and effect. Understanding and memorizing definitions.
* Focussing on grammar and vocabulary expansion: CFC practice tests and health vocabulary tests.
* Video-watching: eating disorders – anorexia, bulimia and binge eating. Summarizing the film in writing and giving opinion on the topic. The use of definite and indefinite articles.
* Preparing short oral presentations on harmful habits. Arguing and defending viewpoints. Preparing for discussions. Indirect speech.

*	Guided note taking. Listening to a recording on constipation and its cures. Developing patient advice leaflets from notes.
*	Vocabulary and grammar revision. Practice tests. Final test.

2nd semester

PRACTICE (2 hrs/week)	
*	Organizing written notes and identifying main points. Lecture notes taken from Biology. Commonly used abbreviations and their interpretation.
*	Video watching: psoriasis and its treatment modalities. Medicaments used externally. Group discussion of a video film, arguing and convincing.
*	Essay writing on the importance of the pharmacist in giving advice on a healthy diet. Suggestions and recommendations. The use of MUST/SHOULD/WOULD.
*	Reading skills: developing faster reading and deeper understanding of read texts. Accomplishing reading comprehension tasks. CAE Reading Test.
*	Vocabulary expansion: preparing word-nets concerning internally used medicines. Adjectives, Comparatives and Superlatives.
*	Making use of the Internet in class: searching the Net for information on certain health issues. Presenting ideas found on the Net. Group discussion and evaluation.
*	Revision of Future Tenses and expressions meaning intension and certainty in the future. Describing expected and adverse effects of drugs. Mid-term test.
*	Developing awareness of proper and improper sentence constructions, grammar and vocabulary. Error spotting in essays written by group mates.
*	Clear and concise writing. How to make our writing more effective? Practising short essay writing, analysing problems of English from in biology and chemistry texts. Repetition and reformulation of ideas.
*	Reading and understanding Tables. Numericals, decimals, reading out numbers.
*	Reading and presenting graphs. The Conditional Mood. Vocabulary expansion: preparing word-nets concerning shapes.
*	Vocabulary expansion: English words of Greek and Latin origin in the field of Pharmacy. Prefixes and suffixes giving oppositional meaning to adjectives and adverbs.
*	Listening and writing skills: listening to a recording on the drug industry and taking notes. Comparing and discussing notes. Defining and non-defining relative pronouns.
*	Vocabulary and grammar revision. CAE and Medical Practice tests. Final test.

SHORT HISTORY OF HUNGARY I –II.

1st semester

	Introduction; Course requirements
	Geography and population
	Szeged: Centre of the South-eastern region of Hungary
	Origin of the Hungarians; Ancient history
	Early Middle Ages, foundation of the Hungarian state
	Age of the Anjou dynasty
	WRITTEN TEST I.
	Age of János and Mátyás Hunyadi
	Ottoman Turkish attack; Tripartite division of Hungary
	Reform movement in Western Christianity
	Liberation of Hungary from the Ottoman rule

WRITTEN TEST II.
Course evaluation

2nd semester

Introduction: Hungary as a part of the Habsburg Empire
Reform era of 1825–1848
Revolution and war of independence of 1848–49
Compromise in 1867, birth of the Austro-Hungarian Monarchy
World War I.
Dismemberment of the Austro-Hungarian Monarchy
WRITTEN TEST I.
Horthy regime, interwar period
Hungary in World War II.
Hungary after World War II., Hungary as a part of the Soviet block
Revolution in 1956
WRITTEN TEST II.
Course evaluation

LATIN

1st semester

PRACTICE (2 hrs/week)	
*	The role of the Latin language in medicine and pharmacy. Pronunciation. Groups of nouns - typical forms. Noun-adjective agreement, grammatical gender.
*	1st declension. Noun-adjective agreement, grammatical gender. Cases. Preas. Imp. Activi form of Latin verbs.
*	Simple medicine forms. Plural forms in 1st declension..Prepositions.
*	Praes. Imp. Passivi. 2nd declension.
*	Grammar revision excercises. Ointment, oil.
*	Mid-term test. The stucture of medical prescriptions. 3rd declension - nouns.
*	3rd declension - adjectives. Prepositions. Medicine forms.
*	The structure of medical prescriptions. Abbreviations. Cardinals in prescriptions. Miscellaneous exercises. Cardinals - "gramma".
*	4th declension.
*	Herbal teas. 5th declension.
*	Comparison of adjectives.
*	Participles in the pharmaceutical language. Herbs and plants.
*	Revision.
*	Final test.

HUNGARIAN LANGUAGE

1st semester

PRACTICE (4 hrs/week)	
*	Introduction: general information about the language. The Hungarian alphabet, pronunciation and intonation. Greetings, notices.
*	Getting acquainted: Who are you? Where are you from? Conjugation of the verb 'to be', subject form of the personal pronouns.
*	What is where in Szeged? Asking questions. Question words, existential sentences.
	Definite and indefinite articles.
*	Meeting students. The conjugation of verbs: present indefinite conjugation, singular forms. Cardinal numbers: telephone numbers and prices.
*	Going shopping. The accusative form of nouns.
*	Revision of grammar and vocabulary.
*	Going to the cinema. Telling the time. Making an appointment. Plural forms of the verb (indefinite present tense). The postposition 'előtt'.
*	TEST 1
*	A Sunday out: museum, theatre. The plural form of nouns and adjectives. Expressing possibility. The infinitive form.
*	Buying cinema tickets. Practising the present tense indefinite conjugation. Some adverbial suffixes: -ba/-be (to, into), -ban/-ben (in)
*	In a restaurant. Ordering a meal. Further adverbial suffixes: -hoz/-hez/-höz (to), -nál/-nél (at)
*	General revision.
*	TEST 2
*	Oral tests

2nd semester

PRACTICE (4 hrs/week)	
*	My family:possesive suffixes, genitive structure.
*	I have a…:Possesives+case endings. Expressing possession.
*	What is your friend like:describing people. Calendar, dates.
*	Revision
*	TEST 1
*	Students life: review of indefinite conjugation. Transitive and intransitive verbs.
*	Definite conjugation.
*	Daily routine: verbal prefixes.
*	Finding a flat: suffixes tól/től, hoz/hez/höz, ra/re. Compound nouns.
*	Weather and seasons.
*	General revision.
*	TEST 2
*	Preparation for the oral exam.
*	Oral tests

BASIC COMMUNICATION (ELECTIVE COURSE)

1. Introduction, motivation
2. Definition of communication, elements and basics of interpersonal communication, Factors influencing communication
3. Belbin test, human characters and their handling
4. Movie
5. Body language
6. Active listening, I and You language
7. Summary: situations, practice
8. Verbal communication elements: assertivity, win-win communication
9. Presentation skills

SYLLABUSES FOR 2ND YEAR PHARMACY STUDENTS

QUANTITATIVE CHEMICAL ANALYSIS

3rd semester

	LECTURE	PRACTICE
*	The nature, role and importance of quantitative analytical chemistry in the industry, research and medical practice. The fundamental concepts and methods of analytical chemistry.	Complexometry:
*	The measuring equipment and their calibration used in analytical chemistry. The sampling, sample treatment and preparations, techniques in component concentration and separation. Dissolving, fusion, mineralization of the samples.	Preparation and standardization of EDTA standard solution.
*	Basic principles of gravimetry solubility of precipitates, factors influencing the solubility of pracipitates. Mechanism and conditions of analytical precipitation. Impurities in precipitates. Techniques used in precipitation. Washing, filtering, thermal treatment and weighing of precipitates. Calculating the gravimetric results. Gravimetric determination of cations and anions. Precipitates formed by organic reagents.	Determination copper(II)-ion.
*	Principles of titrimetric methods. Volumetric glassware and their calibration. Preparation and standardization of titrants. End-point determination techniques in titrimetry. Calculation of results, error calculation and their sources.	Titration of calcium- and magnesium ions in mixture.
*	Acid-base theories, ionization of strong and weak acids, bases and their salts, calculation of pH. Classification and characterization of solvent used in acid-base titration. Construction of	Permanganometry:

	titration curves. Detection of end-point, mechanism of indication, indicator exponent. Preparation and standardization of titrants in acid-base titration. Titration of strong and weak acids, bases and their salts. Titration of alkali carbonate, bicarbonate and hydroxide mixture. The hardness of natural waters. The role of acid-base titrationin analysis of trigycerids (fats and oils). Acid-base titration in nonaqueous solution.	
*	Principles of precipitate forming titration. Calculation of solubility and construction of titration curves. End-point detection methods in precipitate forming titration. Preparation and standardization of silver nitrate titrant. Determination of silver ions, halogenides and pseudohalogenides.	Preparation and standardization of potassium-permanganate standard solution.
*	Complex equilibrium in analytical chemistry, theory of complexometric titration. Influence of pH and the presence of other complex forming reagents on stability of complexes. The selectivity of complex forming titration. Indication of end-point by visual and instrumental methods. Preparation and standardization of EDTA solution. Direct, indirect and back titration in complexometry. Determination of hardness of waters.	Titration of hydrogen-peroxide.
*	Redox equilibrium in analytical chemistry. Influencing factors on redox potential. Calculation of redox potential change during the titration, construction of titration curve. Role of induced reactions and catalysis in redox titrations. Indication methods of end-point, mechanism of indications, influencing factors on redox indicators.	Determination of iron(II) ion.
*	Preparation and standardization of potassium permanganate solution. Direct, indirect and back titration in permanganometry.	Bromatometry:
*	Preparation and standardization of the titrants in cerimetry and chromatometry. Cerimetric and chromatometric determination of iron(II), hydrogen-peroxide, alcohols and organic acids. Determination of chemical oxygen demand of natural waters.	Preparation of potassium bromate standard solution.
*	Influencing factorsin bromatometric redox systems. Preparation of titrant in bromatometry. Determinations based on addition and substitution reactions of organic compounds with bromine. Direct titration with potassium bromate standard solution determination of As(III), ascorbic-acid, azophenum. Back titrations in bromatometry. Determination with brominechloride.	Titration of arsenic(III) ion by *Győry*.
*	Preparation and standardization of iodine and sodium-thiosulfate standard solution. End point indication in iodometry and iodimetry. pH dependence on iodometric titrations. Determination of oxidizing agents titration of	Determination of antipyrin by bromine substitution reaction.

	halogens, hypohalogenides, halogenites, halogenates and metallic oxides. Determination of dissolved oxygen in waters. Determination of reducing agents titration of sulfides, sulfites, aldehydes, saccharides. Water determination by Karl Fischer methods.	
*	Reductometric methods titanometry, ascorbinometry.	Jodometry:
*	Instrumental methods of chemical analysis, classification and importance of instrumental analysis.	Preparation and standardization of sodium-thiosulfate solution.
*	Electrochemical methods potentiometry (membrane-type and special electrodes) and potentiometric titrations, electrolytic methods (polarography, volt-ammetric titrations), coulombmetry and measurements based on electric conductivity.	Determination of phenol by *Koppeschaar*.
*	Spectrometric methods in instrumental analysis, interaction of electromagnetic radiation with matter. General rules of light absorption and emission. Excitation methods in atomic emission spectroscopy. Principles and applications of atomic absorption. Ultraviolet visible and infrared spectrophotometry. Fluorometric methods.	Titration of thiocyanate ion by *Schulek*.
*	Separation methods of instrumental analysis. Principles and applications of gas chromatography, high performance liquid chromatography and ionchromatography.	Jodometric determination of copper(II) ion.
*	Basic principles of resonance methods (NMR, ESR) and mass spectrometry.	Instrumental analysis:
*		Conductometric titration: determination of oxalic acid
*		Coulombmetry: determination arsenic(III) ion
*		Potentiometry:
*		alkalimetric titration of phosphoric acid, cerimetric titration of iron(II)-ion by potentiometric end point indication
*		Voltametry: iodometric titration of iodate by byamperometric end point detection
*		Chromatograpy: gas chromatographic analysis of alcohols or HPLC measurement of phenolic compounds

PHYSICAL CHEMISTRY

	LECTURE	**PRACTICE**
*	Thermodynamics	Thermochemistry
*	The first law of thermodynamics	Determination of the heat of neutralization.
*	The second law of thermodynamics	Phase equilibria
*	The third law of thermodynamics	Determination of vapour pressure and heat of vaporisation of a liquid. Determination of the partial molar volume. Solubility relations in a three component system. Determination of

		boiling point diagram of two component miscible liquids. Partition experiments. Solubility measurements of solid substances.
*	Phase equilibrium	Reaction kinetics
*	Chemical equilibrium	Temperature dependence of the decomposition of a medicine. The kinetics of the hydrolysis of methyl acetate. The study of catalysis, promotion and inhibition. Primary salt effect on the kinetics of ionic reactions. Study of the kinetics of the decomposition of benzene-diazonium-chloride. Determination of initial rate and order of a reaction by clock reaction.
*	Electrochemical equilibrium	Electric conductance
*	Iontransport	Study of dissociation by electric conductance. Dependence of conductivity on concentration. Solubility by conductivity measurements.
*	Reaction kinetics	Electromotive force
*		Study of redoxy electrodes. Dependence of electrode potential on the concentration of electrolyte. Concentration cells. Determination of pH.
*		Experiments based on optical methods
*		Dependence of light refraction on the concentration. Study of absorption spectrum of solutions. Study of inversion of cane sugar by polarimetry. Study of complexes by spectrophotometry.

ORGANIC CHEMISTRY

3rd semester

	LECTURE	PRACTICE
*	General introduction. Electronic theory and bonding in carbon compounds. Degree of oxidation, functional groups, families of organic compounds. Classification of organic transformations. General rules of nomenclature. Bond polarization.	Basic methods of synthetic organic chemistry; Distillation; Crystallization, melting point; Extraction;
*	Isomerism in organic chemistry: constitutional, conformational, configurational. Conformation, configuration. Stereoisomerism: geometric isomers (cis-trans), optical isomers, chirality. Central chirality, molecular asymmetry. Stereochemical characteristics of chemical transformations. Asymmetric synthesis, resolution. Tautomerization.	Reactivity of functional groups in organic compounds (hydrocarbons, halogeno compounds, hydroxyl derivatives, amino derivatives, carbonyl compounds, carboxylic acids and derivatives saccharides,
*	Hydrocarbons. Saturated hydrocarbons (alkanes): structure, conformation. Free-radical halogenation. Unsaturated hydrocarbons (alkenes): mono-olefins, dienes. Electrophilic additions. Dienes, conjugation. Alkynes. Aromatic hydrocarbons: monocyclic, isolated, and condensed ring systems. Aromaticity, aromatic	Syntheses (oxidation, reduction, nucleophilic substitution, electrophilic substitution, electrophilic addition, esterification, acylation, condensation, cyclocondensation, synthesis of representative compounds with pharmacological activities

	electrophilic substitutions. Substituent effects on aromatic S_E reactions: reactivity and orientation.
*	Organic halides. Nucleophilic substitutions and eliminations; stereochemistry. Structure and reactivity of organic halides.
*	Compounds containing C–O and C–S single bonds. Alcohols and thio analogs: substitution, elimination, oxidation. Phenols and thio analogs. Acidity. Hydrogen bonding. Ethers and thio analogs: open-chain and cyclic ethers. Crown ethers.
*	Nitrogen-containing compounds. Nitro compounds. Amines: basicity, nucleophilicity. Alkylation, reactions with nitrous acid and carbonyl compounds. Biological and pharmaceutical importance of amines. Azo compounds, diazomethane, diazonium compounds.
*	Carbonyl compounds. Aldehydes, ketones: general reactivity. Nucleophilic additions, condensations, oxidations, reductions.
*	Carboxylic acids and derivatives. Acidity. Nucleophilic acyl substitutions: ester formation, ester hydrolysis. Carboxylic acid derivatives: general reactivity. Substituted carboxylic acids: dicarboxylic acids, keto- and hydroxy-carboxylic acids.
*	Carbonic acid derivatives.

4th semester

	LECTURE
*	Heterocyclic compounds. Saturated and unsaturated compounds. Aromatic heterocycles: five- and six-membered rings with one or two heteroatoms. Benzo-fused derivatives. Aromaticity and reactivity. Tautomerization of aromatic heterocycles.
*	Amino acids, peptides, proteins. Chemistry of a-amino acids. Synthesis and structure determination of peptides. Chemistry related to the structure of proteins.
*	Carbohydrates. Structure and chemistry of monosaccharides. Di-, oligo- and polysaccharides.
*	Nucleic acids. Building blocks of nucleic acids. Ribonucleic acids, deoxyribonucleic acids: the Watson-Crick model. Nucleotide coenzymes.
*	Isoprenoids. Terpenoids, carotenoids, steroids.
*	Alkaloids.

PHYSIOLOGY

3rd semester

LECTURE	**PRACTICE**
Introduction, homeostasis	Information about work safety and fire protection.
	Recording technics, recording devices: kimograph, computer. Methods of stimulation: thermal, chemical, electrical, types of electrodes.

Membrane physiology	Membrane potential and action potential observing with METANEURON system: ionic theory of the action potential, the threshold of action potential, stimulus strengths – duration relationship, refractory periods.
Transmission: synapsis, receptors	
Muscle physiology	Electromyography (EMG). Neuromuscular studies with BIOPAC system.
Blood physiology	Blood tests:
	The microscope in haematological tests, sterilisation and disinfection, methods of taking blood from the fingertip, centrifuges. Blood cells (HEMOSURF program), qualitative blood smear, hematocrit (micro). Observation of blood clotting (in vitro), determination of blood groups (AB0, Rh), prothrombin time. Using and cleaning of the melangeur pipettes, Bürker's chamber, red blood cell count, white blood cell count, osmotic resistance of red blood cells, observing reticulocytes in blood smear.
	Principles of: methods of taking blood from a vein, Price-Jones' curve, erythrocyte sedimentation rate by Westergren, bleeding time, partial thromboplastin time, thrombin time, International Normalized Ratio (INR), thrombocyte count (Fischer-Germer), reticulocyte count, staining index, haematological automata.
Heart physiology	Studies on the circulatory system: Experiments in the isolated rat heart preparation (Langendorf perfusion): effects of ions and drugs (adrenaline, acetylcholine, atropine) on the heart. Video: in situ registration of the activity of the heart in the frog.
	Human ECG: recording the human ECG, characteristics of the normal ECG, draw the electrical axis of the heart.
Circulation	The human circulatory system: peripheral pulse, characteristics of the radial pulse, blood pressure measurement, effects of breathing on the circulation, cold pressor test, investigation of the axon reflex flare (triple response of the skin), jugular pulse.
Respiration physiology	The human respiratory system: spirometry, determination of inspiratory and expiratory pressures, palpation over the chest, auscultation over the heart and lungs.
Physiology of the urinary system	Technical information for the urine practice. Urine analysis: colour, smell, transparency and pH. Microscopic investigation of the urinary sediment (power point slide show). Specific gravity. Detection of: calcium (Sulkowitsch' test), glucose (Nylander's and

	Fehling's tests), proteins (Heller's test, boiling test, sulphosalicylic acid test), acetone (Rothera's test,Legal's test), bile pigments, UBG (Ehrlich's method), blood (benzidine test; theory), pus (theory). Rapid (strip) tests.
Volumen-, osmo- and pH regulation	Demonstration of the effect of ADH on the diuresis. Dilution and concentration test in human (theory). Counting corpuscular elements in urine (Addis' method, theory). Determination of clearance (theory).
Skin and thermoregulation	

4th semester

Physiology of the gastrointestinal system	The pH of the saliva, detection of proteins of the saliva. Investigation of saliva amylase and maltase.
	Demonstration of the protein digesting activity of pepsin. Detection of lactic acid in gastric juice. Collection of gastric juice (MAO, BAO, PAO - theory). Measurement of acidity of the gastric juice with titration.
	Calculate of Body Mass Index (BMI)
	Video (stomach).
Vitamins, nutrition, metabolism	
Endocrine system	Pregnancy tests
	The effect of insulin on blood glucose level
	Thorn's test (theory)
Physiology and structure of the nervous system	Demonstration of blood-brain barrier in the rat
Motor system	Human reflexes (patella-, Achilles-tendon, biceps-, triceps-, radial-reflex; skin reflexes)
	Tremor – tremometer. Video (disorders of the motor system)
Somatosensory system	Investigation of the skin senses (pressure, pain, tactile sense, graphaesthesia, sense of localisation).
	Weber's 3 basin test.
	Cool and hot receptors localization on the hand.
Autonomous nervous system	Observation of the autonomic nervous system with the BIOFEEDBACK program, the polygraph examination (BIOPAC),
Sensory system: vision, hearing, taste, smell	Vision: determination of visual acuity, accommodation, Mariotte's blind-spot test, the light-response of the pupil(direct and consensual pupil reflex). Testing of colour blindness, visual field. Ophthalmoscopy. Dark adaptation, fusion frequency, observation of the ophtokinetic reflex. Detection of astigmatism (Placido's keratoscope, Javal-Schiötz'-ophthalmometer). Visual evoked potentials (computer program). Optical illusion (magic pictures). Video: visual field

	Hearing and balance: laryngoscopy, otoscopy
	Determination of the acoustic acuity (audiometry), tuning fork tests (examinations according to Rinne, Schwabach and Weber).
	Bárány's pointing test.
	Sense of taste, olphactometry.
	Reaction time measurement: motor response to each visual stimulus, and to each auditory stimulus (BIOPAC)
Sleep ang higher brain functions	Effects of relaxation and arousal to body functions. EEG recording. Cognitive tests (Stroop paradigm, Mini-Mental Test, Eyes test, Trail making test).
Sport physiology	The effects of physical exercise on respiration, heart rate and blood pressure.

