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### BRIEF HISTORY OF THE UNIVERSITY OF SZEGED

Before the 12th century, intellectual and scholarly life was 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 Tudományegyetem (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.*
<table>
<thead>
<tr>
<th>Title</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>RECTOR</td>
<td>Prof. GÁBOR SZABÓ Ph.D., D.Sc.</td>
</tr>
<tr>
<td></td>
<td>Member of the Hungarian Academy of Sciences</td>
</tr>
<tr>
<td>VICE RECTOR FOR GENERAL AFFAIRS</td>
<td>Prof. BÉLA RÁCZ Ph.D., D.Sc.</td>
</tr>
<tr>
<td>VICE RECTOR FOR SCIENTIFIC AFFAIRS AND INNOVATION</td>
<td>Prof. ANDRÁS VARRÓ M.D., Ph.D., D.Sc.</td>
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<td>VICE RECTOR FOR EDUCATION</td>
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</tr>
<tr>
<td>VICE RECTOR FOR INTERNATIONAL AFFAIRS AND PUBLIC RELATIONS</td>
<td>Prof. JÓZSEF PÁL Ph.D., D.Sc.</td>
</tr>
<tr>
<td>GENERAL DIRECTOR FOR FINANCE AND MAINTENANCE</td>
<td>Dr. ZOLTÁN MAJÓ Ph.D.</td>
</tr>
<tr>
<td>GENERAL SECRETARY OF THE UNIVERSITY</td>
<td>Dr. MÁTÉ DÖMÖTÖR LL.D.</td>
</tr>
<tr>
<td>HEAD OF RECTOR’S CABINET</td>
<td>GEORGINA PETRI</td>
</tr>
</tbody>
</table>
Manchester School of Professional Studies

MANAGEMENT OF THE ALBERT SZENT-GYÖRGYI CLINICAL CENTER

Office of the President
Address: 6725 Szeged, Tisza Lajos krt. 107.
Tel.: + 36 62 545-007, Fax: + 36 62 545-005

PRESIDENT
Prof. ATTILA PÁL M.D., Ph.D.
Tel.: + 36 62 545-007

VICE PRESIDENT FOR GENERAL AFFAIRS
Prof. FERENC HAJNAL M.D., Ph.D.
Tel.: + 36 62 545-007

VICE PRESIDENT FOR EQUIPMENT AFFAIRS
Prof. GYÖRGY LÁZÁR M.D., Ph.D.
Tel.: + 36 62 545-007

VICE PRESIDENT FOR MEDICINAL AFFAIRS
Prof. SÁNDOR TURI M.D., Ph.D., D.Sc.
Tel.: + 36 62 545-007

HEAD OF THE OFFICE OF THE PRESIDENT
Dr. IVÁN KOVÁCS M.D., LL.D.
Tel.: + 36 62 546-450

CHIEF COUNSELLOR
MAGDOLNA BARÁTH-TÓTH
MANAGEMENT OF THE FACULTIES

**FACULTY OF AGRICULTURE**
Dr. JÓZSEF HORVÁTH Ph.D.
Dean

**FACULTY OF ARTS**
Dr. SÁNDOR CSERNUS Ph.D.
Dean

**FACULTY OF DENTISTRY**
Prof. KATALIN NAGY D.D.S., Ph.D.
Dean

**FACULTY OF ECONOMICS AND BUSINESS ADMINISTRATION**
Dr. MÁRTON VILMÁNYI
Dean

**FACULTY OF ENGINEERING**
Prof. ANTAL VÉHA Ph.D.
Dean

**FACULTY OF HEALTH SCIENCES AND SOCIAL STUDIES**
Dr. MÁRIA BARNAI Ph.D.
Dean

**FACULTY OF LAW**
Prof. IMRE SZABÓ LL.D., Ph.D.
Dean

**FACULTY OF MEDICINE**
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Member of the Hungarian Academy of Sciences
Dean

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Prof. FERENC KEREK D.L.A.
Dean

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Prof. habil. JUDIT HOHMANN D.Pharm., Ph.D., D.Sc.
Dean

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Dean

**JUHÁSZ GYULA TEACHER TRAINING FACULTY**
Prof. GÁBOR GALAMBOS Ph.D.
Dean
MANAGEMENT OF THE FACULTY OF MEDICINE

Dean’s Office
Address: 6720 Szeged, Tisza L. krt. 109.
Tel.: +36 62 545-016, Fax: +36 62 545-478

DEAN
Prof. LÁSZLÓ VÉCSEI M.D., Ph.D., D.Sc.
Member of the Hungarian Academy of Sciences

VICE DEAN FOR GENERAL AND SCIENTIFIC AFFAIRS
Prof. LAJOS KEMÉNY M.D., Ph.D., D.Sc.

VICE DEAN FOR CLINICAL AFFAIRS
Prof. ATTILA PÁL M.D., Ph.D.

VICE DEAN FOR EDUCATIONAL AFFAIRS
Prof. ISTVÁN LEPRÁN D.Pharm., Ph.D., D.Sc.

DEAN’S GENERAL ADVISOR
Dr. ANDRÁS LEDNITZKY, LL.D.

HEAD OF THE DEAN’S OFFICE
Dr. NÓRA FÖZŐ LL.D.
MANAGEMENT OF THE FACULTY OF DENTISTRY

Dean’s Office
Address: 6720 Szeged, Tisza Lajos körút 64.
Tel.: + 36 62 545-299, Fax: + 36 62 545-282

DEAN
Prof. KATALIN NAGY D.D.S., Ph.D.

VICE DEAN
Dr. KINGA TURZÓ Ph.D.

DEAN’S ADVISORY
Dr. ILDIKÓ PINKE

Dr. PÉTER VÁLYI

HEAD OF THE DEAN’S OFFICE
ESZTER RÉVÉSZ KOCSIS
MANAGEMENT OF THE FACULTY OF PHARMACY

Dean’s Office
Address: 6720 Szeged, Zrínyi u. 9.
Tel/Fax: + 36 62 545-022

DEAN
Prof. habil. JUDIT HOHMANN D.Pharm., Ph.D., D.Sc.

VICE DEAN FOR EDUCATIONAL AFFAIRS
Dr. habil. LÁSZLÓ LÁZÁR D.Pharm., Ph.D.

VICE DEAN FOR SCIENTIFIC AND FINANCIAL AFFAIRS
Dr. habil. ISTVÁN ZUPKÓ D.Pharm., Ph.D.

VICE DEAN FOR ADMISSIONS AND PUBLIC RELATIONS
Dr. RÓBERT GÁSPÁR D.Pharm., Ph.D.

HEAD OF THE DEAN'S OFFICE
Dr. ILONA LANTOS D.Pharm.
FOREIGN STUDENTS’ SECRETARIAT

Address: 6720 Szeged, Dóm tér 12.  
Tel: +36 62 545-458  
Fax: +36 62 545-028, +36 62 544-562  
Web: www.szegedmed.hu  
E-mail: office.fs@med.u-szeged.hu

**Program Director:**  
Prof. habil. GYULA SZABÓ M.D., Ph.D., D.Sc.  
*Reception Hours:* Monday, Thursday 12.00-13.00

**Special advisor on housing affairs:**  
Prof. habil. GÁBOR TÓTH Ph.D., D.Sc.

**Head of the Foreign Students’ Secretariat:**  
ANDREA LEHOCKI BAŁOG  
Tel.: +36 62 545-458  
E-mail: office.fs@med.u-szeged.hu

**Academic officers:**

ZSUZSANNA RAKONCZAI  
Tel.: +36 62 545-031  
E-mail: pharm.fs@med.u-szeged.hu  
*(English Pharmacy Program, English Medical Program: year 6)*

SZILVIA BAUNOK  
Tel.: +36 62 546-865  
E-mail: german1.fs@med.u-szeged.hu  
*(German Medical Program: application and admission, year 1, German Program Preparatory Courses, Student card: application)*

KATALIN FEHÉR  
Tel.: +36 62 342-124  
E-mail: apply.fs@med.u-szeged.hu  
*(English Programs: application and admission Student card: application)*

DEZSŐ JEREMIÁS  
Tel.: +36 62 545-029  
E-mail: med3.fs@med.u-szeged.hu  
*(English Medical Program: year 3)*

ZSUZSANNA KOVÁCS  
Tel.: +36 62 545-030  
E-mail: dent.fs@med.u-szeged.hu  
*(English Dentistry Program)*
LÁSZLÓ CSÉPE
Tel.: +36 62 545-029
E-mail: etr.fs@med.u-szeged.hu
(ETR -Unified Academic System- coordinator, English Medical Program: years 4-5, webmaster)

KATALIN SZIVERI
Tel.: + 36 62 546-867
E-mail: finance.fs@med.u-szeged.hu
(Tuition Fee, Health Insurance
English programm – Student card: sticker)

ERZSÉBET GUTÁNÉ NAGY
Tel.: + 36 62 546-865
E-mail: german2.fs@med.u-szeged.hu
(German Medical Program: application and admission, year 2, English Program Foundation Year
German programm – Student card: sticker)

JUDIT TÓTH
Tel.: + 36 62 545-836
E-mail: med2.fs@med.u-szeged.hu
(English Medical Program: year 2)

SZILVIA TÖRÖK-CSORDÁS
Tel.: + 36 62 545-031
E-mail: med1.fs@med.u-szeged.hu
(English Medical Program: year 1)

Reception hours:

Monday and Thursday: 9.30 - 12.00 and 14.30 - 15.30
Tuesday, Wednesday and Friday: 9.30 - 12.00
ORGANIZATIONAL UNITS OF THE FACULTIES

FACULTY OF MEDICINE

Pre-Clinical Departments

Department of Anatomy, Histology and Embryology (ANATÓMIAI, SZÖVET- ÉS FEJLŐDÉSTANI INTÉZET)
(Szeged, Kossuth Lajos sugárút 40. Tel.: + 36 62 545-665, Fax: + 36 62 545-707)
Head of Department: Prof. habil. ANDRÁS MIHÁLY, M.D., Ph.D., D.Sc.

Department of Behavioural Sciences
(MAGATARTÁSTUDOMÁNYI INTÉZET)
(Szeged, Szentháromság u. 5. Tel./Fax: + 36 62 420-530, + 36 62 545-968)
Head: Dr. habil. KATALIN BARABÁS, M.D., Ph.D.

Section of Gerontology
(GERONTOLÓGIAI OKTATÁSI RÉSZLEG)
Head: Dr. habil. SÁNDOR BENKŐ Ph.D.

Department of Biochemistry
(BIOKÉMIAI INTÉZET)
(Szeged, Dóm tér 9. Tel.: + 36 62 545-096, Fax: + 36 62 545-097)
Head of Department: Prof. habil. LÁSZLÓ DUX, M.D., Ph.D., D.Sc.

English-Hungarian Medical Translator Training Group (formerly Department of Foreign Languages)
(ANGOL-MAGYAR ORVOSI SZAKFORDÍTÓKÉPZŐ CSOPORT)
(Szeged, Szentháromság u. 5. Tel./Fax: + 36 62 425-521)
Head of Department: Dr. ÉVA DEMETER, Ph.D.

Department of Medical Biology
(ORVOSI BIOLÓGIAI INTÉZET)
(Szeged, Somogyi Béla u. 4. Tel.: + 36 62 545-109, Fax: + 36 62 545-131)
Head of Department: Prof. ZSOLT BOLDOKÓI, Ph.D., D.Sc.

Department of Medical Chemistry
(ORVOSI VEGYTANI INTÉZET)
(Szeged, Dóm tér 8. Tel.: + 36 62 545-136, Fax: + 36 62 545-971)
Head of Department: Prof. habil. GÁBOR TÓTH, D.Chem., Ph.D., D.Sc.

Supramolecular and Nanostructured Materials Research Group
(MAGYAR TUDOMÁNYOS AKADÉMIA SZUPRAMOLEKULÁRIS ÉS NANOSZERKEZETŰ ANYAGOK KUTATÓCSOPORT)
(Szeged, Dóm tér 8. Tel.: + 36 62 544-593)
 Hungarian Academy of Sciences - University of Szeged
Head: Prof. habil. BOTOND PENKE, D. Chem., Ph.D., D.Sc.

Department of Medical Physics and Informatics
(ORVOSI FIZIKAI ÉS ORVOSI INFORMATIKAI INTÉZET)
(Szeged, Korányi fasor 9. Tel/Fax.: + 36 62 545-077)
Head of Department: Prof. habil. FERENC BARI, Ph.D., D.Sc.

Department of Medical Microbiology and Immunobiology
(ORVOSI MIKROBIOLOGIÁI ÉS IMMUNBIOLOGIÁI INTÉZET)
(Szeged, Dóm tér 10. Tel.: + 36 62 545-115, Fax: + 36 62 545-113)
Head of Department: Dr. KATALIN BURIÁN, MD., Ph.D.

Department of Pathophysiology
(KÖRÉLETTANI INTÉZET)
(Szeged, Semmelweis u. 1. Tel.: + 36 62 545-994, Fax: + 36 62 545-710)
Head of Department: Prof. habil. GYULA SZABÓ, M.D., Ph.D., D.Sc.

Department of Pharmacology and Pharmacotherapy
(FARMAKOLÓGIAI ÉS FARMAKOTERÁPIAI INTÉZET)
(Szeged, Dóm tér 12. Tel.: + 36 62 545-682, Fax: + 36 62 545-680)
Head of Department: Prof. habil. ANDRÁS VARRÓ, M.D., Ph.D., D.Sc.
Cardiovascular Pharmacology Research Group
(MTA-SZTE KERINGÉSFARMAKOLÓGIAI KUTATÓCSOPORT)
(Szeged, Dóm tér 12. Tel.: + 36 62 545-681, Fax: + 36 62 544-565)
Hungarian Academy of Sciences - University of Szeged
Head: Prof. habil ANDRÁS VARRÓ, M.D., Ph.D., D.Sc.

Department of Physiology (ÉLETTANI INTÉZET)
(Szeged, Dóm tér 10. Tel.: + 36 62 545-101, Fax: + 36 62 545-842)
Head of Department: Dr. habil. GYULA SÁRY, M.D., Ph.D. D.Sc.

Department of Public Health (NÉPEGÉSZSÉGTANI INTÉZET)
(Szeged, Dóm tér 10. Tel.: + 36 62 545-119, Fax: + 36 62 545-120)
Head of Department: Dr. habil. EDIT PAULIK, M.D. Ph.D.

Institute of Surgical Research (SEBÉSZETI MŰTÉTTANI INTÉZET)
(Szeged, Szökefalvi-Nagy B u. 6. Tel.: + 36 62 545-103, Fax: 545-743)
Head of Department: Prof. habil. MIHÁLY BOROS, M.D., Ph.D., D.Sc.

Department of Cell Biology and Molecular Medicine (SEJTBIOLÓGIA ÉS MOLEKULÁRIS MEDICINA TANSZÉK)
(Szeged, Somogyi Béla u. 4. Tel./Fax: + 36 62 544-569)
Head: Prof. habil. KÁROLY GULYA, Ph.D., D.Sc.

Clinics, Clinical and Diagnostic Departments

Department of Anesthesiology and Intensive Therapy
(ANESZTEZIOLÓGIAI ÉS INTENZÍV TERÁPIÁS INTÉZET)
(Szeged, Szökefalvi-Nagy B u. 4. Tel.: + 36 62 545-168, Fax: + 36 62 545-593)
Head of Department: Prof. habil. ZSOLT MOLNÁR, M.D., Ph.D., DEAA

IV. Intensive Therapy Section
(ANESZTEZIOLÓGIAI ÉS INTENZÍV TERÁPIÁS INTÉZET)
(Szeged, Kossuth Lajos sgt. 42)
Head of Section: Prof. GYÖRGY MAROSI, M.D.

Department of Aviation and Space Medicine (REPÜLŐ- ÉS ÜRVORSI TANSZÉK)
(Kecskemét, Balaton u. 17. Tel.: + 36 76-581-600/3170, Fax: +36 76 581-622
Head of Department: Prof. ANDOR GRÓSZ, M.D., Ph.D.

Department of Laboratory Medicine
(LABORATÓRIUMI MEDICINA INTÉZET)
(Szeged, Semmelweis u. 6. Tel.: + 36 62 545-751, Fax: +36 62 544-559)
Head of Department: Dr. habil. IMRE FÖLDESí, Pharm.D., Ph.D.

Department of Clinical Microbiology
(KLINIKAI MIKROBIOLÓGIAI DIAGNOSZTIKAI INTÉZET)
Szeged, Semmelweis u. 6. Tel.: +36 62 545-398, Tel./Fax: +36 62 545-712
Head of Institute: Dr. habil. EDIT URBÁN, Pharm.D, Ph.D.

Department of Dermatology and Allergology (BÖRGYÓGYÁSZATI ÉS ALLERGOLÓGIAI KLINIKA)
(Szeged, Korányi fasor 6. Tel.: + 36 62 545-277, Fax: +36 62 545-954)
Head of Department: Prof. habil. LAJOS KEMÉNY, M.D., Ph.D., D.Sc.
Dermatology Research Group (MTA-SZTE DERMATOLOGIAI KUTATÓCSOPORT)
(Szeged, Korányi fasor 6. Tel.: + 36 62 545-277)
Hungarian Academy of Sciences - University of Szeged
Head: Prof. habil. LAJOS KEMÉNY, M.D., Ph.D., D.Sc.

Department of Family Medicine (CSALÁDORVOSI INTÉZET ÉS RENDELŐ)
(Szeged, Tisza Lajos krt 109. Tel./Fax: + 36 62 545-553)
Head of Department: Prof. habil. FERENC HAJNAL, M.D., Ph.D.

Department of Forensic Medicine (IGAZSÁGÜGYI ORVOSTANI INTÉZET)
(Szeged, Kossuth Lajos sugárút 40. Tel./Fax: + 36 62 545-708)
Appt. Head of Department: Dr. ÉVA KERESZTY, M.D., Ph.D.

Departments of Internal Medicine

First Department of Internal Medicine (I. SZ. BELGYÓGYÁSZATI KLINIKA)
(Szeged, Korányi fasor 8-10, Secretary: Tel.: + 36 62 545-189, Fax: + 36 62 545-185)
Head of Department: Prof. habil. TIBOR WITTMANN, M.D., Ph.D., D.Sc.

II. Division of Internal Medicine (BELGYÓGYÁSZATI OSZTÁLY II.)
(Szeged, Kálvária sgt. 57. Tel.: +36 62 561-361)
Head of Division: Dr. JÓZSEF KISS, M.D.

I. Division of Geriatry and Chronical Diseases (GERIÁTRIAI ÉS KRÓNIKUS BELGYÓGYÁSZATI OSZTÁLY I.)
(Szeged, Kossuth L. sgt. 42. Tel.: +36 62 553-853)
Head of Division: Dr. MAGDOLNA ZÖLLEI, M.D.

Division of Infectology (INFEKTOLÓGIAI OSZTÁLY)
(Szeged, Kálvária sgt. 57. Tel.: +36 62 561-361)
Head of Division: Dr. EDIT HAJDÚ, M.D., Ph. D.

Dyalis Center
(FMC MAGYARORSZÁGI EGÉSZSÉGÜGYI KFT.
DIALÍZIS CENTRUM)
(6724 Szeged, Korányi fasor 8-10., Tel.: 545-585)
Head of Center: Dr. ZOLTÁN ONDRIK, M.D.

Division of Endocrinology and Research Laboratory
(ENDOKRINOLÓGIAI ÖNÁLLÓ OSZTÁLY ÉS KUTATÓ LABORATÓRIUM)
(Szeged, Korányi fasor 8. Tel./Fax: + 36 62 545-211)
Head of Division: Prof. habil. JÁNOS JULESZ, M.D., Ph.D.

Second Department of Internal Medicine and Cardiological Center
(II. SZ. BELGYÓGYÁSZATI KLINIKA ÉS KARDIOLÓGIAI KÖZPONT)
(Szeged, Korányi fasor 6. Tel.: + 36 62 545-220, Fax: + 36 62 544-568)
Head of Department: Prof. habil. TAMÁS FORSTER, M.D., Ph.D., D.Sc.

Section of Invasive Cardiology (INVAZÍV KARDIOLÓGIAI RÉSZLEG)
(Szeged, Szőkefalvi-Nagy B u. Fel: +36 62 544-915, 544-962, 545-473, Fax: +36 62 544-915)
Head of Section: Dr. IMRE UNGI, M.D.

Division of Cardiac Surgery (SZÍVSEBÉSZETI OSZTÁLY)
(Szeged, Szőkefalvi-Nagy B u. Fel: +36 62 545-183, Fax: +36 62 544-563)
Head of Division: Dr. GÁBOR BOGÁTS, M.D.
Department of Oral and Maxillofacial Surgery (ARC-, ÁLLCSONT- ÉS SZÁJSEBÉSZETI KLINIKA)
(6725 Szeged, Kálvária sg. 57. Tel.: +36 62 561-393, Fax.: +36 62 561-340)
Head of Department: Prof. habil. JÓZSEF PIFFKÓ D.M.D., M.D., Ph.D.

Department of Medical Genetics (ORVOSI GENETIKAI INTÉZET)
(Szeged, Somogyi Béla u. 4. Tel.: +36 62 545-134, Fax: +36 62 545-699)
Head of Department: Dr. habil. MÁRTA SZÉLL, M.D., Ph.D.

Department of Neurology (NEUROLÓGIAI KLINIKA)
(Szeged, Semmelweis u. 6. Tel.: +36 62 545-351, Fax: +36 62 545-597)
Head of Department: Prof. habil. LÁSZLÓ VÉCSEI, M.D., Ph.D., D.Sc.

Department of Neurosurgery (IDEGSEBÉSZETI KLINIKA)
(Szeged, Semmelweis u. 6. Tel.: +36 62 545-379, Fax: +36 62 545-972)
Head of Department: Prof. habil. PÁL BARZÓ, M.D., Ph.D., D.Sc.

Department of Nuclear Medicine (NUKLEÁRIS MEDICINA INTÉZET)
(Szeged, Korányi fasor 8. Tel.: +36 62 545-390, Fax: +36 62 544-564)
Head of Department: Prof. habil. LÁSZLÓ PÁVICS, M.D., Ph.D., D.Sc.

Department of Obstetrics and Gynaecology (SZÜLÉSZETI ÉS NÖGYÓGYÁSZATI KLINIKA)
(Szeged, Semmelweis u. 1. Tel.: +36 62 545-499, Fax: +36 62 545-711)
Head: Prof. habil. ATTILA PÁL, M.D., Ph.D.

Department of Oncotherapy (ONKOTERÁPIÁS KLINIKA)
(Section A: Szeged, Korányi fasor 12., Section B: Szeged, Semmelweis u. 1
Tel.: +36 62 545-404, Fax: +36 62 545-922)
Head of Department: Prof. habil. ZSUZSANNA KAHÁN, M.D., Ph.D.

Department of Ophthalmology (SZEMÉSZETI KLINIKA)
(Szeged, Korányi fasor 10-11. Tel.: +36 62 545-487, Fax: +36 62 544-573)
Head: Dr. habil. ANDREA FACSKÓ, M.D., Ph.D.

Department of Orthopedics (ORTOPÉDIAI KLINIKA)
(Szeged, Semmelweis u. 6. Tel.: +36 62 545-423, Fax: +36 62 545-418)
Head of Department: Prof. habil. KÁLMÁN TÓTH, M.D., Ph.D.

Central Physiotherapeutic Unit and Educational Group
(KÖZPONTI FIZIOTERÁPIÁS RÉSZLEG ÉS OKTATÁSI CSOPORT)
Head: Dr. TAMÁS BENDER, M.D., Ph.D.

Department of Oto-Rhino-Laryngology and Head-Neck Surgery
(FÜL, ORR, GÉGÉSZETI ÉS FEJ-NYAKSEBÉSZETI KLINIKA)
(Szeged, Tiszalajos körút 111. Tel.: +36 62 545-310, Fax: +36 62 545-848)
Head: Dr. habil. LÁSZLÓ RÓVÓ, M.D., Ph.D.

Department of Pathology (PATHOLOGIAI INTÉZET)
(Szeged, Állomás u. 2. Tel.: +36 62 545-148, 545-878, Fax: +36 62 545-868)
Head of Department: Prof. habil. BÉLA IVÁNYI, M.D., D.Sc.

Department of Pediatrics and Child Health Center
(GYERMEKGYÓGYÁSZATI KLINIKA ÉS GYERMEKEGÉSZSÉGÜGYI KÖZPONT)
(Szeged, Korányi fasor 14-15. Tel.: +36 62 545-330 Fax: +36 62 545-329)
Head: Dr. CSABA BERECZKI, M.D., Ph.D.
Department of Pediatrics Child Health Center Outpatient Department Section D
(GYERMEKGÖGYÁSZATI KLINIKA ÉS GYERMEKÉGÉSZSÉGÜGYI KÖZPONT "D" RÉSZLEG
GYERMEK- ÉS IFJÚSÁGPSCHICHIÁTRIAI OSZÁLY)
(Szeged, Boldogasszony sugárút 15. Tel.: + 36 62 545-052, Fax: + 36 62 545-049)
Head: Dr. ÁGNES VETRÓ

Department of Psychiatry (Pszichiátriai Klinika)
(Szeged, Kálvária sgt. 57.)
Head of Department: Prof. habil. ZOLTÁN JANKA, M.D., Ph.D., D.Sc.

Psychiatry Unit I.
(I. sz. PSZICHIÁTRIAI OSZTÁLY)
(Szeged, Kálvária sgt. 57., Tel.: + 36 62 490-590)
Head of Unit: Dr. ISTVÁN BONCZ, M.D., Ph.D.

Psychiatry Unit II.
(II.sz. PSZICHIÁTRIAI OSZTÁLY)
(Szeged, Kálvária sgt. 57., Tel.: + 36 62 490-590/307, Fax: + 36 62 490-760/376)
Head of Unit: Dr. ILDIKÓ DEMETER, M.D.

Psychiatry Unit III.
(III.sz. PSZICHIÁTRIAI OSZTÁLY)
(Szeged, Pulz u.1., Tel.: + 36 62 545-376)
Head of Unit: Dr. RÓBERT TARI, M.D.

Psychiatric Rehabilitation Unit
(PSZICHIÁTRIAI REHABILITÁCIÓS OSZTÁLY)
(Szeged, Leányszállás köz 2/a., Tel.: + 36 62 490-590/490, Fax: + 36 62 490-590-489)
Head of Unit: Dr. ZOLTÁN KOVÁCS, M.D.

Psychiatric Outpatient Unit
(PSZICHIÁTRIAI SZAKRENDELÉS I.)
(Szeged, Vasas Szent Péter u. 1-3., Tel.: + 36 62 574-418)
Head of Unit: Dr. ISTVÁN SZENDI, M.D., Ph.D.

Clinical Psychology Group
(KLINIKAI PSZICHOLÓGIAI CSOPORT)
(Szeged, Leányszállás köz 2/a., Tel.: + 36 62 490-590/490, Fax.: + 36 62 490-590/489)
Head: Dr. TIBOR RUDISCH, Ph.D.

Alzheimer’s Disease Research Group
(ALZHEIMER-KÓR KUTATÓCSOPORT)
(Szeged, Leányszállás köz 2/a., Tel.: + 36 62 490-590/466)
Head: Prof. habil. JÁNOS KÁLMÁN, M.D., Ph.D., D.Sc.

Department of Pulmonology (TÜDÖGYÖGYÁSZATI TANSZÉK)
(Deszk, Alkotmány u. 36. Tel./Fax: + 36 62 571-552)
Head of Department: Prof. habil ATTILÁS 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 Surgery (SEBÉSZETI KLINIKA)
(Szeged, Szőkefalvi-Nagy u. 4. 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.

Transfusiology Section (TRANSZFÚZIOLÓGIAI TANSZÉK)
(Szeged, Szőkefalvi-Nagy u. 4/b 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. JÁNOS AURÉL SIMONKA, M.D., Ph.D.

**Department of Urology (UROLÓGIAI TANSZÉK)**
(Szeged, Kálvária sugárút 57. Tel./Fax: + 36 62 490-590/280)
Head of Department: Prof. habil. LÁSZLÓ PAJOR, M.D., Ph.D.

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

Department of Operative and Esthetic Dentistry
(KONZERVÁLÓ ÉS ESZTÉTIKAI FOGÁSZATI TANSZÉK)
(Szeged, Tisza Lajos krt. 64. Tel.: +36 62 545-299)
Acting Head: Prof. habil. KATALIN NAGY D.DS., Ph.D.

Department of Periodontology
(PARODONTOLÓGIAI TANSZÉK)
(Szeged, Tisza Lajos krt. 64. Tel.: +36 62 545-292)
Acting Head: Prof. habil. KATALIN NAGY D.DS., Ph.D.

Department of Prosthodontics
(FOGPÓTLÁSTANI TANSZÉK)
(Szeged, Tisza Lajos krt. 64. Tel.: +36 62 545-308)
Acting Head: Dr. ANETTE STÁJER D.DS, Ph.D.

Department of Oral Biology and Experimental Dental Research
(ORÁLBIOLÓGIAI ÉS KÍSÉRLETES FOGORVOSTUOMÁNYI TANSZÉK)
(Szeged, Tisza Lajos krt. 83. Tel.: +36 62 342-541)
Acting Head: Dr. JÁNOS MINÁROVITS MD, DSc professor

Department of Oral Surgery
(SZÁJSEBÉSZETI TANSZÉK)
(Szeged, Tisza Lajos krt. 64. Tel.: +36 62 545-447, +36 62545-299)
Head: Prof. habil. KATALIN NAGY D.DS., Ph.D.

Department of Orthodontics and Paediatric Dentistry
(FOGSZABÁLYOZÁSI ÉS GYERMEKFOGÁSZATI TANSZÉK)
(Szeged, Tisza Lajos krt. 64. Tel.: +36 62 545-294)
Head: Dr. EMIL SEGATTO D.DS., Ph.D.
FACULTY OF PHARMACY

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

Institute of Drug Regulatory Affairs
(GYÓGYSZERFELÜGYELETI INTÉZET)
(Szeged, Eőtvös u. 6. Tel./Fax: +36 62 546-115)
Head of Department: Dr. habil. ILDIKÓ CSÓKA D.Pharm., Ph.D.

Institute of Pharmaceutical Analysis
(GYÓGYSZERANALITIKAI INTÉZET)
(Szeged, Somogyi u. 4. Tel.: + 36 62 545-804, Fax: +36 62 545-806)
Head of Department: Prof. habil. GYÖRGY DOMBI, D.Chem., Ph.D.

Institute of Pharmaceutical Chemistry
(GYÓGYSZERKÉMIAI INTÉZET)
(Szeged, Eőtvös u. 6. Tel.: + 36 62 545-562, Fax: +36 62 545-705)
Head of Department: Prof. habil. FERENC FÜLÖP, D.Chem., Ph.D., D.Sc.

Department of Pharmaceutical Technology
(GYÓGYSZERTECHNOLÓGIAI INTÉZET)
(Szeged, Eőtvös u. 6. Tel./Fax: + 36 62 545-571)
Head of Department: Prof. habil. PIROSKA RÉVÉSZ, D.Pharm., Ph.D., D.Sc.

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

Department of Pharmacognosy
(FARMAKOGNÓZIAI INTÉZET)
(Szeged, Eőtvös 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

<table>
<thead>
<tr>
<th>Department</th>
<th>Educational advisor</th>
<th>Research consultant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dept. of Anatomy, Histology and Embryology</td>
<td>Dr. Czigner Andrea</td>
<td>Dr. Annamária Kovács</td>
</tr>
<tr>
<td>Medicine and Dentistry:</td>
<td>+36 62/545 056</td>
<td></td>
</tr>
<tr>
<td>Pharmacy:</td>
<td><a href="mailto:barzone.czigner.andrea@med.u-szeged.hu">barzone.czigner.andrea@med.u-szeged.hu</a></td>
<td></td>
</tr>
<tr>
<td>Dept. of Anatomy, Histology and Embryology</td>
<td>Dr. Süle Zoltán</td>
<td></td>
</tr>
<tr>
<td>Medicine and Dentistry:</td>
<td>+36 62/545 734</td>
<td></td>
</tr>
<tr>
<td>Pharmacy:</td>
<td><a href="mailto:sule.zoltan@med.u-szeged.hu">sule.zoltan@med.u-szeged.hu</a></td>
<td></td>
</tr>
<tr>
<td>Dept. of Anesthesiology and Intensive Therapy</td>
<td>Dr. Erika Gyura</td>
<td>Dr. László Praefort</td>
</tr>
<tr>
<td>- Medicine:</td>
<td>+36 62/545 173</td>
<td></td>
</tr>
<tr>
<td>Dentistry and Pharmacy:</td>
<td><a href="mailto:gyuraerika@hotmail.hotmail.hu">gyuraerika@hotmail.hotmail.hu</a></td>
<td></td>
</tr>
<tr>
<td>Dept. of Behaviour Sciences</td>
<td>Dr. Bettina Pikó</td>
<td>Dr. Katalin Barabás</td>
</tr>
<tr>
<td>Medicine:</td>
<td>+36 62/545 968</td>
<td></td>
</tr>
<tr>
<td>Dentistry and Pharmacy:</td>
<td><a href="mailto:fuzne.piko.bettina@med.u-szeged.hu">fuzne.piko.bettina@med.u-szeged.hu</a></td>
<td></td>
</tr>
<tr>
<td>Dept. of Biochemistry</td>
<td>Csaba Hamvai</td>
<td>Dr. Katalin Barabás</td>
</tr>
<tr>
<td></td>
<td>+36 62/545 968</td>
<td></td>
</tr>
<tr>
<td>Dentistry and Pharmacy:</td>
<td><a href="mailto:hamvacsaba@freemail.hu">hamvacsaba@freemail.hu</a></td>
<td></td>
</tr>
<tr>
<td>Dept. of Biochemistry</td>
<td>Dr. Anikó Görbe</td>
<td>Dr. Tamás Csont</td>
</tr>
<tr>
<td></td>
<td>+36 62/342-810</td>
<td></td>
</tr>
<tr>
<td>Department of Cell Biology and Molecular Medicine</td>
<td>Dr. Ádám Légrádi</td>
<td>Dr. Ádám Légrádi</td>
</tr>
<tr>
<td></td>
<td>+36 62/544-000/2296</td>
<td></td>
</tr>
<tr>
<td>Department of Clinical Microbiology</td>
<td>Dr. Gabriella Terhes</td>
<td>Dr. Gabriella Terhes</td>
</tr>
<tr>
<td></td>
<td>+36 62/545 888</td>
<td></td>
</tr>
<tr>
<td>Dentistry and Pharmacy:</td>
<td><a href="mailto:terhesga@gmail.com">terhesga@gmail.com</a></td>
<td></td>
</tr>
<tr>
<td>Dept. of Laboratory Medicine</td>
<td>Dr. Rita Ónody</td>
<td>Dr. Rita Ónody</td>
</tr>
<tr>
<td></td>
<td>+36 62/545 753</td>
<td></td>
</tr>
<tr>
<td>Dept. of Surgery</td>
<td>Dr. József Furák</td>
<td>Dr. Gyula Farkas</td>
</tr>
<tr>
<td></td>
<td>+36 62/545 472</td>
<td></td>
</tr>
<tr>
<td>Dept. of Dermatology and Allergology</td>
<td>Dr. Zsuzsanna Bata</td>
<td>Dr. Kornélia Szabó</td>
</tr>
<tr>
<td></td>
<td>+36 62/545 996</td>
<td></td>
</tr>
<tr>
<td>1st Department of Internal Medicine</td>
<td>Dr. András Rosztóczy</td>
<td>Dr. Tamás Takács</td>
</tr>
<tr>
<td></td>
<td>+36 62/545 195</td>
<td></td>
</tr>
<tr>
<td>Dept. of Forensic Medicine</td>
<td>Dr. Beáta Havasi</td>
<td>Dr. Beáta Havasi</td>
</tr>
<tr>
<td></td>
<td>+36 62/342-910</td>
<td></td>
</tr>
<tr>
<td>Institute of Foreign Languages</td>
<td>Vanda Varga</td>
<td>Izabella Villányi</td>
</tr>
<tr>
<td></td>
<td>+36 62/425-521</td>
<td></td>
</tr>
<tr>
<td>Institute of Surgical Research</td>
<td>Dr. Andrea Szabó</td>
<td>Dr. József Kaszaki</td>
</tr>
<tr>
<td></td>
<td>+36 62/545 106</td>
<td></td>
</tr>
<tr>
<td>Dept. of Medical Biology</td>
<td>Dr. Dóra Tombácz</td>
<td>Dr. István Belec</td>
</tr>
<tr>
<td></td>
<td>+36 62/542 384</td>
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<tr>
<td>Institute of Foreign Languages</td>
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<tr>
<td>Institute of Surgical Research</td>
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<tr>
<td>Department/Program</td>
<td>Name</td>
<td>Contact Information</td>
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</tr>
<tr>
<td>Dept. of Medical Chemistry</td>
<td>Dr. Györgyi Váradi</td>
<td>+36 62/545 136</td>
</tr>
<tr>
<td></td>
<td></td>
<td><a href="mailto:varadi.gyorgyi@med.u-szeged.hu">varadi.gyorgyi@med.u-szeged.hu</a></td>
</tr>
<tr>
<td>Dept. of Medical Genetics</td>
<td>Dr. Zsuzsanna László</td>
<td>+36 62/546 127</td>
</tr>
<tr>
<td></td>
<td></td>
<td><a href="mailto:laszlo.zsuzsanna@med.u-szeged.hu">laszlo.zsuzsanna@med.u-szeged.hu</a></td>
</tr>
<tr>
<td>Dept. of Medical Physics and Informatics</td>
<td>Dr. Ferenc Peták</td>
<td>+36 62/545 832</td>
</tr>
<tr>
<td></td>
<td></td>
<td><a href="mailto:petak.ferenc@med.u-szeged.hu">petak.ferenc@med.u-szeged.hu</a></td>
</tr>
<tr>
<td>Dept. of Medical Microbiology and Immunobiology Medicine:</td>
<td>Dr. Zoltán Tiszlavicz</td>
<td>+36 62/342 840</td>
</tr>
<tr>
<td></td>
<td></td>
<td><a href="mailto:tiszlavicz.zoltan@med.u-szeged.hu">tiszlavicz.zoltan@med.u-szeged.hu</a></td>
</tr>
<tr>
<td></td>
<td>Dr. Béla Prágai</td>
<td>+36 62/545 920</td>
</tr>
<tr>
<td></td>
<td></td>
<td><a href="mailto:pragai.bela@med.u-szeged.hu">pragai.bela@med.u-szeged.hu</a></td>
</tr>
<tr>
<td>Dept. of Neurology</td>
<td>Dr. János Tajti</td>
<td>+36 62/545 355</td>
</tr>
<tr>
<td></td>
<td></td>
<td><a href="mailto:tajti.janos@med.u-szeged.hu">tajti.janos@med.u-szeged.hu</a></td>
</tr>
<tr>
<td>Dept. of Neurosurgery</td>
<td>Dr. Zsolt Kopniczky</td>
<td>+36 62/545 383 or 71-154</td>
</tr>
<tr>
<td></td>
<td></td>
<td><a href="mailto:kopniczky@hotmail.com">kopniczky@hotmail.com</a></td>
</tr>
<tr>
<td>Dept. of Nuclear Medicine</td>
<td>Dr. Miklós Papós</td>
<td>+36 62/545 736</td>
</tr>
<tr>
<td></td>
<td></td>
<td><a href="mailto:papos.miklos@med.u-szeged.hu">papos.miklos@med.u-szeged.hu</a></td>
</tr>
<tr>
<td>Dept. of Obstetrics and Gynecology</td>
<td>Dr. Zoltán Borthaiser</td>
<td>+36 62/545 518</td>
</tr>
<tr>
<td></td>
<td></td>
<td><a href="mailto:borthaiser.zoltan@med.u-szeged.hu">borthaiser.zoltan@med.u-szeged.hu</a></td>
</tr>
<tr>
<td></td>
<td>Dr. György Bártfai</td>
<td>+36 62/545 518</td>
</tr>
<tr>
<td></td>
<td></td>
<td><a href="mailto:borthaiser.zoltan@med.u-szeged.hu">borthaiser.zoltan@med.u-szeged.hu</a></td>
</tr>
<tr>
<td></td>
<td>Dr. Anikó Maráz</td>
<td>+36 62/545 518</td>
</tr>
<tr>
<td></td>
<td></td>
<td><a href="mailto:borthaiser.zoltan@med.u-szeged.hu">borthaiser.zoltan@med.u-szeged.hu</a></td>
</tr>
<tr>
<td>Dept. of Oncotherapy</td>
<td>Dr. Gabriella Fábián</td>
<td>+36 62/545 403</td>
</tr>
<tr>
<td></td>
<td></td>
<td><a href="mailto:fabian.gabriella@med.u-szeged.hu">fabian.gabriella@med.u-szeged.hu</a></td>
</tr>
<tr>
<td>Dept. of Ophthalmology - Medicine:</td>
<td>Dr. Mártá Janáky</td>
<td>+36 62/545686</td>
</tr>
<tr>
<td></td>
<td></td>
<td><a href="mailto:janaky.marta@med.u-szeged.hu">janaky.marta@med.u-szeged.hu</a></td>
</tr>
<tr>
<td></td>
<td>Dr. Dégi Rózsa</td>
<td>+36 62/ 545 778, 544 933</td>
</tr>
<tr>
<td></td>
<td></td>
<td><a href="mailto:degirozsa@freemail.hu">degirozsa@freemail.hu</a></td>
</tr>
<tr>
<td>Dept. of Orthopedics</td>
<td>Dr. Péter Kellermann</td>
<td>+36 62/541 314</td>
</tr>
<tr>
<td></td>
<td></td>
<td><a href="mailto:kellermann.dr@gmail.com">kellermann.dr@gmail.com</a></td>
</tr>
<tr>
<td>Dept. of Oto-Rhino-Laryngology - Medicine:</td>
<td>Dr. Miklós Csanády</td>
<td>+36 62/545 317</td>
</tr>
<tr>
<td></td>
<td></td>
<td><a href="mailto:csanady.miklos@med.u-szeged.hu">csanady.miklos@med.u-szeged.hu</a></td>
</tr>
<tr>
<td></td>
<td>Dr. Smehák György</td>
<td>+36 62/545 317</td>
</tr>
<tr>
<td></td>
<td></td>
<td><a href="mailto:smehak.gyorgy@med.u-szeged.hu">smehak.gyorgy@med.u-szeged.hu</a></td>
</tr>
<tr>
<td>Dept. of Pathology - Medicine:</td>
<td>Dr. Levente Kuthi</td>
<td>+36 62/546 176</td>
</tr>
<tr>
<td></td>
<td></td>
<td><a href="mailto:kuthi.levente@med.u-szeged.hu">kuthi.levente@med.u-szeged.hu</a></td>
</tr>
<tr>
<td></td>
<td>Dr. Birinyiczki Kitti</td>
<td>+36 62/546 176</td>
</tr>
<tr>
<td></td>
<td></td>
<td><a href="mailto:kovari.bence.peter@med.u-szeged.hu">kovari.bence.peter@med.u-szeged.hu</a></td>
</tr>
<tr>
<td>Dept. of Pathophysiology - Medicine:</td>
<td>Dr. Zsófia Mezei</td>
<td>+36 62/545 111</td>
</tr>
<tr>
<td></td>
<td></td>
<td><a href="mailto:mezeizsofia@gmail.com">mezeizsofia@gmail.com</a></td>
</tr>
<tr>
<td></td>
<td>Dr. Miklós Jászberényi</td>
<td>+36 62/545 993</td>
</tr>
<tr>
<td></td>
<td></td>
<td><a href="mailto:julia.szakacs@gmail.com">julia.szakacs@gmail.com</a></td>
</tr>
</tbody>
</table>
Curriculum 2013/2014