COLLOID CHEMISTRY

	LECTURE	PRACTICE
*	Introduction	Safety precaution, fire protection.
*	Colloidal state and systems	Viscosity of polymer solutions.
*	Major characteristics of colloidal systems: classification, definition, delimitation and comparison.	Effect of surface active agents on surface tension of water.
*	Incoherent (incohesive) and coherent (cohesive) colloidal systems.	Solubilization of organic acids.
*	Macromolecular colloids	Adsorption from solution, determination of specific surface of adsorbent.
*	Chemical structure of macromolecules.	Emulsions, microemulsions.
*	Characterization of macromolecular coils.	Spreading and wetting. Making of monomolecular films by Pockels method.
*	Preparation of polymeric materials.	
*	Macromolecular solutions, molecular mass determination.	
*	Polyelectrolytes, structure and solution behavior.	
*	Association colloids	
*	Structure and types of amphiphilic molecules, HBL scale.	
*	Micelle formation equilibrium.	
*	Structure of micelle.	
*	Critical micelle formation concentration.	
*	Physical-chemical properties of surfactant solutions.	
*	Solubilization in surfactant solutions.	
*	Interfaces	
*	Interfacial phenomena, interfacial energy.	
*	Gas/liquid, liquid/liquid interfaces. Surface tension, surface activity, excess amounts,	

	spreading.
*	Monomolecular films.
*	Gas/solid and liquid/solid interfaces. Adsorption.
*	Adsorbents.
*	Spreading and wetting.
*	Charged interfaces, electric double layer.
*	Electrokinetic phenomena.
*	Preparation, characterization and stability of colloid and coarse disperse systems
*	Classification and characterization of colloid and coarse disperse systems.
*	Spontaneous and forced changes in colloidal state, preparation and destabilization, colloidal stability.
*	Aerosols, foams, emulsions, microemulsions, suspensions and sols.
*	Structural characterization of colloidal systems
*	Particle size and shape. Size distribution. Measuring methods.
*	Coherent systems, gels. Rheology, flow curves, tixotropy.

BIOCHEMISTRY

*	Enzymology
*	Definition and scope of biochemistry
*	Conditions of processes in biological systems
*	Living organism as a thermodynamically open system
*	Protein structure
*	Functions of proteins in the organism
*	Protein composition/structure
*	Protein conformation
*	Enzymes
*	Enzymatic action
*	Coenzymes
*	Classification of enzymes.
*	Isoenzymes, their clinical importance
*	Units of enzyme activity
*	Enzyme kinetics
*	Role of enzymes during catalysis
*	Steady state condition
*	Order and conditions of reactions
*	Lineweaver-Burk equation/plot
*	Kinetics of inhibition
*	Carbohydrate metabolism
*	Energy generation and storage

*	Glycolysis
*	Glycogen metabolism
*	Synthesis of glucose (gluconeogenesis) from non-carbohydrate precursosrs: glycerol (from neutral lipids), glucogenic amino acids
*	Importance of hexose monophosphate shunt
*	Relationship between the carbohydrate metabolism and other metabolisms
*	Lipidmetabolism
*	Metabolism of fatty acids and triacyl glycerols and phospholipids
*	Lipoproteins
*	Amino acid metabolism
*	Urea cycle and nitrogen elimination
*	Nucleotide metabolism
*	Citric acid cycle, terminal oxidation and oxidative phosphorylation
*	Citric acid cycle as the central pool of the intermediate metabolism
*	Definition of terminal oxidation, redox systems in the organism
*	Oxidative phosphorylation
*	Biochemical characterization of the connective tissue and the cytoskeleton
*	Collagen structure and its synthesis
*	Biochemistry of membranes
*	Structure of biological membranes, fluid mosaic model
*	Membrane proteins and transport systems
*	Biochemistry of contractile tissues
*	Types of contractile tissues
*	Regulation of muscle contraction by calcium
*	Biochemistry of the neural tissue and vision
*	Biochemistry of the blood
*	Organic components of the blood plasma
*	Biochemical characteristics of blood cells
*	Biochemistry of blood clotting and fibrinolysis
*	Biochemistry of the liver and biotransformation
*	Structure of liver and its microcirculation system
*	Biotransformation
*	Biochemical effects of alcohols
*	Biochemistry of hormones
*	Chemical and biochemical classification of hormones
*	Biochemistry of thyroid and parathyroid hormones
*	Hormonal regulation of blood glucose level
*	Biochemistry of steroid hormones
*	Tissue hormones, growth factors
*	Regulation of gene expression
*	General principles of biochemical regulation, adaptation, limits of adaptation
*	Signalling systems
*	Cyclic nucleotide dependent signalling systems
*	Phosphorylation and dephosphorylation as regulation mechanisms
*	General principles of biochemical regulation

PHARMACEUTICAL BOTANY

4th semester

	LECTURE (3 hrs/week)	**PRACTICE (2 hrs/week)**
*	Introduction to the course and the living cell. The hierarchy of plant structure. Endomembrane concept and cytoplasm. Nucleus, mitochondria and plastids.	Introduction, Use of the microscope, Lab drawing, The living plant cell, plasmolysis
*	Cell wall, plasmodesmata. Meristem & the primary plant body. Plant tissues, simple tissues, tissue systems. Parenchyma and collenchyma	*Dermal Tissue System* Epiderm cells and stomatal apparatus, Trichomes, Periderm and lenticel
*	Sclerenchyma - Sclereids and fibers. Secretory structures (internal and external sttructures). Dermal Tissue System: Epidermis and stomata, trichomes. Periderm, lenticell	*Ground Tissue System:* Parenchyma Collenchyma Sclerenchyma, Secretory canals and glands
*	Xylem - Tracheids, vessel members, fibers. Primary xylem and ontogenesis. Phloem - Sieve tubes and cells Sieve tubes and cells Ontogenesis and function	*Vascular Tissue System* Xylem, Phloem, Vascular bundles.
*	Root - Primary structure and differentiation. Secondary growth in roots Adventious roots	Tissues of a Monocot Root, Tissues of a Young Dicot Root, Secondary Thickened Roots
*	Shoot apical meristem. Stems and Buds. Stem - Primary vascular differentiation. Stem - Differentiation and secondary growth.	Anatomy of Secondary Thickened Roots II
*	Woody stem. Cork and anomalous cambia. Stem types and stem modifications. Underground stems. Duration, Plant habit, Leaf structure and ontogeny, Leaf variation	Lab Test
*	Leaf arrangement, Leaf types, Morphology: leaf shapes, margins, venation, Modified structures. Flower structure, Corolla types, Stamens, Pistils, Ovary position, Floral formulas	Primary Growth of Stems, Herbaceous Stems, Woody Stems, Bark
*	Inflorescence types, Sporogenesis and gametogenesis, Fertilization and embryogenesis. Pollination, Breeding Systems, Seed, Fruit (dry fruits, fleshy fruits) and seedlings	Underground stems
*	Plant Taxonomy, Nomenclature, Cronquist System, Monocots vs. Dicots. *Magnoliidae:* Magnoliaceae, Lauraceae, Nymphaeaceae, Ranunculaceae, Papaveraceae	Anatomy of Leaves
*	*Hamamelidae:* Cannabaceae, Urticaceae, Juglandaceae, Fagaceae, Betulaceae. *Caryophyllidae:* Phytolaccaceae, Caryophyllaceae, Polygonaceae.	Anatomy of Seeds
*	*Rosidae*: Rosaceae, Mimosaceae, Caesalpiniaceae, Fabaceae, Rutaceae *Dilleniidae:* Malvaceae, Violaceae, Passifloraceae, Cucurbitaceae, Salicaceae, Brassicaceae	Lab Test
*	*Rosidae:* Apiaceae, *Asteridae:* Solanaceae, Lamiaceae, Scrophulariaceae, Rubiaceae *Asteridae:* Asteraceae, *Commelinidae:* Poaceae, *Liliidae:* Liliaceae	Excursion to the Botanic Garden

PHARMACEUTICAL PROPEDEUTICS

4th semester

	LECTURE (2 hrs/week)
*	Definition of drugs, classification of drugs. Active substances, additives, pharmaceutical dosage forms.
*	Medical prescription. Parts of prescription. Legal condition system of prescription writing.
*	Types of drug prescription: formula magistralis, formula normalis, formula originalis, formula nosocomialis, formula officinalis
	Pharmacies. Types of pharmacies (public pharmacy, branch pharmacy, 'hand' pharmacy, hospital pharmacy). Establishment of pharmacies, equipment and fittings in pharmacies, function of pharmacies.
*	Order of service of pharmacies. Instruments and tools in public pharmacies.
	Functions and structures of pharmacopoeias. Hungarian Pharmacopoeia Ed. VII. and VIII., European Pharmacopoeia.
*	Pharmaceutical collections, specialist books
*	Pharmaceutical calculation (solubility, calculation of concentration, etc.) Role and rules of dose checking.
	Grouping of dosage forms (liquid, semisolid and solid dosage forms).
*	Classification of dosage forms according to application place. ATC code.
*	Institutional pharmacy and its tasks (hospital and clinical pharmacy).
	Industrial pharmacy.
*	Mass measurement. General rules of mass measurement. Principles of measurement with scales.
*	Definition and process of filtering. Grouping of procedures according to the energy used.
*	Pharmacist education, graduate and postgraduate education, PhD.
*	Hungarian organizations of pharmacy (Hungarian Society for Pharmaceutical Sciences, Hungarian Chamber of Pharmacists, National Association of Private Pharmacists, etc.). Most important international organizations of pharmacy (FIP, EUFEPS).

HUNGARIAN LANGUAGE

3rd semester

	PRACTICE (4 hrs/week)
*	General revision.
*	A weekend trip to Budapest. The comparative and superlative form of adjectives.
	Travelling by train. Sightseeing.
*	Travelling abroad: revision of case endings and postpositions. Noun formation.
*	I feel ill 'kell'+personalised infinitive. Reflexive pronouns. Health vocabulary.
*	At the doctor's: kell, lehet, szabad, tilos. Suffix szor/szer/ször. Body parts.
*	Revision
*	TEST 1
*	What happened? :past tense definite and indefinite. Time expressions.
*	Revision of grammar and vocabulary.
*	Revision of grammar and vocabulary.

*	TEST 2
*	Preparation for the oral exam
*	Oral tests

4th semester

	PRACTICE (4 hrs/week)
*	Services: possesive suffixes in the plural. At the pharmacy.
*	Private conversations:personal pronouns with case endings. Hat/het.
*	Revision of past and present tense conjugation.
*	Questions and question words.
*	Word order and complex sentences.
*	Grammar exercises and reading comprehension tasks.
*	TEST 1
*	Practising role-play and picture description.
*	Practising role-play and picture description.
*	Grammar exercises and reading comprehension tasks.
*	Grammar exercises and reading comprehension tasks.
*	Words originating from the same root (kezd, kezdődik etc.)
*	Revision of grammar and vocabulary.
*	Practising role-play and picture description.

SYLLABUSES FOR 3RD YEAR PHARMACY STUDENTS

PHARMACOGNOSY

5th semester

	LECTURE (3 hrs/week)	**PRACTICE (4 hrs/week)**
*	About pharmacognosy in general. The history of pharmacognosy. Plant nomenclature and nomenclature of plant drugs. What is a plant drug? Collection and cultivation of medicinal plants. About plant drugs. The preparation of plant drugs.	Receipt of laboratory tools
*		Safety and laboratory procedures
*		Basic phytochemistry procedures, extraction methods, chromatography I.: Percolation of Rutae herba with solvents of different polarity, TLC examination of the extracts
*	Basic metabolic pathways. Photosinthesis, Calvin, Krebs cycles, glycolises. Primary metabolits. The origin of carbohydrates. The formation of fats and proteins. Secondary metabolites. The origin of terpenoids. The	Basic phytochemistry procedures, extraction methods, chromatography II.: Separation with column chromatography: chloroformic extract of Rutae herba, TLC examination of the fractions

	formation of phenolic compounds and alkaloids. Tissue cultures, Basis of plant biotechnology, chemotaxonomy.	
*	About carbohydrates in general. The types, occurence, uses (in medicine) of carbohydrates. Honey, Tamarin pulp, manna, fig. Rose fruits. Starches.	Basic phytochemistry procedures, extraction methods, chromatography III.: Isolation of rutamarin with preparative TLC, Purity examination of the isolated component by TLC
*		Two dimensional TLC
*	Gums and mucillages. Tragacantha, acacia gum, agar, cotton. Carragen, steraculia gum, psyllium, marshmallow root, linseed.	Drugs with carbohydrate content I.: Testing of starch containing drugs (Maydis amylum, Solani amylum, Tritici amylum), Microscopical characteristics, General starch tests, Test for impuritites, Gossypii lana: Behrens, Schweitzer test, Isolation of polysaccharides from Lini semen and Althaeae radix
*	Fatty acids, fixed oils, waxes. Arachis oil, sesame oil, olive oil. Castor oil, coconut oil, linseed oil, theobroma oil. Hydnocarpus oil, bees wax, spermaceti.	Drugs with carbohydrate content II.: Hydrolysis and TLC determination of the monosaccharides isolated from the polysaccharides of Lini semen and Althaeae radix, Acaciae gummi, Tragacantha: Test for identification and purity, Determination of swelling value of Agar
*	Prostaglandins. Krebs cycle. Amino acids. Peptides. Enzymes, pepsin. Papaya tree, pineapple, ficus. Mistletoe.	Drugs with fixed oil content: Comparison of fixed oils derived from different drugs with TLC, Test for rancidity, Detection of vitamine A from cod fish liver oil
*		Drugs with organic acid content: Detection of vitamine C from Rosae pseudo-fructus
*	Alkaloids in general.	MTO
*	Ornithine-derived alkaloids. Tropane alkaloids. Hyoscyamus leaf. Egyptian Henbane. Belladonna herb and root. Stramonium leaf. Duboisia leaves. Coca leaf and Cocaine.	Drugs with alkaloid content I.: General alkaloid reactions, Drugs with alkaloids derived from ornitine: alkaloids with tropane skeleton., TLC determination of Belladonnae folium, Stramonii folium, Hyoscyami folium, Vitali reaction, Detection of scopoletin, Drugs with alkaloids of phenylalanine-origin: Ipecacuanhae radix → Rubremetin-reaction, Frohde-reaction
*	Lysine-derived alkaloids. Lobelia. Tobacco alkaloids.	Drugs with alkaloid content II.
_*		Drugs with alkaloids derived from phenylalanine: Detection of carotinoids from Capsici fructus, Marquis reaction, detection of meconic acid from Opium
*		Separation of morphine from the other opium alkaloids, Purity test of the isolated morphine by TLC
*	Phenylalanine-derived alkaloids. Opium poppy. Opium. Opium alkaloids, Biogenesis of morphine.	Drugs with alkaloid content III.
*		Drugs with alkaloids derived from tryptophane: Strychni semen: detection of strychnine, brucine, loganin, Chinchonae cortex: Thalleioquin reaction, Grahe test
*		Secale cornutum: van Urk reaction, detection of antraquinones (sclereritin)

*	Phenylalanine-derived alkaloids. Papaveraceae and Amaryllidaceae alkaloids and their drugs. Boldo leaves. Ephedra. Khat. Hydrastis. Ipecacuanha. Colchicum seed and Corm.	Drugs with alkaloid content IV.
*		Drugs with alkaloids derived from tryptophane: Chinchonae cortex: Thalleioquin reaction, Grahe test, Quantitative determination of the alkaloid content of Chinchonae cortex by spectrofotometry
*	Triptophan-derived alkaloids. Ergot.	Drugs with alkaloid content V.
*		Drugs with alkaloids derive from xanthine: TLC examination of the caffeine, theobromine, theophylline content of Coffeae semen, Colae semen, Cacao semen, Theae folium, Micromurexid reaction
*	Calabar bean. Nux vomica. Rauwolfia. Catharanthus roseus. Cinchona. Camptotheca acuminata, Curare. Imidazole alkaloids. Jaborandi leaf.	MTO
*	Purine alkaloids. Coffee seed. Thea. Cocoa seed. Mat leaf. Cola. Guarana.	Oral exam: images of medical herbs and *in toto* drugs

6th semester

	LECTURE (3 hrs/week)	**PRACTICE (4 hrs/week)**
*	Isoprenoid compounds (in general, biogenesis). Monoterpenes, volatile oil (preparation, characters, uses) Peppermint leaf and oil, spermint oil. Lavender oil and flower. Rosemary oil and leaves. Oil of rose.	Receipt of laboratory tools
*	Melissa, sage, sweet basil.	Safety and laboratory procedures
*		Determination of drugs with volatile oil content I.
*		General examination of volatile oils (colour, odour, taste, purity), Lavandulae flos, Coriandri fructus, Menthae piperitae folium, Menthae crispae folium, Carvi fructus: TLC determination of monoterpenes
*	Caraway and caraway oil. Coriander and coriander oil. Dill and dill oil. Thyme, eucalyptus oil and leaves. Cardamon fruit, bitter orange peel. Lemon peel, juniper berries and oil.	Determination of drugs with volatile oil content II.
*		TLC examination of Matricariae flos, Determination of proazulenes by EP-test (Absinthii herba, Millefolii herba, Matricariae flos), Equipment for the steam distillation of the volatile oils
*	Aniseed and aniseed oil, fennel, cinnamon and cinnamon oil. Star anis fruit and oil. Camphor. Clove and clove oil. Nutmeg and nutmeg oil. Tea tree. Calamus, ginger, turmeric. Iridoids, gentian roots. Valerian.	Determination of drugs with volatile oil content III.
*		Caryophylli floris aetheroleum: determination of the eugenol content in Cassia flask, Cinnamomi cassiae aetheroleum: determination of the cinnamaldehyde content in Cassia flask, Anisi fructus and Foeniculi dulcis fructus: TLC

		determination of phenylpropane-derivatives
*		Drugs with miscellaneous terpene content: Determination of valepotriates, Definition of bitterness value
*		Determination of unknown drug powders
*	Sesquiterpenes, Roman chamomile flowers. Matricaria flowers. Fish berries, santonica flowers. Other Asteraceae drugs. Sandal wood, oil of cade. Artemisinin, Pyrethrum.	Drugs with saponin content: Liebermann-Burchard-reaction (Primulae radix, Saponariae albae radix), TLC determination of Liquiritiae radix, TLC determination of Hederae folium
*		Determination of unknown drug powders
*	Diterpenoids, colophony resin and turpenine. Asafoetida, myrrh, Triterpenoids (biogenesis of triterpenoids). Ginseng, senega root. Quillaya bark, Liquorice. Gypsophilla, Saponaria.	Drugs with digitalis glycoside content: Keller-Kiliani test, Baljet test, Kedde test (Digitalis purpureae folium, Digitalis lanatae folium, Strophanthi semen), TLC determination of Digitalis purpureae, Determination of unknown drug powders
*	About steroids in general (biogenesis of steroids). Steroidal saponins (dioscorea, solanum, sarsaparilla root). Natural steroids as staring materials for partial synthesis of pharmaceuticals.	Drugs with triterpene saponin content I.: TLC determination of Calendulae flos, TLC determination of Hippocasteni semen, TLC determination of Urticae herba et radix, Determination of unknown drug powders
*	About cardioactive glycosides containing drugs in general. Digitalis (purpurea) leaf. Digitalis lanata leaf.	MTO
*	Strophamtus and other (nerium, thevetia, convallaria, adonis) cardenolid containing drugs. Bufadienolids and its drugs (squills, black hellebore rhizom).	Drugs with anthraquinone content: Gel chromatographic separation and TLC determination of the anthraquinone derivatives of Frangulae cortex, Bornträger reaction (Frangulae cortex, Rhei rhizome, Sennae folium, Aloe), Separation of the free and glycosidic antranoids of Aloe and Sennae folium, Rosenthaler and Schouteten test (Aloe)
*	Phenols and phenolic glycosides. Vanillia, bearberry, willow, meadowsweet, Hope strobiole, Phloroglucinol-derivatives. Male fern.	Drugs with flavonoid content I.: TLC determination of the flavonoid aglycones (glycoside-free components) from Tiliae flos, TLC determination of the flavonoids from Sambuci flos and Hyperici herba, Determination of unknown drug powders
*	Anthraquinones and glycosides. Senna leaf. Cascara bark. Frangula bark. Rhubarb. Aloes.	Drugs with flavonoid content II.: Isolation and TLC determination of the purity of hesperidin from Aurantii epi- and mesocarpium, Detection of procyanidins from Crataegi folium cum flore and Crataegi fructus (Bate-Smith test), Determination of unknown drug powders
	Flavonoid compounds. Silybum. Sambucus.	
*	Tannins. Galls and tannic acid. Hamamelis. Catechu. Rhatany.	Drugs with tannin content: General tannin reactions
*	Coumarins and their glycosides. Visnaga. Lignans. Podophyllum and Podophyllum resin.	Drug with hydroquinone derivative content: TLC determination of the methanolic extract and sublimate of Uvae ursi folium, Determination of catechin derivatives and phenolic components of Uvae ursi folium, Determination of unknown drug powders
*	Simple phenolic compounds. Vanilla and Vanillin. Baerberry leaves. Capsicum. Indian hemp. Henna.	Drug with triterpene saponin content II.: TLC determination of the ginsenosides (A-I) from Panax ginseng tea, capsule and alcoholic extract, Determination of unknown drug powders
*		MTO

*		Oral exam: images of medical herbs and *in toto* drugs

PHARMACEUTICAL CHEMISTRY

5th semester

	LECTURE	PRACTICE
	GENERAL PART	Seminar: Taking laboratory equipment. Measures in the laboratory. Safety instructions and fire-protective rules. Lab note book.
*	Definition and classification of drugs or pharmaceuticals. The history and development of drug control. Nomenclature of drugs. Physical, physico-chemical and chemical investigations of pharmaceuticals and substances used in pharmacy. Identification and qualitative tests, quantitative assays.	*Natrii chloridum* It. A, B, Pt. Appearance of solution, Acidity or alkalinity, Ferrocyanides, Iodides, Phosphates, Sulphates, Arsenic, Barium, Iron, Heavy metals, Informative test: 2, 3
		Seminar: Reagents, limit test solutions and colorimetric matching fluids. Identifying and general purity tests of European Pharmacopoeia 6th Ed.
	INORGANIC PART	
		Kalii chloridum It. A, B, Pt. Appearance of solution, Acidity or alkalinity, Iodides, Sulphates, Barium, Heavy metals, Iron, Informative test: 2,3
*	Halogen group. Chlorine water, Iodine, Hydrochloric acid, Sodium fluoride, Sodium chloride, Potassium chloride, Sodium bromide, Potassium bromide, Sodium iodide, Potassium iodide, Potassium chlorate, Potassium perchlorate.	Seminar: Pharmaceutical nomenclature. Quantitative assays. Group of halides. Compounds of halides, oxygen group and alkali hydroxids: Chlorine water, bromine, *Iodum*, *Acidum hydrochloridum*, *Natrii chloridum*, *Kalii chloridum*, *Natrii bromidum*, *Kalii bromidum*, *Natrii iodidum*, *Kalii iodidum*, chloride of lime, *Kalii perchloras*, *Oxygenium*, *Aqua purificata*, *Aqua valde purificata*, *Aqua ad iniectabilia*, *Hydrogenii peroxidum 30 per centum*, *Natrii hydroxydum, Kalii hydroxidum.*
*	Oxygen compounds. Demineralized water, Distilled water, Hydrogen peroxide solution 30%, Potassium hydroxide, Sodium hydroxide.	*Natrii iodidum* It. A, B, Pt. Appearance of solution, Alkalinity, Iodates, Sulphates, Thiosulphates, Heavy metals, Iron, Informative test: 1, 3
*	Sulphur and its compounds. Purified sulphur powder, Precipitated sulphur, Sodium disulphite, Potassium sulphate, Sodium sulphate, Sodium thiosulphate.	*Iodum* It. A, B, Pt.. Bromides, chlorides
*	Nitrogen group. Nitrogen, Concentrated ammonia solution, Ammonium chloride, Ammonium bromide, Nitrous oxide, Sodium nitrite, Concentrated nitric acid, Potassium nitrate.	Seminar: Sulphur and sulphur compounds. Compounds of the nitrogen group, salts of the phosphoric acid. *Sulfur ad usum externum*, *Natrii metabisulfis, Natrii sulfis*, *Natrii sulfas, Kalii sulfas*, *Natrii thiosulfas*, Nitrogenium, *Ammoniae solutio concentrata*, *Ammonii chloridum*, *Ammonii bromidum*, *Dinitrogenii oxidum*, *Natrii nitris*, *Kalii nitras, Natrii*

		dihydrogenophosphas, *Kalii dihydrogenophosphas*, *Dinatrii phosphas*, *Dikalii phosphas*, *Calcii hydrogenophosphas*, *Tricalcii phosphas.*
*	Phosphoric acid and its salts. Sodium dihydrogenphosphate, Disodium hydrogenphosphate, Calcium hydrogenphosphate, Tricalcium phosphate.	*Aqua purificata* Pt. Nitrates, Acidity or alkalinity, Oxidisable substances, Chlorides, Sulphates, Ammonium, Calcium and magnesium
*	Compounds of arsenic, antimony and bismuth. Arsenic oxide, Bismuth oxynitrate.	*Hydrogenii peroxidum 3 per centum* It. A, B)
*	Carbon group. Activated charcoal, Carbon dioxide, Lithium carbonate, Sodium carbonate, Potassium carbonate, Potassium thiocyanate.	*Natrii bromidum* It. A, B, Pt. Chlorides, Assay, Informative test: 1, 3
*	Silicon compounds. Hydrophilic colloidal silica, Hydrophobic colloidal silica, Talc, Magnesium trisilicate, White clay.	*Kalii bromidum* It. A, B, Pt. Appearance of solution, Acidity or alkalinity, Bromates, Iodides, Sulphates, Heavy metals, Iron, Informative test: 2, 3
*	Lead compounds. Lead monoxide, Lead acetate.	*Ammonii bromidum* It. A, B, Pt. Appearance of solution, Acidity or alkalinity, Bromates, Iodides, Informative test: 2, 3
*	Boron compounds. Boric acid, Sodium borate.	Seminar: Inorganic arsenic and bismuth compounds. Carbo and inorganic compounds of carbon. Silicium, lead, boron, aluminium and zinc compounds. *Arsenii trioxidum ad praeparationes homoeopathicae*, *Bismuthi subcarbonas*, *Bismuthi subnitras ponderosus*, *Carbo activatus*, *Carbonei dioxidum*, *Natrii hydrogenocarbonas*, *Kalii hydrogenocarbonas*, *Natrii carbonas*, *Kalii carbonas*, *Lithii carbonas*, *Silica colloidalis anhydrica, Silica colloidalis hydrica, Aluminii magnesii silicas, Magnesii trisilicas*, *Talcum*, *Kaolinum ponderosum, Bentonitum*, *Acidum boricum*, *Borax*, *Aluminii oxidum hydricum*, *Aluminii sulfas*, *Alumen*, *Aluminii chloridum*, *Zinci chloridum*, *Zinci oxidum*, *Zinci sulfas.*
*	Aluminium compounds. Dried aluminium hydroxide, Aluminium sulphate, Crystalline potassium aluminium sulphate, Aluminium chloride.	*Natrii hydrogenocarbonas* It. A, B, C, Pt. Appearance of solution, Carbonate, Chlorides, Sulphates, Heavy metals, Iron, Ammonium, Arsenic, Calcium
*	Zinc compounds. Zinc chloride, Zinc oxide, Zinc sulphate.	*Natrii carbonas decahydricus* It. A, B, C, Pt. Appearance of solution, Alkali hydroxides and bicarbonates, Informative test: 1, 2
*	Mercury and its compounds. Mercury, Mercury(I) chloride, Mercury(II) amidochloride, Red mercury iodide, Yellow mercury(II) oxide, Mercury(II) sulphide.	*Kalii hydrogenocarbonas* It. A, B
*	Copper and silver compounds. Copper(II) sulphate, Silver nitrate.	Seminar: Mercury compounds, iron and iron compounds, mangan, calcium, magnesium and barium compounds, mercury, mercury(I) chloride, *Hydrargyri dichloridum*, *Cupri sulfas*, *Argenti nitras*, *Ferrum ad praeparationes homoeopathicas*, *Ferrosi sulfas, Ferri chloridum, Mangani sulfas, Kalii permanganas*, *Calcii chloridum*, *Calcii carbonas*, *Calcii hydroxidum*, *Calcii sulfas*, *Magnesii subcarbonas levis*, *Magnesii chloridum*,

		Magnesii oxidum leve, Magnesii peroxidum, Magnesii sulfas, *Barii sulfas.*
*	Iron and its compounds. Powdered iron, Reduced iron, Iron(III) chloride, Iron(II) sulphate.	*Natrii thiosulfas* It. A, B, C, D, Pt. Appearance of solution, Acidity or alkalinity, Sulphates and sulphites, Sulphides, Heavy metals, Assay, Informative test: 1, 3
*	Manganese compounds. Potassium permanganate.	*Natrii metabisulfis* It. B, C, Pt. Appearance of solution, Thiosulphates, Informative test: 1
*	Calcium compounds. Calcium chloride, Calcium bromide, Calcium oxide, Dried calcium sulphate, Calcium carbonate.	*Kalii sulfas* It. A, B
*	Magnesium compounds. Magnesium chloride, Magnesium carbonate, Magnesium oxide, Magnesium sulphate.	*Natrii sulfas decahydricus* It. A, B, Pt. Appearance of solution, Acidity or alkalinity, Chlorides, Calcium, Heavy metals, Iron, Magnesium, Informative test: 1, 3
*	Barium compounds. Barium sulphate.	*Calcii sulfas dihydricus* It. B, C
		Acidum boricum It. A, B, Pt. Organic matter, Assay
	ORGANIC PART	*Borax* It. A, B, C, Pt. Appearance of solution, pH, Ammonium, Arsenic, Calcium, Heavy metals, Informative test: 1
		Natrii nitris It. A, B, Informative test: 1, 3
*	General Anaesthetics	*Kalii nitras* It. A, B, Informative test: 2, 3
*	Ether, Chloroform, Halothane (Narcotan), Isofluran (Florane), Thiopental (Trapanal)	*Sulfur ad usum externum* It. A, B, Pt. Appearance of solution, Odour, Acidity or alkalinity, Chlorides, Sulphates, Sulphides
*	Sedative-Hypnotics	Seminar: Nomenclature of organic drug compounds. Carbocyclic and heterocyclic skeletons, functional groups. Isomerism of the organic drug compounds. Constitution, configuration, conformation. Geometrical isomerism: *Z, E, cis, trans, endo, exo*. Chirality, optical isomerism. Enantiomers, epimers, diastereomers, inversion, retention,, enantiomer excess, „euthomer", „distomer", ,,eudismic ratio". Indication of the configuration: Fischer and Cahn-Ingold-Prelog conventions. Absolute and relative configuration. *L, D, meso* and *erithro–threo* isomerism, *enol–oxo*, *lactam–lactim* tautomerism.
*	Chloral hydrate, Paraldehyde, Carbromal, Barbital, Phenobarbital, Hexobarbital, Glutethimide, Talidomide (Contergan), Nitrazepam (Eunoctin), Midazolam (Dormicum)	*Carbo activatus* It. A, B, Pt. Acidity or alkalinity, Alkali-soluble coloured substances, Sulphides, Adsorption power, Informative test: 2
*	Drugs Used in the Treatment of Chronic Alcoholism	*Arsenii trioxidum ad praeparationes homoeopathicas* It. A, B
*	Disulfirame (Antaethyl)	*Dinatrii phosphas dodecahydricus* It. A, B, C, D, Informative test: 1, 3
*	Anticonvulsant Drugs	*Natrii dihydrogenophosphas dihydricus* It. A, B, C, Pt. Appearance of solution, Reducing substances, Informative test: 2, 3
*	Phenobarbital (Sevenal), Primidone (Sertan), Phenytoin (Diphedan), Ethosuximide(Petnidan), Clonazepam (Rivotril), Carbamazepin (Stazepine, Tegretol), Lamotrigin (Lamictal), Valproic acid	*Calcii hydrogenophosphas dihydricus* It. A, B, Pt. Carbonates, Chlorides, Sulphates, Arsenic, Barium, Iron, Heavy metals, Informative test: 1, 3

	(Convulex)	
*	Antipsychotics, Neuroleptics	*Silica colloidalis hydrica* It. A, Informative test: 1, 2, 3
*	Chlorpromazine (Hibernal), Chlorprotixene (Truxal), Haloperidol, Risperidon (Risperdal), Clozapine (Leponex), Olanzapin (Zyprexa)	Seminar: Heterocyclic ringsystems, pharmaceutical periodicals and manuals, literature. Study of the pharmaceutical literature by traditional methods and computer.
*	Anxiolytics	General anaesthetics: Aether[1], Chloroformium, Halothanum (Narcotan), isoflurane (Forane), thiopental (Trapanal)
*	Chlordiazepoxide (Elenium), Diazepam (Seduxen), Medazepam (Rudotel), Alprazolam (Xanax), Tofisopam (Grandaxin), Meprobamate (Andaxin), Buspiron (Anxiron), Trimetozine (Trioxazin)	Sedatohypnotics: Chloralhydratum, paraldehyde, Carbromalum, Barbitalum, Phenobarbitalum (Sevenal), Hexobarbitalum (Novopan), Glutethimidum (Noxyron), thalidomid (Contergan), Nitrazepamum (Eunoctin), Midazolamum (Dormicum)
*	Narcotic Analgesics and their Antagonists	Treatment of alcoholism: Disulfiramum (Antaethyl)
*	Morphine, Ethylmorphine, Pethidine (Dolargan), Methadone(Depridol), Fentanyl (Durogesic), Tramadol (Contramal), Naloxon (Narcanti)	*Ferrum ad praeparationes homoeopathicae* It. A, Pt. Sulphides and phosphides, Assay
*	Antidepressants	*Ferri chloridum hexahydricum* It. A, B, Pt. Free chlorine, Ferrous ions, Informative test: 1
*	Imipramine (Melipramin), Amitriptyline (Teperin), Maprotilin (Ludiomil), Fluoxetin (Prozac), Sertraline (Zoloft)	*Ferrosi sulfas heptahydricus* It. A, B
*	Antiparkinson Agents	*Magnesii sulfas heptahydricus* It. A, B
*	Levodopa, Carbidopa, Amantadine (Viregyt-K), Selegiline (Jumex), Procyclidine (Kemadrin), Apomorphine (Apo Go)	*Magnesii subcarbonas levis* It. A, B, C, Pt. Appearance of solution, Chlorides, Sulphates, Arsenic, Calcium, Iron, Informative test: 1
*	Muscle Relactants	Seminar:
*	Pipecuronium bromide (Arduan), Baclofen (Lioresal), Carisoprodol, Tolperisone (Mydeton)	Antiepileptics: Phenobarbitalum (Sevenal), Primidonum (Sertan), Phenytoinum (Diphedan), etosuximid (Petnidan), clonazepam (Rivotril), carbamazepine (Stazepine, Tegretol), lamotrigin (Lamictal), valproic acid (Convulex)
*	Psychomotor Stimulants, Anorectics	Neuroleptics: Chlorpromazini hydrochloricum (Hibernal), chlorprotixen (Truxal), Haloperidolum, Risperidonum (Risperdal), Clozapinum (Leponex), olanzapin (Zyprexa)
*	Amphetamine, Caffeine	Anxiolytics: Chlordiazepoxidum (Librium), Diazepamum (Valium), medazepam (Rudotel), alprazolam (Xanax), tofizopam (Grandaxin), meprobamate (Andaxin), buspiron (Anxiron), Trimetozinum (Trioxazin)
*	Hallucinogens and illegal drugs	*Kalii permanganas* It. A, B, Assay
*	Cocain, Heroin, LSD, tetrahydrokannabinol (THC), MDMA (Extasy)	*Mangani sulfas monohydricus* It. A, B
*	Anorectics	*Magnesii trisilicas* It. A, B, Informative test: 1, 2, 3
*	Sibutramin (Reductil)	*Magnesii oxidum leve* It. A, B, Pt. Appearance of solution, Chlorides, Sulphates, Arsenic, Calcium, Iron, Informative test: 1, 3)