Pharmacy: Dr. Zsolt Bagosi  
+36 62/545 789  
bagosi@hotmail.com

Dept. of Pediatrics: Dr. Csaba Bereczki  
+36 62/545 546  
bereczki.csaba@med.u-szeged.hu

Dentistry: Dr. Gyula Tálosi  
+36 62/545 338  
talosi.gyula.andras@med.u-szeged.hu

Dept. of Child and Adolescent Psychiatry: Dr. Dochnal Roberta Beatrix  
+36 62/549 635  
dochnal.roberta@med.u-szeged.hu

Dept. of Pharmacology and Pharmacotherapy: Dr. János Pataricza  
+36 62/545 674  
pataricza.janos@med.u-szeged.hu

Dept. of Physiology: Dr. Ferenc Domoki  
+36 62/545 100  
domoki.ferenc@med.u-szeged.hu

Medicine and Dentistry: Dr. Gyöngyi Horváth  
+36 62/544 971  
horvath.gyongyi@med.u-szeged.hu

Dept. of Psychiatry: Dr. János Kálmán  
+36 62/490 590  
kalman.janos@med.u-szeged.hu

Dr. Horváth Szatmár  
+36 62/545 944  
horvath.szatmar@med.u-szeged.hu

Dept. of Public Health (Public Health): Dr. Andrea Szabó  
+36 62/342 869  
szabo.andrea@med.u-szeged.hu

Medicine and Dentistry: Dr. Andráspapp  
+36 62/342 866  
szatmardokszuszanna@med.u-szeged.hu

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

Dept. of Pulmonology: Dr. Edit Csada  
+36 62/571 552  
csada@deszkikorhaz.hu

Dept. of Radiology: Dr. Endre Nagy  
+36 62/545 438  
nagyendre@gmail.com

2nd Department of Internal Medicine: Dr. Szabolcs Modok  
+36 62/545 226  
moszadokbolcs@gmail.com

Dept. of Traumatology: Dr. Endre Varga  
+36 62/545 537  
endrevargamd@yahoo.com

Dept. of Urology: Dr. István Papos  
+36 62/541 918  
papos.istvan@med.u-szeged.hu

Dr. Eszter Karg

Dr. István Baczkó

Dr. János Kálmán

Dr. János Kálmán

Dr. András Papp

Dr. Regina Molnár

Dr. Edit Csada

Dr. Erika Vörös

Dr. Zita Borbényi

Dr. Sándor Pintér

Dr. Olivér Pintér
## FACULTY OF DENTISTRY

<table>
<thead>
<tr>
<th>Department</th>
<th>Educational advisor</th>
<th>Research consultant</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dr. Anette Stájer</td>
<td>Prof. Zoltán Rakonczay</td>
</tr>
<tr>
<td></td>
<td>+36 62/545 298</td>
<td>+36 62/545 301</td>
</tr>
<tr>
<td></td>
<td><a href="mailto:anette@stoma.szote.u-szeged.hu">anette@stoma.szote.u-szeged.hu</a></td>
<td></td>
</tr>
</tbody>
</table>

## FACULTY OF PHARMACY

<table>
<thead>
<tr>
<th>Department</th>
<th>Educational advisor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institute of Drug Regulatory Affairs</td>
<td>Dr. Ildikó Csóka</td>
</tr>
<tr>
<td></td>
<td>+36 62/546 162</td>
</tr>
<tr>
<td></td>
<td><a href="mailto:csoka@pharm.u-szeged.hu">csoka@pharm.u-szeged.hu</a></td>
</tr>
<tr>
<td>Institute of Clinical Pharmacy</td>
<td>Dr. Péter Doró</td>
</tr>
<tr>
<td></td>
<td>+36 62/544 944</td>
</tr>
<tr>
<td></td>
<td><a href="mailto:dorop@clph.szote.u-szeged.hu">dorop@clph.szote.u-szeged.hu</a></td>
</tr>
<tr>
<td>Institute of Pharmaceutical Analysis</td>
<td>Dr. Gerda Szakonyi</td>
</tr>
<tr>
<td></td>
<td>+36 62/545 925, 545-804</td>
</tr>
<tr>
<td></td>
<td><a href="mailto:gerda.szakonyi@pharm.u-szeged.hu">gerda.szakonyi@pharm.u-szeged.hu</a></td>
</tr>
<tr>
<td>Institute of Pharmaceutical Chemistry</td>
<td>Dr. Márta Palkó</td>
</tr>
<tr>
<td></td>
<td><a href="mailto:palko@pharm.u-szeged.hu">palko@pharm.u-szeged.hu</a></td>
</tr>
<tr>
<td>Department of Pharmaceutical Technology</td>
<td>Dr. Erzsébet Csányi</td>
</tr>
<tr>
<td></td>
<td>+36 62/545 573</td>
</tr>
<tr>
<td></td>
<td><a href="mailto:csanyi@pharm.u-szeged.hu">csanyi@pharm.u-szeged.hu</a></td>
</tr>
<tr>
<td>Department of Pharmacodynamics and Biopharmacy</td>
<td>Dr. Eszter Ducza</td>
</tr>
<tr>
<td></td>
<td>+36 62/541-977</td>
</tr>
<tr>
<td></td>
<td><a href="mailto:ducza@pharm.u-szeged.hu">ducza@pharm.u-szeged.hu</a></td>
</tr>
<tr>
<td>Department of Pharmacognosy</td>
<td>Dr. Katalin Veres</td>
</tr>
<tr>
<td></td>
<td>+36 62/546 451</td>
</tr>
<tr>
<td></td>
<td><a href="mailto:veres@pharm.u-szeged.hu">veres@pharm.u-szeged.hu</a></td>
</tr>
</tbody>
</table>
# ACADEMIC CALENDAR

## Faculty of Medicine
## Faculty of Dentistry
## Faculty of Pharmacy
## 2013/2014

## ACADEMIC PERIODS

<table>
<thead>
<tr>
<th>Period</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1st (Fall) semester:</strong></td>
<td></td>
</tr>
<tr>
<td>Examination period:</td>
<td>from December 09, 2013 to February 01, 2014</td>
</tr>
<tr>
<td>Repeat examination period:</td>
<td>from February 03 to February 07, 2014</td>
</tr>
<tr>
<td>Holidays:</td>
<td>October 23, November 01, November 15, 2013</td>
</tr>
<tr>
<td></td>
<td>(School is closed. No exams!)</td>
</tr>
<tr>
<td><strong>ETR course registration period:</strong></td>
<td>from August 28, 5 p.m. to September 15, 2013 11.59 p.m.</td>
</tr>
<tr>
<td></td>
<td>from August 28, 8 p.m. to September 15, 2013 11.59 p.m.</td>
</tr>
<tr>
<td><strong>Exam registration period:</strong></td>
<td>from November 27, 2013 5 p.m.</td>
</tr>
<tr>
<td></td>
<td>from November 27, 2013 8 p.m.</td>
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</table>

<table>
<thead>
<tr>
<th>Period</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2nd (Spring) semester:</strong></td>
<td></td>
</tr>
<tr>
<td>Examination period:</td>
<td>from May 19 to June 28, 2014</td>
</tr>
<tr>
<td>Repeat Examination period:</td>
<td>from June 30 to July 05, 2014</td>
</tr>
<tr>
<td>Holidays:</td>
<td>April 21, May 01, 2014</td>
</tr>
</tbody>
</table>

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

1. Tuition fees

Fees are subject to change in case the students’ academic progress does not follow the suggested study plan. Minimum tuition fee can be determined by the Academic Board.

| Fee of attending three or more compulsory subjects/Hungarian Language/Latin Language | 100% of one semester’s tuition fee |
| Fee of attending two compulsory subjects/Hungarian Language/Latin Language | 60% of one semester’s tuition fee |
| Fee of attending one compulsory subject/Hungarian Language/Latin Language | 40% of one semester’s tuition fee |
| Exam course fee | 570 USD/course |
| Fee of Compulsory Elective Courses/Elective Courses/Physical Education (in case of attending one or two compulsory courses/Hungarian Language/Latin Language) | 5% of one semester’s tuition fee/course |

Payment can be made the following ways:
- by transfer
- by cash: you have to pick up a slip at the Foreign Students’ Secretariat in order to be able to pay in cash at the MKB Bank.
- by check: the checks have to be handed in at the Foreign Students' Secretariat.

Account:
University of Szeged
Hungarian Foreign Trade Bank (MKB), Szeged,
Kölcey u. 8
Swift code: MKKBHUHB
IBAN: HU14-1030-0002-6610-3177-2700-4013

2. Procedural fees

Repeat examination fee
- on the first occasion | HUF 1 000 |
- on the second occasion | HUF 1 500 |
Procedural fee for further requests (Deans’ permission) | HUF 3 000 |
Fee for improving a successful examination | HUF 500 |
State Board Examination fee | USD 300 |
Fee for repeating the State Board examination | USD 250 |
Fee for repeating the Thesis defense
- on the first occasion | HUF 7 500 |
- on the second occasion | HUF 15 000 |
- procedural fee for further requests | HUF 15 000 |

3. Administrative fees

- loss of the index book and providing a duplicate
  first occasion | HUF 5 000 |
  further occasions | HUF 10 000 |
- transcript | HUF 400/semester |
- certificate | HUF 300 |
- syllabus | HUF 400/year |
- ETR Late course registration (only possible in the week after the course registration deadline) | HUF 5 000/subject |
- missing other deadlines | HUF 10 000 in the first week, after that additional HUF 2000/week |

Fees are subject to change. For updates please check the relevant Info Sheet.
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.
- ETR registration form (to be signed at the Secretariat)
- Valid residence permit. Please check in the ETR (under MY DATA/PERSONAL DATA/IDENTIFIERS) 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.
- Valid health insurance (If it was renewed recently please present the original and a copy to the Secretariat. If you contract the Generali Providencia insurance you do not have to bring a copy).
- Index book (**with all signatures and grades**)  
- Summer practice evaluation sheet (if required)  
- **NEW!** Paid repeat examination ticket  
- **NEW!** Valid Medical Fitness Certificate (completed medical check-up by the University Doctor) You will be notified via e-mail in case any part of the medical check up has been found insufficient!

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.) **ETR course registration**: Students have to sign up for their courses in the ETR (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**
*Details: [http://szegedmed.hu/residence_permit_info](http://szegedmed.hu/residence_permit_info)*

5.) **Health Insurance**

All students must have a valid health insurance during their stay in Hungary.
*Details: [http://www.szegedmed.hu/insurance](http://www.szegedmed.hu/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 ETR**.
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:**
- One course can be taken 3 times during your studies (3 exams/semester).
- All exams including date, time and place is posted in the ETR. Make sure to arrive for your exam on time with your index book.
- Exam dates can be postponed before the ETR 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.

In order to receive your index book for the exam period you have to meet all the following requirements:
• Paid tuition fee, valid matriculation, valid health insurance, and valid visa/residence permit.
• Please note that Hungarian law (2007. II. Törvényszabályzat) requires Non-EU Students to be fully covered under a health insurance plan or be able to cover the expenses of their health care. EU citizens are supposed to register with BÁH upon their arrival and submit a photocopy of their health insurance (2007. I. Törvényszabályzat)

Please make sure to register for all your exams at the beginning of the exam registration period. Index book can be picked up from the Secretariat upon signing a consent form.
Students are required to return their index book to the Secretariat upon finishing their exams.

Procedures for unsuccessful exams:
• Repeated exam can be scheduled at the earliest by the 3rd day following the unsuccessful exam. Repeat exam cheques are available at the Secretariat. Fees have to be paid at the post office and slips have to be returned to the Secretariat in order to get repeat tickets. The repeat ticket has to be presented at the Department before starting the examination. The current fee schedule is:
• 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 ETR.
• 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). Request 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 Study and Examination Regulations will be evaluated on individual basis by the Academic Board (eg. 4th course registration)!

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 chose 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 CREDIT SYSTEM
AT THE FACULTY OF MEDICINE

I. STRUCTURE OF STUDIES

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 Training 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 (15 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)
  - Medical Ethics (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)

It is also recommended to complete 2 semesters of Physical Education in the Basic Module.
Preconditions for enrollment to the forthcoming semesters:

- The compulsory courses in the **second semester** have examination requirements. This means one can *take the examination of the second semester course* only if the examination of the first semester subject (defined in the examination requirement) has been completed successfully:

<table>
<thead>
<tr>
<th>Course</th>
<th>Examination requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anatomy II.</td>
<td>Anatomy I.</td>
</tr>
<tr>
<td>Medical Chemistry II.</td>
<td>Medical Chemistry I.</td>
</tr>
<tr>
<td>Medical Physics II.</td>
<td>Medical Physics I.</td>
</tr>
<tr>
<td>Medical Biology II.</td>
<td>Medical Biology I.</td>
</tr>
</tbody>
</table>

The first semester courses might be taken as examination courses in the second semester, if the Department concerned announces it in the given semester and if you get permission from the Academic Board. This means that the student will be exempted from fulfilling the study requirements (classes do not have to be attended). An examination course can be taken only once in a certain subject. If one fails to complete an examination course both the study and examination requirements have to be completed in the proper semester (the whole course has to be repeated by attending the lectures and practices).

- The compulsory courses in the **third semester** have subject requirements. This means one can *attend a third semester course* only if the examination of the second semester (defined in the subject requirement) has been completed successfully:

<table>
<thead>
<tr>
<th>Course</th>
<th>Subject requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anatomy III.</td>
<td>Anatomy II.</td>
</tr>
<tr>
<td>Biochemistry I.</td>
<td>Medical Chemistry II</td>
</tr>
<tr>
<td>Physiology I.</td>
<td>Medical Chemistry II</td>
</tr>
</tbody>
</table>

In this case the failed examination of the second semester can be repeated as an examination course in the semester when it is announced by the Department concerned.

- The compulsory courses in the **fourth semester** have examination requirements. This means one can *take the examination of the fourth semester course* only if the examination of the third semester (defined in the examination requirement) has been completed successfully:

<table>
<thead>
<tr>
<th>Course</th>
<th>Examination requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anatomy IV.</td>
<td>Anatomy III.</td>
</tr>
<tr>
<td>Biochemistry II.</td>
<td>Biochemistry I.</td>
</tr>
<tr>
<td>Physiology II.</td>
<td>Physiology I.</td>
</tr>
</tbody>
</table>

For further conditions see the requirements of the second semester.

---

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)
Preconditions for enrollment to the forthcoming semester:

- The compulsory courses in the **second semester** have **subject requirements**. This means one can **take the second semester course** only if the first semester course has been completed successfully:

<table>
<thead>
<tr>
<th>Course</th>
<th>Subject requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pathophysiology II.</td>
<td>Pathophysiology I.</td>
</tr>
<tr>
<td>Microbiology and Immunology II.</td>
<td>Microbiology and Immunology I.</td>
</tr>
<tr>
<td>Pathology II.</td>
<td>Pathology I.</td>
</tr>
<tr>
<td>Internal Medicine I.</td>
<td>Clinical Diagnostics I.</td>
</tr>
</tbody>
</table>

If one fails to complete the first semester course both the study and examination requirements have to be completed in the proper semester (the whole course has to be repeated).

### 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)

**Preconditions for enrollment to the forthcoming semester:**

You can find the subject requirements in the suggested study plans for the certain semesters.

### 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

#### BASIC MODULE

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course</th>
<th>Department</th>
<th>Head of Department</th>
<th>Hrs/week: Theory</th>
<th>Hrs/week: Practice</th>
<th>Form of exam</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>AOK-KUA011</td>
<td>Anatomy, Histology and Embryology I.</td>
<td>Dept. of Anatomy</td>
<td>Prof. András Mihály</td>
<td>2</td>
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#### Compulsory Elective Subjects

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### SUGGESTED STUDY PLAN

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## Compulsory Subjects

### Medical Physiology II.
- AOK-KA352N Medical Physiology (Seminar) II. | Dept. of Physiology | Prof. Gyula Sáry | - | 4 Evaluation(5) | 4 parallel completion of Med. Physiol. II.
- AOK-KA1632 Biochemistry Seminar II. | Dept. of Biochemistry | Prof. László Dux | 2 | - Evaluation(5) | 2 parallel completion of Biochem. II.
- 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

### Mathematical and Statistical Modelling in Medicine Lecture
- AOK-KA99051 Mathematical and Statistical Modelling in Medicine Lecture | Dept. of Med. Physics and Informatics | Prof. Ferenc Bari | 1 | - Evaluation(5) | 2 -
- AOK-KA99052 Mathematical and Statistical Modelling in Medicine Practice | Dept. of Med. Physics and Informatics | Prof. Ferenc Bari | - | 1 Signature | - -

## Criteria Subjects

### Hungarian Language IV.*
- AOK-KA4714 Hungarian Language IV.* | Dept. of Foreign Lang. | Dr. Éva Demeter | - | 4 Prel.Exam | - ER: Hungarian III.

### Physical Education (P.E.)**
- XT0011-2PHE Physical Education (P.E.)** | Sport Center | Dr. Zs. R. Dr. Trényiné | 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.
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#### MEDICINE

#### PRE-CLINICAL MODULE

**2013/2014 3rd year, 5th (fall) semester**

**Compulsory Subjects**

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**Compulsory Elective Subjects**

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

#### PRE-CLINICAL MODULE

**2013/2014 3rd year, 6th (spring) semester**

**Compulsory Subjects**

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**Criteria Subjects**

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* The completion of the course is obligatory in the semester given.
** Only half of the 4th year students can register in each semester.
# Suggested Study Plan

## MEDICINE

### CLINICAL MODULE

#### 2013/2014 4th year, 8th (spring) semester

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#### Compulsory Subjects

#### Criteria Subjects

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

** Only half of the 4th year students can register in each semester.
## SUGGESTED STUDY PLAN

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### MEDICINE

**CLINICAL MODULE**

**2013/2014 5th year, 9th (fall) semester**

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**Compulsory Elective Subjects in the Clinical Module, fall semester (semester 7 and 9)**

**Compulsory Elective Subjects in the Clinical Module, only semester 9**

**Elective Subjects in the Clinical Module, only semester 9**

**Elective Subjects in the Clinical Module, fall semester (semester 7 and 9)**
## SUGGESTED STUDY PLAN

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### Compulsory Elective Subjects in the Clinical Module, only semester 10

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<td>Tropical Diseases</td>
<td>Department of Clinical Microbiology</td>
<td>Dr. habil Edit Urbán</td>
<td>2</td>
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<td>Evaluation(5)</td>
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</table>
### SUGGESTED STUDY PLAN

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course</th>
<th>Department</th>
<th>Head of Department</th>
<th>Hrs/week: Theory</th>
<th>Hrs/week: Practice</th>
<th>Form of exam</th>
<th>Credit</th>
<th>Course Requirement (SR=Subject requirement; ER=Examination requirement; P=Parallel Completion)</th>
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<tbody>
<tr>
<td>AOK-KA901</td>
<td>Internal Medicine</td>
<td>1st Department of Internal Medicine</td>
<td>Prof. Tibor Wittmann</td>
<td>9 weeks*</td>
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<td>Comprehensive Exam</td>
<td>9</td>
<td>Clinical Module</td>
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<tr>
<td>AOK-KA902</td>
<td>General Practice</td>
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<td>1 week*</td>
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<tr>
<td>AOK-KA941</td>
<td>Surgery</td>
<td>Department of Surgery</td>
<td>Prof. György Lázár</td>
<td>7 weeks*</td>
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<td>Comprehensive Exam</td>
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<td>Clinical Module</td>
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<tr>
<td>AOK-KA921</td>
<td>Neurology</td>
<td>Department of Neurology</td>
<td>Prof. László Vécsei</td>
<td>4 weeks*</td>
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<td>Clinical Module</td>
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<tr>
<td>AOK-KA931</td>
<td>Psychiatry</td>
<td>Department of Psychiatry</td>
<td>Prof. Zoltán Janka</td>
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<td>Clinical Module</td>
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<tr>
<td>AOK-KA951</td>
<td>Obstetrics and Gynaecology</td>
<td>Department of Obstetrics and Gynaecology</td>
<td>Prof. Attila Pál</td>
<td>4 weeks*</td>
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<td>Comprehensive Exam</td>
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<tr>
<td>AOK-KA911</td>
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<td>Department of Pediatrics</td>
<td>Dr. Csaba Berecki</td>
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<tr>
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<tr>
<td>AOK-KA973</td>
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<tr>
<td>AOK-KA974</td>
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<td>Examination</td>
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**2013/2014 6th year**

#### MEDICINE

**FINAL MODULE**

<table>
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<th>Compulsory Subjects</th>
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<tr>
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<tr>
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<td></td>
<td>Examination</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*1 week = 30 hours*
The 6th year (11th and 12th semester) academic year 2013/2014

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).

Fees:

<table>
<thead>
<tr>
<th>Sixth year practices</th>
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<tr>
<td><strong>Period of practice</strong></td>
<td>Fee</td>
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<tr>
<td>• Obligatory fee *</td>
<td>5,350 USD</td>
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<tr>
<td>• All practices are spent at the University of Szeged (37 weeks)</td>
<td>10,700 USD</td>
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<tr>
<td>• 1 extra week of practice at the University of Szeged</td>
<td>290 USD</td>
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<tr>
<td>• 1 extra month of practice at the University of Szeged</td>
<td>1160 USD</td>
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<tr>
<td><strong>State Board Examination fee</strong></td>
<td>300 USD</td>
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</table>

* Students can complete half of the practices abroad. This amount entitles them to complete half of the practices (18 weeks) at the University of Szeged without additional costs.
** Students can complete more than half of the practices abroad, provided they have the permission of the Program Director before starting the practice.

Payments have to be made before starting the practice, but latest before the final examination of the subject concerned.

*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 06, 2014.**

**Fees if the practices are performed in Hungary:**
- Nursing practice: 500 USD
- Internal Medicine practice: 1000 USD
- Surgery practice: 1000 USD.

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

*4th 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 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 psychiatry
   Dr. László Pávics Professor of Nuclear Medicine

2. Experimental validation of new radiopharmaceuticals
   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. Specially selected topics dealing with sexually transmitted infections. Dr. habil Judit Deák

2. Specially selected topics dealing with tropical diseases. Diagnostic problems, epidemiology, and therapy. Dr. habil Judit Deák

3. Antibiotic resistance development in a selected pathogen. Dr. habil. DSc. Elisabeth Nagy

4. Anaerobic infections. Diagnostics and therapy. Dr. Edit Urbán Ph.D.

5. Role of anaerobic bacteria in oral infections. Dr. Edit Urbán Ph.D.

6. Clostridium difficile-associated infections. Dr. Gabriella Terhes Ph.D.
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. Behavioral science approach to smoking
   Dr. Bettina Pikó associate professor

2. Cultural medicine: theory and examples
   Dr. Bettina Pikó associate professor

3. Prevention of addictions
   Dr. Bettina Pikó associate professor

4. Stress and anxiety in modern medicine
   Dr. Bettina Pikó associate professor

Department of Otolaryngology 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. 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/ The mechanisms of action of antiarrhythmic drugs.  
Tutor: Dr. András Varró

2/ Cellular electrophysiology of the cardiac muscle.  
Tutor: Dr. András Varró

3/ Mechanism of the antiarrhythmic effect of preconditioning. Role of endogenous substances.  
Tutor: Dr. Ágnes Végh

4/ Investigation of antiarrhythmic mechanism in rat models.  
Tutor: Dr. István Leprán

5/ Potassium channel and cyclic nucleotide mediated vasodilation in isolated blood vessels.  
Tutor: Dr. János Pataricza

6/ Cellular electrophysiological techniques.  
Tutor: Dr. László Virág and Dr. Norbert Iost

7/ Patomechanisms of congestive heart failure  
Tutor: Dr. István Baczkó

8/ Intra-and extracellular regulatory mechanisms of electric activity in human cardiac atrium.  
Etiology and pathomechanism of atrial fibrillation.  
Tutor: Dr. Ottó Hálá

9/ Regulation of the Ca2+ homeostasis in isolated cardiac cells.  
Tutor: Dr. András Tóth

10/ Cellular mechanism leading to ischemia/ reperfusion in jury in cardiac tissue.  
Tutor: Dr. András Tóth

11/ Review of the literature: A selected topic in pharmacology.  
Tutor: Dr. István Leprán

Department of Medical Informatics

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

2. Computer analysis of lung sounds
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: Dr Miklós Jászberényi, MD, PhD
telephone number: 62-545-993
E-mail: jm@patph.szote.u.szeged.hu, jaszberenyi.miklos@med.u.szeged.hu

Programs:

1. Tutors:
   Professor Dr Gyula Szabó, MD, PhD, DSc head of the department
   
   Topics:
   1. Computer based education of pathophysiology (usage of internet in medical education)
   2. The investigation of specific opiate ligands in animal experiments
   3. Elected subject from pathophysiology

2. Tutors:
   Professor Dr Gyula Szabó, MD, PhD, DSc head of the department
   Julianna Szakács, MD
   
   Topics:
   1. The effect of neuropeptides on experimental drug tolerance and dependence
   2. Elective subject from pathophysiology

3. Tutors:
   Professor emeritus Gyula Telegdy, MD, PhD, DSc, member of the Hungarian Academy of Sciences
   Ágnes Adamik, MSc; Tanaka Masaru MD, PhD
   
   Topics:
   1. The effects of neuropeptides on behavioral and cognitive processes
   2. Examination of behavioral and cognitive processes in the rat
   3. The effects of neuropeptides on thermoregulatory processes
   4. The role of neuropeptides in the organization of cognitive processes

4. Tutor:
   Professor emeritus Gyula Telegdy, MD, PhD, DSc, member of the Hungarian Academy of Sciences
   
   Topics:
   1. The role of nitric oxide in the organization of cognitive processes
   2. The investigation of the anxiogenic-anxiolytic effects of neuropeptides

5. Tutors:
   Professor Dr Gyula Szabó, MD, PhD, DSc head of the department
   Zsófia Mezei, MD, PhD
   
   Topics:
   1. Role of the mediators in the pathogenesis of the cardiovascular diseases.
   2. Role of the mediators in the pathogenesis of the neurodegenerative disorders.
   3. Role of the mediators in the pathogenesis of the diabetes mellitus.

6. Tutors
   Professor emeritus Gyula Telegdy, MD, PhD, DSc, member of the Hungarian Academy of Sciences
   Professor Gyula Szabó, MD, PhD, DSc head of the department
   Miklós Jászberényi, MD, PhD
   Zsolt Bagosi, MD, PhD
   Krisztina Anna Csabaфи, MD
   
   Topics:
   1. The effects of neuropeptides on the hypothalamic-pituitary-adrenal axis
   2. The investigation of anxiolytic and antidepressant effects of neuropeptides
   3. The investigation of the thermoregulatory, cardiac and behavioral effects of neuropeptides
   4. The interaction between neuropeptides and addictive drugs
   5. The interaction between neuropeptides and neurotransmitters
   6. The action of neuropeptides in the development of Alzheimer’s disease
   7. The action of neuropeptides in different animal models of psychiatric disorders
Recommended textbooks for first year medical students

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

ANATOMY, HISTOLOGY AND EMBRYOLOGY

Obligatory:
- Sadler: Langman's Medical Embryology, with Simbryo CD, Lippincott Williams & Wilkins
- Kiernan: Barr’s The Human Nervous System, International Student Edition, Lippincott Williams & Wilkins
- Snell, Richard S.: Clinical Anatomy, Lippincott Williams & Wilkins
- Sobotta Atlas of Human Anatomy, Volume 1, (Latin Edition), Lippincott Williams & Wilkins

Recommended:
- Gartner, LP, Hiatt, JL: Concise Histology, Saunders Elsevier, 2011

CELL BIOLOGY AND MOLECULAR GENETICS


FIRST AID

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

INTRODUCTION TO MEDICINE


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,

MEDICAL PHYSICS AND STATISTICS

- 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
Recommended textbooks for second year medical students

ANATOMY, HISTOLOGY AND EMBRYOLOGY
Obligatory:
- Sadler: Langman’s Medical Embryology, with Simbryo CD, Lippincott Williams & Wilkins
- Kiernan: Barr’s The Human Nervous System, International Student Edition, Lippincott Williams & Wilkins
- Snell, Richard S.: Clinical Anatomy, Lippincott Williams & Wilkins
- Sobotta Atlas of Human Anatomy, Volume 1, (Latin Edition), Lippincott Williams & Wilkins

Recommended:
- Kyung Won Chung: Gross Anatomy, Lippincott Williams & Wilkins
- Sobotta Atlas of Human Anatomy, Volume 1 (Head, Neck, Upper Limb), English Text with English Nomenclature, Lippincott Williams & Wilkins
- Sobotta Atlas of Human Anatomy, Volume 2 (Trunk, Viscera, Lower Limb), English Text with English Nomenclature, Lippincott Williams & Wilkins
- Sobotta Atlas of Human Anatomy, 2 Volume Set, English Text with English Nomenclature, Lippincott Williams & Wilkins
- Tömböl Teréz: Topographic Anatomy, Medicina Könyvkiadó Rt.

BIOCHEMISTRY, BIOCHEMISTRY SEMINAR
Obligatory:

Recommended: for 1st semester
- Pamela. C. Champe, Richard A. Harvey: Lippicott’s Illustrated Roviews, BIOCHEMISTRY, Wolters Kluwer/Lippincott Williams&Wilkins
- WJ Marshall, SK Bangert: Clinical Chemistry, Mosby Elsevier

BIOCHEMICAL BASICS OF PREVENTIVE MEDICINE
- Janet Christian and Janet Greger: Nutrition for Living, Addison-Wesley

CARDIAC ELECTROPHYSIOLOGY AS A BASIC PROPERTY OF CARDIAC FUNCTION

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
- Walter F. Boron, Emile L. Boulpaep: Medical Physiology, Saunders Elsevier
- Fonyó Attila: Principles of Medical Physiology, Medicina Kiadó Zrt.
- Albert Szent-Györgyi Medical University, Department of Physiology, Physiology Laboratory Manual, (handout)

MEDICAL SOCIOLGY
Recommended textbooks for third year medical students

HUNGARIAN LANGUAGE

INTERNAL MEDICINE (CLINICAL DIAGNOSTICS)
Obligatory:

Recommended:
- 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

MEDICAL MICROBIOLOGY AND IMMUNOLOGY
- ABBAS et al., Cellular and Molecular Immunology, Sanders, Elsevier, 6th ed., 2007.
- Murphy et al., Janeway's Immunology, Garland Science; 7th ed., 2008.
- Practical Notes (Edited by R. Pusztai, University of Szeged, 2002)

MICROSURGERY

PATHOLOGY

PATHOPHYSIOLOGY
Textbooks
Handouts (for practice)

PSYCHOLOGY
• Kent G., Dalgleish M.: Psychology and Medical Care, W.B. Saunders C.L.T.D. 1996. (compulsory)
• Andrew B. Crider et al Psychology, Harper Collins College Publisher 1993. (recommended)

SURGERY (CLINICAL DIAGNOSTICS)

BASICS OF EMERGENCY MEDICINE

MICROSURGERY

BASIC SURGICAL SKILLS, ADVANCED SURGICAL SKILLS

BASIC IMMUNOPATHOLOGY

LABORATORY MEDICINE
**Recommended textbooks for fourth year medical students**

**ANAESTHESIOLOGY AND OXYOLOGY**

**Recommended:**

**CASES IN CLINICAL MICROBIOLOGY**


**CHILD AND ADOLESCENT PSYCHIATRY**


**CLINICAL IMMUNOLOGY**


**CLINICAL ONCOLOGY**

- AJCC Cancer Staging Manual, 2002 Springer
- Cancer Management: A Multidisciplinary Approach, 2002 PRR Melvilla NY
- Principles and Practice of Radiation Oncology Editors Carlos A. Perez Luther W. Brandy., 1998 Lippincott-Raven

**HUNGARIAN LANGUAGE**

**Obligatory:**

**INTERNAL MEDICINE**

**Obligatory:**

**Recommended:**

**LABORATORY DIAGNOSTICS: USE OF LABORATORY TESTS IN PRACTICE**

NUCLEAR MEDICINE

OBSTETRICS AND GYNAECOLOGY

ORTHOPAEDICS

PHARMACOLOGY

PUBLIC HEALTH
Obligatory:

Recommended:
  I2-3]0B90-B

PULMONOLOGY
  ISBN: 0071133801

RADIOLOGY

SURGERY

STOMATOLOGY
- R. A. Cawson: Essentials of Oral Pathology and Oral Medicine, Churchill Livingstone, 1-3 Baxters Place
  (Leith Warh, Edinburg, EHI 3AF), ISBN: 0443040427

TROPICAL DISEASES
- Manson's Tropical Diseases, By Gordon C. Cook, and Alimuaddin I. Zumla, 22nd Edition,

Recommended textbooks for fifth year medical students

CHILD AND ADOLESCENT PSYCHIATRY

CLINICAL GENETICS
- 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
CLINICAL MICROBIOLOGY
- Peter H. Gilligan, Daniel S. Shapiro and M. Lynn Smiley: Cases in Medical Microbiology and Infectious Diseases, Publisher: Amer Society for Microbiology, Published Date: 1992, ISBN 1555810454

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

DERMATOLOGY

FORENSIC MEDICINE
- Lecture Notes of Forensic Medicine (Ed.: P. Sótonyi, E. Keller), Semmelweis Publisher, 2008.
  ISBN 978 963 9656 92 5

INTERNAL MEDICINE
Obligatory:

Recommended:
- 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

NEUROLOGY

NEUROSURGERY

OPHTHALMOLOGY

OTO-RHINO-LARYNGOLOGY
• Sziklai: Oto-Rhino-Laryngology Lecture notes 1994. (handout), Order from: Semmelweis Orvostudományi Egyetem Képzéskutató, Oktatástechnológiai és Dokumentációs Központ, Budapest

PAEDIATRICS

or
• Op Ghai: Essential Pediatrics, Fifth Edition

PSYCHIATRY

or any of the following books:
• R.J. Waldinger: Psychiatry for Medical Students.
• H.H. Goldman: Review of General Psychiatry.
• H.I. Kaplan - B.J. Sadock: Synopsis of Psychiatry.
• Szilárd J. - Janka Z.: Elements of Social Psychology.
  University Meddical School Press, Szeged

RHEUMATOLOGY

SURGERY

UROLOGY

TRAUMATOLOGY
# SYLLABUSES
## BASIC AND PRE-CLINICAL MODULE - MEDICINE
### ANATOMY, HISTOLOGY AND EMBRYOLOGY
#### 1st semester

<table>
<thead>
<tr>
<th>LECTURE (2 hrs/week)</th>
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<th>ANATOMY SEMINAR (2 hrs/week)</th>
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<tr>
<td>General anatomy</td>
<td>General anatomy</td>
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<td></td>
<td>Dissection room regulations.</td>
<td>I. Upper limb</td>
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<td></td>
<td>I. Upper limb</td>
<td>Bones and joints of the upper limb.</td>
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<td></td>
<td>Dissection of the upper limb: bones and joints.</td>
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<td></td>
<td>Functional anatomy of muscles of the UL.</td>
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<tr>
<td></td>
<td>Arteries and veins of the UL. Branches of the axillary artery. Lymph vessels of the UL.</td>
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<tr>
<td>Introduction to peripheral nerves. Anatomy of the brachial plexus and lumbosacral plexus.</td>
<td>Dissection of the upper limb: blood vessels.</td>
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<tr>
<td></td>
<td>Branches of the brachial plexus on the UL. Nerve injuries on the UL.</td>
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<tr>
<td>Functional- and clinical anatomy of the UL.</td>
<td>Dissection of the upper limb: nerves.</td>
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<tr>
<td>II. Trunk anatomy</td>
<td>II. Lower limb</td>
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<tr>
<td>Anatomy of the vertebral column (bones and joints). Thorax: bones and joints. Movements of the spine and rib cage.</td>
<td>Dissection of the bones and joints of the LL.</td>
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<td></td>
<td>Muscles of the hip and pelvis. Muscles of the LL. Fasciae of the LL.</td>
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<td></td>
<td>Functional anatomy of the blood vessels of the LL. Lymph nodes and vessels of the LL.</td>
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<tr>
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<td>Functional anatomy of the blood vessels of the LL. Lymph nodes and vessels of the LL.</td>
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<tr>
<td></td>
<td>Functional anatomy of the blood vessels of the LL. Lymph nodes and vessels of the LL.</td>
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<tr>
<td>III. Basic tissues</td>
<td>III. Trunk anatomy</td>
<td>III. Skull</td>
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<tr>
<td>Epithelia and connective tissues.</td>
<td>Study of the bones of the trunk (vertebrae, ribs, sternum) on human samples and on radiographic pictures.</td>
<td>Bones of the skull. Sutures and joints. The concept of viscerocranium and neurocranium.</td>
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<td></td>
<td>Dissection of the chest- and back muscles. Dissection of the intercostal space.</td>
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<td></td>
<td>Functional anatomy of the abdominal wall: muscles, fasciae. Inguinal canal, rectus sheath, hernia canals.</td>
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<tr>
<td>Cartilage and bone tissues. Muscle tissues.</td>
<td>Dissection of the nerves of the LL.</td>
<td></td>
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<tr>
<td></td>
<td>Functional- and clinical anatomy of the LL.</td>
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<tr>
<td>Nerve tissues in the PNS and CNS. Histology of peripheral nerves, receptors and effectors.</td>
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<tr>
<td>IV. Circulatory- and respiratory anatomy</td>
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</tbody>
</table>
* Anatomy and histology of the nasal cavity and paranasal sinuses.

Dissection of the abdominal wall. Dissection of the inguinal canal.

Nasal cavity, oral cavity, orbit, infratemporal- and pterygopalatine fossae (bony structures and contents).

* Anatomy and histology of the larynx.

Preparation for the practical exam: repetition, tutorial.

External and internal cranial basis: bony structures and contents.

* Anatomy and histology of the lung, bronchial tree and pleura.

PRACTICAL EXAM

Discussion of the topics of the semester: tutorial on the radiological images (UL, LL, trunk, skull).

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2nd semester

**LECTURE**

(2 hrs/week)

* The vertebral column. Bones and muscles of the thorax. The breast.

* The diaphragm. Anatomy of the abdominal wall. The deep muscles of the back

* Topography and anatomy of the heart. The pericardium.

* The chambers and valves of the heart. Coronary vessels.

* Radiological anatomy of the heart and the great vessels. Anatomy of the nasal cavity

* Anatomy and histology of the larynx. Laryngoscopy.

* Anatomy and histology of the trachea, bronchial tree and lungs. The pleura.

* Anatomy and histology of the oral cavity, tongue and large salivary glands.

* Teeth and pharynx. General histology of the alimentary tract

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**DISSECTION PRACTICE**

(3 hrs/week)

Bones and joints of the vertebral column and the thorax.

Structure of the thoracic wall. Opening of the thoracic cavity. The mediastinum. The anatomy of the diaphragm.

Dissection of the supracardiac mediastinum and the heart I. Dissection of the supracardiac mediastinum and the heart II.

Practical assessment: thorax, vertebral column and the heart.

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**MICROSCOPY PRACTICE**

(2 hrs/week)

Epithelial tissues I.

Epithelial tissues II.

Connective tissues.

Bone and cartilage.

Ossification.

Muscle tissues.

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Nervous tissue

The histology of the heart and blood vessels.

Histology of the respiratory system

Written assessment: basic tissues; histology of heart, vessels and respiratory system. Histology of the lip, tongue, teeth and salivary glands.

Histology of the esophagus and stomach. Histology of the small intestine I.

Histology of the small intestine II. Histology of the large intestine and the anal canal.

Histology of the liver, gall bladder and the pancreas.
the abdominal cavity and the viscera.

* Histology of the blood. Hematopoiesis.  
  **Practical assessment:** the abdominal cavity and the alimentary tract.  
  **Written assessment:** histology of the digestive system.  
  General recapitulation

* Histology of the immune system and lymphoid organs.  
  General recapitulation

**3rd semester**

**LECTURE**  
(2 hrs/week)

* Gross anatomy, blood supply and histology of the kidney.  
  Anatomy and histology of the ureter and urinary bladder.  
* The anatomy and histology of the male genital organs.  
* The anatomy and histology of the female genital organs.  
* The anatomy of the male and female perineum.  
  Topography of the lesser pelvis.

* The gross anatomy of the central nervous system (CNS). The meninges.  
  Blood supply of the CNS.

* Anatomy and histology of the spinal cord: Rexed's laminae, neuron types and transmitters.  
  The white matter tracts.

* Sectional anatomy of the brain stem: nuclei and pathways.  
  Blood supply of the brain stem.

* Neuroanatomy, histology and synaptology of the cerebellum.

* **HOLIDAY**

* Neuroanatomy of the diencephalon: Thalamus and hypothalamus.

**ANATOMY PRACTICE**  
(3 hrs/week)

Dissection of the retroperitoneum: kidneys, ureters, posterior abdominal wall.
Dissection of the scrotum, testis and epididymis.
Topography of the male pelvis.
Dissection of the female genital organs.
Topography of the female pelvis.
Dissection of the male and female perineum

**HISTOLOGY PRACTICE**  
(2 hrs/week)

**Uropoietic system:**  
kidney, ureter, urinary bladder.  
**Male genital organs:** testis-epididymis, spermatogenesis.
Male genital organs: spermatic cord, seminal vesicle, prostate, penis.  
**Female genital organs:** ovary, oviduct, uterus.  
Cyclic changes in the female genital organs.

**Practical assessment:** Histology of the urogenital organs

**Practical assessment:** Histology of the urogenital organs

**Blood and hematopoiesis:**  
Blood smear, red bone marrow.

**Lymphatic system I:** thymus, lymph node,

**Lymphatic system II:** palatine tonsil and spleen.

**Peripheral nervous system:**  
spinal ganglion, autonomic ganglion, peripheral nerve.
### 4th semester

<table>
<thead>
<tr>
<th>LECTURE</th>
<th>ANATOMY PRACTICE</th>
<th>HISTOLOGY PRACTICE</th>
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<tbody>
<tr>
<td>(2 hrs/week)</td>
<td>(3 hrs/week)</td>
<td>(2 hrs/week)</td>
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#### LECTURE

- * Neuroanatomy of the basal ganglia. The extrapyramidal motor system.
- * Neuroanatomy of the cerebral cortex.
- * The pituitary gland and the neuroendocrine regulation. The anatomy and histology of the thyroid and parathyroid glands.

#### ANATOMY PRACTICE

- Ovulation, fertilization, cleavage, germ layers. Implantation, placentation.
- Differentiation of the ectoderm, mesoderm and endoderm. Foldings of the embryo.
- Derivatives of the germ layers. The branchial apparatus. The placenta.

#### HISTOLOGY PRACTICE

- The skull: bones of the neurocranium. The skull: bones of the viscerocranium. The skull: the internal and external cranial base, orbit, nasal cavity, paranasal sinuses, pterygopalatine fossa, temporomandibular joint.

#### Practical assessment:

- The skin and its appendages. Repetition: the nervous system.
- The extrapyramidal motor system: motor-end-plate and sensory nerve endings.
- Gross anatomy and cross sections of the spinal cord.

#### General recapitulation
**BIOCHEMISTRY**

### 3rd semester

**LECTURE (3 hrs/week)**
* Proteins and bioenergetics: structure and function of proteins, thermodynamics of living systems
* Enzymology: enzyme classes, coenzymes, characterisation of enzymes, isoenzymes, multienzyme systems
* Enzymology: molecular mechanism of catalysis, enzyme kinetics, modulation and regulation of enzyme activity
* Carbohydrate metabolism: Digestion and absorption of carbohydrates, glycolysis, gluconeogenesis, pyruvate dehydrogenase enzyme complex
* Carbohydrate metabolism: glycogen metabolism, pentose phosphate cycle and glucuronide shunt
* Carbohydrate metabolism: Fructose and galactose metabolism, glycoproteins, regulation of blood glucose level, diabetes mellitus
* Lipid metabolism: Digestion and absorption of lipids, lipoprotein metabolism, lipid mobilisation, oxidation of fatty acids, ketone bodies
* Lipid metabolism: Synthesis of fatty acids, synthesis of triacyl glycerols and sphingolipids, cholesterol and steroid metabolism
* Amino acid metabolism: Digestion and absorption of proteins, catabolism of amino acids, fate of amino group, urea cycle
* Amino acid metabolism: catabolism of amino acids, fate of carbon skeleton of amino acids, one-carbon units, glutathione
* Synthesis of hem and porphyrine, enterohepatic circulation of hem degradation products
* Nucleotide metabolism: synthesis and degradation of purine and pirimidine nucleotides, salvage pathways, synthesis of deoxyribonucleotides
* Citric acid cycle: steps and regulation of the cycle, relationship between the cycle and other metabolic pathways
* Mitochondrial transport systems, mechanism of respiratory chain and oxidative phosphorylation

**PRACTICE (2 hrs/week)**
General recapitulation
General information, work safety and laboratory work
Substrate specificity and temperature optimum of amylase enzyme activity
Determination of protein concentration
Determination of carbohydrate metabolism
Determination of glucose-6-phosphatase enzyme activity
Determination of uric acid concentration
Investigation of oxygen consumption of isolated mitochondria
Consultation

### 4th semester

**LECTURE (4 hrs/week)**
* Biochemistry of blood: plasma proteins, structure and function of hemoglobin, biochemistry of red blood cells
* Biochemistry of blood: biochemistry of leukocytes, chemotaxis, biochemical basis of blood clotting and fibrinolysis
* Biochemistry of biomembranes: structure and function of the membrane, transport across the biological membranes
* Biochemistry of connective tissue: structure, synthesis and degradation of collagen, elastin, fibrillin, proteoglycans, adhesion receptors and cytoskeleton

**PRACTICE (2 hrs/week)**
General information, work safety and laboratory work
Biochemistry of blood I.: determination of bilirubin concentration
Biochemistry of blood II.: serum protein electrophoresis, determination of haptoglobin concentration
* Biochemistry of muscle: structure and main types of muscle, energy generation, mechanism of muscle contraction

* Biochemistry of liver: function of hepatocytes and central role of the liver in the metabolism

* Biochemistry of liver: biotransformation, role of cytochrome P450 system, ethanol oxidation

* Biochemistry of nervous system: Neurotransmitters- amino acid, biogenic amin, peptide, acetylcholine, synthesis and breakdown of catecholamines

* Endocrine system: Mechanism of neuroendocrine regulation, hormones of hypothalamus-hypophysis system, thyroid hormones

* Endocrine system: hormonal regulation of blood glucose level, calcium metabolism and its hormonal regulation

* Endocrine system: steroid hormones, tissue hormones and cytokines, growth factors. Regulation of gene expression: Structure of chromosome and DNA, mutations, repair mechanism

* Regulation of gene expression: Structure eukaryotic gene, transcription, transcription factors, biosynthesis of proteins, cell cycle, apoptosis. Cell signalling mechanisms, cyclic nucleotides, G proteins

* Cell signalling mechanisms, PIP2 system, Ca2+ as second messengers, regulation of metabolism at the tissue level

* Regulation of metabolism at the organism level, Limits of the biochemical regulation, adaptation; supraindividual regulation; biochemical interpretation of health and disease

* The topics are clinical

**CELL BIOLOGY AND MOLECULAR GENETICS**

**1st semester**

**LECTURE**
(2 hrs/week)

* Structure and operation of the cell
* The DNA
* Transcription, translation & proteins
* Mutation & jumping genes
* Bacterial genetics
* Genetic regulation in eukaryotes
* Mendelian and non-Mendelian genetics
* Epigenetics
* Genes and traits
* Genetic diseases
* Evolution
* Cytoskeleton & membrane processes
* Molecular biology of viruses
* Frontiers of molecular and cell biology

**PRACTICE**
(2 hrs/week)

Handling of technical devices
Microscopy-1
Microscopy-2
DNA and RNA purification
Genetic exercises
Separation techniques
Lac operon & consultation

**2nd semester**

**LECTURE**
(2 hrs/week)

* Human genome
* Genetically modified organisms & cloning
* Cell cycle & tumor formation

**PRACTICE**
(2 hrs/week)

Molecular cloning
PCR & DNA sequencing
Detection of DNA and RNA
* Molecular medicine
* Cell signalling-1
* Cell-signalling-2
* Cell communication & tissue differentiation
* Genetic regulation of ontogenesis
* Neural communication & consciousness
* Molecular biology of sensation
* Immunogenetics
* Molecular evolution
* Genetics of behaviour
* Genetic disease of brain and psyche

**FIRST AID AND RESUSCITATION**

1st semester

**PRACTICE**

(2 hrs/week)

* The unresponsive patient. Terms of position. Extrication of the injured patient (Rautek 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.
* Poisoning.
* Heart attack. Respiratory emergencies.
* Revision of BLS.

**MEDICAL CHEMISTRY**

1st semester (14 weeks)

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<th>LECTURE</th>
<th>SEMINAR</th>
<th>PRACTICE</th>
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<td>3.</td>
<td>Intermolecular forces: hydrogen bonding and van der Waals forces (dipole-dipole and</td>
<td>The application of the periodic table. Continuation of practicing simple chemical calculations.</td>
<td>The principle of photometry, Lambert-Beer law.</td>
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<tr>
<td>Chapter</td>
<td>Topics</td>
<td>Reference</td>
<td>Additional Notes</td>
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<td>4.</td>
<td>Properties of the most important nonmetals and their compounds. Biological importance and usage.</td>
<td>Intra- and intermolecular chemical bonds.</td>
<td>Potentiometry, pH measurements.</td>
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<td></td>
<td>Properties of the most important metals and their compounds. Biological importance and usage.</td>
<td>Continuation of practicing simple chemical calculations.</td>
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<td>I) Quantitative determination of HCl content by titration with NaOH solution.</td>
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<td>II) Determination of pKₐ of a known concentration weak acid solution through the preparation of different buffers.</td>
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<td>III) Measurement of buffer capacity.</td>
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<td>IV) Qualitative analysis (2 weeks).</td>
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<td>V) Quantitative determination of Fe(II)-content by permanganometric titration measuring the redox potential.</td>
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<td>VI) Complexometric determination of calcium and magnesium.</td>
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<td>VII) Photometric determination of iron.</td>
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<td>VIII) Photometric determination of glucose.</td>
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<tr>
<td>10.</td>
<td>General principles of organic</td>
<td>Voltaic cells. Calculations</td>
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### 2nd semester (14 weeks)

<table>
<thead>
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<th>WEEK</th>
<th>LECTURE</th>
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<th>PRACTICE</th>
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10. Important monosaccharides: aldoses and ketoses and their derivatives.


MEDICAL PHYSICS AND STATISTICS

1st semester

Lecture

(2+1 hours a week)

Medical physics course requirements, training objectives, subject, structure. Importance of physics in understanding physiological mechanisms, medical diagnostics, therapy and its use in medical research.

Introduction. Course requirements, training objectives, subject, structure. Introductory examples. Types of data.


Practice/Seminar

(2 hours a week)

Anthropometric measurements. Fundamental aspects of measurements: derived quantities, measurement error.

Force, work and power measurement.

Introduction to the BIOPAC measurement system. Data collection, data processing, illustration.

**Electrophysiology I.: Electromyography.** Relationship between the measured electric signal and the applied force. Linearization. Studying muscle fatigue.

Characterising sound waves: frequency, loudness, power.

Blood pressure measurement: Korotkoff-sounds, oscillometric method. Hydrostatic pressure of blood column.

Evaluation of the blood pressure measurement results

Make up practicals

**2nd semester**

**Lecture**
(2+1 hours a week)
Introduction. Therapeutic and diagnostic procedures.

**Practice/Seminar**
(2 hours a week)
Electrophysiology II. ECG period / frequency, frequency spectrum, filtering. Unipolar and bipolar leads. Differential amplification.


Medical imaging techniques: ultrasound, CT, MRI/NMR, PET, infrared diagnostics. 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

Biophysics of the senses: vision, hearing. Relationship between stimulus and sensation..

Pulmonary function: flow and volume of inhaled and exhaled air (spirometry)

Measurement of the focal distance of optical lenses, visual acuity.

Electrodermal activity


CT image - reconstruction

Make up practicals

MEDICAL PHYSIOLOGY

3rd semester

LECTURE (6hrs/week) PRACTICE (2 hrs/week)

* Introduction. Regulation dynamics.

* Membrane: transport mechanisms, electrical activity.

Recording techniques. Recording devices: Methods of stimulation: thermal, chemical, electrical, types of electrodes. Studies on nerve-muscle preparation (frog): video, anaesthesia, righting (turning) reflex, decapitation, lesioning of the spinal cord, studies on nerve-muscle preparation, direct and indirect stimulations, stimulus summation, complete and incomplete tetanus, rheobasis, chronaxia, recording of fatigue in the muscle.

* Transmission of excitation.


* Muscle physiology.

Blood tests: hematocrit (micro-, macro-), determination of hemoglobin concentration (Drabkin), erythrocyte sedimentation rate by Westergren, differential count (leukocytes), osmotic resistance of red blood cells, prothrombin time, blood groups (AB0, Rh), red blood cell count, white blood cell count, thrombocyte count (Fischer-Germer), reticulocyte count.

* Fluid compartments. Physiology of the blood.

Blood tests: hematocrit (micro-, macro-), determination of hemoglobin concentration (Drabkin), erythrocyte sedimentation rate by Westergren,
differential count (leukocytes), osmotic resistance of red blood cells, prothrombin time, blood groups (AB0, Rh), red blood cell count, white blood cell count, thrombocyte count (Fischer-Germer), reticulocyte count.

* Heart physiology. Studies of the circulatory system I. : video, in situ registration of the activity of the heart in the frog, effects of electrical and thermal stimulations of the heart, Stannius' ligatures, summation, all or none law, Goltz reflex.

* Circulation physiology. Renal physiology. Studies of the circulatory system II. Effects of ions (adrenaline, acetylcholine, atropine) on the heart, in the isolated rat heart preparation (Langendorf perfusion).

* Osmoregulation, volumen regulation.

* Respiration physiology.

* pH regulation.

* Gastrointestinal physiology.


* Thermoregulation.

* Sport/work physiology.

**4th semester**

**LECTURE**  
*(4hrs/week)*

* CNS, introduction, transmitters  
  General information. Video (GI tract, liver). Collection of gastric juice, test meal (principle)

* Autonomic nervous system  

* Motor system, spinal cord  

* Physiology of the cerebral cortex, EEG  

* Receptors. Somatosensory system  

* Vision. Hearing  
Taste, smell

Endocrinology, hypophysis

Adrenal cortex. Thyroid gland
Thorn’s test (principle).

Pancreas
The effect of insulin on blood glucose level.

Parath. gland Ca2+, adrenal medulla
Video (Sleep, behaviour).

Reproduction, male sexual.

Reproduction, female sexual

Emotions, limbic system

Speech, hemispherical lateralization. Learning

HUNGARIAN LANGUAGE

1st semester

PRACTICE
(4 hrs/week)


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: possessive suffixes, genitive structure.

I have a...: Possessives+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.
* Weather and seasons.
* General revision.
* TEST 2
* Preparation for the oral exam.
* Oral tests

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.
* At the doctor’s: kell, lehet, szabad, tilos. Suffix szor/szer/ször. Body parts.
* Revision
* TEST 1
* Where were you in the summer: past tense conjugations.
* 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: possessive 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.

**LATIN**

1st semester

**PRACTICE**
**(2 hrs/week)**
* The role of the Latin language in medicine. Pronunciation. Groups of nouns - typical forms.
* 2nd declension. Examples from anatomy. Prepositions.
* The verb.
* Miscellaneous exercises on the covered subjects.
* Mid-term test.
* 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

**LECTURE**  
(2 hrs/week)  
* Characterization of proteins (protein structure, folding, chaperones, and central role of heat shock proteins)
* Enzymology (molecular mechanism of enzyme action, regulation 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 sphingolipids, detailed characterization of fatty acids, eikokazoids)
* 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)*

* Introduction
* Biochemistry of blood (transport of bilirubin and its patobiochemistry)
* Biochemistry of blood (patobiochemistry of plasma proteins and biochemical background of blood coagulation)
* Biochemistry of blood (ion determination and blood-gas analysis)
* Biochemical background of risk factors of cardiovascular diseases. (measurement of cholesterol, triacylglycerols, lipoproteins, diagnostics of heart attack)
* Pathobiochemical aspects of connective tissue. (diseases relating to defect of collagen and fibrillin)
* Pathobiochemical aspects of adhesion receptors and cytoskeleton.
* Pathobiochemistry and diagnostics of liver. (liver biotransformation and detoxification of ethanol)
* Biochemistry of nutrition (macro and micronutrients, dietary fibers, minerals, vitamins)
* Pathobiochemistry and diagnostics of diabetes mellitus. (regulation of blood glucose level, types of diabetes, patomechanism, diagnostics)
* Molecular biology diagnostics
* Signaling

**BIOINORGANIC CHEMISTRY**

2nd semester

**LECTURE**
*(1 hr/week)*

* Copper and its compounds. Copper-metalloenzymes and their role: cytochrome oxidase, superoxide dismutase, amine oxidases. Hemocyanin. Problems in the metabolism of copper.
* Halogens and their compounds. Biological role of fluoride ion, fluoroapatite. Biological role of chloride ions, chloride transport. Medical usage of iodine and its compounds.
* Phosphorus and its poisoning effect. Phosphoric acids. The role of high-energy phosphate bonds in the energy production of cells.

**CARDIAC ELECTROPHYSIOLOGY AS A BASIC PROPERTY OF CARDIAC FUNCTION**

**4th 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.
* Practical. Investigational techniques in cardiac cellular electrophysiology
* Practical and consultation

**CYTOMORPHOLOGY AND MICROTECHNICS**

**1st semester**

**LECTURE**

(2 hrs/week)

* The shape and size of the cell. The cell membrane.
* Integrating cells into tissues: Cell adhesions.
* The extracellular matrix.
* Cytoskeleton. Filamentary system of the cell, intracellular filamentous proteins and cellular movement.
* The structure and organization of nucleus. Chromatin, nucleolus.
* The cell cycle, cell growth.
* Plasmamembrane (ER, Golgi). The transport inside the cell, transport vesicles.
* Endocytosis, exocytosis, phagocytosis, lysosomes.
* Mitochondrion.
* Histotechnics I: Staining methods.
* Histotechnics II: Optical methods.

**INTRODUCTION TO ANALYTICAL CHEMISTRY**

**1st semester**

**LECTURE**

(1 hr/week)

* Definition of quantitative and qualitative analysis. Application of analytical chemistry: environment
Curriculum 2013/2014

* SI Units, prefixes and base units. Types of concentration of solutions. Methods of analytical error calculation.
* Sensitivity of analytical methods. Definition. Sensitivity of different analytical methods.
* 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.

INTRODUCTION TO INFORMATICS

1st semester

LECTURE
(1 hr/week)
Why do we learn and teach medical informatics?
The information system of the health.
History of computing hardware. (From the mechanical devices to supercomputers).
Software. The operating system, viruses.
Computer networks, internet, data protection.
Development and integration of software application. Data presentation, documents handling, spreadsheets, data analysis and reports.
Internet browsers, search engines, metadata, web documents, Web 2.0
Virtual reality. Telemedicine.
Integrated IT support of scientific research.
Data and information in health care. Health care data types: text, signs, images, sounds, videos, codes, medical code systems.
Integrated hospital information systems. (Database and standards). Digital medical image communication systems and standards (PACS, DICOM).
Digital medical images, basic image processing.
New trends in medical informatics. Advanced systems

PRACTICE
(2 hrs/week)
Hardware and software environment (login, rights, sharing resources) of the practice. ETR CooSpace.
Creating presentation: IT in health care.
Examination of medical data with spreadsheets (validation, sorting, filtering).
Evaluation of medical data with spreadsheets (calculations).
Evaluation of health information (functions, sub-total tables).
Health data presentation (tables, charts, graphs, images).
1st practical test
Literature reference; well-known databases and queries.
Documents
Formatting large documents templates and styles.
Advances document editing, embedding tables, graphs and images.
2nd practical test
Conclusion remarks and discussion of practical marks

INTRODUCTION TO MEDICINE

1st semester

LECTURE/PRACTICE
(1 hr/week)/(1 hr/week)
* Health Philosophy and Behavioral Medicine I. Modern concept of health and disease
* Health Philosophy and Behavioral Medicine II. What influences health? The development of disease: Causal models
* Health Philosophy and Behavioral Medicine III. Stress, coping, culture and lifestyle
* Preventive Medicine and Public Health I. Community diagnosis. Describing health problems
* Preventive Medicine and Public Health II. Analyzing health problems. Risk perception and risk communication
* Preventive Medicine and Public Health III. Basic theories of prevention and health education. The role of screening in prevention
* History of medicine I. Earliest medicine, antique times
* History of medicine II. Medicine in Middle Ages, Renaissance, Enlightenment
* History of medicine III. Science and technology in the 19th-20th centuries
* Medical Ethics I. The Hippocratic oath
* Medical Ethics II. Ethics, morality and ethical theories
* Medical Ethics III. Basic principles of bioethics

WRITTEN TEST EXAM

INTRODUCTION TO PSYCHOLOGY, BASICS OF NURSING

2nd semester

LECTURE
(1 hr/week)
* General prelude, the attitude, point of view of the curse, what is psychology, the relation between psychology and medicine. The necessity and traits of self-evaluation (self-image, assertive attitude, games people play, and it’s solution)
* Block in basic and biological elements of psychology (Sensation and perception). The psychology of social interactions (Basic elements of perception of people, schemas, stereotypes, attributions, the point of view of individual psychology)
* The psychology of social interactions (Basic elements of social behavior – the effect of people's presence on human achievement, human groups and roles, the human mass's symptom)
* The psychology of social interactions (submission, diffusion of responsibility, conformity to the great mass, the effect of minority on the majority)
* General psychology (attention, memory, imagination, human consciousness, thinking)
* Motivation (human needs, sexual, human arousal)
* Human values (The base of values - cognition, exploration, self-respect and respecting people), The born-out syndrome (how to protect our mental health and harmony)
* Emotions (the evolution of them, theories of their functioning, the mechanism of facial feedback, and it's practical utility)
* The personality (definitions, theories, the role of nature and nurture)
* The psychology of human development (The importance, sections, approaches of it)
* The mechanism of human behavior, the possibilities to take effect on it. Basic element of learning processes (Respondent or classical

COMMUNICATION SKILLS (PRACTICE)
(2 hrs/week)
* Introduction, technical details
* Basic elements of communication
* Factors which disturb the communicational process I.
* Factors which disturb the communicational process II.
* Verbal communication I.
* Verbal communication II.
* Factors which disturb the communicational process III.
* Nonverbal communication I.
* Nonverbal communication II.
* Cultural presentation I.
* Cultural presentation II.
* Discussion
conditioning, Instrumental conditioning, complex – observational, and cognitive-behavioral – learning, and it’s practical utility).
* Summary of practical utilities of psychology – Questions and answers

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.
* 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).
* 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.
* The kidney, the testis and the ovarium: light- and electron-microscopical properties. Development of the
ovarian follicles. Ultrastructure of spermatozoon.
* The teeth, the major salivary glands and the tongue: 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.

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 vessels and endothel cells, multipotent stem cells, blood cell renewal. Fibroblasts and their transformations. The movement and muscle types. The origin and potency of stem cells.
* Seminary (lecture 8)
* The cancer as a microevolutionary process.
* Tumor formation and 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 exocytosis 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
* 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 bulb. 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 contradictory 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)*
* Elementary mathematical functions (The logarithm and exponential functions). Definitions and graphs.

**PRACTICE**
*(1 hr/week)*
* 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

* Ratios, proportions and rates in epidemiology

* Conditional probability, testing proportions: the relative difference

* One- and Two-way ANOVA

* Repeated measurement ANOVA

* Nonparametric ANOVA. Kruskall-Wallis, Jonckheere-Terpstra and Nemenyi tests

* Linear-by-linear method. Kendall tau statistic. Logrank test

* Logistic and Poisson regression models (ROC curves)

* Harmonic trend and seasonality (Edward and Walter-Elwood test, logistic regression and Cosinor method)

* Area under curve methods

* Non-linear regression models (Michaelis–Menten kinetics, RIA, Scatchard plots)

* Internal and external quality control methods

* Decision and cost-effectiveness analysis with probabilities.
CLINICAL DIAGNOSTICS I. – INTERNAL MEDICINE

5th semester

<table>
<thead>
<tr>
<th>LECTURE</th>
<th>PRACTICE</th>
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</thead>
<tbody>
<tr>
<td>Basics of Haematology (2 hrs/week)</td>
<td>(2 hrs/week)</td>
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<tr>
<td>* Case history, documentation</td>
<td>General introduction and guide to the practicals in internal medicine</td>
</tr>
<tr>
<td>* Inspection, palpation</td>
<td>Documentation, taking history</td>
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<tr>
<td>* Percussion, auscultation</td>
<td>Elements of physical examination: practical aspects of inspection, palpation</td>
</tr>
<tr>
<td>* Fever, pulse, blood pressure</td>
<td>Elements of physical examination: practical aspects of percussion and auscultion</td>
</tr>
<tr>
<td>* Heart sounds</td>
<td>Elements of physical examination: feeling pulse, checking blood pressure, taking temperature</td>
</tr>
<tr>
<td>* Electrocardiography</td>
<td>Listening to the heart and chest</td>
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<tr>
<td>* Electrocardiography</td>
<td>Basic aspects of electrocardiography. Developing skills in PE</td>
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<tr>
<td>* Echocardiography</td>
<td>Practical electrocardiography. Developing skills in PE</td>
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<tr>
<td>* Modern cardiological investigative methods</td>
<td>Practical echocardiography. Developing skills in PE</td>
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<tr>
<td>* Abdominal sonography</td>
<td>Practical echocardiography. Developing skills in PE</td>
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<tr>
<td>* Modern gastroenterological investigative methods</td>
<td>Practical echocardiography. Developing skills in PE</td>
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<tr>
<td>* Physical examination in ophthalmology</td>
<td>Abdominal sonography</td>
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<tr>
<td>* Physical examination in neurology</td>
<td>Physical examination in neurology. Developing skills in PE</td>
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<tr>
<td>* Consultation</td>
<td>Consultation</td>
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CLINICAL DIAGNOSTICS II. – INTERNAL MEDICINE

6th semester

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Practice/Seminar</th>
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</thead>
<tbody>
<tr>
<td>The origins and development of surgery</td>
<td>Demonstration and investigation of surgical patients</td>
</tr>
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<td>Demonstration and investigation of surgical patients</td>
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<tr>
<td>The shock. Basic mechanism and clinical profile</td>
<td>Demonstration and investigation of surgical patients</td>
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<tr>
<td>The circulatory shock</td>
<td>Demonstration and investigation of surgical patients</td>
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<tr>
<td>The basis of fluid and electrolyte therapy in surgical patients</td>
<td>Demonstration and investigation of surgical patients</td>
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<tr>
<td>Blood transfusion</td>
<td>Demonstration and investigation of surgical patients</td>
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<tr>
<td>Bleeding and haemostasis</td>
<td>Demonstration and investigation of surgical patients</td>
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<tr>
<td>The significance and role of asepsis and antisepsis in the practice of surgery</td>
<td>Demonstration and investigation of surgical patients</td>
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<tr>
<td>Surgical infections. Modern antibiotic treatment</td>
<td>Demonstration and investigation of surgical patients</td>
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<tr>
<td>Types of wounds and the basic principles of wound healing</td>
<td>Demonstration and investigation of surgical patients</td>
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<tr>
<td>Perioperative complications</td>
<td>Demonstration and investigation of surgical patients</td>
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<tr>
<td>Parenteral feeding</td>
<td>Demonstration and investigation of surgical patients</td>
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<tr>
<td>Surgical oncology</td>
<td>Demonstration and investigation of surgical patients</td>
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<tr>
<td>The possibilities and practice of organ transplantation</td>
<td>Demonstration and investigation of surgical patients</td>
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<tr>
<td>Consultation</td>
<td>Demonstration and investigation of surgical patients</td>
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</tbody>
</table>

ETHICS IN MEDICINE

6th semester
**LECTURE/PRACTICE**
*(1 hr/week)/(2 hrs/week)*
- Introduction to Medical Etics. Laws and Morals
- Basic Ethical Theories, Principles of Bioethics.
- Informed Consent
- Moral dilemmas in reproductive medicine. Family planning
- Reproductive medicine (cont.)
- Moral aspects of pediatrics
- Ethical aspects of medical genetics
- Surgery. Pain. Transplantation from living donors
- Euthanasia – a non –medical approach
- AIDS
- Cloning
- Research on human subjects. Patients’ rights and health care system
- Consultation

**INTERNAL MEDICINE I.**

**6th semester**

<table>
<thead>
<tr>
<th>LECTURE</th>
<th>PRACTICE</th>
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<tbody>
<tr>
<td><em>(4 hrs/week)</em></td>
<td><em>(2 hrs/week)</em></td>
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<tr>
<td>* Esohpageal disorders</td>
<td>Problem oriented evaluation of the symptoms of patients with esophageal disorders</td>
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<tr>
<td>* Peptic ulcer disease</td>
<td>Practical aspects of the functional evaluation of patients with esophageal disorders (esophageal manometry, 24 h pH-metry, evaluation of the biliary reflux)</td>
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<tr>
<td>* Functional dyspepsia</td>
<td>Upper gastrointestinal endoscopy</td>
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<td>* Gastrointestinal hormones</td>
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<tr>
<td>* Gastric Cancer</td>
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<tr>
<td>* Chronic hepatitis</td>
<td>Symptomatic evaluation of the liver patient.</td>
</tr>
<tr>
<td>* Cirrhosis of the liver I. (etiology, symptoms)</td>
<td>Problem oriented laboratory investigation of the liver patient.</td>
</tr>
<tr>
<td>* Cirrhosis of the liver II (complications, therapeutical options)</td>
<td>Symptoms of biliary obstruction, investigative methods for patients with biliary obstruction (symptoms, biochemistry, ultrasonography, ERCP)</td>
</tr>
<tr>
<td>* Diseases of the biliary system I</td>
<td></td>
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<tr>
<td>* Diseases of the biliary system II</td>
<td>Symptoms of patients with acute pancreatitis</td>
</tr>
<tr>
<td>* Acute pancreatitis</td>
<td>Diagnostic work up of patients with acute pancreatitis</td>
</tr>
<tr>
<td>* Chronic pancreatitis</td>
<td>Diagnostic work up of patients with chronic pancreatitis and pancreatic cancer</td>
</tr>
<tr>
<td>* Pancreatic cancer</td>
<td>Diagnostic work up of patients with CU and Crohn’s disease.</td>
</tr>
<tr>
<td>* Pathomechanisms of Inflammatory Bowel Disease</td>
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<tr>
<td>* Crohn’s disease and Ulcerative Colitis</td>
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<tr>
<td>* Tumors of the large intestine</td>
<td>Early identification of patients with colorectal cancer. Diagnostic methods.</td>
</tr>
<tr>
<td>* Malabsorption syndrome</td>
<td>Symptoms of malabsorption, maldigestion, Diagnostic workup: Hydrogen, c13 urea and starch breath tests</td>
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<tr>
<td>* Irritable Bowel Syndrome</td>
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<tr>
<td>* Diabetes mellitus (etiology, classification)</td>
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<tr>
<td>* Complications of diabetes mellitus</td>
<td>Practical aspects of the diagnosis and therapy of patients with diabetes mellitus; the patient education.</td>
</tr>
<tr>
<td>* Therapy of diabetes mellitus</td>
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<tr>
<td>* Dyslipoproteinemias</td>
<td>Practical aspects of insulin therapy. Treatment of dyslipoproteinemias</td>
</tr>
<tr>
<td>* Hyperuricemia, gout</td>
<td></td>
</tr>
<tr>
<td>* Introduction to clinical</td>
<td>Physical examination of patients with rheumatoid diseases</td>
</tr>
</tbody>
</table>
immunology
Rheumatoid arthritis
* SLE, Dermatomyositis, Consultation
Sjögren’s disease, MCTD
Consultation

MEDICAL PSYCHOLOGY I.

6th semester

LECTURE/PRACTICE
(1 hr/week)/(1 hr/week)
* Introduction: Medical psychology and border areas
Patients’ representations and beliefs about illness
Stress, in the light of evolution
Stress and control perception
Coping with stress and illness
The psychological process of becoming ill
The role of personality in the changes of health status
The influences of gender and age on health behaviors
Psychological aspects and management of pain
Chronic illness and social support
Hospitalization
Adherence in the patient–physician relationship
The prevention and management of burnout among health professionals

MICROBIOLOGY AND IMMUNOLOGY

5th semester

LECTURE
(3 hrs/week)
* Introduction to microbiology.
Characterization and classification of bacteria.

Structure of bacteria. Growth and nutrition of bacteria.
* Principle and practice of sterilization and disinfection.

Antimicrobial chemotherapy I.
* Antimicrobial chemotherapy II.
Microbial genetics.

* Pathogenesis of bacterial infection I. Microbial antigens.
Pathogenesis of bacterial infection. II.
* Introduction to immunology. Basic principles.

Constituents of the immune system. Primary and secondary immune organs.
* Humoral immune response. Active and passive immunity. Vaccines.

* Major histocompatibility complex (MHC)
Antigen processing. MHC I, MHC II.
* Phagocytic cells, phagocytosis. Innate immunity.
The structure and the activation of the complement system.
* Cytokines I.
Cytokines II. Adhesion molecules.
* Hypersensitivity reactions.
Tolerance, autoimmunity.

PRACTICE
(2 hrs/week)
Introduction to microbiology.
Laboratory safety. Aseptic techniques.
Wet-mount preparation
Preparation of bacterial smear.
Simple staining.
Methods of sterilization.
Differential staining:
Gram’s and Ziel-Neelsen’s staining
Culture media.
Preparation of blood agar.
Handling bacterial cultures (inoculation and plating).
Colony morphology. Anaerobic cultivation.
Biochemical diagnostic tests.
Methods for counting bacteria.
Antimicrobial susceptibility testing.
MTO

Serological reactions I.
Agglutination.
Serological reactions II.
(Precipitation, CFT).
Serological reactions III.
ELISA, RIA, IF.
Tests for cellular immune
Transplantation and immunity. Tumor immunity. Laboratory methods in immunology.


6th semester

**LECTURE**
*(3 hrs/week)*


* Aetiology of AIDS. Important human pathogenic fungi. Important human pathogenic protozoa. Important human pathogenic helminths.

**PRACTICE**
*(2 hrs/week)*


**PATHOLOGY**

5th semester

**LECTURE**
*(3 hrs/week)*


**SEMINAR**
*(1 hour/week)*


**PRACTICE**
*(2 hrs/week)*

Histolopathology of cellular injury and death/Autopsy. Autopsy/Histolopathology of cellular injury and death/
Curriculum 2013/2014

* Pathology of inflammation I.
* Pathology of inflammation II.
* Pathology of inflammation III.
  Pathology of inflammation IV.
  Tissue repair. Wound healing.
* Immunopathology I.
* Immunopathology II.
* Immunopathology III.
  Pathology of transplant rejection.
  Neoplasia I.
* Neoplasia II. Carcinogenesis.
  Amyloidosis. Cystic fibrosis.
  Pathology of bed rest.
  Pathology of alcohol abuse.
  Pathology of smoking.
* Diabetes. Pathology of obesity.
  Diseases of the blood vessels I.
  Diseases of the blood vessels II.
  Diseases of the heart I.
  Diseases of the heart II.
  Essential hypertension.
* Nephropathology I.
* Nephropathology II.
* Nephropathology III.
* Nephropathology IV.
* Diseases of the lung I.
* Diseases of the lung II.
* Diseases of the lung III.
* Oral pathology.
  Gastrointestinal pathology


* Diseases of the blood vessels I.
  Diseases of the blood vessels II.
  Diseases of the heart I.
  Diseases of the heart II.
* Essential hypertension.
* Nephropathology I.
* Nephropathology II.
* Nephropathology III.
* Nephropathology IV.
* Diseases of the lung I.
* Diseases of the lung II.
* Diseases of the lung III.
* Oral pathology.
  Gastrointestinal pathology

6th semester

LECTURE (2 hrs/week)
* Gastrointestinal pathology.
  Pathology of the liver.
  Pathology of the biliary tract and pancreas.
  Pathology of soft tissue tumours. Pathology of the bones, joints and muscles.
  Endocrine pathology I.
  Endocrine pathology II.
  Pathology of female genital system I.
  Pathology of female genital system II. Breast pathology.
  Neuropathology I.
  Neuropathology II.
  Immune pathology

SEMINAR (1 hr/week)
Gastrointestinal pathology.
Pathology of the liver.
Pathology of the biliary tract and pancreas.
Pathology of soft tissue tumours. Pathology of the bones, joints and muscles.
Endocrine pathology
Endocrine pathology
Pathology of female genital system
Pathology of female genital system. Breast pathology.
Neuropathology
Neuropathology

PRACTICE (3 hrs/week)
Histopathology of the cardiovascular system/Autopsy
Histopathology of the respiratory tract/Autopsy
Histopathology of the gastrointestinal system/Autopsy
Histopathology of the liver and pancreas/Autopsy
Haematohistopathology/Autopsy
Histopathology of the urogenital tract/Autopsy
Histopathology of the female genital tract/Autopsy
Histopathology of the breast/Autopsy
Endocrine histopathology/Autopsy
Histopathology of the bones, joints and muscles/Autopsy
Histopathology of the nervous system/Autopsy
* Pathology of male genital system.
* Haematopathology I.
* Haematopathology II.

**PATHOPHYSIOLOGY**

5th semester

**LECTURE**

(3 hrs/week)

* Introduction to Pathophysiology; Basics of ECG

* Inflammation I.: Definition, causes and forms of inflammation. Mediators of acute inflammation.

* Inflammation II.: Cellular elements of acute inflammation. Regulation and outcome of acute inflammation.

* Inflammation III.: Chronic inflammation. Local and generalized reactions of inflammation: fever, inflammatory pain.


* Endocrinology I.: Diseases of hypothalamus, adenohypophys, thyroid, and adrenal (cortex and medulla) glands.


* Starvation and obesity. Diabetes mellitus I: definition, diagnosis and classification.

* Diabetes mellitus II: Type 1 and 2 diabetes mellitus pathogenesis and consequences. Hypoglycemia. Arrhythmia III.: Tachyarrhythmias.

* Cardiovascular system I.: Pathophysiology of plasma lipoprotein metabolism. Atherosclerosis (development and consequences).

* Cardiovascular system II.: Pathophysiology and ECG of acute coronary syndromes: angina pectoris, myocardial infarction, sudden ischemic death.

**PRACTICE/SEMINAR**

(2 hrs/week)


Review of physiologic background of normal ECG. Registration and analysis of ECG. Determination of spirometric parameters. (Lecture topic of the 1st week).

Seminar: Inflammation I. (Lecture topic of the 2nd week).

Seminar: Inflammation II. (Lecture topic of the 3rd week).

Seminar: Inflammation III. (Lecture topic of the 4th week).

Seminar: Pathophysiology of leukocytes I.: Immunology Arrhythmia I. (Lecture topic of the 5th week)

Seminar: Endocrinology I. (Lecture topic of the 6th week).

Seminar: Endocrinology II. Arrhythmias II. (Lecture topic of the 7th week).

Seminar: Starvation, obesity Diabetes mellitus (Lecture topic of the 8th week).

Seminar: Diabetes mellitus, hypoglycemia. Arrhythmias III. (Lecture topic of the 9th week).

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.

* **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.


**6th semester**

**LECTURE**  
(3 hrs/week)


* **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

* **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.

* **Pulmonary diseases I**: Abnormal breathing patterns, dyspneas. Obstructive pulmonary diseases: CODP, asthma bronchiale, cystic fibrosis, bronchiectasis, bronchiolitis acuta.

* **Pulmonary diseases II**: Restrictive pulmonary diseases, hypoxias, disorders of pleura, pulmonary edema, hypertension, embolisation, hypoxic conditions, respiratory failure. Cor pulmonale.


**PRACTICE/SEMINAR**  
(2 hrs/week)

**Seminar**: Cardiovascular system II. **ECG**: Myocardial ischemia, injury and infarction (Lecture topic of the 11th week).

**Seminar**: Cardiovascular system III. (Lecture topic of the 12th week). **ECG**: Hypertrophy and repetition of ECG

**Seminar**: Cardiovascular system IV. (Lecture topic of the 13th week).

**Seminar**: Pathophysiology of 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.

**Seminar**: Pathophysiology of salt-water balance 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.

**Seminar**: Pathophysiology of salt-water balance II (Lecture topic of the 3rd week)

**Seminar**: Pathophysiology of pulmonary diseases I. (Lecture topic of the 4th week).

**Seminar**: Pathophysiology of pulmonary diseases II. (Lecture topic of the 5th week).

Seminar: Disturbances of acid-base metabolism (Lecture topic of the 6th week).


Seminar: Gastroenterology I. (Lecture topic of the 7th week).


Seminar: Gastroenterology II. (Lecture topic of the 8th week).


Seminar: Pathophysiology of liver diseases (Lecture topic of the 10th week).


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).

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**Hungarian Language**

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 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.
* 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).

ADVANCED SURGICAL SKILLS
5th, 6th, 7th, 8th, 9th or 10th semester
LECTURE
(2 hrs/week)
* Minimally invasive surgery I. Technical background. Equipments and instruments. Robotic and fetoscopic surgery
* Written test exam

PRACTICE
(4 hrs/gr./every 2nd week)

BASICS OF EMERGENCY MEDICINE
6th semester

LECTURE
(2 hrs/week)
* 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,

PRACTICE
(4 hrs/gr./every 2nd week)
Complications). Blood flow, cardiac output measurements. Oxygen delivery, saturation and consumption measurement (central and mixed venous $O_2$). Heart contractility


* Monitoring of oxygenation and hypoxia. Inadequate external respiration, $O_2$ transport, internal respiration. Hypoxemia, tissue hypoxia, subcellular hypoxia (etiologic, pathophysiologic, 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 oximeter, 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. Extracorporeal membrane oxygenation


**MICROSURGERY**

<table>
<thead>
<tr>
<th>5th, 6th, 7th, 8th, 9th or 10th semester</th>
<th>LECTURE</th>
<th>PRACTICE</th>
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<tbody>
<tr>
<td>(TOTAL: 8 hrs)</td>
<td>(TOTAL: 20 hrs)</td>
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<tr>
<td>* General information. introduction to microsurgery (1 hrs)</td>
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* Written test exam

Practical exam
* Indications of microsurgery. Personal and technical conditions of microsurgery. Asepsis in microsurgery (2 hrs)
* Clinical applications of microsurgery (2 hrs)
* The operating microscope (1 hr) Appropriate posture at the operating microscope and the adjustment of the microscope. Movement coordination of the hands: interlacing threads under microscope (1 hr)
* Tying basic microsurgical knots under macroscopic and microscopic conditions (2 hrs)

* Basic suturing techniques, sutures of vessels and nerves (2 hrs)
* Stitching and tying knots with microsurgical instruments on rubber gloves (3 hrs)
* Stitching and tying knots with microsurgical instruments on rubber gloves (2 hrs)
* Suture of tubes (3 hrs)
* Suture of tubes (3 hrs)
* End-to-end anastomosis of rat carotid artery ex vivo (3 hrs)
* End-to-end anastomosis of rat carotid artery ex vivo (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, immunocytochemistry, citotoxicity tests, etc.).
* Diagnostic methods based on nucleic acid hybridization (Northern and Southern analysis, in situ hybridization, 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.
* 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
  Basic coagulation tests, monitoring of anticoagulant therapy, testing for congenital and acquired thrombophilias
* Laboratory diagnosis of coagulation disorders
  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
* 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 acute coronary syndrome

**BASIC SURGICAL SKILLS**

5th semester

**LECTURE**
(2 hrs/every 2nd week)

**PRACTICE**
(2 hrs/gr./every 2nd week)
* General information. Scrubbing, gowning and gloving. Practical rules of asepsis in the operating room. Behavior and movement in the operating room


* General information. Scrubbing, gowning and gloving. Practical rules of asepsis in the operating room. Behavior and movement in the operating room
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* Basic surgical instruments, suture materials, textiles. Scrubbing, gowning and gloving. Scrub preparation and draping of the surgical site. Tying surgical knots (hand and instrument knots)

* Tying surgical knots. Knotting under tension and in cavities


* 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


* Basics of minimally invasive surgery. Components of the laparoscopic tower, laparoscopic instruments. Eupractic movements, handling of laparoscopic instruments, knotting

* Written test exam

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
* Immunological tolerance. Self tolerance: central and peripheral tolerance. Mechanisms 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**

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**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

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**GERONTOLOGY**

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**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
ANAESTHESIOLOGY AND OXYLOGY

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
12. Acute treatment of intoxicated patient
13. Chronic pain, pain clinic
14. Recognition and acute treatment of multi-organ dysfunction
**CLINICAL ONCOLOGY**

**7th semester**

**LECTURE**

(2 hrs/week)

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Lecturer(s)</th>
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<tbody>
<tr>
<td>6-Sep</td>
<td>Cancer etiology, epidemiology. Tumor prevention</td>
<td>Prof. Dr. Zsuzsanna Kahán</td>
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<tr>
<td>13-Sep</td>
<td>The basics of Radiotherapy</td>
<td>Dr. Elemér Szil</td>
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<tr>
<td>20-Sep</td>
<td>The importance of pathology and diagnostic imaging in oncology; AJC/UICC TNM system</td>
<td>Prof. Dr. Zsuzsanna Kahán</td>
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<tr>
<td>27-Sep</td>
<td>Practical aspects of Radiotherapy</td>
<td>Dr. Katalin Hideghéty</td>
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<tr>
<td>4-Oct</td>
<td>Medical therapies: chemotherapy, endocrine therapy, biological therapies</td>
<td>Prof. Dr. Zsuzsanna Kahán</td>
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<tr>
<td>11-Oct</td>
<td>Supportive, palliative therapy and the holistic approach; psychooncology</td>
<td>Prof. Dr. Zsuzsanna Kahán</td>
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<tr>
<td>18-Oct</td>
<td>Breast cancer and gynecological malignancies</td>
<td>Prof. Dr. Zsuzsanna Kahán</td>
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<tr>
<td>25-Oct</td>
<td>The complex therapy of head and neck, oesophagus and gastric cancers</td>
<td>Dr. Katalin Hideghéty</td>
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<tr>
<td>8-Nov</td>
<td>The complex therapy of liver, pancreas and colorectal tumors</td>
<td>Prof. Dr. Zsuzsanna Kahán</td>
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<tr>
<td>15-Nov</td>
<td>Genitourinary malignancies</td>
<td>Dr. Anikó Maráz</td>
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<tr>
<td>22-Nov</td>
<td>Lung cancer and mesenchymal tumors</td>
<td>Dr. Anikó Maráz</td>
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<tr>
<td>23-Nov</td>
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<td>Dr. Katalin Hideghéty</td>
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<tr>
<td>29-Nov</td>
<td>Central nervous system, childhood and skin malignancies</td>
<td>Dr. Katalin Hideghéty</td>
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<tr>
<td>6-Dec</td>
<td>Multidisciplinary team-work</td>
<td>Prof. Dr. Zsuzsanna Kahán</td>
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<tr>
<td>13-Dec</td>
<td>EXAM</td>
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**DERMATOLOGY**

**9th semester**

**LECTURE**

(3 hrs/week)

* Introduction. The anatomy and physiology of the skin. Types of skin lesions.