*	Nootropics	*Zinci oxidum* It. A, B, Pt. Alkalinity, Carbonates and substances insoluble in acids, Assay
*	Piracetam (Nootropil)	*Zinci sulfas heptahydricus* It. A, B
*	Parasympathomimetics	
*	Acetylcholine, Carbachol (Miostat), Pilocarpine (Humacarpin), Physostigmine, Neostigmine methylsulphate (Stigmosan)	Seminar:
*	Cholinesterase reactivators	Opioid analgesics and antagonists: Morphinium chloratum, Aethylmorphini hydrochloricum, Pethidini hydrochloricum (Dolargan), Methadoni hydrochloricum (Depridol), fentanil (Durogesic), tramadol (Contramal), Naloxone (Narcati)
*	Pralidoxime	Antidepressants: Imipramini hydrochloricum (Melipramin), Amitriptylini hydrochloricum (Teperin), maprotilin (Ludiomil), fluoxetine (Prozac), sertaline (Zoloft)
*	Sympathomimetics	Antiparkinson agents: levodopa (Dopaflex), carbidopa, amantadine (Viregyt-K), Apomorphini hydrochloricum (Apo-Go), selegiline (Jumex), procyclidine (Kemadrin)
*	Epinephrine (Anapen), Isoprenaline, Oxedrine (Sympathomim), Phenylephrine (Vibrocil), Ephedrine (Epherit), Naphazoline, Xylomethazoline (Novorin)	Muscle relactants: Pipecuroni hydrobromidum (Arduan), Baclofenum (Lioresal), Carisoprodolum, Tolperisone (Mydeton)
		Bismuthi subnitras ponderosus It. A, B, C, Assay, Informative test: 2
		Aluminii sulfas It. A, B, Pt. Appearance of solution, Ammonium, Iron, Heavy metals, Informative test:
		Barii sulfas It. A, B, Pt. Oxidisable sulphur compounds, Soluble barium salts
		Titanii dioxidum It. A, Informative test: 2, 3
		Hydrargyri dichloridum It. A, B
		Argenti nitras It. A, B
		Cupri sulfas pentahydricus It. A, B, Assay

6th semester

	LECTURE	**PRACTICE**
*	Parasympatholytics	Seminar:
*	Atropine, Homatropine, Methylhomatropine bromide, Scopolamine, Propantheline bromide, Tropicamide (Mydrum)	Psychomotor stimulants: Amphetamine,[2] Caffeine
*	Sympatholytics	*Hallucinogens and illegal drugs*: Cocaine, heroin, LSD, Tetrahydrocannabinol (THC), MDMA (Ecstasy)
*	Prazosine (Minipress), Propranolol (Huma-pronol), Atenolol (Blokium), Metoprolol (Betaloc), Pindolol (Visken)	*Anoretics*: Sibutramin (Reductil)
*	Anti-Migrain Agents	*Nootropics*: Piracetam (Nootropil)
*	Sumatipran (Imigran)	*Parasympathomimetics*: Acetylcholine, Carbachol (Miostat), Pilocarpine

		(Humacarpin), Physostigmine, Neoostigmine methylsulphate (Stigmosan)
*	Local anesthetic agents	*Cholinesterase reactivators*: Pralidoxime
*	Cocain, benzocain, procain, lidocain, bupivacain (Bucain, Marcain)	*Trometamolum* (Identification: A; Tests: Appearance of solution, pH, Chloride, Heavy metals, Iron;
*	Spasmolytics	Assay; Informative test: 3)
*	Papaverin, Drotaverin (No-Spa), bencyclan (Halidor)	*Ureum* (Identification: C, D; Tests: Appearance of solution, Alkalinity, Biuret, Ammonium, Heavy metals)
*	Antiasthmatic drugs	*Phenolphthaleinum* (Identification: B)
*	Theophylline, Salbutamol (Buventol), Terbutaline (Bricanyl)	*Vanillinum* (Identification: D)
*	Antiarrhythmic drugs	Seminar:
*	Quinidine, Lidocaine, Amiodarone (Cordarone)	*Sympathomimetics*: Epinephrine (Anapen), Isoprenaline (Isuprel), Oxedrine (Sympathomim), Phenylephrine, Ephedrine (Epherit), Naphazoline, Xylomethazoline (Novorin)
*	Digitalis and other cardiac glycosides	*Parasympatholytics*: Atropine, Homatropine, Methylhomatropine bromide, Scopolamine, Propantheline bromide, Tropicamide (Mydrum)
*	Digitoxin (Digimerck)	*Local anesthetic agents*: Cocaine, Benzocaine, Procaine, Lidocaine, Bupivacaine (Bucain, Marcain)
*	Xantin derivatives	*Spasmolytics*: Papaverine, Drotaverine (No-Spa), Bencyclane (Halidor)
*	Theobromine, Theophylline, Caffeine	*Anti-Migrain Agents*: Sumatriptan (Imigran)
*	Antiemetics	*Aether* (Tests: Acidity, Substances with a foreign odour, Aldehydes, Peroxides)
*	Ondansetron (Zofran), Dimenhydrinate (Daedalon)	*Barbitalum* (Identification: D; Tests: Acidity; Informative test: 4)
*	Anticoagulants and haemostatics	*Hexobarbitalum* (Identification: D)
*	Acenocoumarol (Syncumar), Ticlopidine (Ticlid)	*Phenobarbitalum* (Identification: D; Tests: Acidity; Informative test: 4)
*	Antihypertensive agents	*Phenobarbitalum natricum* (Identification: D, E; Informative test: 1)
*	Methyldopum (Dopegyt), Captopril (Tensiomin), Enalapril (Ednyt), Losartan (Cozaar), Dihydralazin (Depressan), Moxonidine (Cynt)	*Natrii acetas trihydricus* (Identification: A, B; Tests: Appearance of solution, pH; Reducing substances, Chloride, Sulphate, Arsenic, Heavy metals, Iron; Informative test: 2, 3)
*	Antianginal agents and vasodilators	*Tosylchloramidum natricum* (Identification: A, B, C, D, E; Assay)
*	Glyceril trinitrate (Nitromint), Pentaerythritol tetranitrate (Nitropenton), Isosorbide mononitrate (Cardisorb, Rangin), Nicotinic acid, Pentoxyfilline (Trental)	Seminar:
*	Antihyperlipidaemic agents	*Sympatholytics*: Prazosine (Minipress), Propranolol (Huma-pronol), Atenolol (Blokium), Metoprolol (Betaloc), Pindolol (Visken)
*	Lovastatin (Mevacor), Phenofibrate (Lipanthyl, Lipidil)	*Antiasthmatic drugs*: Theophylline, Salbutamol (Buventol), Terbutaline (Bricanyl)
*	Calcium channel blockers	*Antiarrhythmic drugs*: Quinidine, Lidocaine,

		Amiodarone (Cordarone)
*	Nifedipine (Corinfar), Amlodipin (Amlipin, Norvasc), Verapamil (Isoptin), Diltiazem (Blocalcin)	*Digitalis and other cardiac glycosides*: Digitoxin (Digimerck)
*	Agents improving cerebral circulation	*Xantin derivatives*: Theobromine, Theophylline, Caffeine
*	Vinpocetine (Cavinton), Cinnarizine (Stugeron)	*Anticoagulants and haemostatics*: Acenocoumarol (Syncumar), Ticlopidine (Ticlid)
*	Antitussiv agents	*Ethanolum (96 per centum)* (Identification: C, D; Tests: Appearance, Acidity, alkalinity; Informative test: 2)
*	Codeine, Noscapine, Butamirate (Sinecod), Prenoxdiazine (Libexin)	*Alcohol isopropylicus* (Identification: C; Tests: Peroxides)
*	Mucolytics	*Apomorphini hydrochloridum* (Identification: C; Informative test: 3, 4)
*	Bromhexine (Paxirasol), Ambroxol (Halixol), Terpin, Acetylcysteine (ACC, Fluimucil)	*Codeini hydrochloridum dihydricum* (Identification: C, D, E; Informative test: 4)
*	Drugs of osteoporosis prevention	*Ethylmorphini hydrochloridum* (Identification: C, D; Informative test: 4)
*	Clodronic acid (Bonefos)	*Morphini hydrochloridum* (Identification: C, D, E)
*	Drugs for rheumatic gout	*Calcii gluconas* (Identification: B; Tests: Appearance of solution, Sucrose and reducing sugars, Chloride;
*	Allopurinol (Milurit), Colchidin (Colchicum-Dispert)	Assay; Informative test: 1, 2, 3)
*	Thyroid and antithyroid drugs	*Chlorali hydras* (Identification: A, B; Tests: Appearance of solution, pH; Chloral alcoholate, Chloride, Heavy metals; Assay)
*	Levothyroxine (Euthyrox), Liothyronin, Thiamazole (Metothyrin), Propylthiouracil (Propycil)	Seminar:
*	Antidiabetics	*Antihypertensive agents*: Methyldopum (Dopegyt), Captopril (Tensiomin), Enalapril (Ednyt), Losartan (Cozaar), Dihydralazine (Depressan), Moxonidine (Cynt)
*	Glibenclamide (Gilemal), Metformin (Adimet, Metrivin)	*Antianginal agents and Vasodilators*: Glyceril trinitrate (Nitromint), Pentaerythritol tetranitrate (Nitropenton), Isosorbide mononitrate (Cardisorb, Rangin), Nicotinic acid, Pentoxyfilline (Trental)
*	Artificial sweeteners	*Antihyperlipidaemic agents*: Lovastatin (Mevacor), atorvastatin (Atorvox, Liprimar),Phenofibrate (Lipanthyl, Lipidil)
*	Saccharin sodium, Aspartame (Nutrasweet), Acesulfam-potassium	*Calcium channel blockers*: Nifedipine (Corinfar), amlodipine (Amlipin, Norvasc), Verapamil (Isoptin), Diltiazem (Blocalcin)
*	Mono- and disaccharides	*Agents improving cerebral circulation*: Vinpocetine (Cavinton), Cinnarizine (Stugeron)
*	Fructose, Glucose, Lactose, Sucrose	*Benzocainum* (Identification: C, D; Informative test: 3)
*	Drugs used in stomac disease	*Cocaini hydrochloridum* (Identification: D, E; Informative test: 4)
*	Phenolphthalein, Diphenoxylate (Reasec), Loperamide (Imodium), Metoclopramide	*Lidocainum* (Identification: D, E; Tests: 2,6-dimethylaniline; Informative test: 2)

	(Cerucal), Cimetidine, Ranitidine (Ulceran, Zantac), Omeprazole (Losec), Sulfasalazyneb (Salazopyrin)	
*	Diuretics	*Procaini hydrochloridum* (Identification: C, D, E, F; Informative test: 3, 4)
*	Acetazolamide (Huma-Zolamide), Furosemide (Furon), Hydrochlorothiazide (Hypothiazid), Etacrynic acid (Uregyt), Amiloride, Spironolactone (Verospiron), Sorbitol	*Tetracaini hydrochloridum* (Identification: B, C, D; Informative test: 2)
*	Antiallergic antihistamins	*Acidum asparticum* (Identification: B; Tests: Appearance of solution, Chloride, Sulphate; Assay; Informative test: 2, 3)
*	Promethazine (Pipolphen), Dimenhydrinate (Daedalon), Dimethindene (Fenistil), Cetirizine (Zyrtec), Loratadine (Claritine)	*Glycerolum (85 per centum)* (Identification: C, D; Assay)
*	Nonsteroidal analgesics and antipyretics	Seminar:
*	Salicyclic acid, Acetylsalicylic acid (Aspirin), Paracetamol (Rubophen), Phenacetin, Phenazone, Aminophenazone, Propiphenazone, Metamizol sodium (Algopyrin)	*Antitussiv agents*: Codeine, Noscapine, Butamirate (Sinecod), Prenoxdiazine (Libexin)
*	Nonsteroidal antiinflammatory agents	*Mucolytics*: Bromhexine (Paxirasol), Ambroxol (Halixol), Terpin, Acetylcysteine (ACC, Fluimucil)
*	Phenylbutazone, Etofenamate (Rheumon), Niflumic acid (Donalgin), Indometacin, Diclofenac (Voltaren, Cataflam), Ibuprofen (Solpaflex, Advil), Naproxen (Naprosyn, Aleve)	*Drugs of osteoporosis prevention*: Clodronic acid (Bonefos)
*	Piroxicam (Hotemin, Feldene),	*Drugs for gout*: Allopurinol (Milurit), Colchicine (Colchicum-Dispert)
*	Antiinflammatory steroids	*Thyroid and antithyroid drugs*: Levothyroxine (Euthyrox), Liothyronin, Thiamazole (Metothyrin), Propylthiouracil (Propycil)
*	Hydrocortisone, Prednisolone, Triamcinolone acetonide (Ftorocort), Flucinolone acetonide (Flucinar), Betamethazone (Diprophos), Dexamethasone (Oradexon), Beclomethasone (Aldecin), Budesonide (Pulmicort), Mazipredone (Depersolon)	*Antidiabetics*: insulin, Glibenklamide (Gilemal), Metformin (Adimet, Metrivin)
*	Antifungal agents	*Artificial sweeteners*: Saccharin sodium, Aspartame (Nutrasweet), Acesulfame potassium
*	Clotrimazole (Canesten), Tolnaftate (Chinofungin), Terbinafine (Lamisil), Ketoconazole (Nizoral), Fluconazole (Diflucan)	*Mono- and disaccharides*: Fructose, Glucose, Lactose, Sucrose
*	Drugs used in the chemtoherapy of helminthiasis	*Atropini sulfas* (Identification: D, E, F; Informative test: 3)
*	Levamisole (Decaris), Mebendazole (Vermox)	*Physostigmini salicylas* (Identification: C, D)
*	Antimalarial agents	*Pilocarpini hydrochloridum* (Identification: D, E)
*	Quinine, Chloroquine (Delagil), Mefloquine (Lariam), Pyrimethamine	*Ephedrini hydrochloridum* (Identification: D, E)
*	Antiseptics and desinfectans	*Isoprenalini hydrochloridum* (Identification: D, E)
*	Methenamine, Ethanol, Isopropanol, Phenol, Thymol, Resorcin, Clioquinol, Hexachlorophene, Benzalkonium chloride, Tosylchloramid sodium,	*Papaverini hydrochloridum* (Identification: D; Informative test: 2)

	Lactic acid, Chlorohedidine, Acriflavinium chloride, Xanthacridine chloride, Briliant green, Fuchsin, Methylene blue	
*	Microbiological preservatives	*Natrii edetas* (Identification: B, C, D; Assay; Informative test: 3)
*	Methyl (*p*-hydroxy benzoate), Benzylalcohol, Benzoic acid, Sorbic acid	*Formaldehydi solutio (35 per centum)* (Identification: A, B, C; Tests: Appearance of solution, Acidity; Assay)
*	Chemotherapic sulfonamides	*Acidum acetylsalicylicum* (Identification: B, C, D; Assay; Informative test: 1)
*	Sulfadimidine, Sulfamethoxazole	*Acidum salicylicum* (Identification: C; Informative test: 2, 3)
*	Chemotherapic nitrocompounds	*Methylis parahydroxybenzoas* (Identification: D; Informative test: 2, 3)
*	Nitrofurantoin, Metronidazole (Klion)	*Phenazonum* (Identification: C, D; Tests: Appearance of solution, Acidity, alkalinity, Chloride, Sulphate, Heavy metals; Assay; Informative test: 4)
*	Other chemotherapic compounds	*Metamizolum natricum* (Identification: B, C, D; Informative test: 1, 3)
*	Trimethoprim, Nalidixic acid (Nevigramon)	*Phenylbutazonum* (Identification: D; Informative test: 1, 2)
*	Fluoroquinolon derivatives	*Paracetamolum* (Identification: D, E)
*	Ciprofloxacin (Ciprobay), Ofloxacin (Tarivid)	*Indometacinum* (Identification: D, E)
*	Antituberculotics	Seminar:
*	Isoniazid (Isonicid), Pyrazinamide, Ethambutol (Sural)	*Drugs used in stomac disease* : Phenolphthalein, Diphenoxylate, Loperamide (Imodium), Metoclopramide (Cerucal), Cimetidine (Histodil), Ranitidine (Ulceran, Zantac), Omeprazole (Losec), Sulfasalazine (Salazopyrin)
*	Sex hormones and analogues	*Antiemetics*: Ondansetron (Zofran), Dimenhydrinate (Daedalon)
*	Oestradiol, Oestrone, Ethinyl oestradiol, Clomifen (Clostilbegyt), Raloxifen (Evista), Testosterone (Andriol), Nandrolol (Retabolil), Progesterone, Levonorgestrel	*Diuretics*: Acetazolamide (Huma-Zolamide), Furosemide (Furon), Hydrochlorothiazide (Hypothiazid), Etacrynic acid (Uregyt), Amiloride, Spironolactone (Verospiron), Sorbitol
*	Nonsteroidal agents acting on sexual activity	Antiallergic antihistamins: Promethazine (Pipolphen), Dimenhydrinate (Daedalon), Dimethindene (Fenistil), Cetirizine (Zyrtec), Loratadine (Claritine)
*	Sildenafil (Viagra), Apomorphine (Uprima)	*Acidum ascorbicum* (Identification: D; Assay; Informative test: 2)
*	Vitamins	*Nicotinamidum* (Identification: C, D)
*	Retinol (vitamin A_1), Ergocalciferol (vitamin D_2), Cholecalciferol (vitamin D_3), Menadione (vitamin K_3), Thiamine chloride (vitamin B_1), Riboflavine (vitamin B_2), Pyridoxine (vitamin B_6), Nicotinamide, Folic acid, Ascorbic acid (vitamin C)	*Riboflavinum* (Identification: C)
*	Antiviral agents	*Thiamini hydrochloridum* (Identification: B, C; Informative test: 2)
*	Amantadine, Acyclovir (Zovirax), Ribavirin (Copegus, Rebetol), Nevirapine (Viramune)	*Cholesterolum* (Identification: C; Informative test: 1)