* Basic immunopathologic reactions. Urticaria. Drug allergy.

* Atopic dermatitis. Contact dermatitis and other eczematous reactions. Viral diseases.

* Bacterial diseases with cutaneous involvement. Fungal diseases with cutaneous involvement.


* AIDS. Scabies, pediculosis. Tropical skin diseases.


**PRACTICE**

(2 hrs/week)

Examination of patients with dermatological diseases. Case presentations.

Primary and secondary lesions. Case presentations.

Special tools and techniques in Dermatology (Wood-lights, diascopy, dermatoscopy) Case presentations.

Special tests in Dermatology I. In vitro and in vivo (skin) tests in allergic disorders. Case presentations.

Special tests in Dermatology II. Diagnosis of infectious diseases. Case presentations.

Special tests in Dermatology. Diagnosis and treatment of STD. Case presentations.

Special tests in Dermatology III. Diagnosis of autoimmune diseases. Case presentations.

* Disorders of collagen and tissue. Vasculitis, purpuric conditions. Topical therapy in Dermatology. Case presentations.


* Disorders of the hair and nails. UV-induced dermatoses. Laser therapy in dermatology. Systemic therapy in Dermatology. Case presentations and discussions.

**FORENSIC MEDICINE**

9th semester

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

**FORENSIC MEDICINE**

10th semester

<table>
<thead>
<tr>
<th>LECTURE</th>
<th>PRACTICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2 hrs/every second week)</td>
<td>(2 hrs/week)</td>
</tr>
<tr>
<td>1. Traffic accidents I.</td>
<td>Hystology (sudden death in adults)</td>
</tr>
<tr>
<td>2.</td>
<td>Toxicology</td>
</tr>
<tr>
<td>3. Traffic accidents II.</td>
<td>Autopsy</td>
</tr>
<tr>
<td>4.</td>
<td>Malpractice</td>
</tr>
<tr>
<td>5. Forensic aspects of drug abuse</td>
<td>Reconstruction of accidents and criminal cases</td>
</tr>
<tr>
<td>6.</td>
<td>Autopsy</td>
</tr>
</tbody>
</table>
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
    Assessment of working ability and
    disability
14. -
15. Consultation
    Autopsy

INTERNAL MEDICINE
7th semester

LECTURE (4 hrs/week)
* Echocardiography
* Infective endocarditis. Tumors of the heart
* Hypertension in cardiologic aspect. Aortic dissection
* Aortic stenosis + Aortic incompetence.
* Mitral stenosis + Mitral incompetence
* Rheumatic fever. Myocarditis and pericarditis
* Adult congenital heart diseases
* Hypertrophic and dilatative cardiomyopathy: diagnosis and treatment
* Electrocardiography
* Cardiac arrhythmias
* Ischemic heart diseases
* Invasive diagnostic and therapeutical methods in cardiology
* Restrictive and obliterative cardiomyopathy. Chronic heart failure
* Pulmonary embolism. Pulmonary hypertension.
* Cardiac rehabilitation
* Special cardiac conditions: women, athletics, elders. Cardiac risk stratification in non cardiac surgery
* Acute heart failure. Failure of periferal circulation
* Revascularization in cardiac surgery
* Basic hematology
* Anemias
* Anemias. Hemolytic anemia
* Pancytopenias

PRACTICE (2 hrs/week)
Methods in echocardiography, reading an echocardiographic record.
Taking the case history the physical examination.
Performing percussion, auscultation.
Performing percussion, auscultation.
Performing percussion, auscultation.
Performing percussion, auscultation.
Performing percussion, auscultation.
The physical findings of rheumatic fever and inflammatory diseases.
Performing percussion, auscultation.
Performing percussion, auscultation. The physical findings of cardiomypathies.
Reading ECG records.
Reading ECG records learning modern antiarrhythmic treatment and procedures.
Non invasive and invasive technics in the diagnosis of ischemic heart disease.
Non invasive and invasive technics in the diagnosis of ischemic heart disease.
Performing percussion, auscultation. The physical findings of cardiomyopathies and chronic heart failure.
Physical findings of pulmonary embolism and hypertension.
Possibilities in rehabilitation program.
Non invasive and invasive technics in cardiology.
The signs and treatment of heart failure and periferal circulation
disturbances.
Visiting at operation theatre.
Evaluation of laboratory data
Inspection of patients with anaemia
Microscopic evaluation of red cells morphology
Bone marrow smears examination, physical signs of pancytopenic
* Myelodysplastic syndromes. Aplastic anemia
* Acut leukemia
* Stem cell transplantation
* Myeloproliferative diseases
* Malignant lymphomas.
* (Classification, Hodgkin disease)
* Aggressive lymphomas
* Malignant lymphomas.
* (Indolent lymphomas, multiple myeloma)
* Coagulation abnormalities.

8th semester

**LECTURE (5 hrs/week)**

* Esohpageal disorders
  Problem oriented evaluation of the symptoms of patients with esophageal disorders
* Peptic ulcer disease
  Practical aspects of the functional evaluation of patients with esophageal disorders (esophageal manometry, 24 h pH-metry, evaluation of the biliary reflux)
* Functional dyspepsia
  Upper gastrointestinal endoscopy
* Gastrointestinal hormones
  Gastric Cancer
* Chronic hepatitis
  Cirrhosis of the liver I. (etiology, symptoms)
* Cirrhosis of the liver II (complications, therapeutical options)
  Symptoms of patients with acute pancreatitis
  Symptoms of patients with biliary obstruction, investigative methods for patients with biliary obstruction (symptoms, biochemistry, ultrasonography, ERCP)
* Diseases of the biliary system I
* Diseases of the biliary system II
  Acute pancreatitis
  Chronic pancreatitis
  Pancreatic cancer
  Pathomechanisms of Inflammatory Bowel Disease
* Crohn’s disease and Ulcerative Colitis
  Tumors of the large intestine
  Early identification of patients with colorectal cancer. Diagnostic methods.
* Malabsorption syndrome
  Symptoms of malabsorption, maldigestion, Diagnostic workup: Hydrogen, c13 urea and starch breath tests
* Irritable Bowel Syndrome
  Diabetes mellitus (etiology, classification)
  Complications of diabetes mellitus
  Therapy of diabetes mellitus
  Dyslipoproteinemias
  Hyperuricemia, gout
  Introduction to clinical immunology
  Rheumatoid arthritis
  Practical aspects of the diagnosis and therapy of patients with diabetes mellitus; the patient education.
  Practical aspects of insulin therapy. Treatment of dyslipoproteinemias
  Physical examination of patients with rheumatoid diseases
* SLE, Dermatomyosistis, Sjögren’s disease, MCTD Consultation

**9th semester**

**LECTURE**

**PRACTICE**

(2 hrs/week) (2 hrs/week)


* Pathophysiology and diagnosis of infectious diseases.

* Infections of the respiratory organs.

* Infections of the gastrointestinal tract.

* Neuroinfections.

* Hepatitis.

* AIDS.

* Sepsis.

* Prevention of infectious diseases.

* Exanthematous infectious diseases.

* Antropozoonoses (Lyssa, Brucellosis, Tularemia etc.).

* Antimicrobial therapy.

* Nosocomial infections.

* Tropical diseases.

**10th semester**

**LECTURE**

(2 hrs/week)

* Diarrhoea, constipation.

* Abdominal pain.

* Ascites.

* Gastrointestinal bleeding.

* Jaundice.

* Hypertension.

* Motility disorders of the GI tract.

* Differential diagnosis of chest pain.

* Edema, cyanosis, dyspnoea.

* Approach to patients with bleeding problems.

* Differential diagnosis of anaemias and lymph node enlargements.

* Hematuria, edema.

* Syncope.

* Genetic disorders, obesity.

**PRACTICE**

**(total 16 hrs)**

Medical thinking, general principles of differential diagnostics

Differential diagnostics of diarrhea and constipation

Differential diagnostics in patients with abdominal pain

Differential diagnostics of ascites

Differential diagnostics of occult and manifest gastrointestinal bleedings

Differential diagnostics of jaundice

Differential diagnostics of the gastrointestinal motility disorders

differential diagnostics of hypertension

differential diagnostics of chest pain and syncope

differential diagnostics of edema, cyanosis, dyspnoea

differential diagnostics of anaemias and lymph node enlargements

differential diagnostics in patients with renal diseases

selected differential diagnostic problems, consultation

selected differential diagnostic problems, consultation

**MEDICAL PSYCHOLOGY II.**

**7th semester**
LECTURE/PRACTICE
(1 hr/week, 1 hr/week)
* Outline of the course. Behavioral medicine / psychosomatic medicine
Psychological aspects of general practice and family medicine
Medically unexplained symptoms – Somatisation
Risk behaviors and problem health conditions (smoking, obesity, diabetes etc.)
Cardiovascular diseases. Psychological aspects of prevention, treatment and rehabilitation
Cancer prevention and the care of cancer patients
The psychological aspects of death and dying. Breaking bad news
Surgery and organ transplantation. Problems of body-image in different medical conditions
The role of persuasive communication and suggestion in medicine
Psychological interventions and communication in pediatric care
Management of communication problems and medical decision making
Telemedicine and the use of the internet in health communication
The role of psychologists in medical care

NEUROLOGY
9th semester

LECTURE
(1 hr/week)
* a. The organization of the sensory system. b. Pain.
* The organization of the motor system.
* Spinal cord. Neurological localization.
* Brainstem. Neurological localization.
* Cerebellum. Neurological localization.
* a./ Parietal and occipital lobes. Neurological localization. b./ Vegetative nervous system.
* Cerebrospinal fluid. Diagnostic methods.
* Neurovascular system. Neurological localization.
* Extrapyramidal system. Neurological localization.
* a./ Electrical activity and examination of muscles and nerves
  b./ Modern neuroradiological diagnostic methods.
* Review of basic neurology knowledge

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

OBSTETRICS AND GYNAECOLOGY

7th semester

LECTURE (3 hrs/week)
* Development and function of the placenta. Development of the fetus.
* Endocrinology of pregnancy.
* Obstetrical anatomy. Diagnosis of pregnancy.
* Genital and extragenital changes during pregnancy.
* Signs of the fetal life. The mature placenta, umbilical cord, membranes and amniotic fluid.
* Intrauterine position of the fetus.
* Antenatal care and examinations.
* Normal mechanism of labour.
* Patient care during labour.
* Pharmacokinetics in pregnancy. Registration of the uterine activity.
* Diseases of the trophoblast.
* Monitoring of the fetus and placenta.
* Physiology of the uterus.
* Obstetrical ultrasonography.

PRACTICE (2 hrs/week)
* Prenatal care. Obstetrical history, physical examination.
* Pregnancy tests
* Induction of labour
* Ultrasonography
* Follow up examinations during pregnancy
* Genetics, CVS, AC, Cordocentesis
* Preparation for labour
* CTG, OCT, AS, X ray
* Normal delivery
* Induced abortion. Surgical aspects.
* Forceps delivery, vacuum extraction
* Breech presentation
* Postpartal hemorrhage
* Caesarean section
* 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)*

* Uterine rupture, postpartal haemorrhage, abnormal puerperium.
* Causes of 3rd trimester bleeding (premature separation of the placenta, DIC, plac. praevia).
* Dysmaturity. Hyperemesis.
* Erythroblastosis fetalis.
* Dystocia (difficult labor) pelvic dystocia due to uterine dysfunction, dystocia of fetal origin, dystocia of placental origin.
* Infectious diseases and pregnancy.
* Respiratory, renal, neurologic, endocrine and metabolic diseases.
* Benign tumors of the uterus.
* Diseases of the cervix. Cancer screening.
* Pelvic inflammatory diseases. Diseases of the Fallopian tube.
* Medical complications during pregnancy. (Heart, haematologic, gastrointestinal diseases.)
* Genetic disorders.
* Birth control. Contraception.
* Abnormalities of the menstruation.
* Climacteric.
* 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.

**PRACTICE**
*(2 hrs/week)*

Gynaecological history taking, physical and pelvic examinations.
Screening methods for cervical cancer: cytology.
Screening methods for cervical cancer: colposcopy.
Curettage, cervical biopsy, electrosurgery, conisation.
Female infertility, diagnostic procedures.
Infertility study of the male partner.
Labor procedures of infertility.
Conception control.
Endoscopy.
Abdominal gynaecological operations.
Vaginal surgical procedures.
Adolescent gynaecology.
Physiotherapy in gynaecology.
Radio- and chemotherapy.
Psychosexual diseases.

**OPHTALMOLOGY**

10th semester

**LECTURE**
*(2 hrs/week)*

* The eye and systemic diseases
* Essentials of anatomy and physiology, Optics and refraction

**PRACTICE**
*(2 hrs/week)*

General Practical
General Practical
### Orthopaedics

**7th semester**

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Field of orthopaedics, history.</strong> Diagnosis and treatment of orthopaedic disorders.</td>
<td>The course of the examination of the patients with locomotor system diseases. Diagnostic means. X-ray demonstration. Case report.</td>
</tr>
<tr>
<td><strong>Disorders of the spine in childhood. Scoliosis.</strong> General affections of the skeleton</td>
<td>Examination of the neck and cervical spine. Disorders of the neck and cervical spine. X-ray demonstration. Case report.</td>
</tr>
<tr>
<td><strong>Congenital deformities and disabilities</strong></td>
<td>Examination of the trunk and spine. Disorders of the trunk and spine. X-ray demonstration. Case report.</td>
</tr>
<tr>
<td><strong>Disorders of the foot (congenital club foot, pes planovalgus)</strong></td>
<td>Examination of the scoliosis. Diagnostic means. X-ray demonstration. Case report.</td>
</tr>
<tr>
<td><strong>Arthritis, osteomyelitis, tuberculous arthritis</strong></td>
<td>Examination of the shoulder and elbow. Disorders of the shoulder and elbow. X-ray demonstration. Case report.</td>
</tr>
<tr>
<td><strong>Bone tumors</strong></td>
<td>Examination of the forearm, wrist and the hand. Disorders of the forearm, wrist and the hand. X-ray demonstration. Case report.</td>
</tr>
<tr>
<td><strong>Disorders of the neck and upper limbs</strong></td>
<td>Examination of the osteoarthritis of the hip and of the knee. X-ray demonstration. Case report.</td>
</tr>
<tr>
<td><strong>Congenital dislocation and dysplasia of the hip</strong></td>
<td>Examination of the knee. Disorders of the knee. X-ray demonstration. Case report.</td>
</tr>
<tr>
<td><strong>Other hip disorders in childhood (Perthes disease, slipped upper femoral epiphysis. Transient arthritis of the hip.)</strong></td>
<td>Examination of the leg, ankle and foot. Disorders of the leg, ankle and foot. X-ray demonstration. Case report.</td>
</tr>
<tr>
<td><strong>Neuromuscular diseases, general affections of the skeleton</strong></td>
<td></td>
</tr>
</tbody>
</table>
* Oto-rhino-laryngology in medicine. Examination equipment in oto-rhino-laryngology.


* Diseases of the external ear and their treatment. X-ray, CT, MR pictures of the ear.


* Diseases of the inner ear: toxic damage to the ear, inflammatory and vascular lesions of the inner ear. Acoustic trauma. Meniere's disease.

* Diseases of the inner ear: acoustic neuroma, temporal bone fractures.

* Anatomy of the inner ear. The vestibular and cochlear system.

* Examination of hearing and the vestibular system.

* Anatomy of the nose and nasal sinuses.

* Diseases of the external nose and the nasal cavity.

* Sinusitis. Treatment and complications. Fractures of the sinuses.

* Haemorrhage from the nose. Tumors of the nose and paranasal sinuses.

* Anatomy of the pharynx. Diseases of the nasopharynx.

* 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**

<table>
<thead>
<tr>
<th>LECTURE (3 hrs/week)</th>
<th>PRACTICE (2 hrs/week)</th>
</tr>
</thead>
<tbody>
<tr>
<td>* The ill child and his doctor</td>
<td>History taking, Iatrogenic infections</td>
</tr>
<tr>
<td>* The interview, The problems, Mortality</td>
<td>Examination of the child and infant, Rickets, tetany</td>
</tr>
<tr>
<td>* Genes</td>
<td>Newborn, preterm and small for dates infants</td>
</tr>
<tr>
<td>* 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</td>
<td>O2, incubator, mechanical ventilation</td>
</tr>
<tr>
<td>* Fetus</td>
<td>Paediatric surgery: malformations</td>
</tr>
<tr>
<td>* 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</td>
<td>Developmental and nutritional state</td>
</tr>
<tr>
<td>* Newborn</td>
<td>Healthy babies' care and nutrition</td>
</tr>
<tr>
<td>* 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</td>
<td>Prevention and treatment of infections</td>
</tr>
<tr>
<td>* Nutrition</td>
<td>Immunological procedures, tuberculin test</td>
</tr>
<tr>
<td>* Breast feeding, Artificial feeding, Feeding problems, Nutritional deficiencies, Malnutrition, Obesity</td>
<td>Management of the poisoned child</td>
</tr>
<tr>
<td>* Infection</td>
<td>Treatment of burns, shock, unconsciousness</td>
</tr>
<tr>
<td>* 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</td>
<td>Respiratory tract diseases, Asthma, Allergens and respiratory function testing</td>
</tr>
<tr>
<td>* Hazards</td>
<td>Examination: murmurs, heart failure, congenital heart disease</td>
</tr>
<tr>
<td>* Injuries, Burns and scalds, Drowning, Choking, Poisoning, Other hazard</td>
<td>Cardiological diagnostics</td>
</tr>
<tr>
<td>* Airways and lungs</td>
<td>Dehydration, Infusion therapy, Malabsorption, Liver diseases</td>
</tr>
</tbody>
</table>
* Upper respiratory tract infections, Upper airway obstruction, Lower respiratory tract infections, Cystic fibrosis, Asthma

* Heart

* 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

* Gut

* 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, Mentabatic 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
**Curriculum 2013/2014**

**LECTURE**
**(3 hrs/week)**
* Pharmacokinetics II: Distribution.
* Cholinolytic drugs. Sympathomimetic drugs.
* Smooth muscle relaxants. Treatment of asthma bronchiale.
* Local anaesthetics. Antiinflammatory drugs. Glucocorticoids.
* Chemotherapy I. Cell wall synthesis inhibitors. Protein synthesis inhibitors.
* Chemotherapy III. Macrolid-antibiotics. Chemotherapy of neoplastic diseases.
* Chemotherapy IV: Antiviral and antifungal agents. Treatment of protozoan infections (malaria).

**PRACTICE**
**(2 hrs/week)**
Receptor theory.
Computer Lab: Drug-receptor interactions.
Computer Lab: Pharmacokinetics.
Computer Lab: Repeated drug administration.
MTO: General pharmacology.
MTO-GPH Discussion
Computer Lab: Parasympathetic nervous system.
Computer Lab: Sympathetic nervous system.
Computer Lab: Skeletal muscle and smooth muscle relaxants.
MTO: Autonomic nervous system.
Prescription writing.
Treatment of mycobacterium infections (TBC).
To recapitulate: Chemotherapy.

**8th semester**

**LECTURE**
**(4 hrs/week)**
* Antipsychotic drugs. Antiepileptic drugs.
* Antiarrhythmic drugs.
* Antiinflammatory drugs.
* Diuretic drugs. Pharmacotherapy of hyperlipoproteinemias. Cardiotonics.
* Hormones. Vitamines.
* Drugs that influence the GIT. Toxicology I.
* Toxicology II.
* Toxicology of doping.

**PRACTICE**
**(2 hrs/week)**
Introduction.
Contemporary drug abuse.
To recapitulate: General anaesthesia.
Pharmacotherapy of pain.
To recapitulate: CNS
MTO: CNS.
Therapy of AMI.
Computer lab - CVS
Therapy of migraine.
Therapy of anaemias.
MTO: CVS.
Discussion - CVS.
Principles of immunopharmacology.
Prepare for the final exam.

**PSYCHIATRY**

**9th semester**

**LECTURE**
**1 hr/week**
* The psychiatric examination

**PRACTICE**
**1 hr/week**
Psychiatric patient examination related to the lecture
**10th semester**

**LECTURE**  
(2 hrs/week)  
* Organic mental disorders  
* Dementia states  
* Psychoactive substance abuse  
* Psychosomatic diseases  
* Psychosexual disorders  
* Personality disorders  
* Anxiety states. Neurosis I.  
* Anxiety states. Neurosis II.  
* Psychotherapeutic methods  
* Psychopharmacologic treatments  
* Child and adolescent psychiatry  
* Sleep disorders  
* Geriatric psychiatry  
* Ethics and law in psychiatry

**PRACTICE**  
(1 hr/week)  
* Psychiatric patient examination related to the lecture

**PUBLIC HEALTH**

**7th semester**

**LECTURE**  
(2 hrs/week)  
* The history of public health. The aim and scope of public health. The levels of prevention; basic principles of health promotion.  
* The theoretical basis of demography and epidemiology.  
* The global health situation; priorities in global health.
* Epidemiology of infectious diseases:
  airborne diseases.

* Epidemiology of infectious diseases:
  enteric diseases, toxicoinfections.

* Epidemiology of infectious diseases:
  hematogenic, cutaneous, and sexually
  transmitted diseases.

* Epidemiology of infectious diseases:
  zoonoses.

* Epidemiology of transmissible spongiform
  encephalopathies and health care
  associated infections (infection control,
  nosocomial surveillance)

* HOLIDAY

* Epidemiology of chronic diseases –
  cardiovascular diseases.

* Epidemiology of chronic diseases –
  tumors.

* Epidemiology of chronic diseases –
  gastrointestinal and respiratory diseases.

* Epidemiology of chronic diseases –
  metabolic and musculoskeletal diseases.

* Epidemiology of mental disorders, suicide
  and accidents.

PUBLIC HEALTH

8th semester

<table>
<thead>
<tr>
<th>LECTURE</th>
<th>PRACTICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2 hrs/week)</td>
<td>(2 hrs/week)</td>
</tr>
<tr>
<td>* Health influencing factors – life style, environment, health care, genetics.</td>
<td>Requirements, questionnaire.</td>
</tr>
<tr>
<td>* Food quality and safety.</td>
<td>Case studies about diet-related hazards in food</td>
</tr>
<tr>
<td>* Epidemiology of smoking.</td>
<td>Special dietary requirements of certain chronic diseases. Students’ presentations.</td>
</tr>
<tr>
<td>* Epidemiology of alcohol and drug consumption. Role of physical activity in the prevention of chronic diseases.</td>
<td>Smoking cessation guidelines for health professionals.</td>
</tr>
<tr>
<td>* Human ecology; global warming; air pollutants and their effects on human health (indoor and outdoor).</td>
<td>Health promotion in various settings (community, workplace, school) Environmental epidemiology: examining health damaging effects of air pollution</td>
</tr>
</tbody>
</table>
Curriculum 2013/2014

* Water pollutants and their effects on human health. Sewage, soil pollutions, waste management.
* General toxicology. Toxicology of metals, solvents and gases.
* Toxicology of persistent organic pollutants, plastics and agrochemicals.
* Occupational health. Occupational diseases caused by physical exposures
* Occupational diseases caused by biological, ergonomic and psychosocial exposures. Health effects of dusts, occupational pneumoconiosis.
* Structure and operation of health systems I. – general aspects
* Structure and operation of health systems II. – health and health care in the family (mother, infant, child, adolescent, elderly).

PULMONOLOGY
7th semester

<table>
<thead>
<tr>
<th>LECTURE (1 hr/week)</th>
<th>PRACTICE (2 hrs/week)</th>
</tr>
</thead>
<tbody>
<tr>
<td>COPD (Chronic bronchitis.Emphysema.)</td>
<td>Characteristic X-ray findings.</td>
</tr>
<tr>
<td>Respiratory function. Spirometry.</td>
<td>Chronic bronchitis. &quot;Pink puffers&quot; and &quot;blue bloaters&quot;.</td>
</tr>
<tr>
<td>Asthma bronchiale</td>
<td>Diagnosis of asthma bronchiale. Aspecific provocation tests, skin test, IgE.</td>
</tr>
<tr>
<td>Malignant neoplasm of lung</td>
<td>Bronchoscopy, Thoracoscopy, mediastinoscopy.</td>
</tr>
<tr>
<td>Diseases of pleura</td>
<td>Aetiology of pleural effusions. Aspiration of the pleural effusion. Laboratory findings.</td>
</tr>
<tr>
<td>Pulmonary thromboembolism, cor pulmonale chronicum</td>
<td>X-ray findings in tuberculosis.</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>Sputum examination in tuberculosis. Tuberculin test. Treatment.</td>
</tr>
<tr>
<td>Respiratory failure. Sleep apnoea syndrome.</td>
<td></td>
</tr>
</tbody>
</table>

RADIOLOGY
7th semester

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

8th semester

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

**PRACTICE**
*(1 hr/week)*
* Radiology of the breasts
* Radiology of the liver
* Radiology of the biliary tract
* Radiology of the pancreas & spleen
* Neuroradiology I.
* Neuroradiology II.
* Neuroradiology III.
* Pediatric radiology
* Radiology of the kidneys & the urinay tract
* Radiology of the retroperitoneal space
* Radiology of the pelvis and the male reproductive organs
* Radiological aspects of emergency
* Radiological aspects of trauma

**STOMATOLOGY**

7th semester

**LECTURE/PRACTICE**
*(1 hr/week, 2 hrs/week)*
* Disorders of development of the teeth and related tissues dental caries prevention
* Diseases of dental pulp, and treatment of dental caries
* Periapical periodontitis and severe infections
* Extraction of teeth and related problems. Injuries to teeth and supporting tissues
* Periodontal diseases
* Cysts of the maxillo-facial region
* Oral diseases
* Systemic diseases in relation to dentistry
* Benign tumors, praecancerous lesions
* Malignant tumors
* Maxillo-facial traumatology
* Prosthetic dentistry and disorders of temporomandibular joints
* Treatment of malignant tumors
* Rehabilitation following maxillo-facial-surgery

**SURGERY**

**7th semester**

**LECTURE**

(2 hrs/week)

* The surgery of the mediastinum
* The surgery of the thorax
* The surgery of the lung
* Cardiac surgery
* The surgery of the breast cancer
* Oncological treatment after the removal of the breast cancer
* Vascular surgery
* The surgery of the abdominal wall, hernias

**PRACTICE**

(2 hrs/week)

The syllabus of the practicals are synchronized with the lectures.

The patients examinations and the discussion of the symptoms and illnesses follow the topics of the lectures.

The practicals take place in the Department of Surgery.

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**8th semester**

**LECTURE**

(2 hrs/week)

* The benign disease of oesophagus
* Gastric surgery. Benign disease
* Gastric surgery. Malignant disease
* The malignant disease of oesophagus
* Surgery of gallbladder
* Surgery of bile duct
* Gastrointestinal bleeding
* Surgery of pancreas
* Gastrointestinal perforation
* Surgical treatment of portal hypertension
* Surgical treatment of liver

**PRACTICE**

(2 hrs/week)

The syllabus of the practicals are synchronized with the lectures.

The patients examinations and the discussion of the symptoms and illnesses follow the topics of the lectures.

The practicals take place in the Department of Surgery.

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**9th semester**

**LECTURE**

(1 hr/week)

* Surgery of the rectum
* Surgery of the large intestine
* Benign disease of the thyroid gland
* Ileus mechanicus

**PRACTICE**

(1 hr/week)

The syllabus of the practicals are synchronized with the lectures.

The patients examinations and the discussion of the symptoms and illnesses follow the topics of the lectures.

The practicals take place in the Department of Surgery.
Curriculum 2013/2014

* Cancer of the thyroid gland
* Other endocrine malignancies
* Organ transplantation
* Appendicitis
* Peritonitis

TRAUMATOLOGY
10th semester

LECTURE
(2 hrs/week)
* Fractures and dislocations about the shoulder, humerus and elbow.
* Injuries of the vertebral column with and without neurological spinal cord defect. Surgical stabilization of the vertebral fractures.
* Fractures of the tibial condyles. Closed and open injuries of the tibial shaft. Complications.
* Fractures and dislocations about the ankle and foot.
* Politraumatization and multiple injuries. First aid and transportation. Priorities in polytrauma. Primary and secondary treatment of fractures.

PRACTICE
(2 hrs/week)
* Clinical examination of the injured patient. Additional clinical investigations. X-ray examination.
* Plaster technique. Synthetic splinting. Other external splints.
* Operative treatment of fractures. Presentation of cases.
* Complications of fractures.
* Delayed union. Non-union.
* Avascular necrosis. Osteoarthritis.
* Reflex sympathetic dystrophy.
* Head injuries. Diagnosis, treatment. Visit at the intensive care unit.
* Shoulder, upper arm and elbow injuries.
* Forearm, wrist and hand.
* Fractures and soft tissue injuries.

UROLOGY
10th semester

LECTURE

PRACTICE
(1hr/week) (2hrs/week)

* Signs and symptoms of urological diseases. Case history and the physical examination.
* Urolithiasis. Catheters and endoscopic instruments.
* Incontinency. Endoscopy.
* Urotraumatology. Percutaneous epicystostomy and nephrostomy.
* Acute and chronic renal failure. ESWL.
* Nonspecific infections in the urology.
* Tumors of the kidney and ureter.
* Tumors of the bladder. Laboratory investigations in the urology.
* Tumors of the external male genitalia.
* 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.
* 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.
* 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)*

* Introduction: summary of basic biostatistics
* Nonparametric methods for two or more dependent or independent data
* Multiple linear regression, linear models
* Comparison of several independent group-means: two-way ANOVA
* Two-way ANOVA with interaction
* Comparison of several related group-means: repeated measures ANOVA
* Summary
* Diagnostic tests. Specificity, sensitivity, PPV, NPV, Accuracy

**PRACTICE**  
*(1 hr/week)*

* The mean concepts of ogistics. Statistical computer systems.
* The choice of the appropriate statistical method and its evaluation
* Data sets with several independent variables (i.e., risk factors)
* Data sets and problems when two-way ANOVA is appropriate
* Understanding the concept of interaction
* Data sets and problems for repeated measurements ANOVA
* TEST I: solving two problems, main results and interpretation
* Calculation of the diagnostic measures
**BASIC BIOSTATISTICS**

7th, 9th semester

**LECTURE**
(1 hr/week)

* Data definition, types of data, displaying data. Sample characteristics.

* Probability, random variables and their types, distributions.

* Binomial, Poisson, uniform and normal distribution and their properties.

* Statistical estimation, confidence intervals.

* Testing hypotheses, significance. One-sample t-test.

* Paired and Independent samples t-tests.

* Errors in hypothesis tests

* Comparing the mean of several groups: one-way analysis of variance.

* Relationship between continuous variables, correlation, linear regression.

* Relationship between categorical variables: the chi-square test for independence

* The use of 2x2 tables in diagnostic tests. The chi-square-test for goodness of fit.

* Nonparametric methods.

* Summary

* Examples from the literature

**PRACTICE**
(1 hr/week)

* Bar chart, histogram. Calculation of the mean and standard deviation.

* Calculation of ogisticccs. The use of a computer program.

* The use of statistical tables – standard normal distribution.

* Calculation of the confidence interval for a population mean. The use of the t-table.

* Practice of one-sample t-test using experimental data.

* Practice of t-tests using experimental data. The meaning of significance, p-value.

* Independent t-tests and one-way ANOVA. Multiple comparisons.

* Scatterplot, trend-line in EXCEL.

* Evaluation of a 2x2 table by hand calculation and by computer

* Calculation of sensitivity, specificity, positive and negative predictive value.

* Statistical tests on ranks.

* 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

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**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.
* Dominant and recessive pattern of inheritance in clinical praxis.
* 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.
* 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.
* Immunohaematology.
* Connective tissue disorders and joint diseases.
* Organ specific autoimmune diseases.
* Immunodeficiencies. The immunology of HIV infection.
* Tumor immunology.
* Neuroimmunology.
* Immune manipulation.

CLINICAL PHARMACOLOGY

8th or 10th semester
LECTURE
(2 hrs/week)
* Introduction into clinical pharmacology. Historical background.
* The basic principles of pharmacokinetics.
* The basic principles of pharmacodynamics
* The basic principles of pharmacogenetics.
* Drug interactions and side-effects.
* The basic principles of biostatistics.
* The evaluation of preclinical data.
* The principles of GCP (Good Clinical Practice)
* The ethical and authoritative legislation of clinical drug trials.
* The principles of human phase studies (Phase I-II.)
* The principles of human phase studies (Phase III-IV.)
* Bioequivalence studies.
* Industrial drug research and development.
* Visit to the human Phase I. Unit at the I. Dept of Internal Medicine.

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 effects of short- and long-range flights from the passenger's point of view.
* The basics of aerodynamics. The composition, layers and main physical properties of the atmosphere.
* Pressure oxygen breathing. Motion sickness in aviation.
* 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.
* The pilots' lifestyle, nutrition and sports.
* The medical qualification of pilots and parachutists.
* The psychophysiological characters of the pilot's personality. The fatigue and overload of aircrews.
* The effects of noise and vibration on the human body during flight.
* Spatial alertness in flight, flight illusions.
* The physiological effects of space flight on the human body. The basic principles of astronaut selection and training.
* Decompression sickness

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 psychiartical problems in aviation medicine.
* Ophthalmology in aviation medicine.
* Emphasized aeromedical issues in oto-rhino-laryngology.
* The comparison of experiences gained in the MiG-29 and the Gripeen.
* 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
* 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

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<th>LECTURE (1 hr/week)</th>
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<tr>
<td>* Head injury. Head trauma, biomechanics, skull fractures, early and late complications, management, outcome.</td>
<td>Material of the lectures in practice.</td>
</tr>
<tr>
<td>* Tumors of the CNS. Increased intracranial pressure, brain oedema, signs and symptoms of space-occupying lesions.</td>
<td>Material of the lectures in practice.</td>
</tr>
<tr>
<td>* Supratentorial tumors.</td>
<td>Material of the lectures in practice.</td>
</tr>
<tr>
<td>* Axial-tumors, tumors of the posterior fossa.</td>
<td>Material of the lectures in practice.</td>
</tr>
<tr>
<td>* Tumors of the spine and spinal cord, metastatic tumors.</td>
<td>Material of the lectures in practice.</td>
</tr>
<tr>
<td>* Subarachnoid bleeding, cerebral aneurysms, early and late surgery, arteriovenous malformations cavernomas of the brain, venous anomalies.</td>
<td>Material of the lectures in practice.</td>
</tr>
<tr>
<td>* Spinal trauma. Biomechanics, acute pathology, early and late surgery versus conservative treatment, peripheral nerve injuries.</td>
<td>Material of the lectures in practice.</td>
</tr>
<tr>
<td>* Cervicobrachial syndromes. Herniation of the intervertebral disc in the cervical region, cervical spondylosis, narrowed spinal canal, surgical versus conservative therapy.</td>
<td>Material of the lectures in practice.</td>
</tr>
<tr>
<td>* Lumbar syndromes. Low back pain, lumbar disc prolaps, spondylosis of the lumbar region, failed back syndrome.</td>
<td>Material of the lectures in practice.</td>
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</tbody>
</table>
* Congenital anomalies. CSF circulatory disturbances, hydrocephalus, meningoceles, Chiari-malformation, pediatric neurosurgery.
* Surgery of the pain. Surgical repair of abnormal functions
* 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
  Tumour-affin 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)
04 Sept. Cardiac risk patients in dental practice and oral surgery
11 Sept. Antibiotics in dentistry and oral surgery
18 Sept. Internal medicine questions in dental practice
25 Sept. Dental treatment of patients with bleeding disorders
02 Oct. Dental treatment of patients following radio/chemotherapy
09 Oct. Maxillary sinus diseases and their management
16 Oct. Stomato-oncological screening
30 Oct. Differential diagnosis of neck masses
6 Nov. Differential diagnosis of facial pain
13 Nov. Head and neck skin tumors
20 Nov. Odontogenic tumors
27 Nov. Sedoanalgiesia
4 Dec. 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.
* An introduction to physician – patient communication 2
  Identifying the elements that make up communication
* Gastroenterology 1
  The patient centered approach: patient friendly language in history taking, instructing patients during examinations and discussing treatment options.
* Gastroenterology 2
  Receiving patients: greeting them and putting them at ease. Introducing yourself as the attending physician and explaining your role.
* Gynecology and obstetrics 1
  Asking for history of menstruation
* Gynecology and obstetrics 2
  Encouraging withdrawn patients to speak
* Orthopedics
  Taking obstetric history: previous pregnancies, complications, deliveries, asking for present complaints
* Endocrinology
  Patient’s past medical history. Discussing family medical history.
* 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
* Pulmonology
  Delivering bad news
* Anesthesiology and intensive care
  Updating patient notes
* Dental care
  Preparing and reassuring the patient during the examination. Negotiating the treatment.

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
* Oncology
  Describing types of anesthesia
* Dermatology
  Postoperative care
* Dermatology
  Educating and counseling patients and their families
* Dermatology
  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.
* Pediatrics 2
  Establishing and developing rapport with a child.
* Pediatrics 2
  Reassuring a child. Child-friendly instructions.
* Pediatrics 2
  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)
* Diarrhea caused by protozoa: entamoebiasis, cryptosporidiosis, giardiasis, and diseases caused by *Isospora, Balantidium,* and *Capillaria.* Pathogenesis, clinical and laboratory diagnosis, and therapy.
* Arthropod-borne infections caused by various bacteria, rickettsia, and spirochetes in tropical areas. Distribution of various vectors which may influence the emergence of a disease. Plague, tularemia, endemic typhus, spotted fevers, and ehrlichiosis, etc. Clinical and laboratory diagnosis, and therapy.
* Tuberculosis, leprosy, and other bacterial infections with special emphasis on tropical areas. (meningitis caused by *N. meningitidis,* anthrax, tetanus, and rhinoscleroma). Clinical and laboratory diagnosis. Differences in clinical picture in the tropical areas compared to other countries. Therapy.

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
* Spondyloarthritis (ankylosing spondylitis, psoriatic arthritis, reactive arthritis, enteropathic arthritis)
* Consultation
GENERAL INFORMATION REGARDING THE CREDIT SYSTEM
AT THE FACULTY OF DENTISTRY

STRUCTURE OF STUDIES CURRICULUM 9002AK_N_2013

For the complete suggested study plan visit the ETR website.

Students have to acquire a total of **300 credits** 5 modules in order to obtain the Doctor of Dental 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 Training**
    (It is compulsory to complete it in the first year)
  - **Dentist-Patient Communication** (in the 5th semester)
  - **Preclinical Course of Prosthodontics and Gnathology Examination**
    (in the 6th semester)
  - **Prosthodontics and Implantology** (in the 10th semester)
  - **Operative Dentistry and Endodontics** (in the 10th semester)
  - **Pediatric Dentistry and Orthodontics** (in the 10th semester)
  - **Oral Surgery** (in the 10th semester)
  - **Periodontology** (in the 10th semester)
  - **Summer practices**
  - 8 semesters of **Hungarian Language**
  - 1 semesters of **Latin Language for Dental Students**

**MODULES:**

1. **Basic Module (years 1-2, semesters 1-4)**

In the Basic Module one has to acquire a minimum of **80 credits** in order to enter the Pre-Clinical module.

It is recommended to acquire 100 credits according to the following scheme:

- Compulsory Subjects: 80 credits
- Compulsory Elective Subjects: **10 credits recommended in the basic module**
- Elective Subjects: **6 credits recommended in the basic module**
- Criteria Subjects (summer practice in Nursing, summer practice in Odontotechnology , 4 semesters of Hungarian Language)
  It is compulsory to complete 2 semesters of Physical Education in the first year.

2. **Pre-Clinical Module (year 3, semesters 5-6)**

In the Pre-Clinical Module one has to acquire a minimum of **52 credits** in order to enter the Clinical Module.

It is recommended to acquire 60 credits according to the following scheme:

- Compulsory Subjects: 52 credits
- Compulsory Elective Subjects: **5 credits recommended in the preclinical module**
- Elective Subjects: **3 credits recommended in the preclinical module**
- Criteria Subjects (Dentist-Patient Communication, Preclinical Course of Prosthodontics and Gnathology Examination, 2 semesters of Hungarian Language, Dental Surgery Summer Practice )

4. **Dental Clinical Module (year 4, 5 semesters 7-10)**

In the Dental Clinical Module one has to acquire a minimum of **83 credits**

5. **General Clinical Module (year 4, 5 semesters 7-10)**

In the General Clinical Module one has to acquire a minimum of **25 credits**
• Criteria Subjects (summer practice in Basic Treatment in Dental Medicine, 2 semesters of Hungarian Language, Prosthodontics and Implantology, Operative Dentistry and Endodontics, Pediatric Dentistry and Orthodontics, Oral Surgery, P
• Periodontology)

6. Compulsory Elective Subjects

One has to acquire a minimum of 25 credits until the 10th semester.

7. Elective Subjects

One has to acquire a minimum of 15 credits until the 10th semester.

8. State Board Examination

A student is entitled to sit for the State Board Examination if he/she has fulfilled all the study and examination requirements of the Dental Medicine Program.

In order to certify the completion of the ten-semester education period of the Dental Medicine Program, student has to fulfill all the study and examination requirements according to the Curriculum by obtaining minimum 280 credits. The thesis has to be submitted and defended in the 10th semester. The credit number obtained at a successful defense of the thesis is 20 credits.

Conditions of issuing the Diploma of Major of Dental Medicine:

- Obtaining minimum 300 credits
- Completion of all parts of the State Board Examination:
  - Successful defense of the thesis
  - completion of the written test, the practical and the oral part of the patient examination

For the complete suggested study plan visit the ETR website.