*	Antibiotics	*Prednisolonum* (Informative test: 1)
*	Benzylpenicillin, Ampicillin (Semicillin), Amoxicillin (Aktil), Oxacillin, Imipenem (Tienam)	*Acidum citricum monohydricum* (Identification: A, C, D; Tests: Appearance of solution, Oxalic acid, Sulphate, Heavy metals; Informative test: 3)
*	Sulbactam (Unasyn), Clavulanic acid, Cephalexin (Pyassan), Cefuroxime (Zinacef, Zinnat), Chloramphenicol, Doxycycline (Tenutan)	*Natrii citras* (Identification: A, B; Tests: Appearance of solution, Acidity, alkalinity, Chloride, Oxalates, Sulphate, Heavy metals; Assay; Informative test: 2, 3)
*	Antineoplastic agents	Seminar:
*	Cyclophosphamide (Cytoxan), Carmustin (BICNU), Cisplatin (Platidiam), Carboplatin (Cycloplatin), Fluorouracil (Efudix), Methotrexate (Trexan), Imatinib (Glivec)	*Nonsteroidal analgesics and antipyretics*: Salicyclic acid, Acetylsalicylic acid (Aspirin), Paracetamol (Rubophen), Phenacetin, Aminophenazone, Propiphenazone, Metamizol sodium (Algopyrin)
*	Drugs used for immunomodulation	*Nonsteroidal antiinflammatory agents*: Phenylbutazone, Etofenamate (Rheumon), Niflumic acid (Donalgin), Indometacin, Diclofenac (Voltaren, Cataflam), Ibuprofen (Solpaflex, Advil), Naproxen (Naprosyn, Aleve), Piroxicam (Hotemin, Feldene)
*	Azathioprine (Imuran)	*Antiinflammatory steroids*: Hydrocortisone, Prednisolone, Triamcinolone acetonide (Ftorocort), Flucinolone acetonide (Flucinar), Betamethazone (Diprophos), Dexamethasone (Oradexon), Beclomethasone (Aldecin), Budesonide (Pulmicort), Mazipredone
*		*Coffeinum* (Identification: C, D, F; Informative test: 3)
*		*Theobrominum* (Identification: B, C; Tests: Acidity; Informative test: 3)
*		*Theophyllinum* (Identification: C, E; Tests: Appearance of solution, Acidity; Assay; Informative test: 3)
*		*Acidum tartaricum* (Identification: A, B; Tests: Appearance of solution, Oxalic acid, Chloride, Sulphate, Calcium)
*		*Methenaminum* (Identification: B, C, D; Tests: Appearance of solution, Acidity, alkalinity, Free formaldehyde, Chloride, Sulphate, Ammonium, Heavy metals; Informative test: 1)
*		Seminar:
*		*Antifungal agents*: Clotrimazole (Canesten), Tolnaftate (Chinofungin), Terbinafine (Lamisil), Ketoconazole (Nizoral), Fluconazole (Diflucan)
*		*Drugs used in the chemtoherapy of helminthiasis*: Levamisole (Decaris), Mebendazole (Vermox)
*		*Antimalarial agents*: Quinine, Chloroquine (Delagil), Mefloquine (Lariam), Pyrimethamine
*		*Antiseptics and desinfectans*: Tosylchloramide sodium, Methenamine, Chlorhexidine
*		*Microbiological preservatives*: Methyl *p*-hydroxybenzoate

*	*Chemotherapic silfonamides*: Sulfadimidine, Sulfamethoxazole
*	*Chemotherapic nitrocompounds*: Nitrofurantoin, Metronidazole (Klion)
*	*Other chemotherapic compounds*: Trimethoprim, Nalidixic acid (Nevigramon)
	Fluoroquinolon derivatives: Ciprofloxacin (Ciprobay), Ofloxacin (Tarivid)
*	*Antituberculotics*: Isoniazid (Isonicid), Pyrazinamide, Ethambutol (Sural)
*	*Saccharinum natricum* (Identification: C, D, E; Informative test: 1)
*	*Fructosum* (Identification: B, C, D)
*	*Glucosum anhydricum* (Identification: C; Tests: Appearance of solution, Acidity, Alkalinity, Foreign sugars, soluble starch, dextrins, Chloride, Sulphate, Arsenic, Barium, Calcium; Informative test: 2)
*	*Lactosum monohydricum* (Identification: C; Informative test: 2)
*	*Sorbitolum* (Tests: Reducing sugars; Informative test: 2)
*	*Saccharum* (Identification: C; Tests: Appearance of solution, Acidity, Alkalinity, Dextrin, Glucose and invertsugars)
*	*Bismuthi subsalicylas* (Identification: A, B; Tests: Chloride; Assay; Informative test: 1)
*	*Bismuthi subgallas* (Identification: A, B)
*	Seminar:
*	*Sex hormones and analogues*: Oestradiol, Ethinyl oestradiol, Clomifen (Clostilbegyt), raloxifen (Evista), Testosterone (Andriol), Nandrolone (Retabolil), Progesterone, Levonorgestrel
*	*Nonsteroidal agents acting on sexual activity* : Sildenafil (Viagra), Apomorphine (Uprima)
	Vitamins: Retinol (vitamin A_1), Ergocalciferol (vitamin D_2), Cholecalciferol (vitamin D_3), Menadione (vitamin K_3), Thiamine chloride (vitamin B_1), Riboflavine (vitamin B_2), Pyridoxine (vitamin B_6), Nicotinamide, Folic acid, Ascorbic acid (vitamin C)
*	*Phenolum* (Identification: A, B, C)
*	*Resorcinolum* (Identification: B, C; Tests: Appearance of solution, Acidity, alkalinity, Pyrocatechol; Assay)
*	*Thymolum* (Identification: C, D)
*	*Acidum benzoicum* (Identification: B; Tests: Oxidisable substances; Assay; Informative test: 1, 2)
*	*Natrii benzoas* (Identification: A, B; Tests: Appearance of solution, Acidity, Alkalinity; Informative test: 2, 3)
*	Seminar:
*	*Antiviral agents*: Amantadine, Acyclovir

		(Zovirax), Ribavirin (Copegus, Rebetol), Nevirapine (Viramune)
*		*Antibiotics*: Benzylpenicillin, Ampicillin (Semicillin), Amoxicillin (Aktil), Oxacillin, Imipenem (Tienam), Sulbactam, Clavulanic acid, Cephalexin (Pyassan), Cefuroxime (Zinacef, Zinnat), Chloramphenicol, Doxycycline (Tenutan), Neomycin, Erythromycin (Eryc)
*		*Antineoplastic agents*: Cyclophosphamide (Cytoxan), Cisplatin (Platidiam), Carboplatin (Cycloplatin), Fluorouracil (Efudix), Methotrexate (Trexan), Imatinib (Glivec)
*		*Drugs used for immunomodulation*: Azathioprine (Imuran)
*		*Chloramphenicolum* (Identification: D, E; Informative test: 1)
*		*Oxytetracyclini hydrochloridum* (Identification: B, C; Informative test: 2)
*		*Sulfadimidinum* (Identification: C, D; Informative test: 1)
*		*Chinidini sulfas* (Identification: B, C; D, E, F; Tests: pH; Informative test: 1, 3, 4)
*		*Chinini sulfas* (Identification: B, C, D, E; Tests: pH; Informative test: 1, 3, 4)
		Acidum lacticum (Identification: A, C; Tests: Appearance, Sugars and other reducing substances,, Citric, oxalic and phosphoric acids, Sulphate, Calcium, Heavy metals; Assay; Informative test: 3)

PHARMACEUTICAL TECHNOLOGY

5th semester

LECTURE	
*	Introduction of the Institute, schedule, requirements, books
*	Definition and object of pharmaceutical technology, stages of its development
*	Drug material, pharmaceutical dosage form, pharmaceutical preparation
*	Grouping of dosage forms
*	APIs and excipients in the preparation of dosage forms
*	Pharmacopoeias. FoNo, etc.
*	Preformulation and formulation in the design of dosage forms
*	Factorial design and neural networks
*	QbD
*	Research, development and production
*	Process of development of new API into medical preparations
*	Patents in the pharmaceutical industry
*	Brand name drugs and generics
*	Preparation of medicines in industry, laboratory and pharmacy
*	Quality assurance, GMP, GPP, GCP, ISO, validation, qualification

*	Operational and methodical principles of industrial manufacturing
*	Instrumentation of technological procedures, automatization, PAT
*	Law of self-cost, law of large numbers of parameters, law of scale up
*	Biopharmaceutical aspects of formulation, ADMER, LADMER, relative and absolute bioavailability
*	Importance of evaluating of the dose in the design of dosage forms, generations of dosage forms
*	Biopharmaceutical classification system (BCS) of drugs
*	Colloid-chemical and physicochemical principles of pharmaceutical technology 1: importance of electric and magnetic properties of molecules in pharmaceutical technology (electric dipole, permittivity, intermolecular forces, DLVO theory, adsorption, adhesion)
*	Colloid-chemical and physicochemical principles of pharmaceutical technology 2: rheological principles of pharmaceutical technology, disperse and coherent systems
*	Colloid-chemical and physicochemical principles of pharmaceutical technology 3: surface and interfacial phenomena in pharmaceutical technology, polymers
*	Principles of chemical engineering 1: purification of water (distillation, ion-changing, reverse osmosis, and desalination of sea water), theory and practice of drying, spray drying, lyophilisation
*	Principles of chemical engineering 2: mixing, mixing of liquids, semisolids and solids, theory and practice of centrifugation and filtration, Fluidization (drying, granulation, coating)
*	Principles of chemical engineering 3: crystallization, characterization of crystalline materials, polymorphism, hydrate and solvate form, screening and investigation of polymorphs, amorphization of crystalline materials, characterization of the amorphous form
*	Principles of chemical engineering 4: theory and practice of particle size reduction, crushing, pulverizing, milling, micronization and nanonization, Theory and practice of production of solid dispersions

6th semester

LECTURE	
*	Pharmaceutical technological characterization of solid materials
*	Habit
*	Particle size distribution
*	Macro- and micromorphological characteristics
*	Bulk and real density
*	Flowability
*	Micro- and nanocrystalline systems in preparation of dosage forms
*	Preparation of solutions
*	Real solutions, colloidal solutions, solid solutions
*	Syrups, mucilages, gargarismas, mixtures, elixirs, drops, nose drops, ear drops
*	Preparation of extractions
*	Processing of herbal drugs to dosage forms
*	Tinctures, extracts, decoctions and infusions, tea-mixtures
*	Preparation and homogenization of dispersions
*	Aerosols, inhalasols, dry powder inhalers
*	Emulsions, micro- and multiple emulsions, liniments
*	Suspensions
*	Sterile and aseptic preparation of medicines
*	Theory and practice of sterilization
*	Microbiological preservation

*	Theory and practice of production of semisolid dosage forms
*	Ointments, creams, gels
*	Ophthalmic preparations: eye drops, eye ointments, eye cleaning solutions
*	Contact lens cleaning and storage solutions
*	Parenteral preparations: injections, infusions (large volume parenterals)
*	Ointments, creams, gels in the pharmaceutical cosmetology
*	Rectal dosage forms: suppositories, foams, creams, gels
*	Vaginal dosage forms
*	Medical sticks (pertica), uretral sticks

PRACTICE

Prescription pharmacy 1

*	General instruction
*	Rules of measuring
*	Dispensing of solutions
*	„A" measuring of liquids
*	„B" measuring of powders
*	Writing of prescriptions
*	Solubility, right order of dissolving, dilution
*	Solvents, excipients
*	Calculation in connection with solutions
*	Liquid dosage forms
*	Preparation of oral solutions
*	Diluendum, aqua aromatica, gargarisma, elixírium, mixtura, sirupus, klysma
*	Preparation of solutions dispensed by dropwise
*	Preparation of external solutions
*	Preparation of emulsions
*	Preparation of suspensions
*	Calculation of dosage
*	Pricing of prescriptions
*	Preparation of liquid dosage forms according to the official books
*	Preparation of magistral liqiuid dosage forms
*	*Self-made preparations*

Galenic Practice

	<u>Introduction</u>
*	Functions of a galenic pharmacy
*	Galenic preparations of the Pharmacopoea
*	Calculations
*	Dosage form investigations of the Pharmacopoea (Ph.Eur., USP, Br.Ph.)
*	Quality control, Operation methods, Production sheets
*	Safety precaution, fire protection, material safety data sheets
	<u>Measurement of mass, balances</u>
*	Definitions, types, general rules
	<u>Mechanical balances:</u>

*	mass-comparative balances: equal arm balances (Berkel), unequal-arm balances (OWA, Metripond, cg quick balance); deformation principles balances (coil, spiral and bent spring);
*	Electronical (strain-gauge) balances: advantages, different functions, types (analytical, precision and industrial platform balances, moisture analyser balance), adjusting/calibration (inner, external).
	Separation methods:
*	Distillation: definition, parts, sets of operation/material/heating, laboratory distillator, thermocompression, products;
*	Ion-exchange/demineralization: theory, synthetic resins, capacity, process, products
*	Reverse osmosis (RO): theory, RO membrane, process, products
*	Centrifugation: definition, factors, alignment, parts, types of rotors (e.g. swing-out, angle rotor)
*	Desintegration
*	Crushing, pulverization: definitions, working principle, efficiency of crushing, crushers (Jaw, gyratory) grinders (roller and hammer);
*	Process of milling: mills (mortar and pestle, ball, vibratory ball, centrifugal ball, planetary ball, disk, cutting, industrial jet and colloid mill), rotary cone sample divider;
*	Particle size analysis (PSA) and its application: importance, FDA guide, USP tests, US and UK standard sieves, frequency of distribution, cumulated plots, microscopic measurement, laser diffractometer.
*	Homogenization
*	Mixing: definiton, efficiency, required mixing time, mixing equipments
*	Liquid mixing: paddle, anchor and propeller type, high shear homogenizer, circular flow and turbine mixer, shakers
*	Mixing of semisolids: planetary mixer, kneaders, dispersers, curved blade impeller
	Mixing of solids: cylindric, cubic, tumbler, double cone, twin shell and vertical screw mixers.
	Material transfers
*	Drying: definitions, purpose, efficiency, industrial microwave drying, vacuum drying, spray drying (nozzle, atomizer) and its application;
*	Dissolution: solutions, theory, definitions, expressions of concentration, pharmaceutical applications, dosage form, dissolution rate, formulation;
*	Molecular and colloidal solution (preparation): real solution, stock solution, syrups (medicinal and flavouring), mucilages (polymers), elixirs, spirits, mixtures, aromatic waters, tinctures;
*	Industrial liquid mixing equipments (e.g. double planetary mixer, high-shear rotor-stator mixer, different mixing blades, Powermix and Triple Shaft mixer, disperser), filtering, storage tanks, industrial liquid filling.
	Preparation of disperse systems
	Emulsifying: emulsions, definitions, types, calculation (work-equation, required HLB), industrial manufacturing methods, equipments (mixers, homogenizers, colloid mills, ultrasonic devices), stability
*	Suspending: suspenions, definitions, classification, flocculation, industrial manufacturing methods, equipments, kinetics of sedimentation.
	Soaps and soap-containing preparations: definitons, types, preparations (Ph.Hg. and USP)
	Ointments, creams, pastes, hydrogels: definitions, classifications, requirements, types of ointment bases, industrial production of semisolid
	preparations, laboratory (LUX, Erweka, Sabaria) and industrial mixers (e.g. counter-rotating paddle agitator), pastes, three-roll apparatus, penetrometric examination;
	Suppositories: definitions, types, types and preparation of suppository bases, laboratory and industrial preparation of suppositories (suppository moulding equpiments), types of moulds (metal, plastic), form-fill-seal.

PATHOPHYSIOLOGY

5th semester

LECTURE	SEMINAR/PRACTICE
Introduction to Pathophysiology; Inflammation I.: Definition, causes, mediators and signs of acute inflammation. Regulation and outcome of acute inflammation.	**Safety regulations**. Review of physiologic background of circulation and normal ECG.
	In the practice room: Registration and analysis of ECG. Determination of spirometric parameters.
Inflammation II.: Chronic inflammation. Local and generalized reactions of inflammation: fever, inflammatory pain.	**Seminar:** Inflammation I. (Lecture topic of the 1st week).
	In the practice room: Registration and analysis of ECG. Determination of spirometric parameters.
Pathophysiology of leukocytes I.: Immunology: *In vivo* allergic reactions, autoimmunity, immunodeficiency.	**Seminar:** Inflammation II.
	(Lecture topic of the 2nd week).
Endocrinology I.: Disturbances of endocrine regulation. Diseases of hypothalamus, hypophysis and thyroid gland. Hyperparathyreoidism.	**Seminar:** Pathophysiology of leukocytes I.: Immunology (Lecture topic of the 3rd week).
Endocrinology II.: Hypoparathyreoidism. Diseases of adrenal (cortex and medulla) gland.	**Seminar:** Endocrinology I. (Lecture topic of the 4th week).
Starvation and obesity.	**Seminar:** Endocrinology II. (Lecture topic of the 5th week).
Diabetes mellitus, hypoglycemia	
Diabetes mellitus causes, types, clinical signs, pathogenesis and consequences. Hypoglycemia	
Cardiovascular system I.: Pathophysiology of plasma lipoprotein metabolism. Development of atherosclerosis.	**Seminar:** Starvation and obesity.
	Disturbances of carbohydrate metabolism
	(Lecture topic of the 6th week).
Cardiovascular system II.:	**Seminar:** Cardiovascular system I.
Pathogenesis and consequences of atherosclerosis.	(Lecture topic of the 7thweek).
Primary and secondary hypertension.	
Cardiovascular system III.:	**Seminar:** Cardiovascular system II.
Pathophysiology and ECG of acute coronary syndromes: angina pectoris, myocardial infarction	(Lecture topic of the 8th week).
Cardiovascular system IV.:	**Seminar:** Cardiovascular system III. (Lecture topic of the 9th week).
Congenital heart diseases.	
Mitral, aortic stenosis and regurgitation. Compensated and decompensated heart function, Heart failure.	
Peripheral circulatory diseases:	**Seminar:** Cardiovascular system IV.
Volume depletion.	(Lecture topic of the 10th week).

Syncope. Circulatory shock (development, stages). Multiple organ dysfunctions in shock.	
Pathophysiology of salt-water balance I.: Volume excess, hyper- and hyponatremia, hyper- and hypocalcemia	**Seminar:** Peripheral circulatory disease
	(Lecture topic of the 11th week).
Pathophysiology of salt-water balance II.:	**Seminar:** Pathophysiology of salt-water balance I (Lecture topic of the 12th week).
Hyper- and hypokalemia, disturbances of trace elements and vitamins.	
Cardiovascular system V.:	**Seminar:** Pathophysiology of salt-water balance II (Lecture topic of the 13th week).
Disturbances of electrical impulse generation and conduction.	

6th semester

LECTURE	SEMINAR/PRACTICE
Pathophysiology of kidney diseases I.: Proteinuria, hematuria, glycosuria, ketonuria, pyuria, bacteruria, polyuria, oliguria and anuria.	Safety regulations. **Seminar:** Thermoregulation. (Please download and study the material from our website or coospace before class).
Pathophysiology of kidney diseases II.: Nephrotic and nephritic syndrome, pyelonephritis, kidney stones. Acute and chronic renal failure.	**Seminar:** Kidney diseases I.
	(Lecture topic of the 1st week).
	In the practice room: Investigation of urine and renal function: proteinuria, hematuria, pyuria, hemoglobinuria, ketone bodies, urobilinogen, urine sediment and casts.
Pulmonary diseases I: Abnormal breathing patterns, dyspneas. Obstructive pulmonary diseases: CODP, asthma bronchiale, cystic fibrosis.	**Seminar:** Kidney diseases II. (Lecture topic of the 2nd week).
	In the practice room: Investigation of urine and renal function: proteinuria, hematuria, pyuria, hemoglobinuria, ketone bodies, urobilinogen, urine sediment and casts.
Pulmonary diseases II: Restrictive pulmonary diseases (pleural disorders, pulmonary edema, embolism, hypertension), hypoxias, respiratory failure.	**Seminar:** Pathophysiology of pulmonary diseases I. (Lecture topic of the 3rd week).
Disturbances of acid-base metabolism: Respiratory acidosis and alkalosis.	**Seminar:** Pathophysiology of pulmonary diseases II. (Lecture topic of the 4th week).
Metabolic acidosis and alkalosis.	
Gastrointestinal diseases I.: Nausea, vomiting, dysphagia. Abnormalities of gastric juice secretion, peptic ulcer.	**Seminar:** Disturbances of acid-base metabolism (Lecture topic of the 5th week).
Gastrointestinal diseases II.: Diseases of absorption**,** diarrhea, constipation. Intestinal obstruction. Acute and chronic pancreatitis.	**Seminar:** Gastroenterology I. (Lecture topic of the 6th week).
Diseases of liver and biliary tract: Diseases of bilirubin metabolism: hemolytic, hepatocellular and obstructive jaundice. Causes, pathogenesis and consequences of hepatic cirrhosis.	**Seminar:** Gastroenterology II. (Lecture topic of the 7th week).

Pathophysiology of leukocytes: Leucopenia. Proliferative diseases: reactive and malignant diseases (leukemias, lymphomas).	**Seminar:** Pathophysiology of liver diseases (Lecture topic of the 8th week).
Red blood cell diseases I.: Polycytemias, Anemias - ineffective erythropoesis.	**Seminar:** Pathophysiology of leucocytes II. (Lecture topic of the 9th week).
Red blood cell diseases II.: Anemias due to blood loss, hemolysis.	**Seminar:** Red blood cell diseases I. (Lecture topic of the 11th week).
Hemostasis I.: Bleeding disorders (platelet disturbances).	
Hemostasis II.: Bleeding disorders (vascular, clotting factor disturbances), thrombosis and embolism.	**Seminar:** Red blood cell diseases II. Hemostasis I. (Lecture topic of the 12th week).
	In the practice room: Determination of WBC, RBC, platelet, eosinophyl and reticulocyte count. Staining and analysis of blood smear.
Pathophysiology of the CNS I.: Multiple sclerosis, neurodegenerative diseases: Alzheimer's, Parkinson's and Huntington's disease. Pathogenesis of psychiatric disorders.	**Seminar:** Hemostasis II. (Lecture topic of the 13th week).
	In the practice room: Determination of WBC, RBC, platelet, eosinophyl and reticulocyte count. Staining and analysis of blood smear.
Pathophysiology of the CNS II.: Circulatory diseases of the CNS. Cerebral edema. Pain, headaches, seizures and epilepsy.	**Seminar:** Pathophysiology of the CNS. (Lecture topic of the 14th week).

COMPUTER LITERATURE SURVEY

5th semester (1 hr/week, elective)

LECTURE
* Introduction: Main point of view of literature searching, importance and usage.
* Scientific publication, main stzructure of articles. How to prepare scientific publication. From idea to published results.
* Comparing of classical printed and electronical data base are available. Keywords and their importance in computer literature survey
* Structure of computational data bases. Introduction and practical use of Chemical Abstracts (SciFinder).
* Introduction and practical use of Web of Science. Impact factor of journals. Citation and independent citation. How to chose appriopiate jurnal to publish results?
* Introduction and practical use of Science Direct, Scopus.
* Usage of graphical part of searching programmes. Getting practice on handling Chemical Abstract, , Science Direct, Medline and Web of Science and scopus. Serching for citations, handling of the resulted data and files. Downloading and transforming of scientic publications via internet.

MICROBIOLOGY AND IMMUNOLOGY

5th semester

	LECTURE (4hrs/week)	**PRACTICE (2hrs/week)**
*	Introduction to microbiology.	Introduction, laboratory safety. Wet-mount

		preparation. Preparation of bacterial smear, simple staining.
	Classification and characterization of bacteria. Microbial genetics. Basic principles of immunology. Constituents of the immune system. Primary and secondary immune organs. Antigens.	
*	Principles and practice of sterilization and disinfection. Factory hygiene and good manufacturing practice. Microbiological requirements and purity classes of pharmaceutical products. Antigen recognition by and activation of T and B cells.	Combined staining. Practice of sterilization. Sterility testing. Disinfection.
	Pharmaceutical products of microbial origin. Microorganisms in pharmaceutical industry. Production of pharmaceuticals by recombinant DNA technology. The histocompatibility complex (MHC). Antigen presentation by MHC.	Culture media. Inoculation and plating bacterial culture. Haemoculture. Colony morphology.
*	Antibiotics and antimicrobial agents. Mechanisms of action of antibiotics Bacterial resistance to antibiotics. Antibiotic policy. Industrial production of antibiotics. Humoral immune response. Structure of immunoglobulins	Biochemical tests. Anaerobic cultivation.
*	Streptococcus, Neisseria, Enterococcus, Staphylococcus Complement system.	Test of bacterial resistance to antibiotics. Enumeration of bacteria.
*	Gram negative rods I. Enteric and extraintestinal pathogens Mycobacterium.	Sterility and pyrogenicity testing of pharmaceutical products
*	Gram negative rods II. Bacteria related to respiratory tract (*Haemophilus, Bordetella, Legionella)* Pathogens of zoonoses (*Yersinia, Francisella)* Gram positive aerob rods (*Corynebacterium, Listeria)* Cytokines I.	Serological tests I.: Precipitation, agglutination.
	Gram positive anaerob rods (Clostridium)B. anthracis Spirohatales. Cytokines II. holiday	MTO holiday
*	General properties and structure of viruses. Reproduction of viruses. Viral pathogenesis, chemotherapy of viral infections	Serological tests II.: CFT; IF; RIA, etc. Cell mediated reactions. Serobacteriological products. Vaccines.

	Obligate intracellular bacteria (Chlamydia, *Coxiella bunettii, R. slovaca, R. prowazekii)* Mechanisms of immunotolerance. Immunology of transplantation. Autoimmunity	
*	Hepatitis viruses DNA viruses. Herpesviruses, human papillomaviruses Hypersensitivity reaction. Immunodeficiencies.	Summary of the most important human pathogenic bacteria I.
*	RNA viruses II. Slow viruses. Retroviridae, AIDS RNA viruses I. Influenzaviruses, measles-, mumps-, rubeola viruses. Immunization against microbes. Vaccination	Summary of the most important human pathogenic bacteria II.
*	RNA viruses III Poliovirus, coxsackie viruses Rabiesvirus. Manufacture of immunological products and their quality control.	Propagation and assay of viruses. Serological methods in virology.
	Fungi of medical importance. Immunological methods.	Important human pathogenic fungi.
	Important human pathogenic helminths. Important human pathogenic protozoa.	Consultation

BIOPHARMACY

	LECTURE	**PRACTICE**
*	Basic principles	Basic principles, drug administration.
*	Drug absorption and distribution. Specific distributions, Blood-brain barrier, placenta. Plasma protein binding.	Absorption, distribution. Blood plasma curve of one compartment intravascular model system.
	Drug metabolism, first-pass effect, factors influencing metabolism.	Drug metabolism. Blood plasma curve of one compartment extravascular model system.
*	Drug elimination, clearance. Pharmacokinetics of repeated dose administration, plato phenomenon.	Pharmacokinetic of Infusion. Blood plasma curve of repeated dose administration.
	Pharmacokinetic model systems.	Blood plasma curve of two compartment intravascular model system.
*		
	Concept and determination of AUC. Model independent pharmacokinetics.	Calculation of physiological availability and absolute and relative bioavailability. Multi dose schedule for subject with renal impairment.
*	Physiological and Biological availability. Equivalences.	Multi dose schedule for subject with hepatic dysfunction. Dosage schedule for children and elderly subjects.
*	Factors influencing biological effects of drugs.	Dose-response curves. Calculation of ED_{50},

		pD_2.
	Dose - response relationships.	Synergism, antagonism, dose-response curves. Calculation of ED_{50}, pD_2, pA_2, pD'_2.
*		
	Drug interactions. Synergism, antagonism.	Non-linear pharmacokinetics, Michaelis-Menten pharmacokinetics.
*	Receptors, signal transduction.	
*	Drug allergy, idiosyncratic drug reactions, polymorphisms.	
*	Therapeutic drug monitoring. Non-linear pharmacokinetics.	

HUNGARIAN FOR PHARMACEUTICAL PURPOSES

1st semester

PRACTICE (3 hrs/week)	
*	The human body. The main systems and organs. Terminology exercises.
*	Drug forms. Drugs for internal and external use. Definition and translation of new expressions.
*	Drug description analyses: indication, dosage, contraindication. Comparison of Hungarian and English drug description.
*	Administration of drugs. The effect of drugs. Drug interaction. Side effects of medications. Word building exercises.
*	Classification of drugs. Drug types. Standard expressions and phrases.
*	Herbal medicines. Natural source ingredients. Trends toward herbal medicines. Cloze-test.
*	Mid-term test.
*	In the pharmacy. OTC drugs and prescription drugs. Pharmacist-patient dialogue.
*	Food and nutrition.The major components of food. Healthy diet. Terminology exercise.
*	Deficiency diseases. Listening exercise on healthy nutrition. Discussion.
*	Vitamins. Main sources of vitamins and minerals. Daily vitamin requirements. Pharmavit products.
*	Infections. Antibacteril and antiviral drugs. Influenza. Pharmacist-patient dialogue
*	Vaccination. Resistance to infections. Medical leaflets for educational purposes.
*	Revision of previous topics. Test.

2nd semester

PRACTICE (3 hrs/week)	
*	Antibiotics. Types of antibiotics. Antibiotic resistance. Natural alternatives. Terminology exercises.
*	Analgesics. Types of analgesics, mechanism of action. Aspirin. Suffixes in medical language.
*	Inflammation. Anti-inflammatory drugs. NSAIDS. Corticosteroids. Vocabulary study.
*	Drugs in the treatment of skin disease. Ointments, lotions, creams. Antipruritics. Role play.
*	Allergy. Drugs in treatment of allergy. Regimens and diet. Environmental effects. Prefixes in the medical language.
*	The GI tract and drugs. Antidiarrhoeal drugs and laxatives. Emetics and antiemetics. Role play.
*	**Revision of previous topics. Mid-term test.**
*	Drugs for IBS and IBD. Diet and regimen. Discussion.

*	Ulcer. H.pylori. Anti-ulcer drugs. PPI. Diet and regimen. Terminology exercises.
*	Diabetes. IDDM, NIDDM. Oral anti-diabetics. The importance of good control.
*	Insulin treatment. Complications of diabetes. Compliance. Regimen and diet. Educational leaflets.
*	The pharmaceutical industry in Hungary. Hungarian drugs on the world market. Discussion.
*	The Faculty of Pharmacy at SZTE. The institutes and departments of the faculty. Scientific achievements. International cooperation.
*	General revision. Test.

COMMUNICATION IN PHARMACY PRACTICE (ELECTIVE COURSE)

*	Introduction, course content. Importance of psychotherapy and communication in health care
*	Laws and ethical regulations concerning pharmacist' communication
*	Patient types and their handling
*	Practice: situations in pharmacy
*	Dispensing and consulting: verbal and non-verbal elements of pharmacist-patient relationship I.
*	Dispensing and consulting: verbal and non-verbal elements of pharmacist-patient relationship II.
*	Improving patient adherence with proper communication, special patients and situations in pharmacy I.
*	Improving patient adherence with proper communication, special patients and situations in pharmacy II.
*	Persuasion in pharmacy
*	Promotion of medicinal products

SYLLABUSES FOR 4TH YEAR PHARMACY STUDENTS

PHARMACEUTICAL ANALYSIS

	LECTURE	**PRACTICE**
*	Instrumental analytical methods are applied for characterization of starting materials and final products, and also for the control of pharmaceuticals and their decomposition products according to pharmacopoeias, together with the metabolites of pharmaceuticals.	1. General notes. Importance of the course. Fire and safety training. Calculations.
*	Electrometric methods: voltametry, polarography, amperometry, potentiometry, conductometry and oscillometry.	2. Conductometry: assay of benzoic acid and salicylic acid. Seminar: Analysis of paraffins, saturated and

		unsaturated side chains. Conductometry.
*	Spectrophotometry, spectrophotometers, atomic and molecularspectra, UV and visible absorption spectrophotometry, chemical structure and qualitative and quantitative determination of pharmaceuticals by spectrophotometry. Spectrofluorometry and IR spectrophotometry. Structure determination and application of IR spectra for qualitative and quantitative purposes. Emission and atomicabsorption spectrophotometry and flame photometry.	3. Potentiometry: analysis of phosphate salts. Seminar: Analysis of alcohols and organic acids. Potentiometry.
*	Nuclear magnetic resonance spectroscopy (NMR).	4. Photometry I. Pulvis chinacisalis – determination of acetyl salicylic acid or Sparsorium antisudoricum or Tabletta aspirini and Suppositorium paracetamoli Analysis of fenols, aromatic compounds. Spectrophotometry.
*	Mass spectrometry (MS) and combinations of gas chromatography and high-pressure liquid chromatography with MS. Field ionization and chemical ionization mass spectrometry.	5. Potentiometry – displacement titration. Seminar: Analysis of aldehids and ketons. Thermoanalysis.
*	Thermoanalytical methods (TG DTG. DTA, DSC).	6. Photometry II. Pulvis cholagogus and Determination of protein concentration Seminar: Analysis of ethers and esters.
*	Optical rotation (ORD, CD), refraction and molecular refraction.	7. Quantitative analysis of Unguentum ad vulnera Seminar: Analysis of amins and halogen-containing compounds. IR, NIR, Raman.
*	X-ray diffraction (XRD), XRD analysis of solid pharmaceuticals and determination of particle size.	8. Photometry III. Solutio metronidazoli or Pulvis chinacisalis – determination of quinine-sulfate Seminar: Analysis of carbohydrates and sulfonamides. Emission spectroscopy.
*	Fundamentals of nuclear pharmacy. Radionuclide generators (liquid and solid column). Dosage forms of radiopharmaceuticals. Radioimmunoassay (RIA).	9. Atomic absorption analysis of Seminar: Analysis of barbiturates. Atomic absorption.
*	Physical methods: density, solubility, viscosity, surface tension, melting range, eutectic temperature, dropping point, congealing point, boiling range, sublimation, flame coloration, residues of drying and ignition, loss on drying, acid- insoluble ash, etc.	10. HPLC – Tabletta Panadol Semnar: Separation techniques. Analysis of alkaloids.
*	Chromatographic methods: adsorption column, partition column, paperchromatography, thin-layer chromatography (TLC), gas chromatography (GC), high-performance liquid chromatography (HPLC), ion-exchange chromatography, molecular sieves, gel	11. Titration: Suppositorium antipyreticum and Suspensio zinci aquosa

	permeation (filtration), zone electrophoresis and counter-current distribution.	Seminar: Mass spectrometry, analysis of peptides and proteins.
*	Chemical purity and its control. The origin of impurities. Manufacturing product licensing standards. Pharmacopoeial standards. Identity, purity and assays of pharmaceuticals according to pharmacopoeias.	12. Titration: Injectio Algopyrini and Sparsorium sulfaboricum. Seminar: Analysis of inorganic compounds. Other electroanalytical techniques.
*	Methods of drug registration, preclinical requirements, clinical trials (phases I-III), quality control during manufacturing (GMP) and quality control in post-marketing phase.	13. Titration: Pulvis neutracidus and Spiritus Jodosalicylatus. Seminar: Derivative formation.
*	Quality control and separation of formulated pharmaceuticals. Separation of active ingredient/s from the base and separation of active components into fractions. Separation of formulated pharmaceuticals according to Stass-Otto. Identification of separated components. General tests: sensory, heating test, solubility and acidity/alkalinity. Chemical examination: tests for elements (sulphur, halogen, nitrogen, etc.). Assay of halogens and sulphur according to Carius and Schoeniger. Analysis of pharmaceuticals on the basis of functional groups. Hydrocarbons (saturated, unsaturated and aromatic). Qualitative and quantitative determination of halogenated hydrocarbons. Compound with one or more hydroxy groups (alcohols and phenols). Ethers, aldehydes and ketones. Reactions of amines and alkaloids, their determination in galenicals and formulated dosage forms. Carboxylic acids and their derivatives. Their determination in galenical preparations and in vegetable drugs. Urea derivatives (ureides) and sulphonamides and their reactions. Amino acids and peptides, their synthesis and reactions. Quality control of peptide derivatives.	14. NMR.

PHARMACEUTICAL TECHNOLOGY

7th semester

LECTURE	
*	Preparation and investigation of powders, dusting powders and granules
*	Granulation
*	Preparation and investigation of tablets 1
*	Preparation and investigation of tablets 2
*	Preparation and investigation of capsules
*	Preparation and investigation of coated pharmaceutical preparations, coating

*	Blood preparations
*	Wound dressings
*	Other pharmaceutical dosage forms: soaps, plasters and preparations containing soap
*	Preparation and investigation of pharmaceutical dosage forms for veterinary use
*	Pharmaceutical aspects of homeopathic preparations
*	Packaging, packaging materials
*	Stability, stability of pharmaceutical preparations
*	Interactions, incompatibility in pharmaceutical preparations

PRACTICE	
Prescription pharmacy 2	
*	General information
*	Repetition of liquid dosage forms
*	Powders
*	Divided and undivided powders
*	Dusting powders
*	Powder dividing by eyes, checking with measurement
*	Powder dividing by Hunfalvyl, checking with measurement
*	Hard gelatine capsules
*	Capsula calibration
*	Incompatibility of powders
*	Tea mixtures
*	Pills
*	Calculation, writing of prescription
*	Suppository
*	Preparing of suppository with moulding and hand-made method
*	Calibration of moulding forms
*	Vaginal dosage forms
*	Stifts
*	Self-made preparations

Preparation of sterile and aseptic dosage forms	
*	Aseptic preparation
*	Eye-drops
*	Solutions for eye-drops (FoNo galenicals)
*	FoNo preparations
*	Eye ointments
*	Bases of eye ointments
*	FoNo preparations
*	Aerosols, inhalasols
*	Concentration of infusion solutions, isotonic calculations
*	Sterilization
*	Pyrogens, pyrogen removal methods
*	Filtration
*	Large volume parenteral preparations

*	Infusions with electrolyte
*	Infusions with sugars
*	Infusions with electrolyte and sugars
*	Investigation of large volume parenteral preparations
*	Supplementary infusions
*	Infusions for correction of acidosis
*	Infusions for correction of alkalosis
*	Dialysis, peritoneal dialysis solutions
*	Perfusion solutions
*	Plasma substitute infusions
*	Preparation of parenteral nutrition infusion
*	Injections
*	Investigation of injections
*	Non-heat sterilizable injections
*	Multidosage injections
*	Powder ampoules
*	Liofilization
*	Emulsion and suspension type injections
*	Determination of particle size disibution of DPI by Andersen impactor