Students have to acquire a total of 300 credits 5 modules in order to obtain the Doctor of Dental 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 Training
    (It is recommended to complete it in the Basic Module)
  - Dentist-Patient Communication (in the 5th semester)
  - Preclinical Course of Prosthodontics and Gnathology Examination
    (in the 6th semester)
  - Prosthodontics and Implantology (in the 10th semester)
  - Operative Dentistry and Endodontics (in the 10th semester)
  - Pediatric Dentistry and Orthodontics (in the 10th semester)
  - Oral Surgery (in the 10th semester)
  - Periodontology (in the 10th semester)
  - Summer practices
  - 8 semesters of Hungarian Language
  - 2 semesters of Latin Language
MODULES:

1. Basic Module (years 1-2, semesters 1-4)

In the Basic Module one has to acquire a minimum of **84 credits** in order to enter the Pre-Clinical module.

It is recommended to acquire 100 credits according to the following scheme:

- Compulsory Subjects: 84 credits
- Compulsory Elective Subjects: *10 credits recommended in the basic module*
- Elective Subjects: *6 credits recommended in the basic module*
- Criteria Subjects (summer practice in Nursing, summer practice in Odontotechnology, 4 semesters of Hungarian Language)
  - It is recommended to complete 2 semesters of Physical Education in the Basic Module.

2. Pre-Clinical Module (year 3, semesters 5-6)

In the Pre-Clinical Module one has to acquire a minimum of **46 credits** in order to enter the Clinical Module.

It is recommended to acquire 54 credits according to the following scheme:

- Compulsory Subjects: 46 credits
- Compulsory Elective Subjects: *5 credits recommended in the preclinical module*
- Elective Subjects: *3 credits recommended in the preclinical module*
- Criteria Subjects (Dentist-Patient Communication, Preclinical Course of Prosthodontics and Gnathology Examination, 2 semesters of Hungarian Language, Dental Surgery Summer Practice)

4. Dental Clinical Module (year 4, 5 semesters 7-10)

In the Dental Clinical Module one has to acquire a minimum of **85 credits**

5. General Clinical Module (year 4, 5 semesters 7-10)

In the General Clinical Module one has to acquire a minimum of **25 credits**

- Criteria Subjects (summer practice in Basic Treatment in Dental Medicine, 2 semesters of Hungarian Language, Prosthodontics and Implantology, Operative Dentistry and Endodontics, Pediatric Dentistry and Orthodontics, Oral Surgery, Periodontology)

6. Compulsory Elective Subjects

One has to acquire a minimum of **25 credits** until the 10th semester.

7. Elective Subjects

One has to acquire a minimum of **15 credits** until the 10th semester.

8. State Board Examination

A student is entitled to sit for the State Board Examination if he/she has fulfilled all the study and examination requirements of the Dental Medicine Program.

In order to certify the completion of the ten-semester education period of the Dental Medicine Program, student has to fulfill all the study and examination requirements according to the Curriculum by obtaining minimum 280 credits. The thesis has to be submitted and defended in the 10th semester. The credit number obtained at a successful defense of the thesis is 20 credits.
Conditions of issuing the Diploma of Major of Dental Medicine:

- Obtaining minimum 300 credits
- Completion of all parts of the State Board Examination:
  - Successful defense of the thesis
  - Completion of the written test, the practical and the oral part of the patient examination

II. PRECONDITIONS FOR ENROLLMENT TO THE FOR THE COMING SEMESTERS: CURRICULUM 9002AK_N

- The compulsory courses in the second semester have examination requirements. This means one can take the examination of the second semester course only if the examination of the first semester subject (defined in the examination requirement) has been completed successfully:

<table>
<thead>
<tr>
<th>Course</th>
<th>Examination requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anatomy, Histology and Embryology II</td>
<td>Anatomy, Histology and Embryology I.</td>
</tr>
<tr>
<td>Medical Chemistry II.</td>
<td>Medical Chemistry I.</td>
</tr>
<tr>
<td>Medical Physics and Statistics II.</td>
<td>Medical Physics and Statistics I.</td>
</tr>
<tr>
<td>Cell Biology and Molecular Genetics II</td>
<td>Cell Biology and Molecular Genetics I.</td>
</tr>
</tbody>
</table>

The first semester courses can be taken as examination courses in the second semester. This means that the student will be exempted from fulfilling the study requirements (classes do not have to be attended). An examination course can be taken only once in a certain subject. The fee of the course is 570 USD.

If one fails to complete an examination course both the study and examination requirements have to be completed in the proper semester (the whole course has to be repeated).

- The compulsory courses in the third semester have subject requirements. This means one can attend a third semester course only if the examination of the second semester (defined in the subject requirement) has been completed successfully:

<table>
<thead>
<tr>
<th>Course</th>
<th>Subject requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anatomy, Histology and Embryology III</td>
<td>Anatomy, Histology and Embryology II.</td>
</tr>
<tr>
<td>Biochemistry I.</td>
<td>Medical Chemistry II.</td>
</tr>
</tbody>
</table>

In this case the failed examination of the second semester can be repeated as an examination course in the semester when it is offered by the Department concerned.

- The compulsory courses in the fourth semester have examination requirements. This means one can take the examination of the fourth semester course only if the examination of the third semester (defined in the examination requirement) has been completed successfully:

<table>
<thead>
<tr>
<th>Course</th>
<th>Examination requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anatomy, Histology and Embryology IV</td>
<td>Anatomy, Histology and Embryology III.</td>
</tr>
<tr>
<td>Biochemistry II.</td>
<td>Biochemistry I.</td>
</tr>
<tr>
<td>Physiology for dental students II.</td>
<td>Physiology for dental students I.</td>
</tr>
</tbody>
</table>

Further conditions of requirements are in the complete study plan visit the ETR website.

COMPULSORY PRACTICES IN SUMMER

Students who intend to perform the compulsory summer practice abroad should have a “Letter of acceptance” issued by the hospital where the student wishes to complete the practice has to be presented at the Foreign Students’ Secretariat. Deadline for presenting it: May 06, 2014. Official detailed certificate on the accomplishment of the practice has to be submitted subsequently, otherwise students cannot register for the next semester.
Fees if the practices are spent in Hungary: The fee for Nursing practice is 500 USD, for Odontotechnology is 600 USD, for Oral Surgery practice is 600 USD and for Basic Treatment in Dental Medicine is 800 USD. Practice fee must be paid before starting the practice.

Practices are spent in Hungary (Deadline for presenting the application: March 31, 2014.):

1st year dental students have to perform a practice in Nursing of two weeks.

Faculty of Dentistry:
Department of Oral Surgery
Period of time: from July 7, 2014 to August 1, 2014

2nd year dental students have to perform a practice in Odontotechnology of two weeks.

Faculty of Dentistry:
Department of Prosthodontics and Oral Biology
Period of time: from July 7, 2014 to August 1, 2014

3rd year dental students have to perform a practice in Oral Surgery of four weeks.

Faculty of Dentistry:
Department of Oral Surgery
Period of time: from July 7 2014 to August 29, 2014

4th year dental students have to perform a practice in Basic Treatment in Dental Medicine of four weeks.

Faculty of Dentistry:
Department of Prosthodontics and Oral Biology and Department of Operative and Esthetic Dentistry
Period of time: from July 7, 2014 to August 01, 2014
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course</th>
<th>Department and Head of Department</th>
<th>Hrs/week: Theory</th>
<th>Hrs/week: Practice</th>
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<th>Credit</th>
<th>Course Requirement (SR=Subject requirement; ER=Examination requirement; P=Parallel Completion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOG-MA011</td>
<td>Anatomy for Dental Students 1</td>
<td>Department of Anatomy</td>
<td>2</td>
<td>-</td>
<td>Examination</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>FOG-MA012</td>
<td>Anatomy for Dental Students 1</td>
<td>Department of Anatomy</td>
<td>Prof. András Mihály</td>
<td>2</td>
<td>Term Mark(5)</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>FOG-MA111</td>
<td>Biology for Dental Students 1</td>
<td>Department of Oral Biology and Experimental Dental Research</td>
<td>Prof. János Minárovits</td>
<td>2</td>
<td>Examination</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>FOG-MA112</td>
<td>Biology for Dental Students 1</td>
<td>Department of Oral Biology and Experimental Dental Research</td>
<td>Prof. János Minárovits</td>
<td>1</td>
<td>Evaluation(5)</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>FOG-MA081</td>
<td>Physics for Dental Students 1</td>
<td>Department of Oral Biology and Experimental Dental Research</td>
<td>Prof. János Minárovits</td>
<td>2</td>
<td>Examination</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>FOG-MA082</td>
<td>Physics for Dental Students 1</td>
<td>Department of Oral Biology and Experimental Dental Research</td>
<td>Prof. János Minárovits</td>
<td>1</td>
<td>Evaluation(5)</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>FOG-MA101</td>
<td>Chemistry for Dental Students 1</td>
<td>Department of Medical Chemistry</td>
<td>Prof. Gábor Tóth</td>
<td>2</td>
<td>Examination</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>FOG-MA102</td>
<td>Chemistry for Dental Students 1</td>
<td>Department of Medical Chemistry</td>
<td>Prof. Gábor Tóth</td>
<td>Total 30</td>
<td>Term Mark(5)</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>FOG-MA071</td>
<td>First Aid and Resuscitation</td>
<td>Department of Traumatology</td>
<td>Prof. Endre Varga</td>
<td>2</td>
<td>Term Mark(5)</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>FOG-MA061</td>
<td>Introduction to Dentistry</td>
<td>Department of Orthodontics and Pediatric Dentistry</td>
<td>Dr. Emil Segatto</td>
<td>1</td>
<td>Evaluation(5)</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>FOG-MA062</td>
<td>Introduction to Dentistry</td>
<td>Department of Orthodontics and Pediatric Dentistry</td>
<td>Dr. Emil Segatto</td>
<td>1</td>
<td>Term Mark(5)</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>FOG-MA221</td>
<td>Latin Language for Dental Students</td>
<td>Department of Foreign Languages</td>
<td>Dr. Éva Demeter</td>
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<td>Signature</td>
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</tr>
<tr>
<td>FOG-MA231</td>
<td>Hungarian Language 1</td>
<td>Department of Foreign Languages</td>
<td>Dr. Éva Demeter</td>
<td>4</td>
<td>Term Mark(5)</td>
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<td>-</td>
</tr>
<tr>
<td>XT0011-PHE</td>
<td>Physical Education*</td>
<td>Sport Center</td>
<td>Dr. Zsuzsanna Rákóczi Dr. Trényiné</td>
<td>2</td>
<td>Signature</td>
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</tr>
</tbody>
</table>

**Compulsory Elective Subjects**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course</th>
<th>Department and Head of Department</th>
<th>Hrs/week: Theory</th>
<th>Hrs/week: Practice</th>
<th>Form of exam</th>
<th>Credit</th>
<th>Course Requirement (SR=Subject requirement; ER=Examination requirement; P=Parallel Completion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOG-MAC011</td>
<td>Introduction to Medicine</td>
<td>Dept.of Behavioural Sciences</td>
<td>Dr. Katalin Barabás</td>
<td>1</td>
<td>Evaluation(5)</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>FOG-MAC012</td>
<td>Introduction to Medicine</td>
<td>Dept.of Behavioural Sciences</td>
<td>Dr. Katalin Barabás</td>
<td>1</td>
<td>Term Mark(5)</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>FOG-MAC071</td>
<td>Preventive Dentistry in Childhood</td>
<td>Department of Orthodontics and Pediatric Dentistry</td>
<td>Dr. Emil Segatto</td>
<td>1</td>
<td>Evaluation(5)</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>FOG-MAC041</td>
<td>Smoking prevention in Dental practice</td>
<td>Department of Oral Surgery</td>
<td>Prof. Katalin Nagy</td>
<td>1</td>
<td>Evaluation(5)</td>
<td>1</td>
<td>-</td>
</tr>
</tbody>
</table>

**Elective Subjects**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course</th>
<th>Department and Head of Department</th>
<th>Hrs/week: Theory</th>
<th>Hrs/week: Practice</th>
<th>Form of exam</th>
<th>Credit</th>
<th>Course Requirement (SR=Subject requirement; ER=Examination requirement; P=Parallel Completion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>XA0021</td>
<td>General Elective Subjects</td>
<td>University of Szeged</td>
<td>2</td>
<td>-</td>
<td>Examination</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>XN0211</td>
<td>SZTE Language Courses</td>
<td>University of Szeged</td>
<td>-</td>
<td>2</td>
<td>Term Mark(5)</td>
<td>2</td>
<td>-</td>
</tr>
</tbody>
</table>

*One has to complete 2 semesters Physical Education until the end of the 1st year*
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course</th>
<th>Department and Head of Department</th>
<th>Hrs/week: Theory</th>
<th>Hrs/week: Practice</th>
<th>Form of exam</th>
<th>Credit</th>
<th>Course Requirement (SR=Subject requirement; ER=Examination requirement; P=Parallel Completion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOG-MA013</td>
<td>Anatomy for Dental Students 2</td>
<td>Department of Anatomy</td>
<td>2</td>
<td>-</td>
<td>Examination</td>
<td>2</td>
<td>ER: Anatomy 1</td>
</tr>
<tr>
<td>FOG-MA014</td>
<td>Anatomy for Dental Students 2</td>
<td>Department of Anatomy</td>
<td>2</td>
<td>-</td>
<td>Term Mark(5)</td>
<td>3</td>
<td>ER: Anatomy 1</td>
</tr>
<tr>
<td>FOG-MA113</td>
<td>Biology for Dental Students 2</td>
<td>Department of Oral Biology and Experimental Dental Research</td>
<td>2</td>
<td>-</td>
<td>Examination</td>
<td>2</td>
<td>ER: Biology 1 lec.</td>
</tr>
<tr>
<td>FOG-MA114</td>
<td>Biology for Dental Students 2</td>
<td>Department of Oral Biology and Experimental Dental Research</td>
<td>1</td>
<td>-</td>
<td>Evaluation(5)</td>
<td>1</td>
<td>ER: Biology 1 sem.</td>
</tr>
<tr>
<td>FOG-MA083</td>
<td>Physics for Dental Students 2</td>
<td>Department of Oral Biology and Experimental Dental Research</td>
<td>2</td>
<td>-</td>
<td>Examination</td>
<td>2</td>
<td>ER: Physics 1 lec.</td>
</tr>
<tr>
<td>FOG-MA084</td>
<td>Physics for Dental Students 2</td>
<td>Department of Oral Biology and Experimental Dental Research</td>
<td>2</td>
<td>-</td>
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*One has to complete 2 semesters Physical Education until the end of the 1st year*
### SUGGESTED STUDY PLAN

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**BASIC MODULE (semesters 1-4)**

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*One has to complete 2 semesters Physical Education until the end of the 1st year*
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**DENTISTRY**

**BASIC MODULE (semesters 1-4)**

2013/2014 2nd year spring, 4th semester

**Compulsory Subjects**

- **FOG-KA017**: Anatomy, Histology and Embryology IV. (Department of Anatomy; Head: Prof. András Mihály; Hrs/week: 2; Theory: 2; Practice: 5; Form of exam: Comp. Exam; Credit: 7; Course Requirement: ER: Anatomy III.)
- **FOG-KA018**: Anatomy, Histology and Embryology IV. (Department of Anatomy; Head: Prof. András Mihály; Hrs/week: 5; Practice: 2; Credit: 0; Course Requirement: ER: Anatomy III.)
- **FOG-KA023**: Biochemistry II. (Department of Biochemistry; Head: Prof. László Dux; Hrs/week: 4; Practice: 2; Credit: 6; Course Requirement: ER: Biochemistry I.)
- **FOG-KA024**: Biochemistry II. (Department of Biochemistry; Head: Prof. László Dux; Hrs/week: 2; Practice: 2; Credit: 0; Course Requirement: ER: Biochemistry I.)
- **FOG-KA033**: Physiology for Dental Students II. (Department of Medical Physiology; Head: Prof. Gyula Sáry; Hrs/week: 4; Practice: 8; Credit: 8; Course Requirement: ER: Physiol. I.)
- **FOG-KA034**: Physiology for Dental Students II. (Department of Medical Physiology; Head: Prof. Gyula Sáry; Hrs/week: 2; Practice: 0; Credit: 0; Course Requirement: ER: Physiol. I.)
- **FOG-KA121**: Medical Sociology (Department of Public Health; Head: Dr. Edit Paulik; Hrs/week: 1; Practice: 1; Credit: 1; Course Requirement: Examination.)
- **FOG-KA131**: Oral Biology (Department of Oral Biology and Experimental Dental Research; Head: Dr. János Minárovits; Hrs/week: 1; Practice: 2; Credit: 2; Course Requirement: Examination; SR: Cell Biology II.)
- **FOG-KA132**: Oral Biology (Department of Oral Biology and Experimental Dental Research; Head: Dr. János Minárovits; Hrs/week: 1; Practice: 0; Credit: 0; Course Requirement: Signature.)

**Criteria Subjects**

- **FOG-KA142**: Odontotechnological Practice (Faculty of Dentistry; Head: Prof. Katalin Nagy; Hrs/week: 2x35 hours; Practice: Signature; Credit: 0; Course Requirement: Basic Module.)
- **FOG-KA164**: Hungarian Language IV. (Department of Foreign Languages; Head: Dr. Éva Demeter; Hrs/week: 4; Practice: 0; Credit: 0; Course Requirement: ER: Hungarian III.)
- **XT0011-2PHE**: Physical Education* (Sport Center; Head: Dr. Zsuzsanna Rákóczi Dr. Trényié; Hrs/week: 2; Practice: Signature; Credit: 0; Course Requirement:.)

**Compulsory Elective Subjects**

- **FOG-KAC112**: Biochemistry Seminar (Department of Biochemistry; Head: Prof. László Dux; Hrs/week: 2; Practice: Evaluation(5); Credit: 2; Course Requirement: parallel completion of Biochem. II.)
- **FOG-KAC21**: Medical Anthropology (Dept. of Behavioural Sciences; Head: Dr. Katalin Barabás; Hrs/week: 1; Practice: Evaluation(5); Credit: 1; Course Requirement:.)
- **FOG-KAC52**: Medical Physiology Seminar II. (Department of Medical Physiology; Head: Prof. Gyula Sáry; Hrs/week: 4; Practice: Evaluation(5); Credit: 4; Course Requirement:.)
- **FOG-KAC511**: Molecular Developmental Biology (Department of Biochemistry; Head: Prof. László Dux; Hrs/week: 2; Practice: Evaluation(5); Credit: 2; Course Requirement:.)

**Elective Subjects**

- **FOG-KAE031**: Animal Experiments in Medicine (Inst. of Surgical Research; Head: Prof. Mihály Boros; Hrs/week: total 22; Practice: Evaluation(5); Credit: 3; Course Requirement:.)
- **FOG-KAE0311**: Animal Experiments in Medicine (Inst. of Surgical Research; Head: Prof. Mihály Boros; Hrs/week: total 20; Practice: Signature; Credit: 0; Course Requirement:.)
- **FOG-KAE051**: Dental Biometry and Evaluation of Research Results (Department of Oral Biology and Experimental Dental Research; Head: Dr. János Minárovits; Hrs/week: 1; Practice: Evaluation(5); Credit: 2; Course Requirement:.)
- **FOG-KAE052**: Dental Biometry and Evaluation of Research Results (Department of Oral Biology and Experimental Dental Research; Head: Dr. János Minárovits; Hrs/week: 1; Practice: Signature; Credit: 0; Course Requirement:.)
- **FOG-KAE091**: Biochemical Basics of Preventive Medicine (Department of Biochemistry; Head: Prof. László Dux; Hrs/week: 2; Practice: Evaluation(5); Credit: 2; Course Requirement:.)
- **XA0021**: General Elective Subjects (University of Szeged; Hrs/week: 2; Practice: Examination; Credit: 2; Course Requirement:.)
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*One has to complete 2 semesters Physical Education until the end of the 1st year*
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**DENTISTRY**

**2013/2014 3rd year fall, 5th semester**

**Pre-Clinical Module**

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## SUGGESTED STUDY PLAN

### DENTISTRY

**CLINICAL MODULE semester 7-10)**

#### 2012/2013 4th year fall, 7th semester

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#### Compulsory Subjects in the General Clinical Module

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<td>Inst. of Surgical Research</td>
<td>Prof. Mihály Boros</td>
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<td>Term Mark(5)</td>
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<td>Prof. Katalin Nagy</td>
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<td>State Board Examination</td>
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<td>FOG-KAF04</td>
<td>Patient Examination - Practical exam</td>
<td>Faculty of Dentistry</td>
<td>Prof. Katalin Nagy</td>
<td>-</td>
<td>State Board Examination</td>
<td>0</td>
<td>Thesis</td>
</tr>
</tbody>
</table>
Recommended textbooks for first year dental students

For the textbooks of the medical basic module subjects check the medical recommended textbooks (pg: 56.)

**DENTAL ANATOMY**

**DENTAL INSTRUMENTS**

Recommended textbooks for second year dental students

**ETHICS IN MEDICINE**
- World Medical Association (WMA, http://www.wma.net/e/about/index.htm )
- WMA Ethics Manual (http://www.wma.net/e/ethicsunit/resources.htm )
- WMA Policy (http://www.wma.net/e/policy/b3.htm )
- The Declaration of Genevca (http://www.cirp.org/library/ethics/geneva/ )
- The Declaration of Helsinki (http://www.fda.gov/oc/health/helsinki89.html )

**DENTAL MATERIALS AND TECHNOLOGY**

**ORAL BIOLOGY**

Recommended textbooks for third year dental students

For the textbooks of the medical pre-clinical module subjects check the medical recommended textbooks (pg: 58.)

**PHARMACOLOGY**

**HUNGARIAN LANGUAGE**
- Putz Mónika: Magyar fogorvosi szaknyelv, Semmelweis Egyetem, Bp.2006
- Győrffy Mária: Mi a panasz? PTE, Pécs 2003

**PRECLINICAL COURSE OF ORAL SURGERY**

**PRECLINICAL COURSE OF PROSTHODONTICS**

**GENERAL AND DENTAL RADIOLOGY**
- White, SC, Pharoah, MJ: Oral Radiology Principles and Interpretation, 2009, Mosby, St. Louis

**BIO- AND ALLOPLASTIC MATERIALS IN DENTISTRY**
PRECLINICAL COURSE OF OPERATIVE DENTISTRY

GNATOLOGY
- Wheeler’s Dental Anatomy, Physiology and Occlusion
- Klineberg_Jagger Occlusion and Clinical Practice, Wright 2004.
- Stuart: Full Mouth Waxing Technique, Quintessence 1984.

DENTIST-PATIENT COMMUNICATION

ADVANCED IMAGING TECHNICS IN DENTISTRY
- White, SC, Pharoah, MJ: Oral Radiology Principles and Interpretation, 2009, Mosby, St. Louis

PATHOPHYSIOLOGY
Textbooks
- Gayton and Hall: Texbook of Medical Physiology 12th ed. 2011
- Damjanov: Pathophysiology, Elsevier (Saunders title), 2008,
  ISBN: 978-1-4160-0229-1
  ISBN- 0071621679/9780071621670
- Silbernagl, Lang: Color Atlas of Pathophysiology, George Thieme Verlag, 2000,
  ISBN: 9780865778665/97831165510
- 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.,

Handouts (for practice)

PUBLIC HEALTH

Recommended textbooks for fourth and fifth year dental students

OPERATIVE DENTISTRY

ESTHETIC DENTISTRY

ENDODONTICS

PROSTHODONTICS

ORAL SURGERY
• Szabó Gy: Oral and Maxillofacial Surgery, Alapítvány a Száj-, Arc, és Állcsontsebészeti Betegségek Gyógyításáért Bp., 1997

**ORAL MEDICINE**

**INFECTION CONTROL IN DENTISTRY**

**DENTAL DIAGNOSTICS AND TREATMENT PLANNING**
- Content of the lectures
- Relating parts of recommended dental books

**DENTAL BIOMETRY AND EVALUATION OF RESEARCH RESULTS**
- J.A. von Fraunhofer and J.J. Murray: Statistics in Medical, Dental and Biological Studies, TRI-MED BOOKS LTD. First published 1976

**PEDIATRIC DENTISTRY**
- Richard J. Mathewson; Robert E. Primosh: Fundamentals of pediatric dentistry-Quintessence

**PERIODONTOLOGY**

**DENTAL IMPLANTOLOGY**
- Myron Nevins, James T. Mellonig: Implant Therapy
- Hubertus Spiekermann: Implantology

**DENTAL IMPLANTOLOGY (IN PROSTHODONTICS)**
- Myron Nevins, James T. Mellonig: Implant Therapy
- Hubertus Spiekermann: Implantology
- Misch CE: Dental Implant Prosthetics
- Content of the lectures

**ORTHODONTICS**
- TEXTBOOK OF ORTHODONTICS by Samir Bishara, DDS, BDS, Dortho, MS, Professor, Department of Orthodontics, University of Iowa, College of Dentistry, Iowa City, IABibliographic & ordering Information, Hardbound, 592 pages, publication date: MAR-2001, Imprint: SAUNDERS

**DISEASES OF TEMPOROMANDIBULAR SYSTEM**

**TREATMENT OF TRAUMATIC DENTAL INJURIES IN CHILDHOOD**
DENTAL TREATMENT OF ELDERLY PEOPLE AND PATIENTS WITH SPECIAL NEEDS


FORENSIC MEDICINE


ESTHETICS OF THE FACE


HUNGARIAN LANGUAGE

- Putz Mónika: Magyar fogorvosi szaknyelv, Semmelweis Egyetem, Bp.2006
- Győrffy Mária: Mi a panasz? PTE, Pécs 2003

DERMATOLOGY

SYLLABUSES
BASIC MODULE - DENTISTRY

For the syllabus of the general basic module subjects check the medical syllabus (pg.: 65).

DENTAL INSTRUMENTS
1st semester

<table>
<thead>
<tr>
<th>LECTURE</th>
<th>PRACTICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1 hr/week)</td>
<td>(1 hr/week)</td>
</tr>
<tr>
<td>* 1. Introduction to the Szeged Dental School</td>
<td>8. Dental Instruments used in operative dentistry, endodontics</td>
</tr>
<tr>
<td>* 2. History of Dentistry (Stone age – Greco-Roman Dentistry)</td>
<td>9. X-ray machine, Orto-pan tomogram</td>
</tr>
<tr>
<td>* 3. History of Dentistry (Greco-Roman Dentistry – Western Dentistry)</td>
<td>10. Dental instruments used in prosthetic dentistry</td>
</tr>
<tr>
<td>* 4. History of Dentistry (Western Dentistry – today)</td>
<td>11. Dental Instruments used in orthodontics and children dentistry and periodontology, oral hygiene instruments</td>
</tr>
<tr>
<td>* 5. Fully equipped dental surgery</td>
<td></td>
</tr>
<tr>
<td>* 6. Visiting a private dental practice</td>
<td></td>
</tr>
<tr>
<td>* 7. Dental instruments used in oral surgery</td>
<td></td>
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<tr>
<td></td>
<td>12. Exam</td>
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<tr>
<td></td>
<td>13. Semester overview</td>
</tr>
<tr>
<td></td>
<td>14. Consultation</td>
</tr>
</tbody>
</table>

DENTAL ANATOMY
1st semester

<table>
<thead>
<tr>
<th>LECTURE</th>
<th>PRACTICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2 hours/week)</td>
<td>(1 hour/week)</td>
</tr>
<tr>
<td>* 1. The object and importance of Dental Anatomy. Biomimetics</td>
<td>1. Tooth structure - drawing exercise in 2D and 3D, study of pulp sections</td>
</tr>
</tbody>
</table>
### CHEMISTRY FOR DENTAL STUDENTS

1st semester (14 weeks)

<table>
<thead>
<tr>
<th>WEEK</th>
<th>LECTURE</th>
<th>SEMINAR</th>
<th>PRACTICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>2 hrs/week</td>
<td>Review of laboratory requirements. Fire and safety precautions.</td>
<td>No practice these weeks.</td>
</tr>
<tr>
<td>2.</td>
<td>2 hrs/week</td>
<td>Electronic configuration of atoms. Chemical calculations: concentration of solutions.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>2 hrs/week</td>
<td>The periodic table. Continuation of practicing simple chemical calculations.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>2 hrs/week</td>
<td>Metals and their compounds. Complexes. Metathesis reactions.</td>
<td>During weeks 5 to 9 students work in rotation and conduct one of the following experiments each week:</td>
</tr>
<tr>
<td>6.</td>
<td>2 hrs/week</td>
<td>Nonmetals and their compounds. Practicing metathesis reactions.</td>
<td>I) Quantitative determination of HCl content by titration with NaOH solution. II-III) Qualitative analysis (2 weeks). IV) Complexometric determination of calcium ions. V) Determination of pKₐ of a known concentration weak acid solution through the preparation of different buffers. VI) Quantitative determination of Fe(II)-content by permanganometric titration measuring the redox potential. VII) Photometric determination of iron.</td>
</tr>
<tr>
<td>7.</td>
<td>2 hrs/week</td>
<td>Solutions. Continuation of practicing simple chemical calculations.</td>
<td></td>
</tr>
</tbody>
</table>
and weak electrolytes. Acid-base concepts.

8. **Self-ionization of water, pH and pOH. Acid-base ionization equilibrium. Acid-base titration. Common-ion effect. Buffers and their biological importance.**
   - Chemical equilibrium. Application of LeChatelier’s principle. Acid-base concepts.

   - Simple pH calculations. Buffers, calculations involving buffers.

    - Oxidation-reduction reactions. Voltaic cells.
    - Weeks 10 and 11: make-up laboratory practicals.

    - Brief summary of chemical thermodynamics and reaction kinetics.

    - Types of organic chemical reactions.
    - Saturated hydrocarbons: alkanes and cycloalkanes.
    - No practice these weeks.

13. **Aromatic hydrocarbons. Structure and reactions of benzene. Organic halogen compounds.**
    - Unsaturated hydrocarbons: alkenes and alkynes.

    - Aromatic hydrocarbons
    - Organic halogen compounds.
2nd semester (14 weeks)

<table>
<thead>
<tr>
<th>WEEK</th>
<th>LECTURE</th>
<th>SEMINAR</th>
<th>PRACTICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.</td>
<td>Oxo compounds. Structure of the carbonyl group. Chemical reactions of aldehydes and ketones: addition and condensation reactions. 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.</td>
<td>Heterocyclic compounds. During weeks 4 to 8 students work in rotation and conduct one of the following experiments each week:</td>
<td></td>
</tr>
</tbody>
</table>


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**INTRODUCTION TO MEDICINE**

**1st semester**

**LECTURE** (1 hr/week) and **PRACTICE** (1 hr/week)
Health Philosophy and Behavioral Medicine I. Modern concept of health and disease
Health Philosophy and Behavioral Medicine II. What influences health? The development of disease: Causal models
Health Philosophy and Behavioral Medicine III. Stress, coping, culture and lifestyle
Preventive Medicine and Public Health I. Community diagnosis. Describing health problems
Preventive Medicine and Public Health II. Analyzing health problems. Risk perception and risk communication
Preventive Medicine and Public Health III. Basic theories of prevention and health education. The role of screening in prevention
History of medicine I. Earliest medicine, antique times
History of medicine II. Medicine in Middle Ages, Renaissance, Enlightenment
History of medicine III. Science and technology in the 19th-20th centuries
Medical Ethics I. The Hippocratic oath
Medical Ethics II. Ethics, morality and ethical theories
Medical Ethics III. Basic principles of bioethics I.
Medical Ethics IV. Basic principles of bioethics II

COMMUNICATION IN DENTISTRY

2nd semester

<table>
<thead>
<tr>
<th>LECTURE</th>
<th>PRACTICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1 hour/week)</td>
<td>(2 hours/week)</td>
</tr>
<tr>
<td>* 1. General prelude, the attitude, point of view of the curse, what is psychology, the relation between psychology and medicine. The necessity and traits of self-evaluation (self-image, assertive attitude, games people play, and it’s solution)</td>
<td>1. Introduction, technical details</td>
</tr>
<tr>
<td>* 2. Block in basic and biological elements of psychology (Sensation and perception). The psychology of social interactions (Basic elements of perception of people, schemas, stereotypes, attributions, the point of view of individual psychology)</td>
<td>2. Basic elements of communication</td>
</tr>
<tr>
<td>* 3. The psychology of social interactions (Basic elements of social behavior – the effect of people’s presence on human achievement, human groups and roles, the human mass’s symptom)</td>
<td>3. Factors which disturb the communicational process I.</td>
</tr>
<tr>
<td>* 4. The psychology of social interactions (submission, diffusion of responsibility, conformity to the great mass, the effect of minority on the majority)</td>
<td>4. Factors which disturb the communicational process II.</td>
</tr>
<tr>
<td>* 5. General psychology (attention, memory, imagination, human consciousness, thinking)</td>
<td>5. Verbal communication I.</td>
</tr>
<tr>
<td>* 7. Human values (The base of values - cognition, exploration -, self-respect and respecting people), the born-out syndrome (how to protect our mental health and harmony)</td>
<td>7. Factors which disturb the communicational process III.</td>
</tr>
<tr>
<td>* 8. Emotions (the evolution of them, theories of their functioning, the mechanism of facial feed-back, and it’s practical utility)</td>
<td>8. Nonverbal communication I.</td>
</tr>
<tr>
<td>* 9. The personality (definitions, theories, the role of nature and nurture)</td>
<td>9. Nonverbal communication II.</td>
</tr>
<tr>
<td>* 10. The psychology of human development (The importance, sections, approaches of it)</td>
<td>10. Cultural presentation I.</td>
</tr>
</tbody>
</table>
* 11. The mechanism of human behavior, the possibilities to take effect on it. Basic element of learning processes (Respondent and classical conditioning, and it’s practical utility)

* 12. The mechanism of human behavior, the possibilities to take effect on it. Basic element of learning processes (Complex – observational, and cognitive-behavioral – learning, and it’s practical utility)

* 13. Summary of practical utilities of psychology – Questions and answers

* 14. Free consultation – Questions and answers

11. Cultural presentation II.

12. Discussion

13. Test

14. Closing

**NURSIG PRACTICE (SUMMER PRACTICE)**

**2nd semester**

Students may perform the emergency ambulance practice out of the University (in their country) at a dental emergency ambulance. In this case they have to submit an acceptance letter from the head of the chosen surgery. Students have to submit a certificate about the practice, containing a short evaluation.

2 x 35 hours (dental emergency ambulance) in July and August according to the group arrangement.

Detailed description of the practice requirements:

Getting to know the work of the Emergency Ambulance:
- Observing the administrative tasks in connection with patient examination. (assignments, computerized patient admission, ambulance diary, patient records)
- Procedure and practice of making a diagnosis
- Getting to know and practicing the duties related to patient examination.
- Observing the examination of X-ray results, and diagnosis making.
- Getting to know the procedure of patients referral to certain departments.

**DENTAL MATERIALS AND TECHNOLOGY**

**3rd semester**

**LECTURE**

(2 hrs/week)


* 2. Types, classifications and applications of impression materials

Presentation of elastic impression materials.

* 3. Examining, treating and preventive methods used in dentistry from technological point of view.

Die materials and methods of model preparation

* 4 Burs and polishing instrument in dentistry.

* 5. Basic physical properties of materials. Test methods for materials in dental material science

* 6. Polymers used in dentistry (1st part). Practical aspects of polymers used in dentistry (2nd part)

**PRACTICE**

(1 hr/week)

1-2. Carving a premolar and an upper central incisor tooth in plaster (white)

3-4. Impression materials in practice (impression gypsum products in practice, take impression from a coin, demonstration and use putty and wash materials)

5-6. Making impression with alginate on manikin, casting impression with gypsum. Basing the cast, five pointed trimming
* 7. Waxes. Occlusion papers and foils. Artificial teeth (acrylic and ceramic)
* 8. Filling materials and adhesive technologies. Dental cements and endodontic materials
* 10. Investment, investment materials, metal casting. Processing of surfaces of dental appliances, polishing
* 11. Amalgam. Allergic reactions to dental materials
* 12. WRITTEN TEST
* 13. Materials used for porcelain-fused-to-metal restorations. All-ceramic systems, composition, characteristics, processing
* 14. Course-evaluation

### MEDICAL PSYCHOLOGY

#### 3rd semester

**LECTURE**

(1 hr/week)

1. Introduction (bio-psycho-social perspective, patient-centered dentistry, compliance)
2. Informing patients, patient education, persuasive communication
3. Stress, anxiety
4. Conveying bad news
5. Aesthetic treatment, self-acceptance
6. Psychosomatic problems
7. Relaxation techniques

**PRACTICE**

(1 hr/week)

1. **Psychological and psychosomatic viewpoints in the dentistry.**
   **Basic principles:** The preventive dentistry makes the respect of the psychological viewpoints necessary.
2. **Going to the dentist and its psychological aspects.**
   The features of the distressful behaviour. Measuring the anxiety with the help of the Taylor test and the Spielberger test (self experience, measuring anxiety level influenced with the help of a film detail). The different forms of manifestation of the anxiety.
3. **The anxiety and the non-verbal behaviour features in the course of the dentist's treatment.**
   The channels of the direct human communication.
   The types of the dental interventions and its effects on the patients behaviour. The patients dental knowledge and the contact between the anxiety. The opportunities of the anxiety reduction.
4. **Pain in the dentist's practice.**
   The general psychological features of the pain.
   The patient pain on his own admission and his satisfaction with the treatment. The dental situations considered by the patients most unpleasant one.
5. **Emotions and empathy.**
   The doctor's empathy and the contact between his patients' confidence. The dentist patient relation. Patient groups: children, aged, heavy cases (psychiatric patient, hysteria,
neurosis, convicts, foster children).
Different approach viewpoints.

VI. The psychic effects of the different dentist's interventions
The prosthetic dentistry, the tooth losing, etc.

ETHICS IN MEDICINE
3rd semester

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

1. Introduction, basic moral concepts
2. Morals and law, short history of ethics
3. Basic ethical theories and principles of bioethics
4. Health and illness, informed consent
5. Abortion
6. Aids
7. Euthanasia and suicide
8. Impaired infants
9. Animal experimentation
10. Cloning
11. Transplantation
12. Patients' rights
13. Justice in medicine and public health

ORAL BIOLOGY
4th semester

LECTURE
(1 hour/week)

* 1. The chemical composition of bone and teeth
* 2. The microstructure of teeth. The enamel, the dentine and the cementum
* 3. Formation and mineralization of hard tissues. Trace elements in teeth
* 4. The periodontium
* 5. The mastication, the deglutition and the speech
* 6. Measurement of the masticator force
* 7. The dental pulp
* 8. The biochemistry of fluoride ion
* 9. The pharmacology and the toxicology of the fluoride ion. The detrimental effects of fluoride on teeth
* 10. The taste and the olfaction
* 11. The microbial flora of the mouth in health and diseases
* 12. The saliva and the salivary glands
* 13. The calcium metabolism of bones and teeth
* 14. Consultation

PRACTICE
(1 hour/week)

1. The chemical composition of bone and teeth
2. The bone and teeth mineralization. The trace elements in the teeth.
3. Microstructure of teeth (light microscopy)
4. The periodontium
5. The mastication, the deglutition and the speech
6. Measurement of the masticator force
7. The dental pulp
8. Research methods in dentistry
9. Literature search
10. The taste and the olfaction
11. The microbial flora of the mouth in health and diseases
12. The saliva and the salivary glands
13. The calcium metabolism of bones and teeth
14. Consultation

DENTAL BIOMETRY AND EVALUATION OF RESEARCH RESULTS
4th/6th/8th semester

LECTURE

PRACTICE
1. The importance and applications of statistics in dental sciences. Introduction to Mathematics, Part I. (definition of functions, different type of determinations and analysis)

2. Introduction to Mathematics, Part II. (set theory, combinatorics). Populations, probability, discrete variables and probability distributions

3. Continuous variables and frequency distributions.

4. Theoretical background of tests of significance: null hypothesis, level of significance, degree of freedom, possible errors

5. Parametric tests. Verification of normality. Student’s t-test for paired samples

6. Student’s t-test for unpaired samples and the F-test for variances

7. Written test (I.)

8. Analysis of variance (ANOVA-test)

9. Non-parametric methods (Wilcoxon, Mann-Whitney U-test etc.)

10. Analysis of discrete variables: $\chi^2$ - test and Fisher exact test (contingency table)

11. Linear regression and the $t$-test of correlation.

12. Written test (II.)

13. Statistical analysis and data analysis in other statistical programs (Statistica 11)

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**ODONTOTECHNOLOGY (summer practice)**

4th semester

2 x 35 hours (Odontotechnology) in July according to the group arrangement.

**Detailed description of the practice requirements:**

1. **First week**
   - 1. day – Drawing of teeth, carving teeth in wax (upper first incisor with root)
   - 2. day – Drawing of teeth (praemolars and molars), carving teeth in wax (lower praemolar with root)
   - 3. day – Carving teeth in plaster, learn to use handpieces and burs
   - 4. day – Carving teeth in plaster, learn to use handpieces and burs
   - 5. day – Use of impression materials on manikin. Making study casts, bite registration. Mounting the casts in the articulator – demonstration

2. **Second week**
   - 1. day – Students laboratory: Mounting the casts in the articulator based on Bonwill triangle. Preparation of resin teeth, embedding them in plaster
   - 2. day – Students laboratory: Mounting the casts in the articulator for gnathology practice, mixing and polishing base plate acrylic material. Visiting the dental technical laboratory (2 groups from 8.00 am, 2 groups from 10.00 am)
   - 3. day – Students laboratory: Mounting the casts in the articulator for gnathology practice, mixing Pattern Resin, shaping a premolar tooth with burs in resin. Surgery: making a lower jaw alginate impression from each other, making a cast.
   - 4. day – Students laboratory: making resin teeth, mounting resin teeth in gypsum block, mixing self curing acrylate, shaping a premolar tooth with burs in resin.
   - 5. day – Students laboratory: Power point presentation about a dental technical technical procedure with own photos taking in the laboratory. Evaluation of model mounting.

In the 2nd week students visit a dental technical laboratory in small groups (watch metal casting, ceramic works, model preparation, etc.) and make documentation about a technical procedure, which is presented in the last day of the summer practice. Pictures from the internet are not accepted!
Conditions of accepting the practice for those who spend the practice outside the University

Those students who don't come to the Dental Faculty Students Laboratory for the practice, have to bring a certification from the head of the laboratory, where they stay for the practice, in which he/she declares that the student spent two weeks in the lab and fulfilled the above mentioned tasks. This statement must arrive to the Dean's Office of the Dental Faculty till **20. August 2013**.

Students have to show their work prepared by themselves in the first week of Preclinical Course of Prosthodontics.

- An upper middle incisor with root carved in wax, coronal size about 2-3cm
- A lower premolar with root carved in wax, coronal size about 2-3cm
- An upper premolar carved in white plaster (only coronal part)
- A lower molar carved in white plaster (only coronal part)

- A power point presentation about a dental technical procedure (4-7 slides) with photos made by the student. Pictures from the internet are not accepted! The presentation will be assessed; the mark will be counted among the results of the Preclinical Course of Prosthodontics. This is also a condition of accepting this course.

**MEDICAL SOCIOLOGY**

4th semester

**LECTURE**

(1 hrs/week)

* Development, division, research fields of medical sociology. The sociology of dentistry
* The medical profession.
* Professional socialisation among medical students.
* Gender differences among medical students in their professional socialisation. Roleconflicts between family and professional roles.
* 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).
* Families and intimate relationships. The life-course.
* Practice of medical sociological research methods. Strategy and research methods of medical sociology.