8th semester

LECTURE	
*	Pharmaceutical technology and biopharmacy
*	Physicochemical characterization of APIs and the effect on the action
*	Solubility, ionization, lipophilicity, permeability
*	Physicochemical properties of APIs and dosage forms
*	Lipophilicity-pH profile, lipophilicity and dosage form
*	Possibilities to increase solubility and permeability
*	Absorption of APIs from the gastrointestinal tract: buccal cavity, gastrointestinal tract and rectum, colon therapy, conventional- and modified-release preparations
*	Biopharmacy of parenteral preparations: injections, infusions, modified-release preparations, Implantation systems
*	Pulmonary drug administration: pharmaceutical influencing factors, dosage forms and APIs, conventional- and modified-release preparations
*	Nasal drug administration: pharmaceutical influencing factors, dosage forms and APIs, conventional- and modified-release preparations
*	Transdermal drug administration: anatomical, physiological and biochemical principals of transdermal absorption, transdermal preparations, study of penetration and permeation of APIs
*	Other ways of drug administration: biopharmaceutical aspects of vagina, uterus, eyes and ears, dosage forms and APIs, conventional- and modified-release preparations
*	Special drug delivery systems (DDSs): liquid-crystal systems, microemulsions, micro- and nanocapsules, micro-and nanospheres. SLN, NLC, liposomes, pharmacosomes, niosomes, pegylation, transporters, targeted therapy
*	Pharmaceutical aspects of APIs produced via biotechnological methods, processability and biopharmaceutical aspects of proteins and peptides
*	Dosage forms in pediatrics and geriatrics and their biopharmaceutical aspects
*	In vitro, ex vivo and in vivo study of dosage forms, in vitro dissolution studies, ex vivo and in vivo methods, dissolution profiles, in vitro and in vivo correlation, bioequivalence studies

* Pharmaceutical aspects of in vitro cell line studies: Caco-2 and other models, pharmaceutical aspects of blood-brain-barrier studies

PRACTICE

Prescription pharmacy 3

* General rules
* Repetition of liquid dosage forms
* Repetation of solid dosage forms
* Definitions of semi-solid preparations for cutaneous applications (ointments, creams, pastes, hydrogels)
* Groups of ointment bases
* Water-free ointment bases
* Emulsifying ointment bases
* Hydrogels
* Preparation of ointment bases
* Medicated ointment
* Solution-type of ointments
* Emulsion-type of ointments
* Suspension-type of ointments
* Packaging
* Pricing
* Incompatibilities of semisolid preparations
* Preparation of semi-solid dosage forms according to the official books
* Preparation of magistral semi-solid dosage forms
* Self made preparations of all dosage forms

Industrial preparation and investigation of solid dosage forms

* Cycle 1
* Powder rheological investigation and qualification of raw materials with ASTM
* apparatus (effective and auxiliary materials).
* Powder rheological investigation and qualification of raw materials with PTG-1
* equipment (effective and auxiliary materials).
* Particle size investigation of raw materials with a vibration sieve analysis method.
* Moisture content investigation of raw materials.
* Compactibility investigation of materials.
* Investigation of water absorbing capacity of raw materials and powder mixtures.
* Preparing granules with high shear mixer (solvent granulation with Pro-c-epT equipment).
* Preparing granules (binder granulation with LuxRoyal equipment).
* Preparing granules with centrifugal granulator (binder granulation with Freund CF-360 equipment).
* Preparing granules with fluid granulator (binder granulation with Strea-1 equipment).
* Capsule filling and blistering. Mass control of filled capsules.
* Cycle 2
* Compressibility investigation of different materials with the use of different compression forces. Recording and analysing differen pressure curves.
* Geometrical investigation of tablets prepared by different compression forces.
* Physical investigation of different tablets (breaking hardness, friability, etc.).

*	Tablet preparation by direct compressing without auxiliary materials with the use of eccentric tablet machine.
*	Tablet preparation by direct compression with auxiliary materials with the use of eccentric tablet machine.
*	Tablet preparation with rotary tablet machine.
*	Preparing and mechanical investigation of tablets with effective materials compressed with different compression forces.
*	Water absorbing capacity of different tablets.
*	Dissolution and solution test of different tablets.
*	Sartorius resorption test.
*	Cycle 3
*	Investigation of film forming temperature with different film forming polymer compositions.
*	Film coating of granules in centrifugal granulator.
*	Film coating of granules in fluid granulator with the use of Wurster-column.
*	Film coating of tablets.
*	Sugar coating of tablets in drageé pan.
*	Dissolution test of enteric coated tablets.
*	Investigation of diffusion.
*	Designing, preparing and investigating of new tablet composition.

Investigation of Dosage Forms

Seminar

*	Investigation of suspensions:
*	distributional stability investigations of flocculated and non-flocculated suspensions
*	deteremination of the type of sedimentation and the half life time
*	investigation of the effect of different additives on the sedimentation process.
*	Investigation of air humidity on the geometrical parameters of tablets:
*	determination the influence of 100% relative air humidity on the weight and geometrical parameters of phenylbutazone tablets.
*	Investigation of polymer films:
*	determination of solving time of gelatin films with different thickness in artificial gastric and intestinal juice.
*	Investigation of hydrophyl sols'viscosity changing:
*	study the viscosity changing by electrolites of the Mucilago methylcellulosi and Mucilago hydroxyaethylcellulosi.
*	Investigation of ointments I:
*	Characterization of water-free ointment bases with the help of physical investigations.
*	Investigation of ointments II:
*	Determination of washability and rheological features of ointments.
*	Investigation of ointments III:
*	Consistency characterisation of the ointments by determinating viscosity, spreadability and adhesion.
*	Determination of average molecular weight of dextrane:
*	Determination of average molecular weight of dextrane with measuring density and viscosity.
*	Light permeability determination of glass containers:
*	Investigation of transmittancy of glass containers with different colours in a given wave lenght range.
*	Investigation of drug release by means of the agar diffusion plate method:

*	Investigation of drug release from different ointments.
*	Determination of drop weight:
*	Investigation of the effect of different additives on the drop-weight and surface tension.

Practical Guideline

week	PAIR"1"	PAIR"2"	PAIR"3"	PAIR"4"
1.	Seminar	Seminar	Seminar	Seminar
2.	Investigation of suspension	Investigation of oinments I.	Inv.of drug release by means of the agar diff. plate method	Investigation of oinments II.
3.	Inv.of drug release by means of the agar diff. plate method	Investigation of oinments II.	Determination of average molecular weight of dextrane	Light permeability determination of glass containers
4.	Determination of glucose solution caramellisation	Light permeability determination of glass containers	Investigation of oinments III.	Inv.of drug release by means of the agar diff. plate method.
5.	Inv.of hydrophyl sols' viscosity changing	Investigation of suspension	Investigation of oinments I	Determination of glucose solution caramellisation
6.	Investigation of oinments II.	Inv.of drug release by means of the agar diff. plate method	Determination of drop-weight	Investigation of suspension
7.	Determination of average molecular weight of dextrane	Determination of drop-weight	Inv.of hydrophyl sols' viscosity changing	Investigation of oinments III.
8.	XRPD			
9.	DSC			
10.	FTIR			
11.	TEST			
12.	Investigation of oinments I.	Inv.of drug release by means of the agar diff. plate method	Determination of glucose solution caramellisation	Determination of drop-weight
13.	Investigation of oinments III.	Determination of glucose solution caramellisation	Investigation of oinments II.	Determination of average molecular weight of dextrane
14.	Summary, conclusion			

PHARMACODYNAMICS I.-II.

7th semester

	LECTURE	PRACTICE
*	Drugs acting on ganglionic transmission. Adrenergic neuron blockers. Directly acting parasympathomimetics. Indirectly acting parasympathomimetics. Parasympatholytics. Atropine poisoning. Antispasmodics (papaverine and related drugs)	Administration of drugs to experimental animals. Demonstration of the local and systemic effect. Enternal and parenteral route of administration.
*	Pharmacology of sympathomimetics	Dose-response relationship of drugs. Indication of microsomal enzymes by

		phenobarbital. Statistical evaluation of experimental data. Drug interactions, competitive antagonism. Experiments in isolated guinea pig ileum. Dose-response relations. General anaesthesia. Demonstration of anaesthesia induced by ethylether. Intravenous anaesthetics. Narcotic analgesics. Methods for demonstration of analgesic activity. Evaluation of analgesic potency.
*	Pharmacology of sympatholytics	Neuroleptics and tranquillizing drugs. Evaluation of behavioral effects of drugs in mice and rats (locomotor activity, jumping test, motor coordination).
*	Diuretics and antidiuretics	Convulsants and analeptic drugs. Effects of strychnine and pentylenetetrazol. Anticonvulsant drugs. Reversal of respiratory depression.
*	Antianginal agents. Antihyperlipidemic agents	Investigation of local anaesthetics on frog skin and rabbit cornea. In vitro demonstration of nerve block anaesthesia.
*	Cardiotonics, treatment of congestive heart failure	Agents acting on the autonomic nervous system. Effects on isolated frog heart, the pupil of rabbit and the salivary secretion of rat.
*	Antiarrhythmic agents	Agents acting on the autonomic nervous system. Demonstration of drug effects on isolated ganglia and nictitating membrane of cat.
*	Antihypertensive therapy. Calcium channel blockers. Drugs acting on renin-angiotensin system	Agents acting on the automic nervous system. Effects on cholinergic and adrenergic drugs on the blood pressure of anaesthetized animals.
*	Pharmacology of blood coagulation. Thrombolytics. Drugs acting on platelets.	Agents affecting the smooth muscle function. Demonstration of the action of drugs on isolated ileum.
*	Steroidal antiinflammatory drugs. Non-steroidal antiinflammatory drugs.	Drugs affecting the striated muscles. Muscle relaxant effect of tubocurarine and succinylcholine.
*	Antihistamines	Effect of cardiotonics on isolated frog heart. Demonstration of cardiac action with the help of ECG.
*	Pharmacology of insulin and its congeners. Orally acting antidiabetics	Vasoconstrictor and vasodilator effect of drugs. Laewen-Trendelenburg experiments.
*	Antitussive agents and mucoregulators. Antiasthmatic agents.	Diuretic effect of drugs in rats and in anaethetized rabbit.
*	Drugs used in the treatment of peptic ulcer.	Drugs acting on blood coagulation. Evaluation of prothrombin activity. Anticoagulant activity of heparin and acenocoumarol.
*	Digestive agents, digestive enzymes	Choleretic and laxative drugs. Biliary excretion of BSP. Investigation of laxative effect.
*	Laxatives & prokinetic agents	Pharmacological effects of histamine and antihistamines. Effect of drugs on permeability of capillaries in rat.
*	Drugs for inflammatory bowel disorders, obstipants	Investigation of antiphlogistics. Demonstration of drug effect in rat-paw edema, exudative pleuritis and cotton-granuloma tests.
*	Drugs acting on bile. Hepatoprotectives	Toxicological invesitgations. Benefit of activated charcoal. Demonstration of

		leucopenia produced by cytotoxic agent. Determination of cholinesterase activity after intoxication with organophosphate substances.
*	Antiemetics	

PHARMACODYNAMICS-TOXICOLOGY

7th semester

	LECTURE	PRACTICE
*	Drugs acting on ganglionic transmission. Adrenergic neuron blockers. Directly acting parasympathomimetics. Indirectly acting parasympathomimetics. Parasympatholytics. Atropine poisoning. Antispasmodics (papaverine and related drugs)	Administration of drugs to experimental animals. Demonstration of the local and systemic effect. Enternal and parenteral route of administration.
*	Pharmacology of sympathomimetics	Dose-response relationship of drugs. Indication of microsomal enzymes by phenobarbital. Statistical evaluation of experimental data. Drug interactions, competitive antagonism. Experiments in isolated guinea pig ileum. Dose-response relations. General anaesthesia. Demonstration of anaesthesia induced by ethylether. Intravenous anaesthetics. Narcotic analgesics. Methods for demonstration of analgesic activity. Evaluation of analgesic potency.
*	Pharmacology of sympatholytics	Neuroleptics and tranquillizing drugs. Evaluation of behavioral effects of drugs in mice and rats (locomotor activity, jumping test, motor coordination).
*	Diuretics and antidiuretics	Convulsants and analeptic drugs. Effects of strychnine and pentylenetetrazol. Anticonvulsant drugs. Reversal of respiratory depression.
*	Antianginal agents. Antihyperlipidemic agents	Investigation of local anaesthetics on frog skin and rabbit cornea. In vitro demonstration of nerve block anaesthesia.
*	Cardiotonics, treatment of congestive heart failure	Agents acting on the autonomic nervous system. Effects on isolated frog heart, the pupil of rabbit and the salivary secretion of rat.
*	Antiarrhythmic agents	Agents acting on the autonomic nervous system. Demonstration of drug effects on isolated ganglia and nictitating membrane of cat.
*	Antihypertensive therapy. Calcium channel blockers. Drugs acting on renin-angiotensin system	Agents acting on the automic nervous system. Effects on cholinergic and adrenergic drugs on the blood pressure of anaesthetized animals.
*	Pharmacology of blood coagulation.	Agents affecting the smooth muscle function.

	Thrombolytics. Drugs acting on platelets.	Demonstration of the action of drugs on isolated ileum.
*	Steroidal antiinflammatory drugs. Non-steroidal antiinflammatory drugs.	Drugs affecting the striated muscles. Muscle relaxant effect of tubocurarine and succinylcholine.
*	Antihistamines	Effect of cardiotonics on isolated frog heart. Demonstration of cardiac action with the help of ECG.
*	Pharmacology of insulin and its congeners. Orally acting antidiabetics	Vasoconstrictor and vasodilator effect of drugs. Laewen-Trendelenburg experiments.
*	Antitussive agents and mucoregulators. Antiasthmatic agents.	Diuretic effect of drugs in rats and in anaethetized rabbit.
*	Drugs used in the treatment of peptic ulcer.	Drugs acting on blood coagulation. Evaluation of prothrombin activity. Anticoagulant activity of heparin and acenocoumarol.
*	Digestive agents, digestive enzymes	Choleretic and laxative drugs. Biliary excretion of BSP. Investigation of laxative effect.
*	Laxatives & prokinetic agents	Pharmacological effects of histamine and antihistamines. Effect of drugs on permeability of capillaries in rat.
*	Drugs for inflammatory bowel disorders, obstipants	Investigation of antiphlogistics. Demonstration of drug effect in rat-paw edema, exudative pleuritis and cotton-granuloma tests.
*	Drugs acting on bile. Hepatoprotectives	Toxicological invesitgations. Benefit of activated charcoal. Demonstration of leucopenia produced by cytotoxic agent. Determination of cholinesterase activity after intoxication with organophosphate substances.
*	Antiemetics	

8th semester

*	Hypnotics and sedatives. Pharmacology of barbiturates, benzodiazepines, zolpidem, zopiclone, zaleplone, and miscellaneous drugs. Intoxication with sedato-hypnotics.
*	Ethanol, alcoholism, alcohol withdrawal
*	Pharmacology of anxiolytic drugs
*	Definition of general anaesthesia, stages.
*	Inhalational general anaesthetics.
*	Intravenous general anaesthetics. Premedication and complementary medication of general anaesthesia. Neurolept-analgesia
*	Mechanism of action of local anaesthetics. Therapeutic use of local anaesthetics
*	Opioid analgetics. Pharmacology and therapeutic use of morphine. Acute morphine intoxication and abuse. Semi-synthetic and synthetic opiates. Opiate antagonists.
*	Pharmacotherapy of epilepsies
*	Therapy of Parkinson's disease, secondary parkinsonism
*	Therapy of Alzheimer's disease and sclerosis multiplex
*	Neuroleptics
*	Therapy of endogenous depression
*	Psychostimulants. Pharmacology of amphetamine

*	Hallucinogens
*	Peripheral skeletal muscle relaxants
*	Centrally acting skeletal muscle relaxants
*	Pharmacology of bone metabolism. Osteoporosis, rheumatoid arthritis, osteoarthritis
*	Pharmacology of female sex hormone and their antagonists
*	Pharmacology of androgens and their antagonists
*	General characterisation of contraceptives, oral contraceptives
*	Therapy of infertility
*	Pharmacology of pituitary hormones
*	Pharmacology of thyroid gland
*	Drugs acting on the uterine function
*	Pharmacology of obesity
*	Therapy of erectile dysfunction

PUBLIC HEALTH AND PREVENTIVE MEDICINE

7th semester

LECTURE (2 hrs/week)	
*	Introduction. The aim and scope of public health and preventive medicine. Basic knowledge of demography.
*	Basic knowledge of epidemiology, main types of epidemiological studies. Health status of world population.
*	Epidemiology of cardiovascular and cerebrovascular diseases, and malignant tumours.
*	Epidemiology of metabolic, gastrointestinal, and chronic respiratory diseases.
*	Epidemiology of accidents and suicide.
*	General epidemiology of infectious diseases. Prevention, vaccinations. Epidemiological safety. Epidemiology of infectious diseases: airborne diseases.
*	Epidemiology of infectious diseases: enteric, hematogenic and lymphogenic diseases, cutaneous and sexually transmitted diseases.
*	Epidemiology of infectious diseases: zoonoses, transmissible spongiform encephalopathies, health care associated infections, infection control (nosocomial surveillance).
*	Nutrition in public health. Healthy diet. Malnutrition. Food quality and safety.
*	Epidemiology of smoking, alcohol and drug consumption (health risks, prevention).
*	Environmental health. Climate change and health. Health effects of physical, chemical and biological factors of micro- and macro environment.
*	Occupational health. Occupational diseases caused by physical, ergonomic and psychosocial exposures.
*	Health effects of occupational and environmental chemical exposures. Risk assessment and communication. Chemical safety.
*	Structure and operation of health systems. Health and health care in the family (mother, infants, youth, elderly).

ETHICS IN PHARMACY

LECTURE	
*	Ethics and morality. History of ethics, Ethical theories. Fields of ethics
*	Code of Practices, their role in regulation, functions, general content.

*	Ethics in health care (autonomy, non-maleficence, beneficence, justice)
*	Ethics of the therapeutic relationship
*	Allocation of resources in health care, relationship between economy and ethics. Organ donation and transplantation
*	The beginning and end of life: abortion, assisted reproductive technics, euthanazia, hospice
*	Research ethics
*	Sale and promotion of medicinal products, ethical aspects and regulations
*	Ethics in pharmacy, Code of Pharmacy Practice

SEMINAR	
*	Ethics of pharmacy practice. Pharmaceutical care in pharmacy; Private life of a pharmacist
*	Pharmacist and different relationships: patient, phsysician, assistant, pharmacist, other health care workers
*	Competency fields of a pharmacist, Promotion and marketing in pharmacy, keeping the secret of the patient
*	Pharmaceutical service (strike, misuse of drugs)
*	other topics, exam consultation

DRUG REGULATORY AFFAIRS

8th semester

*	Introduction
*	Bacis Acts and Regulations within Pharmacy
*	Regulation of drug research and human clinical trials
*	Drug manufacture, procurement, wholesale distribution
*	Retail medicine supply (to patients) – regulation concerning community pharmacies
*	Regulation of hospital pharmacies
*	Marketing authorization process of medicinal products
*	Prescribing and dispensing of medicinal products
*	Regulation of herbal medicines (mostly in Europe)
*	Regulation of controlled substances (narcotic and addictive products)
*	Advertising and promotion of medicinal products
*	Drug pricing, drug reimbursement or subsidy, governmental drug budget control
*	Regulation of hazardous waste handling
*	Pharmacovigilance-system

INTRODUCTION TO ECONOMICS

7th semester

*	Introduction lecture: connection between economics and pharmaceutics, introduction of the necessity of the subject, statement of the syllabus
*	Theoretical economics: efficiency, exchange and comparative advantages, law of diminishing marginal utility, evolution of money and its functions
*	Theoretical economics: market processes (demand, supply, interest rate, benefit, economic profit, accounting profit), market actors.