**HUNGARIAN LANGUAGE I-IV.**

1st semester

**PRACTICE**

(4 hrs/week)

* 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/-né (at)
* General revision.
  * TEST 2
  * Oral tests

2nd semester

**PRACTICE**

(4 hrs/week)

* My family: possessive suffixes, genitive structure.
* I have a...: Possessives + 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.
* Weather and seasons.
* General revision.
  * TEST 2
* Preparation for the oral exam.
  * Oral tests

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.
* At the doctor's: kell, lehet, szabad, tilos. Suffix szor/szer/ször. Body parts.
* Revision
  * TEST 1
* Where were you in the summer: past tense conjugations.
* 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: possessive 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.
* Words originating from the same root (kezd, kezdődik etc.)
* Revision of grammar and vocabulary.
* Practising role-play and picture description.
**SYLLABUSES**

**PRE-CLINICAL MODULE - DENTISTRY**

### PRECLINICAL COURSE OF PROSTHODONTICS I.

5th semester

**LECTURE**

(1 hr/week)

* 1. Topics of prosthodontics. Prosthetic appliances
* 2. Main principles of tooth preparation
* 3. Tools and methods of tooth preparation. Veneer crowns
* 4. How to avoid the harmful effects of tooth preparation
* 5. Classification of crowns. Types and indications of different finish lines
* 7. Impression methods
* 8. Procedure of dental impressions
* 9. Digital impression
* 10. Laboratory procedures. Model preparation I, II...
* 11. WRITTEN TEST
* 12. Pulp protection. Provisional restorations
* 13. How to build up a destroyed tooth?
* 14. Consultation

**PRACTICE**

(2 hrs/week)

1. Introduction the order of the laboratory order, instruments. Practicing the use of burs.
2. Preparation of resin teeth for veneer crown, knife edge finish line
3. Preparation of resin teeth for veneer crown, knife edge finish line
4. Preparation of embedded resin teeth for veneer crown, knife edge finish line
5. Preparation of resin teeth int he manikin for veneer crown, knife edge finish line. Embedding removed natural tooth. WRITTEN ASSESSMENT
6. Preparation of resin teeth int he manikin, 90° shoulder
7. Preparation of resin teeth (front), chamfer finish line.
8. Preparation of resin teeth in the manikin, chamfer finish line
9. Preparation of resin teeth in the manikin, chamfer finish line
10. Preparation of resin teeth for partial crown (4/5) in the manikin
11. Preparation of resin teeth for partial crown (3/4) in the manikin
12. Upper central incisor preparation with chamfer as a practical exam
13. Provisional crown fabrication with prefabricated celluloid crown
14. Provisional crown fabrication with Scutan method

### PRECLINICAL COURSE OF PROSTHODONTICS II.

6th semester

**LECTURE**

(1 hr/week)

* 1. Construction of complete crowns – Cast metal crowns, veneer crowns. (Resin faced and porcelain fused to metal crowns.)
* 2. Construction of complete crowns – Jacket crowns. (Resin and ceramic. Jacket crowns)
* 3. Construction of full crowns – fzkk ceranuc crowns
* 4. Laminate veneers, shade selection
* 5. Interim and definitive cementation of crowns. Removal of cemented fixed partial dentures
* 6. Post retained crowns. Classification, construction, indications and contraindications. 1\textsuperscript{st} Midsemester written test (Topic: Crowns,

**PRACTICE**

(4 hrs/week)

1. Tooth preparation for abutment (Chamfer margin design), the students should collect one rooted teeth for modelling a post and core.
2. Preparation of tooth 21 for complete crown, with chamfer margin design. Construction of temporary crown onto the prepared abutment
3. Preparation of tooth 37 for complete cast metal crown.
Preparation of tooth 44 for complete veneer crown
4. Impression making, construction of sectioned cast
5. Impression making, construction of sectioned cast
6. Mounting of the casts into articulator
time: in the practice)

* 7. Fabrication of post retained crowns. Clinical and laboratory steps
* 9. Fábián-Fejérdy classification of partial edentulousness
* 11. Definitions, nomenclature, classification related to fixed partial dentures. Retainers, pontics, materials for constructing fixed partial dentures, veneering methods
* 12. 2nd Midsemester written test (Fixed partial dentures, Post retained crowns)
* 14. Special bridges. Consultation

7. Mounting of the casts into articulator. MTO
8. Construction of cast metal crown. Preparation of wax pattern
9. Construction of resin faced metal crown. Preparation of wax pattern
10. Construction of resin faced metal crown. Preparation of wax pattern
11. Processing and polishing of the crowns
12. Construction of resin faced metal crown. Build up the veneer part of the crown

PRECLINICAL COURSE OF OPERATIVE DENTISTRY I.
5th semester

<table>
<thead>
<tr>
<th>LECTURE</th>
<th>PRACTICE</th>
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<tbody>
<tr>
<td>(1 hr/week)</td>
<td>(4 hrs/week)</td>
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</table>

* 2. The definition of caries, histology, pathology. Diagnostics.  
4. Practicing cavity preparation: Black cl. I., II. MO, OD, MOD (4)
5. Practicing cavity preparation from mirror: Black cl. I., II. MO, OD, MOD (4)
* 6. Comparison of cavity preparation techniques. Contemporary cavity preparation and minimal invasive technique. Special cavity designs  
6. Practicing cavity preparation with high speed handpiece: Black cl. I., II. MO, OD, MOD (4)
* 7. The definition of cavity lining, and base. Goals and theory.  
* 8. Amalgam.  
* 9. The classification of filling materials. Cements, comomers, ormocers, GIC  
* 10. The adhesive technique  
10. Black cl. II. base fillings. Black cl. V. cavity filling with composite and GIC.
* 12. Written demonstration  
**PRECLINICAL COURSE OF OPERATIVE DENTISTRY Seminar I.**

5th (1 hr/week)
1. Introduction
2. Development of caries
3. Caries classification
4. Black classification and cavity preparation
5. Cavity nomenclature
6. Minimal and non-invasive preparation
7. Materials used for direct restorations
8. Amalgam filling
9. Composite filling
10. Matrix systems
11. Occlusion, articulation
12. Finishing and polishing
13. Test
14. Consultation

**PRECLINICAL COURSE OF OPERATIVE DENTISTRY II.**

6th semester

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<thead>
<tr>
<th>LECTURE</th>
<th>PRACTICE</th>
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<tbody>
<tr>
<td>(1 hr/week)</td>
<td>(4 hrs/week)</td>
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<tr>
<td>* 3. Trepanation and access cavity. Defining the working length in the root canal. Different methods.</td>
<td>3. Trepanation, access cavity. Theory and practice.</td>
</tr>
<tr>
<td>* 4. The aims and principles of chemomechanical treatment.</td>
<td>4. Instruments of endodontic treatment. Status and administration.</td>
</tr>
</tbody>
</table>
14. Inlays
PRECLINICAL COURSE OF OPERATIVE DENTISTRY Seminar II.

6th
(1 hr/week)
1. Introduction
2. Pulpal considerations
3. Macro- and microscopy of the endodontium
4. Pulpal and periapical diseases
5. RCT - indications and contra indication
6. RCT - instruments
7. Length measurement
8. RCT - materials
9. RCT - techniques
10. RCF - materials
11. RCF - techniques
12. Retreatment
13. RCT - Coronal restauration
14. Test

GNATOLOGY
5th semester

LECTURE
(1 hr/week)
1. Introduction to Gnatology, it’s significance in dentistry. Functional units involved in mastication. Anatomical terminology of the mouth
* 2. Morphology of osseous structures involved in mastication and the temporo-mandibular joint
* 3. Basics of occlusal anatomy of the teeth and dental-arches
* 4. Occlusal contacts in central occlusion. Orientation in the oral cavity
* 5. Masticatory muscles, their function and innervation
* 6. WRITTEN TEST
* 7. Specific positions of the mandible
* 8. Mandibular movements, tooth guidance.
* 9. The process of chewing. Occlusal relations in natural dentition
* 10. Aticulators (arcon, non-arcon types)

PRACTICE
(3 hrs/week)
1. Introduction. Instruments and materials. Marking reference lines and points on the study cast and on the mounted lower cast. Marking the centric contacts on the upper mounted cast. Cutting off the occlusal surface of the mounted lower cast. Re-tracing the markings on the occlusal surface of the lower cast
2. Forming mandibular buccal cones. Marking reference lines and points on the mounted upper cast. Cutting off the occlusal surface of the mounted upper cast
3. Re-tracing the occlusal surface of the upper cast. Re-tracing the markings on the occlusal surface of the upper cast. Forming maxillary buccal cones. Forming the buccal ridges of mandibular buccal cusps
4. Forming the buccal ridges of maxillary buccal cusps. Shaping the triangular ridges of the maxillary buccal cusps
5. Forming the mesial and distal cusp ridges of the maxillary and mandibular buccal cusps
6. Forming the maxillary lingual cones and the cusp ridges of the maxillary lingual cusps
7. Shaping the lingual surfaces and triangular crests of the maxillary lingual cusps
8. Forming the mesial and distal marginal ridges of the maxillary posterior teeth. Building up the triangular ridges of the mandibular buccal cusps
9. Building up the mandibular lingual cones. Forming the lingual surfaces and the triangular ridges of the mandibular lingual cusps
10. Forming the mesial and distal cusp ridges of the mandibular lingual cusps. Face-bow and it’s use
11. Mounting the casts in the articulator, articulator-programming, face-bow and its usage

12. WRITTEN TEST


14. Theories of occlusion in artificial dentition

DENTIST-PATIENT COMMUNICATION

5th, 6th semester

LECTURE, PRACTICE
(8 hrs in block)

The significance of dentist-patient communication, introduction of consultation models.

Learning the importance of basic ethical principles expected in any dentist-patient communication.

Preparing for project work.

Group work I: 7 tasks of Pendleton in consultation, situation practice, stopping an attack, the art of not saying, preparing for video-recording.

Group work II: defining personality marks by using Myers-Briggs Type Indicator, behaviour, personal relations, stress situations, reactions, leadership style, problem solving methods.

Evaluation of the video-recordings of students’ private consultation with patients in the surgery room.

Following the consultation the evaluation of the whole group according to the Pendleton rules.

GENERAL AND DENTAL RADIOLOGY

5th semester

LECTURE
(2 hrs/week)

1. The basics of the general radiology I.

2. The basics of the general radiology II.

3. Investigating methods of dental radiology, imaging techniques in dental radiology I. The anatomy of the teeth and jaws in the dental radiology I.

4. Investigating methods of dental radiology, imaging techniques in dental radiology II. The anatomy of teeth and jaws in the dental radiology II.

5. Investigating methods of dental radiology, imaging techniques in dental radiology III. The anatomy of teeth and jaws in the dental radiology III.

6. Radiographic diagnostic methods for the malpositioned teeth and eruption anomalies of the teeth. WRITTEN ASSESSMENT

7. Radiographic diagnostic methods in the operative dentistry

8. Radiographic diagnostic methods for the inflammation in jaws

9. Radiographic diagnostic methods for the periodontal diseases

10. Radiographic diagnostic methods for the dentogene sinusitis, sialolyts

11. Radiographic diagnostic methods in maxillo-

PRACTICE
(2 hrs/week)

1. Investigating methods of general radiology I.

2. Investigating methods of general radiology II.

3. The occlusal, panoramic, periapical bite-wing radiographs taking

4. The occlusal, panoramic, periapical bite-wing radiographs taking

5. The occlusal, panoramic, periapical bite-wing radiographs taking

6. The occlusal, panoramic, periapical bite-wing radiographs taking

7. The occlusal, panoramic, periapical bite-wing radiographs taking

8. The occlusal, panoramic, periapical bite-wing radiographs taking

9. The occlusal, panoramic, periapical bite-wing radiographs taking

10. The occlusal, panoramic, periapical bite-wing radiographs taking

11. The occlusal, panoramic, periapical bite-wing
BIO- AND ALLOPLASTIC MATERIALS IN DENTISTRY

5th semester

LECTURE
(2 hrs/week)

* 1. Introduction to biomaterials science. Historical overview. Classes of biomaterials used in dentistry and medicine
* 2. Bulk and mechanical properties of materials and investigation methods (chemical bonds and structure, mechanical testing methods)
* 3. Surface characteristics of materials and investigation methods (contact angle, ESCA, SIMS, SEM, IRS, STM, AFM)
* 4. Metals (stainless steels, Co-Cr alloys, Ti alloys)
* 6. Written test (I.)
* 7. Polymers, types of polymers, polymerization, mechanical and thermal properties
* 8. Ceramics, glasses and glass-ceramics (bioinert, calcium-phosphate ceramics, bioactiv glasses)
* 9. Composites and natural materials (proteins, polysaccharides, polynucleotides)
* 10. Host reactions to biomaterials and degradation of biomaterials in the biological environment
* 11. Titanium implants and biointegration. Thin films, coatings and fabrics
* 12. Written test (II.)
* 14. Consultation

PATHOPHYSIOLOGY

5th semester

LECTURE

Introduction to Pathophysiology;
Inflammation I.: Definition, causes, mediators and signs of acute inflammation. Regulation and outcome of acute inflammation.

Inflammation II.: Chronic inflammation. Local and generalized reactions of inflammation: fever, inflammatory pain.

Pathophysiology of leukocytes I.:
Immunology: In vivo allergic reactions, autoimmunity, immunodeficiency.


Starvation and obesity.
Diabetes mellitus, hypoglycemia

SEMINAR/PRACTICE

Safety regulations. Review of physiologic background of circulation and normal ECG.

In the practice room: Registration and analysis of ECG. Determination of spirometric parameters.

Seminar: Inflammation I. (Lecture topic of the 1st week).

In the practice room: Registration and analysis of ECG. Determination of spirometric parameters.

Seminar: Inflammation II. (Lecture topic of the 2nd week).

Seminar: Pathophysiology of leukocytes I.: Immunology (Lecture topic of the 3rd week).

Seminar: Endocrinology I. (Lecture topic of the 4th week).

Seminar: Endocrinology II. (Lecture topic of the 5th week).
Diabetes mellitus causes, types, clinical signs, pathogenesis and consequences. Hypoglycemia

**Cardiovascular system I.:** Pathophysiology of plasma lipoprotein metabolism. Development of atherosclerosis.

**Cardiovascular system II.:** Pathogenesis and consequences of atherosclerosis. Primary and secondary hypertension.

**Cardiovascular system III.:** Pathophysiology and ECG of acute coronary syndromes: angina pectoris, myocardial infarction

**Cardiovascular system IV.:** Congenital heart diseases. Mitral, aortic stenosis and regurgitation. Compensated and decompensated heart function, Heart failure.

**Peripheral circulatory diseases:** Volume depletion. Syncope. Circulatory shock (development, stages). Multiple organ dysfunctions in shock.

**Pathophysiology of salt-water balance I.:** Volume excess, hyper- and hyponatremia, hyper- and hypocalcemia

**Pathophysiology of salt-water balance II.:** Hyper- and hypokalemia, disturbances of trace elements and vitamins.

**Cardiovascular system V.:** Disturbances of electrical impulse generation and conduction.

**6th semester**

**LECTURE**

**Pathophysiology of kidney diseases I.:** Proteinuria, hematuria, glycosuria, ketonuria, pyuria, bacteruria, polyuria, oliguria and anuria.

**Pathophysiology of kidney diseases II.:** Nephrotic and nephritic syndrome, pyelonephritis, kidney stones. Acute and chronic renal failure.

**Pulmonary diseases I:** Abnormal breathing patterns, dyspneas. Obstructive pulmonary diseases: CODP, asthma bronchiale, cystic fibrosis.

**Pulmonary diseases II:** Restrictive pulmonary diseases (pleural disorders, pulmonary edema, embolism, hypertension), hypoxias, respiratory

**SEMINAR/PRACTICE**

Safety regulations. **Seminar:** Thermoregulation. (Please download and study the material from our website or coospace before class).

**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.

**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.

**Seminar:** Pathophysiology of pulmonary diseases I. (Lecture topic of the 3rd week).


Gastrointestinal diseases II.: Diseases of absorption, diarrhea, constipation. Intestinal obstruction. Acute and chronic pancreatitis.


Red blood cell diseases II.: Anemias due to blood loss, hemolysis.

Hemostasis I.: Bleeding disorders (platelet disturbances).

Hemostasis II.: Bleeding disorders (vascular, clotting factor disturbances), thrombosis and embolism.

Pathophysiology of the CNS I.: Multiple sclerosis, neurodegenerative diseases: Alzheimer’s, Parkinson’s and Huntington’s disease. Pathogenesis of psychiatric disorders.

Pathophysiology of the CNS II.: Circulatory diseases of the CNS. Cerebral edema. Pain, headaches, seizures and epilepsy.

Seminar: Pathophysiology of pulmonary diseases II. (Lecture topic of the 4th week).

Seminar: Disturbances of acid-base metabolism (Lecture topic of the 5th week).

Seminar: Gastroenterology I. (Lecture topic of the 6th week).

Seminar: Gastroenterology II. (Lecture topic of the 7th week).

Seminar: Pathophysiology of liver diseases (Lecture topic of the 8th week).

Seminar: Pathophysiology of leucocytes II. (Lecture topic of the 9th week).

Seminar: Red blood cell diseases I. (Lecture topic of the 11th week).

Seminar: Red blood cell diseases II. Hemostasis I. (Lecture topic of the 12th week).

In the practice room: Determination of WBC, RBC, platelet, eosinophil and reticulocyte count. Staining and analysis of blood smear.

Seminar: Hemostasis II. (Lecture topic of the 13th week).

In the practice room: Determination of WBC, RBC, platelet, eosinophil and reticulocyte count. Staining and analysis of blood smear.

Seminar: Pathophysiology of the CNS. (Lecture topic of the 14th week).

### PRECLINICAL COURSE OF ORAL SURGERY

#### 6th semester

**LECTURE**

(2 hrs/week)

* 2. Local anaesthesia in dentistry. Anatomical and pharmacological considerations
* 3. Complications of anaesthesia. Methods of local anaesthesia
* 4. Indications of tooth extraction. Simple tooth extractions
* 5. Complications of tooth removal. Normal and disturbed wound healing

**PRACTICE**

1 hr/week)

Practice in local anaesthesia in dentistry and tooth extraction. Related problems. 10 simple extractions, assistance to dento-aveolar surgery.
6. Misplaced and impacted teeth
7. Opening of the maxillary sinus and its management
8. Dental inflammations
9. Endodontic surgery. Surgical procedures related to orthodontic treatment
10. Trismus
11. Clinicopathology of cysts
12. Dentoalveolar trauma
13. Written exam
14. Discussion

**ORAL SURGERY (summer practice)**

4 x 35 hours, four weeks in July/August.

**Detailed description of the practice requirements:**
Practice in local anaesthesia in dentistry and tooth extraction. Related problems.
10 simple extractions, assistance to dento-alveolar surgery.

**ADVANCED IMAGING TECHNIQUES IN DENTISTRY**

**6th semester**

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<tr>
<td>(1 hr/week)</td>
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<tr>
<td>* 1. The basics of general radiology I. Modern imaging technics I.</td>
<td>Making of one digital image during the practices</td>
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<tr>
<td>* 2. The basics of general radiology II. Modern imaging technics II.</td>
<td>Knowledge of radiographic anatomy of the teeth and the jaws.</td>
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<tr>
<td>* 3. Interpretation in the dento-maxillo-facial radiology</td>
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<tr>
<td>* 4. Radiographic diagnostic methods in the operative dentistry</td>
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<tr>
<td>* 5. Modern digital imaging technics.</td>
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<tr>
<td>* 6. Modern digital imaging technics in the dental practice, Digora system</td>
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<tr>
<td>* 7. Nuclear medicine in dentistry</td>
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<td>* 8. Radiographic diagnostic methods for the periodontal diseases</td>
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<td>* 9. Modern imaging technics in the implantological diagnosis and in therapy</td>
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<td>* 10. Cone Beam CT in dentistry</td>
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<td>* 11. Using of lateral cephalometric projection in the dental practice</td>
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<tr>
<td>* 12. WRITTEN ASSESSMENT</td>
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<tr>
<td>* 13. The practical questions of the mobile X-ray machine’s application</td>
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<td>* 14. Consultation</td>
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**PUBLIC HEALTH**

**5th semester**

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<td>(1 hr/week)</td>
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<tr>
<td>* The history of public health. The aim and scope of public health. The levels of prevention.</td>
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<tr>
<td>* Basic principles of health promotion. Measuring the health of a population I.</td>
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<tr>
<td>* Measuring the health of a population II.</td>
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</table>
* Measuring the health of a population III.
* Epidemiology of chronic diseases – cardiovascular diseases.
* Epidemiology of chronic diseases – tumors.
* Epidemiology of chronic diseases – respiratory and musculoskeletal diseases.
* Epidemiology of chronic diseases – gastrointestinal and metabolic diseases.
* Dental screening, effective dental prevention and health education.
* Epidemiology of suicide and accidents.
* Epidemiology of smoking.
* Epidemiology of alcohol and drug consumption.
* Structure and operation of health systems.

PUBLIC HEALTH

6th semester

LECTURE
(1 hr/week – 7x2 hrs)
* General epidemiology of infectious diseases.
  Epidemiology of airborne and enteric diseases in dental practice.
  -
* Epidemiology of hematogenic, cutaneous, and sexually transmitted diseases in dental practice.
  -
* Epidemiology of zoonoses, transmissible spongiform encephalopathy. Epidemiology of health care associated infections.
  -
  -
* Food quality and safety.
  -
* Environmental epidemiology; sewage, soil pollutions; hazardous waste, waste management in dental office.
  -
* Occupational diseases caused by chemicals and chemical safety in dental care.

PRACTICE
(1 hr/week – 7x2 hrs)
* Sterilization, disinfection, disinsection, deratisation.
  -
* Practical aspects of vaccination.
  -
* Infection control and hand hygiene in dental practice.
  -
* Dietary guidelines and the prevention of diet-related chronic diseases.
  -
* Air pollutants, water pollutants and their effects on human health.
  -
  -

HUNGARIAN LANGUAGE V.

5th semester

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<thead>
<tr>
<th>Week</th>
<th>Topics</th>
<th>Practice/ Skills</th>
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<tbody>
<tr>
<td>1</td>
<td>Human dentition. Types of teeth</td>
<td>Vocabulary practice</td>
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<tr>
<td>2</td>
<td>Dental Specialties</td>
<td>Word building</td>
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<tr>
<td>3</td>
<td>Taking medical history</td>
<td>Lexical drill</td>
</tr>
<tr>
<td>4</td>
<td>Communication in dental practice</td>
<td>Question-answer practice</td>
</tr>
<tr>
<td>5</td>
<td>Interviewing the patient</td>
<td>Dialogues</td>
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<tr>
<td>6</td>
<td>Examining the patient</td>
<td>Role-play</td>
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<td>7</td>
<td>Written test</td>
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<td>8</td>
<td>Autumn break</td>
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<tr>
<td>9</td>
<td>Basic dental instruments</td>
<td>Reading comprehension</td>
</tr>
<tr>
<td>10</td>
<td>Preventive dentistry</td>
<td>Role-play</td>
</tr>
<tr>
<td>11</td>
<td>Brushing techniques</td>
<td>Vocabulary practice</td>
</tr>
<tr>
<td>12</td>
<td>Dental floss</td>
<td>Lexical drill</td>
</tr>
<tr>
<td>13</td>
<td>Fluoride – a decay fighter</td>
<td>Dialogue</td>
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</tbody>
</table>
### HUNGARIAN LANGUAGE VI.

6th semester

<table>
<thead>
<tr>
<th>Week</th>
<th>Topics</th>
<th>Practice/ Skills</th>
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<tbody>
<tr>
<td>1</td>
<td>Dental diseases</td>
<td>Reading comprehension</td>
</tr>
<tr>
<td>2</td>
<td>Dental plaque</td>
<td>Vocabulary practice</td>
</tr>
<tr>
<td>3</td>
<td>Periodontal diseases</td>
<td>Lexical drill</td>
</tr>
<tr>
<td>4</td>
<td>Gingivitis</td>
<td>Word building</td>
</tr>
<tr>
<td>5</td>
<td>Dental caries</td>
<td>Dialogues</td>
</tr>
<tr>
<td>6</td>
<td>Restorative materials.</td>
<td>Role-play</td>
</tr>
<tr>
<td>7</td>
<td>Written test</td>
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<tr>
<td>8</td>
<td>Spring break</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Anaesthesia in dentistry</td>
<td>Reading comprehension</td>
</tr>
<tr>
<td>10</td>
<td>Complications of anaesthesia</td>
<td>Vocabulary practice</td>
</tr>
<tr>
<td>11</td>
<td>Extractions</td>
<td>Dialogues</td>
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<tr>
<td>12</td>
<td>Scaling techniques</td>
<td>Lexical drill</td>
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<tr>
<td>13</td>
<td>Bleaching techniques</td>
<td>Role-play</td>
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<td>14</td>
<td>Written test</td>
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<td>15</td>
<td>Oral assessment</td>
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### PHARMACOLOGY

5th semester

**LECTURE**
(2 hrs/week)

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<tr>
<td>1</td>
<td>General pharmacology, pharmacodynamics</td>
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<td>2</td>
<td>Pharmacokinetics</td>
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<td>3</td>
<td>Adverse effects of drugs</td>
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<td>4</td>
<td>Drug interactions</td>
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<td>5</td>
<td>Autonomic nervous system: Introduction</td>
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<td>6</td>
<td>Cholinergic and Adrenergic agonists</td>
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<td>7</td>
<td>Cholinergic and Adrenergic antagonists</td>
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<td>8</td>
<td>Local anaesthetics</td>
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<td>9</td>
<td>Chemotherapy and Antibiotics I</td>
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<td>10</td>
<td>Chemotherapy and Antibiotics II</td>
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<tr>
<td>11</td>
<td>Chemotherapy of viral and fungal infections</td>
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<td>12</td>
<td>Non-steroidal anti-inflammatory drugs</td>
</tr>
<tr>
<td>13</td>
<td>Antihelmintic drugs, treatment of protozoal infections</td>
</tr>
<tr>
<td>14</td>
<td>Antiseptics and disinfectants</td>
</tr>
<tr>
<td>15</td>
<td>Agents acting on the blood</td>
</tr>
</tbody>
</table>

**PRACTICE**
(1 hr/week)

- Prescription writing
- Pharmacodynamic and kinetic examples
- Computer Lab: Drug-receptor interaction
- Examples for drug interactions
- **MTO: General Pharmacology**
  - Computer Lab: Sympathomimetics
  - Computer Lab: Sympatholytics
  - Local anaesthetics in dental practice
- **MTO: Autonomic nervous system and local anaesthetics**
  - Prescription writing
  - Prescription writing
  - To recapitulate chemotherapy
  - To recapitulate chemotherapy
  - Prescription writing
  - Haemostatic drugs

### PHARMACOLOGY

6th semester

**LECTURE**
(2 HRS/WEEK)

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<tr>
<td>1</td>
<td>Sedative-hypnotic drugs, anxiolytics</td>
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<td>2</td>
<td>Opioid and non-opioid analgesics</td>
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<tr>
<td>3</td>
<td>General anaesthetics, antiepileptic drugs</td>
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<td>4</td>
<td>Antiparkinson drugs, centrally acting muscle relaxants</td>
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<td>5</td>
<td>Antidepressive drugs, Antipsychotic drugs</td>
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<td>6</td>
<td>Cardiotonic drugs</td>
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<td>7</td>
<td>Antiarrhythmic drugs</td>
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<td>8</td>
<td>Pharmacology of atherosclerosis, antihypertensive drugs</td>
</tr>
</tbody>
</table>

**PRACTICE**
(1 HR/WEEK)

- Drugs of convulsive types, psychostimulants
- Consultation (opioids)
- Prescription writing
- Interactions with centrally acting drugs
- **MTO-CNS drugs**
  - Computer Lab: CVS drugs
  - Computer Lab: CVS drugs
  - Consultation: CVS drugs
9. Antianginal drugs, diuretics
10. Treatment of diabetes and hyperthyrosis
11. Hormons, vitamins
12. Gastrointestinal pharmacology
13. Toxicology
14. Agents affecting bone mineral homeostasis
15. Introduction to immunpharmacology, steroidal drugs

Consultation: CVS drugs
MTO-CVS
Prescription writing
Prescription writing
Consultation: Toxicology
Prescription writing
Introduction to herbal drugs in dental practice

General and Systemic Pathology for Dentistry Students
5th semester

Lecture 3 hours/week
Organ demonstration 1 hour/week
Practice 2 hours/week

Pathology of cellular injury and death. Cellular adaptations of growth and differentiation. Postmortem changes
Actual postmortem cases are presented to the students on each week
Autopsy/ Histology of the cellular injury and death

1 Calcification. Oedema, hyperaemia, congestion. Haemorrhage
Infarction.
Acute inflammation I.
Acute inflammation II.
Actual postmortem cases are presented to the students on each week
Autopsy/ Histology of degeneration

2 Pathology of chronic inflammation.
Tissue repair. Wound healing. Immunopathology I
Actual postmortem cases are presented to the students on each week
Autopsy/ Histology of degeneration

3 Immunopathology II. AIDS. Pathology of transplant rejection.
Neoplasia I.
Actual postmortem cases are presented to the students on each week
Autopsy/ Histology of the circulation

4 Neoplasia II.
Carcinogenesis.
Actual postmortem cases are presented to the students on each week
Autopsy/ Histology of the circulation

5 Clinical aspects of neoplasia.
Actual postmortem cases are presented to the students on each week
Autopsy/ Histology of the inflammation

Vascular pathology I.
Actual postmortem cases are presented to the students on each week
Autopsy/ Histology of the inflammation

7 Vascular pathology II.
Vascular pathology III. Heart failure.
Actual postmortem cases are presented to the students on each week
Autopsy/ Histology of the tumors

8 Pathology of the heart I.
<table>
<thead>
<tr>
<th></th>
<th>Pathology of the Heart II.</th>
<th>Actual postmortem cases are presented to the students on each week</th>
<th>Autopsy/Histology of the tumors</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Essential hypertension. Pathology of the kidney I.</td>
<td>Actual postmortem cases are presented to the students on each week</td>
<td>Autopsy/Histology of the cardiovascular system</td>
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<tr>
<td></td>
<td>Pathology of the kidney II.</td>
<td>Autopsy/Histology of the tumors</td>
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<td></td>
<td>Pathology of the kidney III.</td>
<td>Auto</td>
<td>syp/Histology of the cardiovascular system</td>
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<td></td>
<td>Tumours of the kidney. Pathology of the urinary bladder. Pathology of the lung I.</td>
<td>Actual postmortem cases are presented to the students on each week</td>
<td>Autopsy/repetition</td>
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<td></td>
<td>Pathology of the lung II.</td>
<td>Actual postmortem cases are presented to the students on each week</td>
<td>Autopsy/repetition</td>
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<td>Pathology of the lung III.</td>
<td>Actual postmortem cases are presented to the students on each week</td>
<td>Autopsy/repetition</td>
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<td>Tumours of the lung. Upper respiratory airways diseases.</td>
<td>Disease of the oral cavity. Pathology of the oesophagus.</td>
<td>Actual postmortem cases are presented to the students on each week</td>
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<td></td>
<td>Pathology of the stomach and duodenum.</td>
<td>Actual postmortem cases are presented to the students on each week</td>
<td>Autopsy/repetition</td>
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<td>Oral and Maxillofacial Pathology for Dentistry Students</td>
<td>6th semester</td>
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<td>Organ demonstration 2 hours/week</td>
<td>Lecture 2 hours/week</td>
<td>Practice 2 hours/week</td>
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<td>Actual postmortem cases are presented to the students on each week</td>
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<td>Pathology of the liver.</td>
<td>Pathology of the biliary tract. Pathology of the pancreas.</td>
<td>Pathology of the bowels.</td>
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<td>Pathology of the peritoneum.</td>
<td>Actual postmortem cases are presented to the students on each week</td>
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<td>Hemopathology II.</td>
<td>Actual postmortem cases are presented to the students on each week</td>
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<td>Hemopathology III. Neuropathology I.</td>
<td>Actual postmortem cases are presented to the students on each week</td>
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<td>Neuropathology II.</td>
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<td>Immunopathology.</td>
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<td>Pathology of the male genital tract.</td>
<td>Actual postmortem cases are presented to the students on each week</td>
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</tr>
</tbody>
</table>
11 Pathology of the female genital tract I. Pathology of the breast.
   Actual postmortem cases are presented to the students on each week
   Autopsy/Histology of the nervous system

12 Pathology of the female genital tract II.
   Actual postmortem cases are presented to the students on each week
   Autopsy/Histology of the nervous system

13 Tumors of the soft tissue. Pathology of the bones and joints.
   Actual postmortem cases are presented to the students on each week
   Autopsy/Histology of the endocrine system

14 Pathology of the endocrine glands.
   Actual postmortem cases are presented to the students on each week
   Autopsy/Histology of the endocrine system
ENDODONTICS
7th semester

LECTURE
(1 hr/week)
* 3. Examination of patient with endodontic problems (Anamnesis, clinical examination)
* 4. Diagnostics in endodontics
* 5. Treatment planning in endodontics
* 7. Diseases with a pulpal etiology. Gangrena Simplex et Complicata
* 8. Failures during shaping and obturation of the root canal.
* 10. Irrigation (Protocols, chemicals, instruments)
* 11. Retreatment, revision
* 12. WRITTEN DEMONSTRATION
13. Resorption

ESTHETICS OF THE FACE

7th/9th semester

LECTURE
1. Esthetics of the face, characteristics and factors determining the smile
2. Introduction to facial anatomy and esthetics
3. Historical overview
4. Dental esthetics, pink and white harmony
5. Surgical aspects of facial surgeries
6. Prevailing of esthetic aspects during the planning process of orthognathic surgery
7. Dysgnathic surgeries
8. Developmental disorders and their treatment
9. Injuries and complications
10. Scartreatment, after care, laser therapy
11. Dermatological aspects
12. Epithesis, facial prostheses
13. Ambulatory interventions-Botox, injectable fillers, hyaluronic acid

ESTHETIC DENTISTRY I.
7th/9th semester

LECTURE
(1 hr/week)
* 1. Introduction to esthetics: Extra oral factors, smile line and incisal edge, red-white harmony. Planning, diagnostic wax up.
* 2. Diagnostic wax up: Planning, fabrication of diagnostic wax model, controlled preparation
3. Red-white harmony: optimal soft tissue esthetics and its realization

4. Marketing and Economy

5. Implant esthetics: Single implants in the front region

6. Magnification in dentistry

7. Communication and documentation: Methods of patient-doctor, technician-doctor communication, necessity and failures.

8. Adhesive post in root canal treated teeth, restorations with adhesive splinting


13. Ceramics in the molar region: Inlays, crowns, bridges. What, how, why, when?

**ESTHETIC DENTISTRY II.**

**8th/10 th semester**

**PRACTICE**

(1 hr/week)

1. Color theory (lecture)

2. Layering composite: Anatomic stratification (lecture)

3-4. Stratification technique (practice)

A practice on front teeth

5. Stratification technique („accessory“ Practice)

6. Shoulder preparation for full ceramic crowns (lecture)

7-8. Shoulder preparation for ceramic crowns (practice)

9. Veneers: Ceramic and composite (planning, preparation, bonding)

10-11. Veneer preparation

12. Manufacturing of temporary prostheses

13. Consultation

**INFECTION CONTROL IN DENTISTRY**

**7th semester**

**LECTURE and PRACTICE**

(Lecture 1 hr/week, practice 1 hr/week)

1. Introduction into infection control. Why does the dentist need infection control?

2. Introduction to infectious diseases

3. Blood-borne pathogens

4. Oral and respiratory diseases

5. Disinfection

6. Sterilization

7. Instrument processing, surfaces and equipment asepsis
* 8. Laboratory and radiology asepsis
* 9. Aseptic techniques
* 10. Protection of dental health care personnel. Immunization, protective barriers
* 11. Waste management. Managing chemicals safely in the office
* 12. Management of the office safety program. Work organization. Ergonomics
* 13. Hospital infections

**ORAL SURGERY I.**

**7th semester**

**Practice**
3 hrs/week
Practice in basic dentoalveolar surgery:
- apicectomy
- excochleation
- incision
- bone correction

Minimal requirements of semester 5 simple tooth extraction.

**ORAL SURGERY II.**

**8th semester**

**Practice**
3 hrs/week
Practice in basic dentoalveolar surgery:
- apicectomy
- excochleation
- incision
- bone correction

Minimal requirements of semester 5 simple tooth extraction.

**INTERNAL MEDICINE**

**7th semester**

**LECTURE**
(3 hrs/week)
* Examination of the heart
Carditis, valvular heart disease
* Diagnostic methods in internal medicine
Diagnostic methods in internal medicine
* Arrhythmias
Ischaemic heart disease, myocardial infarction
* Acute heart failure
Acute heart failure. Therapy
* Chronic heart failure
Chronic heart failure. Therapy
* Hypertension
Hypertension. Therapy
* Disorders of the peripheral arteries and veins
Methods and specific questions of the anticoagulant therapy
* Acute respiratory insufficiency
* Chronic pulmonary disorders
Chronic pulmonary disorders. Therapy
* Diabetes mellitus
Diabetes Mellitus. Therapy
* Acute and chronic renal disorders
Acute and chronic renal disorders. Therapy
* Hyperlipidaemia, hyperuricaemia
Anemias

**PRACTICE**
(2 hrs/week)
Examination of the heart
Carditis, valvular heart disease
Diagnostic methods in internal medicine
Arrhythmias
Ischaemic heart disease, myocardial infarction
Acute heart failure
Chronic heart failure
Hypertension
Disorders of the peripheral arteries and veins
Methods and specific questions of the anticoagulant therapy
Acute respiratory insufficiency
Chronic pulmonary disorders
Diabetes mellitus
Acute and chronic renal disorders
Hyperlipidaemia, hyperuricaemia
Anemias
Curriculum 2013/2014

8th semester (15 weeks)

LECTURE
(4 hrs/week)
* Esophageal disorders

PRACTICE
(2 hrs/week)
Problem oriented evaluation of the symptoms of patients with esophageal disorders, functional evaluation of patients with esophageal disorders (esophageal manometry, 24 h pH-metry, evaluation of the biliary reflux)

* Diseases of the stomach
* Diarrhoea, constipation
* Inflammatory bowel diseases
* Disorders of the gallbladder and the biliary tract

* Diseases of the liver
* Disorders of the pancreas
* Gastrointestinal tumors

* Disorders of the thyroid gland
* Diseases of the hypophysis and the parathyroid gland

* Disorders of the adrenal gland
* Degenerative, and autoimmune connective tissue disorders
* Degenerative, and autoimmune connective tissue disorders

* Consultation

8th semester (15 weeks)

ORAL MEDICINE I.

7th semester

LECTURE
(2 hrs/week)
* 1. Anatomical and histological structures of the mouth
* 2. Pathology of the oral mucosa. Primary and secondary skin lesions
* 3. Patient examination: anamnesis, clinical and other examination
* 4. Developmental and genetic disorders
* 5. Physical, chemical and iatrogenic diseases
* 6. Bacterial diseases
* 7. Viral diseases
* 8. Fungal diseases
* 9. Diseases of the lip
* 10. Diseases of the tongue
* 11. Written exam
* 12. Immune-based diseases. Allergic diseases

PRACTICE
(1 hr/week)
Patient presentations according to the lectures’ topics.
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Patient presentations according to the lectures’ topics.
ORAL MEDICINE II.

8th semester

**LECTURE**
(1 hr/week)
* 1. Oral Symptoms of the Neuroendocrine System and the Diseases of Metabolism
* 2. Oral Symptoms of the Gastrointestinal, Hepatic, Cardiovascular and Urogenital System
* 3. Diseases of the Salivary Glands
* 4. Oral Symptoms of the Blood and Blood-Forming Tissues
* 5. Oral Symptoms of the Psychological and Psychiatric Diseases
* 6. Benign Tumors of the Oral Cavity
* 7. Tumorlike Lesions of the Oral Cavity
* 8. Premalignant Lesions of the Mouth
* 10. Written Exam
* 11. Malignant Epithelial and Salivary Tumors of the Oral Cavity
* 12. Other Tumors of the Oral Cavity (Lymphomas, Sarcomas)
* 13. Therapy of the Tumors of the Oral Cavity
* 14. Consultation

**PRACTICE**
(2 hrs/week)
Patient presentations according to the topics of the lectures

OPERATIVE DENTISTRY I.

7th semester

**LECTURE**
(1 hr/week)
* 1. Etiology of caries, the role of dental plaque
* 2. Epidemiology, risk factors, indices. The role of prevention. Digestion, fluoride.
* 3. Etiology of caries, the role of diet, age, gender and habit

**PRACTICE**
(6 hrs/week)
On the first practice the 4th year student has to get familiar with the office equipment. On the second practice two patients will be called, the student has to take their status and history, after that one of them will be treated on the same appointment. The data and the status of the other patient will be recorded in a notebook and the patient will be informed that he/she will be called for another appointment.

On the first practice the 5th year student will treat his/her patient from the previous year or summer practice. If there's no such a patient the student will get someone from the notebook to treat. If there's a patient a student wants to treat, he/she has to inform the assistants of the department at least two weeks before that practice.

The students can get extra patients from the notebook or from previously agreed patient examination at the admission office. Giving appointment, administration and any changing is the
4. Response of the pulp to the progress of caries

5. Treatment planning

6. The methods of shade selection

7. The steps of making a posterior composite filling. (Centripetal technique, Z-technique, elastic cavity wall theory, bulk fill systems)

8. Occlusion and articulation in operative dentistry


10. Filling, veneer, inlay, partial crown, full crown. Indications and possibilities

11. Inlay

12. WRITTEN DEMONSTRATION

13. The cementation of indirect adhesive restorations

14. Consultation

**OPERATIVE DENTISTRY SEMINAR I.**

**7th semester**

Aims: To help the students to increase their theoretical knowledge. The students will have a chance to get answers to their practical and theoretical questions. During the practices and lectures in most of the cases there's not enough time for discussion and evaluation of special cases.

1. Introduction
2. Development of caries
3. Caries classification
4. Black classification and cavity preparation
5. Cavity nomenclature
6. Minimal and non-invasive preparation
7. Materials used for direct restorations
8. Amalgam filling
9. Composite filling
10. Matrix systems
11. Occlusion, articulation
12. Finishing and polishing
13. Test
14. Consultation

**OPERATIVE DENTISTRY II.**

**8th semester**

**LECTURE**

(1 hr/week)

* 1. The Perio-Endo frontier. The comparison of apical and marginal periodontitis. Contact between the pulpal space and the periodontium. Perio-Endo lesions

**PRACTICE**

(5 hrs/week)

On the first practice two patients will be called, the student has to take their status and history, after that one of them will be treated on the same appointment. The data and the status of the other patient will be recorded in a notebook and the patient will be informed that he/she will be called for another
2. Focal infection


4. Apexification and avulsion

5. Endodontic treatment in high risk patients. Local and general effects of different endodontic materials.

6. WRITTEN DEMONSTRATION


8. Magnification in endodontics


10. Endodontic surgery II. - microsurgery

11. Bleaching of root canal treated teeth


8. WRITTEN DEMONSTRATION

8. Consultation

OPERATIVE DENTISTRY SEMINAR II.
8th semester

1. Introduction
2. Pulpal considerations
3. Macro- and microscopy of the endodontium
4. Pulpal and periapical diseases
5. RCT - indications and contraindication
6. RCT- instruments
7. Length measurement
8. RCT – materials
9. RCT – techniques
10. RCF – materials
11. RCF – techniques
12. Retreatment
13. RCT - Coronal restauration
14. Test
### PROTHODONTICS I.

#### 7th semester

<table>
<thead>
<tr>
<th>LECTURE</th>
<th>PRACTICE, SURGERY</th>
<th>PRACTICE, LABORATORY</th>
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<tbody>
<tr>
<td>(1 hr/week)</td>
<td>(4 hrs/week)</td>
<td>(3 hrs/week)</td>
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<tr>
<td>*</td>
<td>1. Administration, health insurance system in Hungary</td>
<td>1. Dental instruments used in prosthetic dentistry, practice of impression making in the dental surgery</td>
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<tr>
<td>*</td>
<td>2. Prosthetic treatment planning. Examination of a partially edentulous patient</td>
<td>2. Medical and dental history of the patients, extraoral and intraoral examination, making diagnostic impression and cast</td>
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<td>*</td>
<td>3. The clinical anatomy of edentulous mouth: basic definitions. Consequences of total edentulousness, state of edentulousness.</td>
<td>3. Planning of fixed dental prosthesis from the cast of patients</td>
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<td>*</td>
<td>5. The clinical anatomy of the edentulous mandible I. (alveolar ridge, retromolar pad, retromylohyoid space)</td>
<td>5. Tooth preparation for abutment, construction of temporary crown</td>
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<td>8. The fabrication of complete dentures II. (assessment of the occlusal plane, the occlusal vertical dimension and the centric relation)</td>
<td>8. Making impressions</td>
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<td>*</td>
<td>9. The fabrication of complete dentures III. (Setting up of artificial teeth and try-in)</td>
<td>9. Making impressions and bite registration</td>
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<tr>
<td>*</td>
<td>10. The fabrication of complete dentures IV. (Processing of denture in the dental laboratory, reocclusion)</td>
<td>10. Checking the metal framework in the mouth, color matching</td>
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<td>*</td>
<td>11. WRITTEN ASSESSMENT</td>
<td>11. Checking the fixed prosthesis in the mouth, luting with interim cement</td>
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<tr>
<td>*</td>
<td>13. The fabrication of complete dentures V. (insertion of denture, reocclusion, remontage, relining the denture)</td>
<td>13. Checking the fix prosthesis</td>
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# PROSTHODONTICS II.

## 8th semester

<table>
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<tr>
<th>LECTURE</th>
<th>PRACTICE, Surgery</th>
<th>PRACTICE, Laboratory</th>
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<tbody>
<tr>
<td>(1 hr/week)</td>
<td>(4 hrs/week)</td>
<td>(3 hrs/week)</td>
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<tr>
<td>* 1. Therapy of partial edentoulism</td>
<td>1. 1st patient: Medical and dental history of the patients, extraoral and intraoral examination, making anatomical (primary) impression and cast</td>
<td>1. Making individual trays, definitive impressions and master models for lower and upper complete dentures</td>
</tr>
<tr>
<td>* 2. Parts of removable partial denture (RPD) – base plate, saddle</td>
<td>2. Planning and drawing the borders of complete removable denture</td>
<td>2. Making wax rims and bite registration</td>
</tr>
<tr>
<td>* 4. Parts of RPD – type of clasps</td>
<td>4. Registration of the occlusal plane, the occlusal vertical dimension and the centric relation</td>
<td>4. Setting up of artificial teeth</td>
</tr>
<tr>
<td>* 5. Removable partial denture – theoretical bases</td>
<td>5. Trying-in the set-up complete dentures in the mouth</td>
<td>5. Setting up of artificial teeth</td>
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<tr>
<td>* 6. Fabrication of clasp retained RPD</td>
<td>6. Delivering the total removable dentures</td>
<td>6. Setting up of artificial teeth, MTO</td>
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<td>MTO – this week in another time</td>
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<tr>
<td>* 8. Fabrication of RPD with precision attachment</td>
<td>8. 2nd patient: Medical and dental history of the patients, extraoral and intraoral examination, making anatomical (primary) impression and cast</td>
<td>8. Preparing dentures for delivery</td>
</tr>
<tr>
<td>* 11. Fabrication of hybrid prosthesis</td>
<td>11. Registration of occlusal plane, the occlusal vertical dimension and the centric relation</td>
<td>11. Planning of partial removable dentures, surveying the models</td>
</tr>
<tr>
<td>* 12. MTO (WRITTEN ASSESSMENT)</td>
<td>12. Trying-in complete dentures in the mouth</td>
<td>12. Making denture design for partial denture with metal framework</td>
</tr>
</tbody>
</table>
DENTAL DIAGNOSTICS AND TREATMENT PLANNING
8th semester

LECTURE
(1 hr/week)
* 1. Case history, diagnosis in dentistry. Documentation
* 2. Decision making in dental therapy
* 3. Diagnosis and therapy in oral surgery
* 4. Diagnosis and therapy in conservative dentistry. Diagnosis and therapy in endodontics.
* 5. Diagnosis, treatment planning and therapy in stomato-ology. Saliva diagnostic methods
* 6. Diagnosis and classification of TMD
  Case presentations
* 7. Diagnosis and therapy in prosthetic dentistry
  Case presentations
* 8. Diagnosis and therapy in pediatric dentistry and orthodontics
* 9. Diagnosis and therapy in parodontology.
* 10. Diagnosis and therapy of tooth wear. Diagnostic of tooth discoloration.
* 11. MTO (WRITTEN ASSESSMENT)

PRACTICE
(1 hr/week)
1. Case history, diagnosis in dentistry. Documentation
2. Decision making in dental therapy
3. Diagnosis and therapy in oral surgery
4. Diagnosis and therapy in conservative dentistry. Diagnosis and therapy in endodontics.
5. Diagnosis, treatment planning and therapy in stomato-ology. Saliva diagnostic methods
6. Diagnosis and classification of TMD
  Case presentations
7. Diagnosis and therapy in prosthetic dentistry
  Case presentations
8. Diagnosis and therapy in pediatric dentistry and orthodontics
9. Diagnosis and therapy in parodontology.
10. Diagnosis and therapy of tooth wear. Diagnostic of tooth discoloration.
11. MTO (WRITTEN ASSESSMENT)

PEDIATRIC DENTISTRY I.
8th semester

LECTURE
(1 hr/week)
* 1. Fundamentals of pediatric dentistry
* 2. Patient management
* 3. Morphology of primary teeth
* 4. Materials in pediatric dentistry
* 5. Eruption and shedding of teeth
* 6. Cariology of primary teeth
* 7. Pulp lesions in primary teeth
* 8. Cariology of permanent teeth
* 9. Treatment of permanent teeth
* 10. Local anesthesia, pharmacology; General anesthesia and pain control for the children
* 11. Traumatic dental injuries in childhood
* 12. Radiology in pediatric dentistry
* 13. Prevention in pediatric dentistry

PRACTICE
(2 hrs/week)
1. Oral assessment; screening
2. Case history, case report
3. Sealants and preventive resin restorations
4. Restorative procedures for primary teeth
5. Restorative procedures for primary teeth
6. Minimal Invasive Technic
7. Pulp therapy; pulpotomy, pulpectomy
8. Diagnostic methods
9. MTO I.
10. Protective crown (permanent incisor) (model)
11. Stainless steel crown
12. Management of the fractured permanent incisors
13. Consultation
14. MTO II.
### PERIODONTOLOGY I.

**7th semester**

<table>
<thead>
<tr>
<th>LECTURE</th>
<th>PRACTICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1 hr/week)</td>
<td>(2 hrs/week)</td>
</tr>
</tbody>
</table>
* 1. The topics of the Periodontology. Introduction to periodontal diseases  | 1. **Seminar**: Power driven instruments       |
* 2. Biochemistry and physiology of the connective tissue | 2. **Seminar**: Hand instruments               |
* 3. Biochemistry and physiology of the bone | 3. **Phantom course**: practicing the use of scalers |
* 4. Dental plaque and calculus | 4. **Phantom course**: practicing the use of universal curettes |
* 5. Microbiology of periodontal diseases | 5. **Phantom course**: practicing the use of Gracey curettes |
* 6. Immune responses in periodontal diseases | 6. **Phantom course**: treatment positions    |
* 7. Mechanisms of destruction of the periodontal tissues | 7. Written and practical examination          |
* 8. The epidemiology of periodontal diseases | 8. **Seminar and phantom course**: General guidelines for periodontal surgery: instruments, local anesthesia, periodontal dressing, suturing |
* 10. Endocrine disorders as a systemic modifiers of periodontal diseases | 10. **Seminar**: periodontal splinting. **Phantom course**: practicing of intra- and extracoronal periodontal splinting |
* 12. Tobacco use and its relation to periodontal diseases | 12. Examination and treatment of patient with gingivitis |

### PERIODONTOLOGY II.

**8th semester**

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1 hr/week)</td>
<td>(2 hrs/week)</td>
</tr>
</tbody>
</table>
* 3. Gingival diseases modified by other systemic conditions | |
* 4. The periodontal abscess. Necrotizing gingivitis. | |
* 5. Non-plaque induced inflammatory gingival lesions | |
* 6. The chronic periodontitis | |
* 7. The aggressive periodontitis | |
* 8. Periodontitis modified by systemic conditions | |
* 9. Basic principles of periodontal treatment | |
* 10. Treatment planing of chronic and aggressive periodontitis | |
* 12. The use of drugs in periodontal therapy | |
13. The use of antiseptics in periodontal therapy

**BASIC TREATMENT IN DENTAL MEDICINE (summer practice)**

8th semester

4th year dental students have to perform a practice of four weeks (4x35 hours) in Basic Treatment in Dental Medicine.

Requirements for accepting the summer practice:
- attendance of practices
- completing the tasks given by the instructor
- pieces upper or lower total removable denture or 1 piece of partial removable denture or 1 piece of post and core with crown or 1 piece of short bridge

The summer practice is a criterium topic! Each student must fulfill it.

**SURGICAL CONSIDERATIONS IN DENTISTRY**

7th semester

**PRACTICE**

(2 hrs/week)

- Internal medicine questions in dental practice
- Antibiotics in dentistry and oral surgery
- Cardiac risk patients in dental practice
- Dental treatment of patients with bleeding disorders
- Dental treatment of patients following radio/chemotherapy
- Maxillary sinus diseases and their management
- Forensic odontology
- Differential diagnosis of neck masses
- Differential diagnosis of facial pain
- Head and neck skin tumors
- Odontogenic tumors
- Bisphosphonate induced osteonecrosis of the jaws
- Sedoanalgnesia
- Written exam

**HUNGARIAN LANGUAGE VII.**

7th semester

<table>
<thead>
<tr>
<th>Week</th>
<th>Topics</th>
<th>Practice/ Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Examination of patient with endodontic problems</td>
<td>Revision</td>
</tr>
<tr>
<td>2.</td>
<td>Root canal treatment</td>
<td>Reading comprehension</td>
</tr>
<tr>
<td>3.</td>
<td>Prosthodontics</td>
<td>Vocabulary practice</td>
</tr>
<tr>
<td>4.</td>
<td>Prosthetical appliances</td>
<td>Word building</td>
</tr>
<tr>
<td>5.</td>
<td>Methods of tooth preparation</td>
<td>Lexical drills</td>
</tr>
<tr>
<td>7.</td>
<td>Written test</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Autumn break</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Types of crowns</td>
<td>Reading practice</td>
</tr>
<tr>
<td>10.</td>
<td>Types of prostheses</td>
<td>Lexical drill</td>
</tr>
<tr>
<td>11.</td>
<td>Types of bridges</td>
<td>Vocabulary practice</td>
</tr>
<tr>
<td>12.</td>
<td>Inlays</td>
<td>Dialogue</td>
</tr>
<tr>
<td>13.</td>
<td>Veneer crowns</td>
<td>Role-play</td>
</tr>
<tr>
<td>14.</td>
<td>Written test</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>Oral assessment</td>
<td></td>
</tr>
</tbody>
</table>

**HUNGARIAN LANGUAGE VIII.**
### 8th semester

<table>
<thead>
<tr>
<th>Week</th>
<th>Topics</th>
<th>Practice/ Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Fixed bridges</td>
<td>Revision</td>
</tr>
<tr>
<td>2.</td>
<td>Removable partial dentures</td>
<td>Reading comprehension</td>
</tr>
<tr>
<td>3.</td>
<td>Complete dentures</td>
<td>Word building</td>
</tr>
<tr>
<td>4.</td>
<td>Dental implants</td>
<td>Lexical drill</td>
</tr>
<tr>
<td>5.</td>
<td>Orthodontic appliances</td>
<td>Dialogue</td>
</tr>
<tr>
<td>6.</td>
<td>Orthodontics for children</td>
<td>Case study</td>
</tr>
<tr>
<td>7.</td>
<td>Written test</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Spring break</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Dental care in diabetes</td>
<td>Dialogue</td>
</tr>
<tr>
<td>11.</td>
<td>Xerostomia and Halitosis</td>
<td>Reading comprehension</td>
</tr>
<tr>
<td>12.</td>
<td>Prevention of cross infections</td>
<td>Case study</td>
</tr>
<tr>
<td>13.</td>
<td>Cosmetic dentistry</td>
<td>Reading comprehension</td>
</tr>
<tr>
<td>14.</td>
<td>Revision for the written test</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>Revision for the oral examination</td>
<td></td>
</tr>
</tbody>
</table>

### 7th semester

**DERMATOLOGY**

#### 7th semester

**LECTURE**

(1 hrs/week)

- Skin and mucous membrane anatomy and physiology
- Types of skin lesions
- Skin immunology
- Allergic skin reactions
- Urticaria
- Allergic skin diseases
- Eczema
- Drug allergy
- Autoimmune skin diseases
- Diseases of the connective tissue
- Vasculitis
- Vesiculobullous autoimmune skin diseases
- Viral, bacterial and fungal diseases of the skin and mucous membrane
- Sexually transmitted diseases
- Dermatoses caused by parasites
- Immunodermatologic disorders and papulo-squamous diseases
- Atopic dermatitis
- Psoriasis
- Lichen ruber planus
- Pityriasis rosea
- Disorders of the vessels
- Varicosity
- Thrombophlebitis
- Deep vein thrombosis
- Postthrombotic syndrome
- Leg ulcer
- Disorders caused by physical agents
- Artefact, combustio, congelatio
- Seborrhoic dermatoses
- Acne
- Rosacea
- Perioral dermatitis
- Alopecias
- Skin tumours
- Benign lesions
- Praecancerous lesions
- Cancers, melanoma malignum

**PRACTICE**

(3 hrs/week)

Presentation of skin diseases
PRACTICE MANAGEMENT IN DENTISTRY
9th semester

LECTURE
(2 hrs/week)
* 1. Career with dental certificate
* 2. Quality control in dental practice
* 3. HR in dental practice
* 4. Service area competitor analysis
* 5. Praxis marketing elements
* 6. Branding and identity
* 7. Connection between medical ethics and right
* 8. Equipment in dental surgery. Design and function in dental office
* 9. Problems of dental practice building and leading
* 10. The difficulties of the foundation of dental practice
* 11. Tariff of charges in dental office
12. Taxation of charges in dental office
13. Consultation, written demonstration

DISEASES OF TEMPOROMANDIBULAR SYSTEM
9th semester

LECTURE
(1 hr/week)
* 1. Pathology of temporomandibular system
* 2. Anatomy, normal function of temporomandibular joint and muscles, innervations
* 3. Inflammatory and degenerative thicknesses
* 4. Symptoms of TMJ dysfunction
* 5. Etiology of TMJ dysfunction
6. Clinical examination methods, diagnostics
7. Imaging methods, importance of MRI
* 8. Differential diagnostics
* 9. Conservative therapy I.: Medicaments
* 10. Conservative therapy II.: Splints
* 12. Conservative therapy IV.: Psychodiagnostic and psychotherapy
* 13. Correction of occlusion, prosthetic treatment of TMJ patients. WRITTEN ASSESSMENT

The practical knowledge of the topics, patient examination methods, students get skill in taking case history and examination of the patients. Introduction of the preparation of splints, students make and insert a splint themselves.
DENTAL IMPLANTOLOGY I.
9th semester

Lecture
(2 hrs/week)
* 1. Osseointegration, bone-physiology, bone-healing
* 2. History of dental implantology. Types, design of dental implants. The definition of an implant system
* 3. Prosthetic aspects of implant planning
* 4. X-ray diagnoses in implantology, CT, 3D etc.
* 5. Procedure of implant surgery
* 6. Consultation before implant surgery: indications and contraindications. Anatomical consideration of the jaws. Surgical planning
* 7. Bone augmentation procedures and different methods
* 8. Implant surgery combined with sinus elevation, bone augmentation
* 9. The dental office and the personnel requirements of dental implantology. Legal aspect of implantology, written consent
* 10. Immediate loading
* 11. Loss of implants, recall, overview
* 12. Implantology in orthodontics
* 13. Exam

DENTAL IMPLANTOLOGY II.
10th semester

Practice
(2 hrs/week)
* 1. The DenTi Implant system in implantology practice I.
* 2. The DenTi Implant system in implantology practice II.
* 3. The Straumann Implant system in implantology practice
* 4. The SGS Implant system in implantology practice
* 5. The CAMLOG Implant system in implantology practice
* 6. The Nobel Biocare Implant system in implantology practice I.
* 7. The Nobel Biocare Implant system in implantology practice II.
* 8. The Ankylos Implant system in implantology practice I.
* 9. The Ankylos Implant system in implantology practice II.
* 10. Spring Congress
* 11. The MDI Implant system in implantology practice
* 12. Written exam, Evaluation of course
* 13. Semester overview

OPERATIVE DENTISTRY III.
9th semester

Practice
(4 hrs/week)
Requirements and evaluation of operative dentistry practice
Patient management:
On the first practice the 4th year student has to get familiar with the office equipment. On the second practice two patients will be called, the student has to take their status and history, after that one of them will be treated on the same appointment. The data and the status of the other patient will be recorded in a notebook and the patient will be informed that he/she will be called for another appointment.
On the first practice the 5th year student will treat his/her patient from the previous year or summer practice. If there’s no such a patient the student will get someone from the notebook to treat. If there’s a patient a student wants to treat, he/she has to inform the assistants of the department at least two weeks before that practice.
The students can get extra patients from the notebook or from previously agreed patient examination at the admission office. Giving appointment, administration and any changing is the students’ responsibility.
Only the points gained during the semester are considered. Points predetermined on the beginning of the semester define practical grades.
Not fulfilling the following conditions results in automatical failure of the semester:
By the end of the 4th year at least one from all Black cavity types should be performed, but VI.cl.
By the end of the 5th year it’s recommended to perform at least one of all the items from the previously mentioned
list. Exceptions can be: core build up, fiber reinforced post, VI.cl., veneers. The lack of these treatments can be neglected if the student's points are around the minimal point line (but achieved it). Only the main practice leader can give permission for this, after consulting the practice leaders.

OPERATIVE DENTISTRY Seminar III.
9th semester
Seminar
(1 hr/week)
Current topics of operative dentistry according to contemporary scientific literature

OPERATIVE DENTISTRY IV.
10th semester
(6 hrs/week)
PRACTICE
Requirements and evaluation of operative dentistry practice

Patient management:
On the first practice two patients will be called, the student has to take their status and history, after that one of them will be treated on the same appointment. The data and the status of the other patient will be recorded in a notebook and the patient will be informed that he/she will be called for another appointment.

On the first practice the 5th year student will treat his/her patient from the previous year or summer practice. If there’s no such a patient the student will get someone from the notebook to treat. If there’s a patient a student wants to treat, he/she has to inform the assistants of the department at least two weeks before that practice.

The students can get extra patients from the notebook or from previously agreed patient examination at the admission office. Giving appointment, administration and any changing is the students’ responsibility.

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By the end of the 5th year it’s recommended to perform at least one of all the items from the previously mentioned list. Exceptions can be: core build up, fiber reinforced post, VI.cl., veneers. The lack of these treatments can be neglected if the student’s points are around the minimal point line (but achieved it). Only the main practice leader can give permission for this, after consulting the practice leaders.

OPERATIVE DENTISTRY Seminar IV.
10th semester
Seminar
(1 hr/week)
Case studies. Comprehensive treatment planning and diagnostics

DENTAL IMPLANTOLOGY (in Prosthodontics)
10th semester
LECTURE
(2 hrs/week)
* 1. Surface properties and modifications of dental implants. Characteristics of titanium
* 2. Hands on practice on manikin
* 3. The components of an implant system. Theoretical background of implantology: osseointegration, soft tissue integration, loading
* 4. Implant-prosthetic treatment planning: alternative treatment plans. Team work, documentation. Special fields: young, old patients, smoking etc.
* 5. Implant planning with CT and guide systems
* 6. Types of implant supported prostheses, indication, conditions 1. Temporary prosthesis
* 7. Types of implant supported prostheses, indication, conditions 2. Occlusion, articulation. Abutments
* 8. Dental technical aspects of implantology. Laboratory steps of preparing fixed prosthesis
* 9. Dental technical aspects of implantology. Laboratory steps of preparing removable prosthesis
* 10. Implant retained hybrid prosthesis
* 11. Maintenance, oral hygiene, recall. Prosthetic problems and their solution. Possible complications during
implant surgery, prevention and therapy.

* 12. Interesting and special implant prosthetic cases
* 13. Written test
* 14. Case presentations, course evaluation
ORTHODONTICS I.
9th semester

**Lecture**
(1 hr/week)

* 1. History of Orthodontics
* 2. Classification and Terminology of Dentofacial Problems
* 3. Malocclusions and Functional Disorders
* 4. Clinical Orthodontic Diagnosis, Functional Analysis
* 5. Orthodontic Study Cast Analysis
* 6. Radiographic Analysis for Orthodontic Diagnosis
* 7. Treatment Plan and Documentation of Orthodontic Treatment
* 8. Removable Plate-Appliances
* 9. Functional Appliances
* 10. Fixed Appliances
* 11. Extraoral Appliances and Auxiliary Appliances used in Orthodontics
* 12. Anchorage in Orthodontics
  14. Consultation

**Practice**
(2 hrs/week)

1. Clinical Examination: Anamnestic Records, Written Orthodontic Documentation
2. Clinical Examination: Intraoral and Functional Examination
3. Orthodontic Impression, Preparation of the Study Cast
4. Orthodontic Impression, Preparation of the Study Cast
5. Orthodontic Impression, Preparation of the Study Cast
6. Measurements on the Orthodontic Study Casts
7. Orthodontic photo documentation
8. MTO I.
9. Cephalometric Analysis of the Lateral Radiograph
10. Cephalometric Analysis of the Lateral Radiograph
11. Cephalometric Analysis of the Frontal Radiograph
12. Cephalometric Analysis of the Frontal Radiograph and Orthopantomogram
13. Cephalometric Analysis of the Frontal Radiograph and Orthopantomogram
14. MTO II.

ORTHODONTICS II.
10th semester

**Lecture**
(1 hr/week)

* 1. Biology, Types and Mechanics of Orthodontic Tooth Movement
* 2. Interceptive Orthodontics, Early Treatments
* 3. Characteristics of Orthodontic Treatment During Mixed Dentition Period and Pubertal Growth
* 4. Conservative Dentofacial Orthopedic Treatments in Late Childhood and Puberty
* 5. Adult Orthodontics
* 6. The Role of Orthodontics in Interdisciplinary Therapy
* 7. Dentoalveolar Surgical Interventions Associated to Orthodontic Treatments
* 8. Preparation and Planning of Orthognathic Surgical Interventions
* 9. Combined Ortho-Surgical Treatments
* 10. Comprehensive Treatment of Craniofacial Malformations
* 11. Modalities and Appliances of the Retention
* 12. Causes of the Relapse, Complications of Orthodontic Treatment
* 13. Dental and Hygienic Caes of Patients Wearing Orthodontic Appliances
  14. Consultation

**Practice**
(2hrs/week)

1. Seminar: Removable Orthodontic Appliances
2. Clinical Presentation of Removable Orthodontic Appliances
3. Clinical Presentation of Removable Orthodontic Appliances
4. Clinical Presentation of Removable Orthodontic Appliances
5. Seminar: Fixed Orthodontic Appliances
6. Clinical Presentation of Fixed Orthodontic Appliances
7. Clinical Presentation of Fixed Orthodontic Appliances
8. Clinical Presentation of Fixed Orthodontic Appliances
9. Seminar: Braking of Bad Habits
10. Braking of Bad Habits
11. Seminar: Complex Care of Children with Cleft Lip and Palate
12. Complex Care of Children with Cleft Lip and Palate in Practice
13. Hygienic Coaching, Motivation and Professional Cleaning of Patients Who Wear Fixed Orthodontic Appliance
14. Consultation
ORAL SURGERY III.
9th semester

**Lecture**
(2 hrs/week)

* 2. Trauma: Midface, frontal skull base fractures
* 3. Temporomandibular joint surgery
* 4. Orthognathic surgery
* 5. Preprosthetic surgery
* 6. Distraction osteogenesis of the facial skeleton
* 7. Salivary gland diseases
* 8. Bisphosphonate related osteonecrosis of the jaws
* 9. Cleft lip and palate surgery
* 10. Etiology and diagnosis of oral cancer
* 11. Scientific search engines and databases
* 12. Surgical management of oral cancer. Reconstruction
* 13. Written exam
* 14. Discussion

**Practice**
(4 hrs/week)

Minimal practice requirement:
- 10 simple tooth extractions
- 3 operation:
  - Apicectomy
  - Tooth extraction by operation
  - Extraction of impacted or displaced tooth
  - Incision (drainage) of abscess
  - Cystectomy

ORAL SURGERY IV.
10th semester

**Practice**
(6 hrs/week)

Practice in basic dentoalveolar surgery:
- apicectomy
- excochleation
- incision
- bone correction

Minimal requirements of semester 8 simple tooth extraction, 2 operations

PEDIATRIC DENTISTRY II.
9th semester

**Lecture**
(1 hr/week)

* 1. Diagnostic methods, oral assessment; screening
* 2. Bad habits in childhood
* 3. Caries therapy for primary teeth
* 4. Oral diseases and parodontology in childhood
* 5. Secondary diseases of caries in permanent dentition
* 6. Minimal invasive therapy
* 7. Pulp therapy for permanent teeth
* 8. Dental surgery in pediatric dentistry
* 9. Prosthetic dentistry in childhood
* 10. MTO
* 11. Traumatic injuries of primary teeth
* 12. Traumatic injuries of permanent teeth
* 13. Assessment of semester
* 14. Consultation

**Practice**
(4 hrs/week)

Diagnostic methods
Caries prevention in childhood
The caries lesion and its management in children and adolescents
Pedodontic endodontics

PEDIATRIC DENTISTRY III.
10th semester

**Practice**
(3 hrs/week)

Diagnostic methods
Caries prevention in child dental care
PERIODONTOLOGY III.

9th semester

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1 hr/week, ie. 2 hours/fortnight)</td>
<td>(3 hrs/week)</td>
</tr>
</tbody>
</table>
* 1. Aim, indications and contraindications of periodontal surgery | Examination and treatment of patient with gingivitis or chronic periodontitis. |
* 2. Aim and indication of periodontal plastic surgery | |
* 3. Elimination of periodontal pocket: gingivectomy and gingivoplasty. Treatment of enlargement of gingiva | |
* 4. Periodontal surgery: access therapy | |
* 5. Periodontal wound healing: regeneration or reparation | |
* 6. GTR. Flap preparation and suturing in regenerative surgical procedures | |
* 7. Grafting procedures | |
* 8. Biomediators in regenerative procedures | |
* 9. Pedicle soft tissue graft in root coverage procedures | |
* 10. Free soft tissue graft in root coverage procedures | |
* 11. Gingival augmentation, crown-lengthening procedures, the deformed edentulous ridge | |
* 12. Electrosurgery and lasers in periodontal surgical procedures | |
* 13. Postsurgical care. Outcome of surgical periodontal therapy | |

PERIODONTOLOGY IV.

10th semester

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Practice</th>
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</thead>
<tbody>
<tr>
<td>(1 hr/week)</td>
<td>(3 hrs/week)</td>
</tr>
</tbody>
</table>
* 1. Supportive periodontal therapy | Treatment of patient with chronic or aggressive periodontitis. |
* 2. Treatment of furcation-involved teeth | |
* 3. Endodontics and periodontics. Treatment of dentin hypersensitivity | |
* 4. Occlusal therapy | |
* 5. Prosthetic rehabilitation of periodontitis patients. | |
| Periodontal health and restorative procedures | |
* 6. Orthodontics and periodontal therapy | |
* 7. Outcomes of periodontal therapy | |
* 8. The use of drugs in periodontal therapy | |
* 9. The use of antiseptics in periodontal therapy | |
* 10. Peri-implant mucositis and peri-implantitis | |
* 11. Treatment of risky patients I | |
* 12. Treatment of risky patients II | |
* 13. HIV-associated periodontal conditions | |
* 14. Consultation | |

PREVENTIVE DENTISTRY

9th semester

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1 hr/week)</td>
<td>(1 hr/week)</td>
</tr>
</tbody>
</table>
* 1. Definitions and objectives of preventive dentistry | Visiting a medical department ward to maintain dental preventive instruction and motivation for inn-patients |
* 2. Definitions of dental caries and role of fluorides | |
* 3. The effects of diet for general health and for dental caries | |
* 4. Preventive measures in periodontology | |
* 5. Preventive strategy and the orthodontic therapy | |
* 6. Preventive measures in prosthodontics
* 7. Iatrogen infections in dentistry and their prevention
* 8. Aetiology of oral precancerous lesions and their prevention
* 9. Exam – giving possibilities to get suggested mark for the examination

PROSTHODONTICS III.
9th semester

Practice
(6 hrs/week)
* 1. Medical and dental history of the patients, extraoral and intraoral examination, making diagnostic impression and cast
* 2. Medical and dental history of the patients, extraoral and intraoral examination, making diagnostic impression and cast, jaw registration
* 3. Planning of fixed/removable dental prosthesis
* 4. Tooth preparation for abutments, construction of temporary crown
* 5. Tooth preparation for abutments, construction of temporary crown
* 6. Tooth preparation for abutments, construction of temporary crown
* 7. Tooth preparation for abutments, construction of temporary crown
* 8. Precision/master impressions and jaw registration
* 9. Precision/master impressions and jaw registration
* 10. Try in of fixed part & metal framework in the mouth, shade selection
* 11. Trial insertion of waxed-up dentures
* 12. Insertion of completed denture
* 13. Review
* 14. Review

PROSTHODONTICS SEMINAR I.
9th semester

Practice
(1 hrs/week)
* 1. Patient case presentation and treatment planning, alternatives
* 2. Patient case presentation and treatment planning, alternatives
* 3. Patient case presentation and treatment planning, alternatives
* 4. Treatment planning and prosthetic treatment of edentoulism in children
* 5. Different types of major connectors
* 6. Patient case presentation and treatment planning, alternatives
* 7. Patient case presentation and treatment planning, alternatives
* 8. Patient case presentation and treatment planning, alternatives
* 9. Patient case presentation and treatment planning, alternatives
* 10. Patient case presentation and treatment planning, alternatives
* 11. Patient case presentation and treatment planning, alternatives
* 12. Patient case presentation and treatment planning, alternatives
* 13. Patient case presentation and treatment planning, alternatives
* 14. Evaluation

PROSTHODONTICS IV.
10th semester

Practice
(6 hrs/week)
* 1. Medical and dental history of the patients, extraoral and intraoral examination, making diagnostic impression and cast
* 2. Medical and dental history of the patients, extraoral and intraoral examination, making diagnostic impression and cast, jaw registration
* 3. Planning of fixed/removable dental prosthesis
* 4. Tooth preparation for abutments, construction of temporary crown
* 5. Tooth preparation for abutments, construction of temporary crown
* 6. Tooth preparation for abutments, construction of temporary crown
TREATMENT OF TRAUMATIC DENTAL INJURIES IN CHILDHOOD

10th semester

**Lecture, Seminar**
(Lecture: 2 hrs/week, Seminar: 1 hr/week)

* 1. Traumatic injuries in childhood
* 2. Orofacial trauma in childhood
* 3. Injuries to the primary dentition
* 4. Crown and root fractures in the permanent teeth
* 6. Injuries to developing teeth, Endodontic management
* 7. Treatment with implants in the trauma situation
* 8. Radiographic findings
* 9. Soft tissue injuries; injuries to the supporting bone
* 10. Orthodontic Management of the Traumatized Dentition
* 11. Prevention of dental and oral injuries
* 12. Follow-up procedures and recall schedule following the various trauma types
* 13. Consultation
* 14. MTO

FORENSIC MEDICINE

9th semester

**LECTURE**

(2 hrs/ every second week)

1. Introduction. Essential law.
2. Medical law – Duties of the doctor
3. Medical malpractice in dentistry
5. Autopsy
6. Classification of wounds I. (blunt force and sharp injuries)
7. Classification of wounds II. (heat and cold injuries, shot wounds)
8. Trauma of the head, face and denture
9. **Mid-term assessment**
10. Medical documentation, documentation of injuries – expert opinion in dental cases
11. Autopsy
12. Accidents (traffic, sport, household)
13. Forensic aspects of alcohol and drug abuse
14. Identification of the living and of the dead
15. DNA investigations in forensic medicine
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.
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**Elective Subjects** *

**Criteria Subjects**

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

**Criteria Subjects**

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**PHARMACY**

2013/2014 2nd year fall, 3rd semester

**Compulsory Subjects**

**Elective Subjects**

**Criteria Subjects**

* One has to complete 2 semesters of Physical Education until the end of the 5th year.
<table>
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<th>Course</th>
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* One has to complete 2 semesters of Physical Education until the end of the 5th year.

### PHARMACY

#### 2013/2014 2nd year spring, 4th semester

**Compulsory Subjects**

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**Elective Subjects**

**Criteria Subjects**

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<th>Department</th>
<th>Lecturer</th>
<th>Hrs/week: Theory</th>
<th>Hrs/week: Practice</th>
<th>Form of exam</th>
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<th>Course Requirement</th>
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*One has to complete 2 semesters of Physical Education until the end of the 5th year.

#### PHARMACY

**2013/2014 3rd year fall, 5th semester**

**Compulsory Subjects**

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**Elective Subjects**

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

**PHARMACY**

**2013/2014 3rd year spring, 6th semester**

**Compulsory Subjects**

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**Elective Subjects**

**Criteria Subjects**
### SUGGESTED STUDY PLAN

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<td>One has to complete 2 semesters of Physical Education until the end of the 5th year.</td>
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### PHARMACY

#### 2013/2014 4th year fall, 7th semester

**Compulsory Subjects**

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<td>* One has to complete 2 semesters of Physical Education until the end of the 5th year.</td>
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### PHARMACY

#### 2013/2014 4th year spring, 8th semester

**Compulsory Subjects**

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<td>Thesis Consultation I.</td>
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## SUGGESTED STUDY PLAN

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<th>Lecturer</th>
<th>Hrs/week: Theory</th>
<th>Hrs/week: Practice</th>
<th>Form of exam</th>
<th>Credit</th>
<th>Course Requirement</th>
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<tr>
<td>XT0011-2PHE</td>
<td>Physical Education*</td>
<td>Sport Center</td>
<td>Dr. Zs. R. Dr. Trényiné</td>
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* One has to complete 2 semesters of Physical Education until the end of the 5th year.

### PHARMACY

#### 2013/2014 5th year, 9th semester

##### Compulsory Subjects

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<th>Department</th>
<th>Lecturer</th>
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<th>Hrs/week: Practice</th>
<th>Form of exam</th>
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<tr>
<td>GTYKKA331</td>
<td>Basic Clinical Disciplines</td>
<td>2nd Department of Internal Medicine</td>
<td>Dr. NOÉMI GRUBER associate professor</td>
<td>3</td>
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<td>Exam</td>
<td>4</td>
<td>Phys. II., Pathophys. II., Pharmacodyn. II.</td>
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<tr>
<td>GTYKKA341</td>
<td>Clinical Pharmacy</td>
<td>Department of Clinical Pharmacy</td>
<td>Dr. PETER DORÖ associate professor, Head of Department</td>
<td>2</td>
<td>-</td>
<td>Exam</td>
<td>3</td>
<td>Pathophys. II., Biopharm., Public Health II.</td>
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<tr>
<td>GTYKKA255</td>
<td>Pharmacodynamics III.</td>
<td>Department of Pharmacodynamics and Biopharmacy</td>
<td>Prof. habil. GYÖRGY FALKAY professor, Dr. RÓBERT GÁSPAR senior lecturer</td>
<td>3</td>
<td>-</td>
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<td>Pharmacodyn. II. (th., pr.)</td>
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<tr>
<td>GTYKKA256</td>
<td>Pharmacodynamics III.</td>
<td>Department of Pharmacodynamics and Biopharmacy</td>
<td>Dr. ANNA KLUKOVITS assistant professor</td>
<td>-</td>
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<td>Pharmacodyn. II. (th., pr.)</td>
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<td>GTYKKA351</td>
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<td>Department of Clinical Pharmacy</td>
<td>Dr. PETER DORÖ associate professor, Head of Department</td>
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<td>Term Mark</td>
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<tr>
<td>GTYKKA371</td>
<td>Natural Treatments</td>
<td>Department of Pharmacodynamics and Biopharmacy</td>
<td>Dr. RÓBERT GASPAR associate professor</td>
<td>2</td>
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<td>Phys.-Biophys. II., Pharmacognosy II., Pathophys. II., Pharmacodyn. II.</td>
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<td>GTYKKA521</td>
<td>Pharmacy Practice 1. (2 months)</td>
<td>Department of Pharmacodynamics and Biopharmacy</td>
<td>Dr. ERZSÉBET CSÁNYI associate professor</td>
<td>40 hrs</td>
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##### Compulsory Elective Subjects

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<th>Hrs/week: Practice</th>
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<th>Credit</th>
<th>Course Requirement</th>
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<tr>
<td>GTYKKA471</td>
<td>Ward Pharmacy (Clinical Pharmacy II)</td>
<td>Department of Clinical Pharmacy</td>
<td>Dr. PETER DORÖ associate professor, Head of Department</td>
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<td>-</td>
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<td>GTYKKA451</td>
<td>Pharmaceutical Psychology</td>
<td>Dept. Of Behavioural Sciences</td>
<td>Dr. CSABA HAMVAI intern</td>
<td>2</td>
<td>-</td>
<td>Exam</td>
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<td>Physiology II., Pathophys. II., par: Pharmacodyn. III.</td>
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<tr>
<td>GTYKKA321</td>
<td>Veterinary Pharmacy</td>
<td>Department of Pharmacodynamics and Biopharmacy</td>
<td>Dr. ESZTER DUCZA assistant professor</td>
<td>2</td>
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<td>GTYKKA421</td>
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<td>Prof. TAMÁS PAÁL professor</td>
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<tr>
<td>GTYKKA461</td>
<td>Phytotherapy</td>
<td>Institute of Pharmacognosy</td>
<td>Dr. DEZSO CSUPOR assistant lecturer</td>
<td>2</td>
<td>-</td>
<td>Exam</td>
<td>2</td>
<td>Pharmacognosy II. exam</td>
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## SUGGESTED STUDY PLAN

### Course Requirement

**SUGGESTED STUDY PLAN**

<table>
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<th>Course Code</th>
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<th>Department</th>
<th>Lecturer</th>
<th>Hrs/week: Theory</th>
<th>Hrs/week: Practice</th>
<th>Form of exam</th>
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<th>Course Requirement</th>
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<td>GYTKKA571</td>
<td>Everyday Dermatology</td>
<td>Department of Clinical Pharmacy</td>
<td>Dr. PÉTER DORÓ associate professor, Head of Department</td>
<td>2</td>
<td>-</td>
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<td>GYTKKA361</td>
<td>Computerized Dosage Form Planning</td>
<td>Pharmaceutical Technology Department</td>
<td>flj. Dr. GEZA REGDON associate professor</td>
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### Criteria Subjects

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<tbody>
<tr>
<td>XT0011-PHE</td>
<td>Physical Education*</td>
<td>Sport Center</td>
<td>Dr. Zs. R. Dr. Trényiné</td>
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### 2013/2014 5th year, 10th semester

#### Compulsory Subjects

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<th>Lecturer</th>
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<th>Hrs/week: Practice</th>
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<tr>
<td>GYTKKA522</td>
<td>Pharmacy Practice 2. (4 months)</td>
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*One has to complete 2 semesters of Physical Education until the end of the 5th year.