*	Theoretical economics: competition, monopoly, price searching (price elasticity, price discrimination)
*	Theoretical economics: income allocation, externalities, markets and state, overall performance of economic systems
*	Theoretical economics: national economic policy, international trade, employment and unemployment
*	Accounting and analysis: basic definitions (assets, fixed assets, liabilities, etc.), changes in assets and liabilities, economic events, accounting source documents
*	Accounting and analysis: accounting of economic events, definition of expenses, revenues and income, indices of financial state of businesses
*	Basics of marketing: marketing research, marketing channels, price policy, marketing communication
*	Basics of marketing: marketing planning, marketing strategy, services marketing
*	Business planning, financial planning: theory of preparing business and financial plans
*	Fiscal and monetary policy: functions of the state, subsystems of the government budget, actors of financial system and their functions
*	Basics of pharmaco-economics: economic characterizations of the health care market, health care systems, comparability of medicine doses (ATC, DDD), comparative standard indices of therapies' efficiency (NNT, NNH, etc.)
*	Basics of pharmaco-economics: measurement of quality of life (QALY, questionnaires), pharmaco-economic analyses

INTRODUCTION TO LAW (SOCIAL LAW)

7th semester

*	Basic terms, introduction to the law
*	Basics of constitution and state organizations
*	Constitutional law
*	Basics on the European Union, European Law
*	Basics of civil law: contracts
*	Basics of civil law: partnerships and self-employment
*	Intellectual property
*	Basics of criminal law
*	Basics of labour law
*	Basics of tax law
*	Basics of social security
*	Equal treatment

HUNGARIAN FOR PHARMACEUTICAL PURPOSES

1st semester

PRACTICE (2 hrs/week)	
*	Video program "The Role of the Pharmacist in the Community". Discussion, new words, expressions.
*	A modern pharmacy. General rules, requirements. The laboratory.
*	Reading comprehension, vocabulary practice. Briefing pharmaceutical news.
*	Translation of drug descriptions. Basic vocabulary. The specific jargon of the text. Summary.

*	Health education in Hungary. General vocabulary. Analysis and discussion.
*	Translation: Bactroban. Vocabulary study. Cloze-test. Revision.
*	Mid-term test.
*	Iron deficiency. Word building exercise. Briefing.
*	AIDS. Reading comprehension, discussion. Terminology exercise.
*	Translation: Lipanthyl. Vocabulary study. Cloze-test.
*	Analyzing patient information leaflets: Aurobin. Discussion.
*	Life expectancy in different countries. Discussion. Role play.
*	Translation: Librium. Vocabulary study. Terminology exercise.
*	Revision. Test.

2nd semester

PRACTICE (2 hrs/week)	
*	Pharmacotherapy. Reading comprehension. Vocabulary study.
*	Geravit Pharmaton. Reading comprehension. Vocabulary practice.
*	Tranquillizers: Seduxen. Vocabulary study. Standard expressions. Translation.
*	Use and misuse of drugs. Addiction. Standard expressions and phrases.
*	Immunopathology. Reading comprehension. Vocabulary study. Cloze-test.
*	Interferon. Translation. Vocabulary study. Short news from "Magyar gyógyszerészet".
*	Revision. Mid-term test.
*	Taleum nasal spray. Vocabulary study. Role play.
*	Erythromicin. Standard expressions. Word building exercises.
*	Translation: Tarivid. Use of vocabulary. Cloze-test.
*	Committee on the Safety of Medicines. Drug tests on animals. Discussion.
*	Outstanding personalities of the Faculty of Pharmacy, their scientific achievements.
*	General revision. Preparation for the final exam.
*	Final test, exam.

CLINICAL LABORATORY DIAGNOSTICS

8th semester

LECTURE	
*	Obtaining biological samples, general pretest preparation
*	Diagnostics of anorganic ions
*	Diagnostics of carbohydrate metabolism
*	Diagnostics of lipid metabolism
*	Proteins
*	Rest nitrogen, creatinine, ammonia, urea and bilirubin determinations
*	Enzymes, enzyme diagnostics
*	Immunoanalytical methods
*	Diagnostics of hereditary metabolic diseases
*	Endocrinological tests
*	DNA based diagnostical tests (PCR, real-time PCR, DNA array)

* Quality control

PRACTICE
* Urine analysis
* Hematology (sampling, test tubes, complete blood count, clotting probes)
* Tumormarkers
* Pregnancy tests
* POCT for blood glucose and hemoglobin A1c
* POCT for cholesterol and triglycerades

PHARMACY ADMINISTRATION

8th semester

PRACTICE **(1 hr/week)**
The aim of the course is to teach pharmacy students about the essential administrative and management steps during everyday work in a community pharmacy. The course gives insight to national and international practices. Topics covered during the course:
* type pharmacies
* ownership pharmacies
* activities of community pharmacies
* storing medications
* counterfeit medication
* Price of medicines
* Health insurance systems, medication reimbursement
* Prescription (forms, requirements, essential elements)
* Prescribing errors, medication errors

SYLLABUSES FOR 5TH YEAR PHARMACY STUDENTS

PHARMACODYNAMICS III.

9th semester

LECTURE and PRACTICE
* Antineoplastic drugs: alkylating agents, antimetabolites
* Immunsuppressants and immunstimulants
* Basic principles of the chemotherapy: resistance, selective toxicity
* Penicillins, cephalosporines
* Pharmacology of the sulfonamides
* Aminoglycosides
* Tetracyclines, macrolides

* Fluoroquinolones and chloramphenicol
* Drugs used in the treatment of tuberculosis
* Antiviral drugs
* Drugs used in the treatment of malaria
* Antifungal agents
* Antiseptic agents
* Antiparasitic agents
* Pharmacology of the vitamins
* Pain managament
* Drug treatment in perinatology and gerontology
* Headache disorders: migrain and cluster
* Principles of toxicology and treatment of poisoning

FUNDAMENTALS OF CLINICAL THERAPY

* Internal medicine
* The patient's examination
* The more important diseases of the circulatory system and their therapy
* Diseases of the respiratory system therapy
* Diseases of the kidneys therapy
* Diseases of the digestive system therapy
* The most important diseases of the ductless glands and their therapy
* Diseases of the blood therapeutic possibilities
* Surgery
* Resuscitation restitution of the circulation and of the breathing
* Mass accidents emergency service
* Skull-injuries commotio, contusio, compressio: fracture of bones sprain
* Dull-damages of the chest
* The types of bleeding and their therapy
* Burning damages
* Appendicitis, ileus, acute abdomen
* Pediatrics
* The periods of childhood
* The main stations of the baby's and child's normal development
* The conditions of the reasonable treatment
* The various types of treatment, the sorts of taking in the drugs which are the rules in childhood?
* Special standpoints of drug use in Pediatrics
* Methods of antifebrile therapy in Pediatrics
* Antispasmodic drugs in Pediatrics
* The treatment of circulatory insufficiency and shock
* What to do in case of status asthmaticus?
* The most common complaints of the respiratory system in childhood treatment.
* Obstetrics and Gynaecology
* Pharmacological influence of the uterus' activity

*	/oxytocin, prostaglandins, beta-mimetics etc./
*	The starting of a delivery
*	Disseminated intravascular coagulation /DIC/ placenta praevia, missed abortion, rupture of the uterus
*	"Extrauterin" pregnancy
*	Acute inflammatory diseases in obstetrics /"post partum" endomymetritis, septic abortion etc./
*	Torsion of ovarian cyst's peduncle
*	Neurology, psychiatry
*	The role of psychiatry in the education of medical and pharmacy students.
*	The symptoms of increased intracranial pressure and its treatment
*	The course of parkinsonism and its treatment
*	Schizophrenia
*	Psychosis maniaco-depressiva
*	Neurological, psychiatric and social consequences of alcoholism
*	Polytoxicomania
*	Suicide
*	Enumeration of psychic abnormalities and the principles of the treatment

CLINICAL PHARMACY I.

*	Introduction to Clinical Pharmacy
*	Activity round and function areas of clinical pharmacy. General and special works of clinical pharmacy. Connection of clinical pharmacist with pharmacotherapy and drug order. Drug safety.
*	The role and works of pharmacist in the in-patient provision
*	Place of pharmacist in medical attendance. The role of pharmacist in drug provision. Connection with patients, physicians, nurses, members of other disciplines.
*	Clinical importance of drug formulation
*	Applied drug technology as a paret of clinical pharmacy. Formulation of oral preparations. Liquid oral drug formulations. Formulation of parenteral drugs, formulation of intramuscular, intravenous injections. Parenteral therapeutic systems. Rectal drug formulations, local drug formulations.
*	Non-compliance
*	Idea, definition, extent and importance of non-compliance. Methods for assessment of non-compliance. Major reasons for non-compliance. Strategies for improving compliance.
*	Therapeutic drug monitoring
*	Possibilities in public pharmacy practice. Hospital practice (Drug history taking. Monitoring of drug effectiveness. Drug blood-level monitoring. Measurement methods).
*	Drug side-effects
*	Drug side-effects. Classification, reasons of drug side-effects. Drug side-effect monitoring systems.
*	Drug interactions
*	Influental factors of development of drug interactions. Mechanism of drug interactions, its evaluating methods. Clinical important interactions.
*	Drug information
*	Topics connected with drug information. The role of pharmacist. The sources of information, its storage and retrieval.

VETERINARY PHARMACY (COMPULSORY ELECTIVE SUBJECT)

9th semester

*	Introduction to veterinary pharmacy.
*	Legal requirements for the sale and supply of veterinary medical products.
*	Business and financial aspect of veterinary products.
*	Comparative anatomy and physiology.
*	FoNo Vet III. Veterinary vaccines
*	Animals and human health.
*	Food-borne zoonoses.
*	Complementary and alternative therapies.
*	Health and nutrition of horses and pigs.
*	Diseases of cattle, sheep and goats
*	Diseases of cats and dogs
*	Pigeon healthcare.
*	The diseases and healthcare of bees and fish.
*	The diseases and healthcare of other small pets (Reptiles, aviary and cage birds, small mammals).
*	Veterinary vaccines
*	The management of animal soft tissue injuries
*	Laboratory animals, knock-out animals, transgenic animals
*	Genetically modified foods and organisms

PHYTOTHERAPY - AN INTRODUCTION TO HERBAL MEDICINE (COMPULSORY ELECTIVE SUBJECT)

9th semester

LECTURE (2 hrs/week)	
*	History and modern phytotherapy traditional medicinal systems that use plants (TCM, ayurveda, North-America, Africa, European traditions etc.); the principles of evidence-based phytotherapy
*	Herbal product regulation International outlook
*	Phytochemical overview of herbal active substances Alkaloids, glycosides, flavonoids, saponins, tannins, bitters, mucilages etc.
*	The issue of safety and efficacy Standardization, quantification, preclinical and clinical trials, the value of tradizional use
*	Plants and the nervous system Anxiety, insomnia Depression
*	Plants and the digestive system Stomatitis, gingivitis Dyspepsia Flatulence Gastritis, eptic ulcer Kinetosis Obstipation Diarrhea

*	Plants an the cardiovascular system Congestive heart failure Atherosclerosis, hypertension Chronic venous insufficiency, haemorrhoids Arterial occlusive disease
*	Plants and the renal system Infections of the urinary tract Diuretics, urinary stones
*	Plants and the respiratory system Cold and flu, rhinitis Expectorants Mucilaginous drugs, antitussives Immunomodulatory drugs
*	Plants and the reproductive system Premenstrual syndrome Menopausal symptoms Benign prostatic hyperplasia
*	Plants and metabolic diseases Lipid metabolism Glucose metabolism Obesíty
*	Plants and the cutaneous system Antiseptic herbal drugs Anti-inflammatory drugs Wound healing and post-traumatic drugs
*	Plants in the treatment of pain Headache Migraine Articular and muscular pain
*	Adaptogenic plants

PHARMACEUTICAL PSYCHOLOGY (COMPULSORY ELECTIVE SUBJECT)

9th semester

LECTURE (2 hrs/week)	
1.	Introduction
2.	Compliance, adherence, basis of communication
3.	Communication barriers I.
4.	Communication barriers II.
5.	Impression formation
6.	Giving information, patient education
7.	Non-verbal communication I.
8.	Non-verbal communication II.
9.	Enhancing the pharmacist-patient relationship
10.	Test
11.	Consultation

PHARMACEUTICAL CARE

9th semester

LECTURE (3 hrs/week)
* Methods of patient counselling
* Sunburn
* Allergic rhinitis, atopic dermatitis
* Asthma, COPD
* Diabetes mellitus
* Thromboembolism
* Musculoskeletal disorders
* Common cold, Flu
* Antibacterial therapy
* Hypertension
* Headache
* Insect bite
* Constipation & diarrhoea

EVERYDAY DERMATOLOGY (COMPULSORY ELECTIVE SUBJECT)

9th semester

LECTURE (2 hrs/week)
* Cutaeous structure; layers & typical cells
* Basic physiological functions of the skin
* Acne
* Seborrhoic dermatitis (face and scalp)
* Diseases of the Hair (alopecia areata, telogen effluvium, male pattern alopecia)
* Psoriasis
* Dermatophyte infection of the skin
* Candidiasis
* Impetigo contagiosa
* Folliculitis
* Erysipelas
* Herpes labialis, herpes genitalis
* Herpes zoster
* Kaposi's sarcoma
* Gonorrhoea
* Syphylis
* Scabies
* Urticaria
* Allergic contact dermatitis
* Topical corticosteroids: recommandations for use

* Common warts
* Condyloma acuminatum
* AIDS
* Pityriasis versicolor
* Dermatological vehicles

QUALITY ASSURANCE (COMPULSORY ELECTIVE SUBJECT)

9th semester

* Introduction: pharmaceutical quality assurance
  - § Definitions of „quality"
  - § Quality control and conformity assessment
  - § From quality control to quality assurance. PDCA
  - § Levels of the quality assurance/manegement
* Certain defect analysis and quality monitoring methods
* Quality assurance in the standardised and regulated fields: different sides of the national quality assurance systems
* The ISO quality assurance standard series
* Good Manufacturing Practices
* Good Laboratory Practices
* Good Clinical Practices
* Good Pharmacy Practices and quality assurance in pharmacies

EVIDENCE-BASED PREVENTION AND HEALTH PROMOTION (COMPULSORY ELECTIVE SUBJECT)

9th semester

LECTURE (2 hrs/week)

* Aim and scope of evidence-based medicine/public health/health promotion. Methodology – types of epidemiological studies.
* The process of evidence-based practice: questions, finding the evidence, critical appraisal and decision making.
* Health and health determinants – global approach. Prevention and health promotion. Aim, scope and methods of health promotion (Ottawa Charter).
* Lifestyle and health behaviour. Epidemiological studies and evidences in nutrition.
* Health promotion in nutrition at various settings (school, workplace, family and civil society).
* Role of physical activity in health maintenance and health promotion; "best practices" at various settings of health promotion. Health promotion and the youth.
* Prevention of smoking – tobacco control policies and smoking cessation guidelines.
* Role of primary prevention and health promotion in the prevention of infectious diseases.
* Prevention of accidents – evidence-based strategies.
* Screening of diseases of public health importance; encouraging participation in screenings.
* Pharmacist as health promoter. Health promotion in the pharmacy.

BIOTECHNOLOGY (COMPULSORY ELECTIVE SUBJECT)

9th semester

* Introduction to biotechnology
* Proteins, their properties and protein engineering
* Protein production at industrial level, newly developed expression systems
* Bioanalytical methods and techniques - quality control of proteins – quantitative analysis
* Bioanalytical methods and techniques – quality control of proteins – qualitative analysis
* Biosimilar proteins in the therapy
* New drug delivery systems
* Development of new biologics and biosimilars
* Plant biotechnology
* Gene therapy
* Stem cell therapy

Vow to be made by 1st year medical and dental students

I, …… name ……., / as the student of the University of Szeged / promise solemnly / that I will observe and adhere / to the rules and regulations / of the Hungarian Republic. /
Also I will observe and adhere / to the rules and regulations / of the University of Szeged / and I am aware of these. / I devote all my best efforts / to go through with my studies here / as efficiently as possible. /
I will give my teachers / the respect and gratitude / which is their due. / I will respect the secrets / which are confided in me / even after the patient has died. / I will maintain by all means in my power / the honor and the noble traditions / of the medical and dental profession./
I will devote my time and efforts / to learn the progressive achievements / of the basic and clinical sciences / in order to use this knowledge / for advancing medicine and dentistry, / for the care of my patients / and to promote man's progress on Earth. / I make these promises solemnly, / freely, / and upon my honor.

Oath to be taken by medical and dental graduates

I, …… name ……., / on this occasion / of my admission / to the ranks of the medical profession / swear on my honor / to devote my talents and knowledge / to the benefit of mankind.
I shall hold / University of Szeged in esteem.
I shall count those / who have instructed me / in the science of medicine / as my masters, / and shall show them / gratitude and respect at all times.
I shall impart my medical knowledge / and experience / to the generations of physicians to come. / I shall constantly labour / to increase my erudition / with a view to developing / and advancing medical science. / I shall practice my profession / conscientiously.
I vow to devote / my medical knowledge / to the protection of health / and to the benefit of the sick. / I shall treat / and advise patients / in the best of their interest / and to the best of my knowledge / and convictions / and I shall strive / to safeguard their health / against hazardous / and injurious effects.
I shall reveal no secret / concerning my fellow men / whether learned within my practice of medicine / or outside it / unless the law demands this.
I shall inform the patients / and also their relatives / if the patients' interest so requires / as to the patients' condition / and the method of treatment / in a timely and considerate manner. / I shall issue a medical certificate / only in accordance with my true convictions.
I shall conduct myself / towards the patients / my fellow physicians and the society as a whole, / in a matter befitting my calling as a physician. / I shall preserve the honor / of the medical profession / and its noble traditions.
I shall not be hampered / from fulfilling the duties of my profession / on the grounds of social, / political, / national, / racial / or religious distinction.
I take this oath solemnly / and of my own free will.

Vow to be made by 1st year pharmacy students

I .....name...../ as the student of the University of Szeged / promise solemnly / that I will respect the Constitution and laws/ of the Hungarian Republic. I will also observe and adhere / to the rules and regulations / of the University of Szeged. /
I promise to devote all my best efforts / to go through with my studies here / as efficiently as possible.
I will give my teachers / the respect and gratitude / which is their due. / I will respect the secrets of the patients / which are confided in me / during my course of studies. / I will maintain by all means in my power / the honor and the noble traditions / of my profession.
I will devote my time and efforts / to learn the progressive achievements / of the basic and clinical sciences / in order to use this knowledge / for advancing medicine, / for the care of my patients / and to promote man's progress on Earth. /
I make these promises solemnly, / freely, / and upon my honor.

Oath to be taken by pharmacy graduates

I..... name....., / hereby swear / that I shall always maintain / an attitude in accordance / with my vocation as a pharmacist. / In my professional practice, / I shall proceed with the greatest degree / of conscientiousness / and with the utmost diligence. /
I shall always behave / worthy of my profession. / As part of the healing work, / I shall devote all my energies / to the protection and recovery / of the health of the individual and society. /
I shall not reveal any data / concerning the health status / or the medication of my patients / unless the law obliges me to. / 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. / I shall use my knowledge/ only for the defence / and restoration of health / of my fellow humans. /
I shall do my best / to promote the science of pharmacy/ and keep the good name / of the University of Szeged. / I take this oath solemnly / and of my own free will.