#### Elective Subjects in the years 1–4

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<th>Hrs/week: Practice</th>
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<td>GYTKKA901</td>
<td>General Laws in Chemistry</td>
<td>Institute of Pharmaceutical Analysis</td>
<td>Prof. habil. GYÖRGY DOMBI associate professor, Head of Department</td>
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<td>Short History of Hungary I.</td>
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<td>SERFOZONE Dr. ADEL TOTH assistant professor</td>
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<td>GYTKKA891</td>
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<td>Prof. habil. GYÖRGY DOMBI professor, Head of Department</td>
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<td>GYTKKA671</td>
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<td>Prof. habil. GYÖRGY DOMBI professor, Head of Department</td>
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<td>GYTKKA1051</td>
<td>Basic Communication</td>
<td>Institute of Drug Regulatory Affairs</td>
<td>Dr. habil. ILDIKÓ CSOKA associate professor, Head of Institute</td>
<td>2</td>
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<td>GYTKKA1081</td>
<td>The Role of Nutrition in the</td>
<td>Institute of Pharmacodynamics and</td>
<td>Dr. ROBERT GÁSPÁR associate professor</td>
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<td>Dr. habil. ILDIKÓ CSOKA associate professor, Head of Institute</td>
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<td>GYTKKA1071</td>
<td>The Harms of Smoking and</td>
<td>Institute of Pharmacodynamics and</td>
<td>Dr. RÓBERT GÁSPÁR associate professor</td>
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<td>GYTKKA780</td>
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<td>Dr. ZSOLT SZAKONYI associate professor</td>
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<td>Hrs/week: Theory</td>
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<td>GYTKA511</td>
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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 - Szöllösi János: Medical biophysics (3rd edition). Medicina Könyvkiadó Rt
- 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/user/karsai/math/mathgytk/mathSenglish.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

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

QUANTITATIVE CHEMICAL ANALYSIS
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
- 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)

**BIOSTATISTICS**
- Lecture notes: [http://www.szote.u-szeged.hu/dmi/](http://www.szote.u-szeged.hu/dmi/)
- M.J. Campbell, D. Machin: *Medical Statistics*. John Wiley & Sons
- Station A Glantz: *Primer of Biostatistics*. McGraw-Hill

Recommended:
- Station A Glantz: *Primer of Biostatistics*. McGraw-Hill
- M.J. Campbell, D. Machin: *Medical Statistics*. John Wiley & Sons

**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.: An Illustrated History of Hungary, Corvina, Budapest, 1998
- Csorba Cs, Estők J. Karádi: Illustrated History of Hungary, Helikon Kiadó, 2005

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

**RADIOCHEMISTRY** (elective)
- Lecture notes (handout)

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**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)
- Solomons-Fryhle: *Organic Chemistry*

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

**PHYSIOLOGY**
- Dr. Mária Dux: *Physiology Laboratory Manual* (handout)

**PHYSICAL CHEMISTRY**
- *Physical Chemistry* (handout), 1987, SZOTE
- *Physico Chemical Experiments* (handout), 1987, SZOTE
COLLOID CHEMISTRY
Theory
Obligatory:
• Lecture notes: http://koll1.chem.u-szeged.hu/colloids/staff/zoli/Pharmacy/

Recommended:
• D. J. Shaw: Introduction to Colloid and Surface Chemistry, Butterworth-Heinemann, Oxford 4th Ed. 2007

Laboratory Practice
Obligatory:

BIOCHEMISTRY
• Pamela C. Champe, Richard A. Harvey: Lippincott’s Illustrated Reviews, BIOCHEMISTRY, 4th edition, Wolters Kluwer/Lippincott Williams&Wilkins

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:

PHARMACEUTICAL CHEMISTRY
• Gareth Thomas (University of Porthsmouth) Medicinal Chemistry, 2nd Edition) John Wiley &Sons Ltd
• Graham L. Patrick, An Introduction to Medicinal Chemistry, Oxford University Press

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

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
Textbooks
• Gayton and Hall: Texbook of Medical Physiology 12th ed. 2011
• Damjanov: Pathophysiology, Elsevier (Saunders title), 2008,
  ISBN: 978-1-4160-0229-1
  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)
• 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.,

Handouts (for practice)

BIOPHARMACY
• Leon Shargel and Andrew Yu: Applied Biopharmaceutics and Pharmacokinetics, Appleton and Lange,
  5th edition 2004

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 (elective)
• Lecture notes

<table>
<thead>
<tr>
<th>Recommended textbooks for fourth year pharmacy students</th>
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<tbody>
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</table>

PHARMACEUTICAL ANALYSIS

PHARMACODYNAMICS

PUBLIC HEALTH

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

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

CLINICAL LABORATORY PRACTICE

PHARMACY ADMINISTRATION

Recommended textbooks for fifth year pharmacy students

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

CLINICAL PHARMACY
Recommended:
• Clinical Pharmacy and Therapeutics by Roger Walker and Kate Whittlesea, Published by Churchill Livingstone, 4th edition 2007

PHARMACODYNAMICS

NATURAL TREATMENTS

PHARMACUTICAL PSYCHOLOGY
• H.I. Kaplan - B.J. Sadock: Synopsis of Psychiatry, 2007

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

PHARMACEUTICAL CARE
• Clive Edwards, Paul Stillman: Minor Illness or Major Disease?, 4th edition, Published by Pharmaceutical Press, 2006

WARD PHARMACY (compulsory elective)
• British National Formulary 60 September 2010, Published jointly by BMJ Publishing Group Ltd and Royal Pharmaceutical Society, 2010
• BNF for Children 2010-2011, 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, 2010

VETERINARY PHARMACY (compulsory elective)
• Steven B Kayne, Michael H Jepson: Veterinary Pharmacy, Pharmaceutical Press 2004

PHYTOTHERAPY (compulsory elective)

EVERYDAY DERMATOLOGY (compulsory elective)
5th year / Spring semester

The deadline of submitting the thesis is March 14, 2014

Pharmacy students perform a 4-month clerkship (3 successive months in public pharmacies, 1 month can be accomplished in pharmacy, pharmaceutical factory, galenical laboratory, university department or hospital pharmacy).

Fees:

From the academic year 2005/2006 fifth year pharmacy students have to pay the whole tuition fee for the second semester of the fifth year.

INTERIM PRACTICE

Pharmacy students are required to complete a compulsory practice in a pharmacy 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 pharmacy or submitted by the student in a sealed envelope. (The form can be downloaded from our website). A “Letter of Acceptance” completed by the pharmacy has to be presented at the Foreign Students’ Secretariat until May 6, 2014.

2nd year pharmacy students must perform a practice of 4 weeks in a pharmacy.

3rd year pharmacy students must perform a practice of 4 weeks in a pharmacy.

4th year pharmacy students must perform a practice of 2 months in a pharmacy (pharmacy, pharmaceutical factory, galenical laboratory, university department or hospital/clinical pharmacy).

Note: The precondition of starting the 2-month compulsory practice is completing all the courses of the first four years and acquiring 16 credits of elective subjects.

5th year pharmacy students must perform a 4-month clerkship in the second semester of the academic year. (3 successive months in public pharmacies and 1 month in a hospital/clinical pharmacy.)
PHYSICS-BIOPHYSICS

1st semester

LECTURE


Diffusion. Fick’s first law. Generalised equation of continuity. Fick’s second law. The oxygen supply of tissues


2nd semester

LECTURE


PRACTICE

Statistical evaluation of experimental data
Viscometry
Electrical conductance. Conductometry
Refractometry
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.


* 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.
* 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.
* 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.

**MATHEMATICS**

**LECTURE**

* Basic concepts: sets, numbers, intervals, relations, functions. Elementary properties of functions: domain, range, graph, even/odd functions, periodicity, boundedness, monotonicity, concavity, maxima and minima.
  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.

**PRACTICE**

Exercises and solutions of problems in the topics of the corresponding lectures.
* 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:
* 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 χ² test, The χ² test for goodness of fit. Nonparametric methods.

GENERAL CHEMISTRY

1st semester

LECTURE
* The science of chemistry
* Chemistry as physical science. Measurements and units
in chemistry.

PRACTICE
* Chemical calculations
* 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.
Laboratory experiments

* Stoichiometry

* States of matter


* The structure of atoms


* Atoms, electrons, the periodic table


* The chemical bond


* Molecular structure and stability

* Molecular properties and geometry. Thermochemistry.

* The properties of solutions


* Chemical equilibrium


* Acids and bases


Separation of NaCl-CaCO3 mixture by solvation and filtration. Preparation of distilled water and its comparison with tap water by simple analysis.


Preparation of different types of chemical compounds. Preparation of a double salt. Study of heat of the solution. Determination of the heat capacity and the approximate atomic mass of a metal.


Curriculum 2013/2014

* Oxidation-reduction
* 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

INORGANIC CHEMISTRY

2nd semester


* 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
* 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-oxidation; 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 place in the periodic table, electron configuration, physical properties, occurrence, synthesis and use of them. Solvatation of 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 solvent). 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 peroxide). 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 vesicles, mitochondria and peroxisomes.
- 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 gene expression strategies: transcription posttranscriptional processing, translation posttranslational modifications.
- Regulation of gene expression in prokaryotes and eukaryotes.
- Principles of molecular biological techniques: 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 signal transduction pathways and their role in cellular functions.

**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.
* Reaction sensitivity
* Reaction specificity
* Groups of cations
    * 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.
* Simple analysis of cation group 3.
* 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 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 (HCl), iodine or bromine. Thiocyanate, reaction with silver ions, iron(III) ions, oxidants.


* Total analysis of solids for cations and anions: physical appearance, color, preliminary tests, heating, flame coloration, preparation of solution, analysis for cations and anions.


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**QUANTITATIVE CHEMICAL ANALYSIS**

**2nd semester**

**LECTURE**

* The nature, role and importance of quantitative analytical chemistry in the industry, research and medical practice. The fundamental concepts and methods of analytical chemistry.

* 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.


**PRACTICE**

* Introduction: Health and accident prevention regulations.

* The use of volumetric glassware.

* Procedure of chemical analysis.


* 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.

* Preparation and standardization of potassium permanganate solution. Direct, indirect and back titration in permanganometry.

* 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.


* Reductometric methods titanometry, ascorbinometry.

* Instrumental methods of chemical analysis, classification and importance of instrumental analysis.

Calculation of analytical results and solving of problems.

Gravimetric determination of sulfate ion in form of BaSO₄.

Gravimetric determination of and calcium ion sin form of Ca₃(PO₄)₂*H₂O.

Preparation and standardization of hydrochloric acid and sodium hydroxide standard solution.

Titration of week acids (acetic acid).

Titration of a mixture of strong and week acids (sulphuric and boric acid).

Determination of sodium thiosulphate (multiplying procedure).

Determination of amonia in ammonium salts by distilation.
**Curriculum 2013/2014**

* Electrochemical methods potentiometry (membrane-type and special electrodes) and potentiometric titrations, electrolytic methods (polarography, volt-amperometric titrations), coulombmetry and measurements based on electric conductivity.
* Separation methods of instrumental analysis. Principles and applications of gas chromatography, high performance liquid chromatography and ion chromatography.
* Basic principles of resonance methods (NMR, ESR) and mass spectrometry.

**Determination of potassium ion by ion exchange separation.**

**FIRST AID AND RESUSCITATION**

* Rautek's manoeuvre, log-roll technique, KED, paramedic-EMC-NIC introducing, helmet removing.
* Unconscious patients, BLS, XBL, AED
* Unconscious patients, BLS, XBL, AED – practice
* Heimlich manoeuvre. Stable position (Gabor's manoeuvre). Esmarch-Heiberg manoeuvre. Laryngeal mask, ET.
* 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.

**SHORT HISTORY OF HUNGARY**

**1st semester**

* Orientation, introduction.
* The origin of the Hungarians, ancient history.
* The early Middle Ages, the foundation of the Hungarian State.
* Hungary as a Central European power, the age of the Anjous.
* The age of the Hunyadis /János and Mátys Hunyadi/.
* Tripartite division of Hungary.
* Efforts to unify the country, the Principality of Transylvania.
* Reformation in Hungary, Rákóczi-rebellion.
* Hungary as a part of the Habsburg Empire.
* The "era of reform" 1825-1848.
* The revolution and war of independence 1848-1849.

**2nd semester**

* Introduction, discussion of requirements
* Reform era of 1825-1848
* Revolution and war of independence of 1848-49
* Compromise in 1867, birth of Austro-Hungarian Monarchy
* World War I
* Dismemberment of Austro-Hungarian Monarchy
* Horthy regime, the interwar period
* Hungary in World War II
* Hungary after World War II, Hungary as a part of the Soviet block
* Revolution in 1956
* Kádár regime and its fall, elections of 1990
* Course evaluation

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.
* Revision of the Past Simple and the Present Perfect Tenses. Presenting research methods and results. Mid-term test.
* 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.
* 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 biology and chemistry texts. Repetition and reformulation of ideas.

* Reading and understanding Tables. Numericals, decimals, reading out numbers.
* 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.

**LATIN**

1st semester

**PRACTICE**

(2 hrs/week)

* Simple medicine forms. Plural forms in 1st declension. Prepositions.
* Praes. Imp. Passivi. 2nd declension.
* Grammar revision exercises. Ointment, oil.
* Mid-term test. The structure of medical prescriptions. 3rd declension - nouns.
* 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)
* 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.
* 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 'élőtt'.
* 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: -höz/-hez/-höz (to), -nál/-nél (at)
* General revision.
* TEST 2
* Oral tests

2nd semester

PRACTICE
(4 hrs/week)
* My family: possessive suffixes, genitive structure.
* I have a...: Possessives + 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.
* 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
QUANTITATIVE CHEMICAL ANALYSIS

3rd semester

**LECTURE**

* The nature, role and importance of quantitative analytical chemistry in the industry, research and medical practice. The fundamental concepts and methods of analytical chemistry.

* 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.


**PRACTICE**

Complexometry:

Preparation and standardization of EDTA standard solution.

Determination copper(II)-ion.

Titrination of calcium- and magnesium ions in mixture.

Permanganometry:

Preparation and standardization of potassium-permanganate standard solution.

Titration of hydrogen-peroxide.
* Redox equilibrium in analytical chemistry.

* Preparation and standardization of potassium permanganate solution. Direct, indirect and back titration in permanganometry.

* 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.


* Reductometric methods titanometry, ascorbinometry.

* Instrumental methods of chemical analysis, classification and importance of instrumental analysis.

* Electrochemical methods potentiometry (membrane-type and special electrodes) and potentiometric titrations, electrolytic methods (polarography, voltammetric titrations), coulombmetry and measurements based on electric conductivity.


* Separation methods of instrumental analysis. Principles and applications of gas chromatography, high performance liquid chromatography and ionchromatography.

* Basic principles of resonance methods (NMR, ESR) and mass spectrometry.

Determination of iron(II) ion.

Bromatometry:

Preparation of potassium bromate standard solution.

Titration of arsenic(III) ion by Győry.

Determination of antipyrin by bromine substitution reaction.

Jodometry:

Preparation and standardization of sodium-thiosulfate solution.

Determination of phenol by Koppeschaar.

Titration of thiocyanate ion by Schulek.

Jodometric determination of copper(II) ion.

Instrumental analysis:

Conductometric titration: determination of oxalic acid

Coulombmetry: determination arsenic(III) ion

Potentiometry:
 PHYSICAL CHEMISTRY

**LECTURE**
* Thermodynamics
* The first law of thermodynamics
* The second law of thermodynamics
* The third law of thermodynamics

**PRACTICE**
* Thermochemistry
* Determination of the heat of neutralization.
* Phase equilibria
* Reaction kinetics
* Electric conductance
* Study of dissociation by electric conductance. Dependence of conductivity on concentration. Solubility by conductivity measurements.
* 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

ORGANIC CHEMISTRY

3rd semester

**LECTURE**

**PRACTICE**
* Basic methods of synthetic organic chemistry;
* Distillation; Crystallization, melting point; Extraction;
**Curriculum 2013/2014**

* Carbonic acid derivatives.

**4th semester**

**LECTURE**

* Isoprenoids. Terpenoids, carotenoids, steroids.
* Alkaloids.
<table>
<thead>
<tr>
<th>LECTURE</th>
<th>PRACTICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Membrane physiology</td>
<td>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.</td>
</tr>
<tr>
<td>Transmission: synapsis, receptors</td>
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</tr>
<tr>
<td>Muscle physiology</td>
<td>Electromyography (EMG). Neuromuscular studies with BIOPAC system.</td>
</tr>
<tr>
<td>Blood physiology</td>
<td>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.</td>
</tr>
<tr>
<td>Heart physiology</td>
<td>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.</td>
</tr>
<tr>
<td>Circulation</td>
<td>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.</td>
</tr>
<tr>
<td>Respiration physiology</td>
<td>The human respiratory system: spirometry, determination of inspiratory and expiratory pressures, palpation over the chest, auscultation over the heart and lungs.</td>
</tr>
<tr>
<td>Physiology of the urinary system</td>
<td>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</td>
</tr>
<tr>
<td>Section</td>
<td>Description</td>
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<tr>
<td>Skin and thermoregulation</td>
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<tr>
<td><strong>4th semester</strong></td>
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</tr>
<tr>
<td>Vitamins, nutrition, metabolism</td>
<td>Pregnancy tests The effect of insulin on blood glucose level Thorn's test (theory)</td>
</tr>
<tr>
<td>Endocrine system</td>
<td>Demonstration of blood-brain barrier in the rat</td>
</tr>
<tr>
<td>Physiology and structure of the nervous system</td>
<td>Human reflexes (patella-, Achilles-tendon, biceps-, triceps-, radial-reflex; skin reflexes) Tremor – tremometer. Video (disorders of the motor system)</td>
</tr>
<tr>
<td>Motor system</td>
<td>Investigation of the skin senses (pressure, pain, tactile sense, graphesthesia, sense of localisation). Weber's 3 basin test. Cool and hot receptors localization on the hand.</td>
</tr>
<tr>
<td>Somatosensory system</td>
<td>Observation of the autonomic nervous system with the BIOFEEDBACK program, the polygraph examination (BIOPAC),</td>
</tr>
<tr>
<td>Autonomous nervous system</td>
<td></td>
</tr>
<tr>
<td>Sleep and higher brain functions</td>
<td>Effects of relaxation and arousal to body</td>
</tr>
</tbody>
</table>
functions. EEG recording. Cognitive tests (Stroop paradigm, Mini-Mental Test, Eyes test, Trail making test).

The effects of physical exercise on respiration, heart rate and blood pressure.

**COLLOID CHEMISTRY**

**LECTURE**
* Introduction
* Colloidal state and systems
* Major characteristics of colloidal systems: classification, definition, delimitation and comparison.
* Incoherent (incohesive) and coherent (cohesive) colloidal systems.
* Macromolecular colloids
* Chemical structure of macromolecules.
* Characterization of macromolecular coils.
* 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.

**PRACTICE**
* Safety precaution, fire protection.
* Viscosity of polymer solutions.
* Effect of surface active agents on surface tension of water.
* Solubilization of organic acids.
* Adsorption from solution, determination of specific surface of adsorbent.
* Emulsions, microemulsions.
* Spreading and wetting. Making of monomolecular films by Pockels method.
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 precursors: glycerol (from neutral lipids), glucogenic amino acids
- Importance of hexose monophosphate shunt
- Relationship between the carbohydrate metabolism and other metabolisms
- Lipid metabolism
- 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
PHARMACEUTICAL BOTANY

4th semester

**LECTURE**
(3 hrs/week)

* Introduction to the course and the living cell. The hierarchy of plant structure. Endomembrane concept and cytoplasm. Nucleus, mitochondria and plastids.

* Cell wall, plasmodesmata. Meristem & the primary plant body. Plant tissues, simple tissues, tissue systems. Parenchyma and collenchyma

* Sclerenchyma - Sclereids and fibers. Secretory structures (internal and external structures). Dermal Tissue System: Epidermis and stomata, trichomes. Periderm, lenticel

* Xylem - Tracheids, vessel members, fibers. Primary xylem and ontogenesis. Phloem - Sieve tubes and cells Sieve tubes and cells Ontogenesis and function

* Root - Primary structure and differentiation. Secondary growth in roots Adventitious roots

* Shoot apical meristem. Stems and Buds. Stem - Primary vascular differentiation. Stem - Differentiation and secondary growth.


* Leaf arrangement, Leaf types, Morphology: leaf shapes, margins, venation, Modified structures. Flower structure, Corolla types, Stamens, Pistils, Ovary position, Floral formulas

* Inflorescence types, Sporogenesis and gametogenesis, Fertilization and embryogenesis. Pollination, Breeding Systems, Seed, Fruit (dry fruits, fleshy fruits) and seedlings

* Plant Taxonomy, Nomenclature, Cronquist System, Monocots vs. Dicots. Magnoliidae: Magnoliaceae, Lauraceae, Nymphaeaceae, Ranunculaceae, Papaveraceae

* Hamamelidae: Cannabaceae, Urticaceae, Juglandaceae, Fagaceae, Betulaceae.

**PRACTICE**
(2 hrs/week)

Introduction, Use of the microscope, Lab drawing, The living plant cell, plasmolysis

Dermal Tissue System

Epiderm cells and stomatal apparatus, Trichomes, Periderm and lenticel

Ground Tissue System: Parenchyma Collenchyma

Sclerenchyma, Secretory canals and glands

Vascular Tissue System Xylem, Phloem, Vascular bundles.

Tissues of a Monocot Root, Tissues of a Young Dicot Root, Secondary Thickened Roots

Anatomy of Secondary Thickened Roots II

Lab Test

Primary Growth of Stems, Herbaceous Stems, Woody Stems, Bark

Underground stems

Anatomy of Leaves

Anatomy of Seeds
Caryophyllidae: Phytolaccaceae, Caryophyllaceae, Polygonaceae.

* Rosidae: Rosaceae, Mimosaceae, Caesalpiniaeae, Fabaceae, Rutaceae Dilleniidae: Malvaceae, Violaceae, Passifloraceae, Cucurbitaceae, Salicaceae, Brassicaceae


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.
* 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.
* At the doctor's: kell, lehet, szabad, tilos. Suffix szor/szer/ször. Body parts.
* Revision
* TEST 1
* Where were you in the summer: past tense conjugations.
* 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: possessive 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.
# SYLLABUS FOR 3RD YEAR PHARMACY STUDENTS

## PHARMACOGNOSY

### 5th semester

<table>
<thead>
<tr>
<th>LECTURE (3 hrs/week)</th>
<th>PRACTICE (4 hrs/week)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Safety and laboratory procedures</td>
<td></td>
</tr>
<tr>
<td>- Basic metabolic pathways. Primary metabolits. The origin of carbohydrates. The formation of fats and proteins. Secondary metabolites. The origin of terpenoids. The formation of phenolic compounds and alkaloids.</td>
<td>Basic phytochemistry procedures, extraction methods, chromatography I.: Percolation of Rutaee herba with solvents of different polarity, TLC examination of the extracts</td>
</tr>
<tr>
<td>- About carbohydrates in general. The types, occurrence, uses (in medicine) of carbohydrates. Honey, Tamarin pulp, manna, fig. Rose fruits. Starches.</td>
<td>Basic phytochemistry procedures, extraction methods, chromatography II.: Separation with column chromatography: chloroformic extract of Rutaee herba, TLC examination of the fractions</td>
</tr>
<tr>
<td>- Gums and mucillages. Tragacantha, acacia gum, agar, cotton. Carragen, steraculia gum, psillium, marshmallow root, linseed.</td>
<td>Basic phytochemistry procedures, extraction methods, chromatography III.: Isolation of rutamarin with preparative TLC, Purity examination of the isolated component by TLC</td>
</tr>
<tr>
<td>- Fats, fixed oils, waxes. Arachis oil, sesame oil, olive oil. Castor oil, coconut oil, linseed oil, theobroma oil. Hydnocarpus oil, bees wax, spermaceti.</td>
<td>Two dimensional TLC</td>
</tr>
<tr>
<td>- 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</td>
<td>Drugs with fixed oil content: Comparison of fixed oils</td>
</tr>
<tr>
<td>- 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, Hyosycami folium, Vitali reaction, Detection of scoopoletin, Drugs with alkaloids of phenylalanine-origin: Ipecacuanhae radix □ Rubremetin-reaction, Frohde-reaction</td>
<td>Drugs with alkaloid content II.</td>
</tr>
<tr>
<td>- Drugs with alkaloids derived from phenylalanine: Detection of carotinoids from Capsici fructus, Marquis reaction, detection of meconic acid from Opium</td>
<td>Drugs with alkaloid content III.</td>
</tr>
<tr>
<td>- Separation of morphine from the other opium alkaloids, Purity test of the isolated morphine by TLC</td>
<td></td>
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<tr>
<td>- Phenylalanine-derived alkaloids. Opium poppy.</td>
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</tbody>
</table>
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Opium.

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)


Drugs with alkaloid content IV.

Triptophan-derived alkaloids. Ergot.

Drugs with alkaloids derived from tryptophane: Chinchonae cortex: Thalleioquin reaction, Grahe test, Quantitative determination of the alkaloid content of Chinchonae cortex by spectrofotometry

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


MTO


Oral exam: images of medical herbs and in toto drugs

6th semester

LECTURE

(3 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.

* 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.


PRACTICE

(4 hrs/week)

Receipt of laboratory tools

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

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

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
248


* About steroids in general (biogenesis of steroids). Steroidal saponins (dioscorea, solanum, sarsaparilla root). Natural steroids as starring materials for partial synthesis of pharmaceuticals.

* About cardioactive glycosides containing drugs in general. Digitalis (purpurea) leaf. Digitalis lanata leaf.

* Strophanthus and other (nerium, thevetia, convallaria, adonis) cardenolid containing drugs. Bufadienoloids and its drugs (squills, black hellebore rhizom).


* Flavonoid compounds. Silybum. Sambucus.


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

Drugs with digitalis glycoside content: Keller-Kiliiani test, Baljet test, Kedde test (Digitalis purpureae folium, Digitalis lanatae folium, Strophanthi semen), TLC determination of Digitalis purpureae, Determination of unknown drug powders

Drugs with triterpene saponin content I.: TLC determination of Calendulae flos, TLC determination of Hippocastenii semen, TLC determination of Urticae herba et radix, Determination of unknown drug powders

MTO

Drugs with anthraquinone content: Gel chromatographic separation and TLC determination of the anthraquinone derivatives of Frangulae cortex, Borntäger 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)

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

MTO

Drugs with flavonoid content II.: Isolation and TLC determination of the purity of hesperidin from Aurantii epi- and mesocarpium. Detection of procyandin from Crataegi folium cum flore et Crataegi fructus (Bate-Smith test), Determination of unknown drug powders

Drugs with tannin content: General tannin reactions

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

MTO

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
GENERAL PART

* 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.

PRACTICE


* 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
Identification and qualitative tests, quantitative assays.

### INORGANIC PART

**Halogen group.** Chlorine water, Iodine, Hydrochloric acid, Sodium fluoride, Sodium chloride, Potassium chloride, Sodium bromide, Potassium bromide, Sodium iodide, Potassium iodide, Potassium perchlorate.

**Oxygen compounds.** Demineralized water, Distilled water, Hydrogen peroxide solution 30%, Potassium hydroxide, Sodium hydroxide.

**Sulphur and its compounds.** Purified sulphur powder, Precipitated sulphur, Sodium disulphite, Potassium sulphate, Sodium sulphate, Sodium thiosulphate.

**Nitrogen group.** Nitrogen, Concentrated ammonia solution, Ammonium chloride, Ammonium bromide, Nitrous oxide, Sodium nitrite, Concentrated nitric acid, Potassium nitrate.

**Phosphoric acid and its salts.** Sodium dihydrogenphosphate, Disodium hydrogenphosphate, Calcium hydrogenphosphate, Tricalcium phosphate.

**Compounds of arsenic, antimony and bismuth.** Arsenic oxide, Bismuth oxynitrate.

**Carbon group.** Activated charcoal, Carbon dioxide, Lithium carbonate, Sodium carbonate, Potassium carbonate, Potassium thiocyanate.

**Silicon compounds.** Hydrophilic colloidal silica, Hydrophobic colloidal silica, Talc, Magnesium trisilicate, White clay.

**Lead compounds.** Lead monoxide, Lead acetate.

*Kalii chloridum* It. A, B. Pt. Appearance of solution, Acidity or alkalinity, Iodides, Sulphates, Barium, Heavy metals, Iron, Informative test: 2,3


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* Boron compounds. Boric acid, Sodium borate.


* 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 nitas, Ferrum ad praeparationes homeopathicae, Ferrosi sulfas, Ferri chloridum, Mangani sulfas, Kalii permanganas, Calci chloridum, Calcii carbonas, Calcii hydrosol, Calcii sulfas, Magnesi subcarbonas levis, Magnesi chloridum, Magnesi oxidum leve, Magnesi peroxidum, Magnesi 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

Borax It. A, B, C, Pt. Appearance of solution, pH, Ammonium, Arsenic, Calcium, Heavy metals, Informative test: 1

* General Anaesthetics

Natrii nitris It. A, B, Informative test: 1, 3

* Ether, Chloroform, Halothane (Narcotan), Isoflurana (Florane), Thiopental (Trapanal)

Kalii nitras It. A, B, Informative test: 2, 3

Sulfur ad usum externum It. A, B, Pt. Appearance of solution, Odour, Acidity or alkalinity, Chlorides, Sulphates, Sulphides
* Sedative-Hypnotics


* Chloral hydrate, Paraldehyde, Carbromal, Barbital, Phenobarbital, Hexobarbital, Glutethimide, Talidomide (Contergan), Nitrazepam (Eunoctin), Midazolam (Dormicum)

* Drugs Used in the Treatment of Chronic Alcoholism

* Disulfirame (Antaethyl)

* Anticonvulsant Drugs

* Phenobarbital (Sevonal), Primidone (Sertan), Phenytoin (Diphenitan), Ethosuximide (Petnidan), Clonazepam (Rivotril), Carbamazepin (Stazepine, Tegretol), Lamotrigin (Lamictal), Valproic acid (Convulex)

* Antipsychotics, Neuroleptics

* Antidepressants

* Antiparkinson Agents

* Muscle Relaxants

* Antiepileptics

* Antiparkininson Agents

* Levodopa, Carbidopa, Amantadine (Viregyt-K), Selegeline (Jumex), Procyclidine (Kemadrin), Apomorphine (Apo Go)

* Anticholinergics

* Chlordiazepoxide (Elenium), Diazepam (Seduxen), Medazepam (Rudotel), Alprazolam (Xanax), Tofisopam (Grandaxin), Meprobamate (Andaxin), Buspiron (Anxiron), Trimetozone (Trioxazin)

* Narcotic Analgesics and their Antagonists

* Morphine, Ethylmorphine, Pethidine (Dolargan), Methadone (Diprolol), Fentanyl (Durogesic), Tramadol (Contramal), Naloxon (Narcanti)

* Antidepressants

* Imipramine (Melipramin), Amitriptyline (Bepirin), Maprotilin (Ludiomil), Fluoxetine (Prozac), Sertraline (Zoloft)

* Antiparkinson Agents

* Levodopa, Carbidopa, Amantadine (Viregyt-K), Selegeline (Jumex), Procyclidine (Kemadrin), Apomorphine (Apo Go)

* Muscle Relaxants

* Pipercuronium bromide (Arduan), Baclofen (Lioresal), Carisoprodol, Tolperisone (Mydetrox)
Psychomotor Stimulants, Anorectics

Neuroleptics: Chlorpromazini hydrochloricum (Hibernal), chlorprobuten (Truxal), Haloperidolum, Risperidonum (Risperdal), Clozapinum (Leponex), olanzapin (Zyprexa)

Psychomotor Stimulants, Anorectics

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)

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

Antidpressants: Imipramini hydrochloricum (Melipramin), Amitriptylini hydrochloricum (Teperin), maprotilin (Ludiomil), fluoxetine (Prozac), sertaline (Zolof)

Sympathomimetics

Antiparkinson agents: levodopa (Dopaflex), carbidopa, amantadine (Viregyt-K), Apomorphini hydrochloricum (Apo-Go), seleqiline (Jumex), procyclidine (Kemadrin)

Epinephrine (Anapen), Isoprenaline, Oxedrine (Sympathomim), Phenylephrine (Vibroil), Ephedrine (Epherit), Naphazoline, Xylomethazoline (Novorin)

Muscle relaxants: Pipercuron hydrobromidum (Arduan), Baclofenum (Lioresal), Carisoprodolium, Tolperisone (Mydeton)

Bismuthi subnitra ponderosus It. A, B, C, Assay, Informative test: 2

Alumen It. A, B, C, Informative test: 1

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

Hydargyri dichloridum It. A, B

Argenti nitras It. A, B

Cupri sulfas pentahydricus It. A, B, Assay

6th semester

**LECTURE**

* Parasympatholytics

Atropine, Homatropine, Methylhomatropine bromide, Scopolamine, Propantheline bromide, Tropicamide (Mydram)

* Sympatholytics

Prazosine (Minipress), Propranolol (Huma-pronol), Atenolol (Blokium), Metoprolol (Betaloc), Pindolol (Visken)

**PRACTICE**

Seminario:

Psychomotor stimulants: Amphetamine,[2] Caffeine

Hallucinogens and illegal drugs: Cocaine, heroin, LSD, Tetrahydrocannabinol (THC), MDMA (Ecstasy)

Anorectics: Sibutramin (Reductil)
* Anti-Migrain Agents

Parasymptomimetics: Acetylcholine, Carbachol, (Mostat), Pilocarpine (Humacarpin), Physostigmine, Neoostigmine methylsulphate (Stigmosan)

* Sumatipran (Imigran)

Nootropics: Piracetam (Nootropil)

* Local anesthetic agents

Cholinesterase reactivators: Pralidoxime

* Cocain, benzoic acid, procain, lidocain, bupivacain (Bucain, Marcain)

Trometamolum (Identification: A; Tests: Appearance of solution, pH, Chloride, Heavy metals, Iron; Assay; Informative test: 3)

* Spasmolytics

Parasympathomimetics: Acetylcholine, Carbachol (Miostat), Pilocarpine, (Humacarpin), Physostigmine, Neoostigmine methylsulphate (Stigmosan), Local anesthetic agents, Cholinesterase reactivators: Pralidoxime

* Papaverin, Drotaverin (No-Spa), bencyclan (Halidor)

Urem (Identification: C, D; Tests: Appearance of solution, Alkalinity, Bluret, Ammonium, Heavy metals)

* Antiarrhythmic drugs

Pralidoxime

* Theophylline, Salbutamol (Buventol), Terbutaline (Bricanyl)

Vanillinum (Identification: D)

* Antiarrhythmic drugs

Sympatholitics: Epinephrine (Anapen), Isoprenaline (Isuprel), Oxedrine (Symptomim), Phenylephrine, Ephedrine (Epherit), Propanolamine, Propylamine, Tropicamide (Mydram)

* Quinidine, Lidocaine, Amiodarone (Cordarone)

Amiodarone (Cordarone), Sympathomimetics: Epinephrine (Anapen), Isoprenaline (Isuprel), Oxedrine (Symptomim)

* Digitalis and other cardiac glycosides

Parasymptomolitics: Atropine, Homatropine, Methylhomatropine bromide, Scopolamine, Propantheline bromide, Tropicamide (Mydram)

* Digitoxin (Digimerck)

Local anesthetic agents: Cocaine, Benzoic acid, Procaine, Lidocaine, Bupivacaine (Bucaun, Marcain)

* Xantin derivatives

Spasmolytics: Papaverine, Drotaverine (No-Spa), Bencyclan (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 (Cyn)

Natriti 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)

Seminars:

* Glyceril trinitrate (Nitromint), Pentaerythritol tetranitrate (Nitropenton), Isosorbide mononitrate (Cardisorb, Rangin), Nicotinic acid, Pentoxyfilline (Trental)

Seminars: Antihyperlipidaemic agents

Parasymptomolitics: Prazosine (Minipress), Propranolol (Huma-pronol), Atenolol (Blokium), Metoprolol (Betacor), Pindolol (Visken)

* Lovastatin (Mevacor), Phenofibrate (Lipanthyl, Lipidil)

Antiarrhythmic drugs: Theophylline, Salbutamol (Buventol), Terbutaline (Bricanyl)

* Calcium channel blockers

Anticoagulants and haemostatics: Acenocoumarol (Syncumar), Ticlopidine (Ticlid)

* Nifedipine (Corinfar), Amlodipin (Amlipin, Norvasc), Verapamil (Isoptin), Diltiazem (Blockcan)

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), Prenoxdazine (Libexin)

Alcohol isopropyllicus (Identification: C; Tests: Peroxides)
* Mucolytics
* Bromhexine (Paxiraso1), Ambroxol (Halioxol), Terpin, Acetylcysteine (ACC, Fluimucil)
* Drugs of osteoporosis prevention
* Clodronic acid (Bonefos)
* Drugs for rheumatic gout
* Allopurinol (Milurit), Colchidin (Colchicium-Dispert)
* Thyroid and antithyroid drugs
* Levothyroxine (Euthyro1), Lithyronin, Thiamazole (Metothyrin), Propylthiouracil (Propyl)
* Antidiabetics
* Glibenclamide (Gilemal), Metformin (Adimet, Metrin)
* Antihyperlipidaemic agents
* Saccharin sodium, Aspartame (NutraSweet), Acesulfam-potassium
* Mono- and disaccharides
* Fructose, Glucose, Lactose, Sucrose
* Drugs used in stomach disease
* Phenolphthalein, Diphenoxylate (Reasec), Loperamide (Imodium), Metoclopromide (Ceruel), Cimetidine, Ranitidine (Ulceran, Zantac), Omeprazole (Losec), Sulfasalazine (Salazopyrin)
* Diuretics
* Acetazolamide (Huma-Zolamide), Furosemide (Furon), Hydrochlorothiazide (Hypothiazid), Etacrynic acid (Uregyt), Amiloride, Spironolactone (Vesospiron), Sorbitol
* Antiallergic antihistamins
* Promethazine (Pipolphen), Dimenhydrinate (Daedalon), Dimethindene (Fenistil), Cetirizine (Zyrtec), Loratadine (Claritine)
* Nonsteroidal analogues and antipyretics
* Salicylic acid, Acetylsalicylic acid (Aspirin), Paracetamol (Rubophen), Phenacetin, Phenazone, Aminophenazone, Propiphenazone, Metamizol sodium (Algopyrin)
* Nonsteroidal antiinflammatory agents
* Phenylbutazone, Etofename (Rheumon), Niflumic acid (Donalgirn), Indometacin, Diclofenac (Voltaren, Cataflam), Ibuprofen (Solpaflex, Advil), Naproxen (Naprosyn, Aleve)
* Piroxicam (Hotemin, Feldene),

* Apomorphini hydrochloridum (Identification: C; Informative test: 3, 4)
* Codeini hydrochloridum dihydricum (Identification: C, D; Informative test: 4)
* Ethylmorphini hydrochloridum (Identification: C, D; Informative test: 4)
* Morphini hydrochloridum (Identification: C, D, E)
* Calcii gluconas (Identification: B; Tests: Appearance of solution, Sucrose and reducing sugars, Chloride; Assay; Informative test: 1, 2, 3)
* Chlorali hydras (Identification: A, B; Tests: Appearance of solution, pH; Chloral alcoholate, Chloride, Heavy metals; Assay)
* Antihypertensive agents: Methylpodum (Dopegyt), Captopril (Tensiomin), Enalapril (Ednyt), Losartan (Cozaar), Dihydaralazine (Depressan), Moxonidine (Cynt)
* Antiangular agents and Vasodilators: Glyceril trinitrate (Nitromint), Pentaerythritol tetranitrate (Nitropenton), Isosorbid mononitrate (Cardisorb, Rangin), Nicotinic acid, Pentoxifylline (Trental)
* Antihyperlipidaemic agents: Lovastatin (Mevacor), atorvastatin (Atofrox, Liprimer), Phenofibrate (Lipanythyl, Lipidil)
* Calcium channel blockers: Nifedipine (Corinfar), amlodipine (Amlipin, Norvasc), Verapamil (Isoptin), Diltiazem (Biocalcin)
* Agents improving cerebral circulation: Vinpocetine (Cavinton), Cinnarizine (Stugerol)
* Benzocainum (Identification: C, D; Informative test: 3)
* Cocaini hydrochloridum (Identification: D, E; Informative test: 4)
* Procaini hydrochloridum (Identification: C, D, E, F; Informative test: 3, 4)
* Tetracaini hydrochloridum (Identification: B, C, D; Informative test: 2)
* Acidum asparticum (Identification: B; Tests: Appearance of solution, Chloride, Sulphate; Assay; Informative test: 2, 3)
* Glycerolum (85 per centum) (Identification: C, D; Assay)
* Mucolytics: Bromhexine (Paxiraso1), Ambroxol (Halioxol), Terpin, Acetylcysteine (ACC, Fluimucil)
* Drugs of osteoporosis prevention: Clodronic acid (Bonefos)
* Drugs for gout: Allopurinol (Milurit), Colchicine (Colchicium-Dispert)
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* Antiinflammatory steroids
  Thyroid and antithyroid drugs: Levothyroxine (Euthyrox), Liothyronin, Thiamazole (Metothyron), Propylthiouracil (Propycl)
  Antidiabetics: insulin, Glibenklamide (Gilemal), Metformin (Adimet, Metrivan)

* Hydrocortisone, Prednisolone, Triamcinolone acetonide (Florocort), Flucinolone acetonide (Flucinar), Betamethazone (Diprophos), Dexamethasone (Oradexon), Beclomethasone (Aldecin), Budesonide (Pulmicort), Macidipredone (Depersolon)
  Antifungal agents
  Artificial sweeteners: Saccharin sodium, Aspartame (Nutrasweet), Acetosulfame potassium
  Mono- and disaccharides: Fructose, Glucose, Lactose, Sucrose

* Clotrimazole (Canesten), Tolnaftate (Chinofungin), Terbinafine (Lamisil), Ketoconazole (Nizoral), Fluconazole (Diflucan)
  Antidiabetics: insulin
  Glibenklamide (Gilemal), Metformin (Adimet, Metrivan)

* Antimarial agents
  Pilocarpini hydrochloridum (Identification: D, E)
  Quinine, Chloroquine (Delagil), Mefloquine (Lariam), Pyrimethamine

* Drugs used in the chemotherapy of helminthiasis
  Atropini sulfas (Identification: D, E, F; Informative test: 3)
  Physostigmini salicylas (Identification: C, D)
  Pilocarpini hydrochloridum (Identification: D, E)
  Ephedrini hydrochloridum (Identification: D, E)

* Levamisole (Decaris), Mebendazole (Vermox)
* Antimalarial agents
  Methenamine,, Ethanol,, Isopropanol,, Phenol,, Thymol,, Resorcinol,, Hexachlorophene,, Benzalkonium chloride,, Tosylchloramid sodium,, Lactic acid,, Chlorohedidine,, Acriflavinium chloride,, Xanthacridine chloride,, Briliant green,, Fuchsin,
  Methylene blue

* Microbiological preservatives
  Natrii edetos (Identification: B, C, D; Assay; Informative test: 3)
  Formaldehydi solutio (35 per centum) (Identification: A, B, C; Tests: Appearance of solution, Acidity; Assay)
  Acidum acetylsalicylicum (Identification: B, C, D; Assay; Informative test: 1)

* Sulphadimidine, Sulphamethoxazole
  Acidum salicylicum (Identification: C; Informative test: 2, 3)

* Chemotherapeutic nitrocompounds
  Methyl (p-hydroxy benzoate), Benzyalcohol, Benzoic acid, Sorbic acid
  Phenazonum (Identification: C, D; Tests: Appearance of solution, Acidity, alkalinity, Chloride, Sulphate, Heavy metals; Assay; Informative test: 4)

* Other chemotherapeutic compounds
  Metamizolum natricum (Identification: B, C, D; Informative test: 1, 3)
  Phenylbutazonum (Identification: D; Informative test: 1, 2)

* Fluoroquinolon derivatives
  Paracetamolum (Identification: D, E)
  Ciprofloxacin (Ciprobay), Ofloxacin (Tarivid)

* Antituberculotics
  Isoniazid (Isonicid), Pyrazinamide, Ethambutol (Sural)
  Drugs used in stomac disease: Phenolphthalein, Diphenoxyate, Loperamide (Imodium), Metoclopramide (Cerucal), Cimetidine (Histodil), Ranitidine (Uceran, Zantac), Omeprazole (Losec), Sulphasalazine (Salazopyrin)

* Sex hormones and analogues
  Antiemetics: Ondansetron (Zofran), Dimenhydrinate (Daedalon)
  Diuretics: Acetazolamide (Huma-Zolamide), Furosemide (Furon), Hydrochlorothiazide (Hypothiazid), Etacrynic acid (Uregyt), Amiloride, Spironolactone (Verosprion), Sorbitol

* Nonsteroidal agents acting on sexual activity
  Antiallergic antihistamins: Promethazine (Pipolphen), Dimenhydrinate (Daedalon), Dinethindene (Fenistil), Cetirizine (Zyrtec), Loratadine (Claritine)
* Sildenafil (Viagra), Apomorphine (Uprima)

* Vitamins
  - Retinol (vitamin A₁), Ergocalciferol (vitamin D₂), Cholecalciferol (vitamin D₃), Menadione (vitamin K₃), Thiamine chloride (vitamin B₁), Riboflavine (vitamin B₂), Pyridoxine (vitamin B₆), Nicotinamide, Folic acid, Ascorbic acid (vitamin C)

* Antiviral agents
  - Thiamini hydrochloridum (Identification: B, C; Informative test: 2)

* Antimicrobials
  - Penicillin, Ampicillin (Semicillin), Amoxicillin (Amitil), Oxacillin, Imipenem (Tienam)

* Antineoplastic agents
  - Cyclophosphamide (Cytoxan), Carmustin (BICNU), Cisplatin (Platidiam), Carboplatin (Cycloplatin), Fluorouracil (Efudix), Methotrexate (Trexan), Imatinib (Glivec)

** Drugs used for immunomodulation

* Azathioprine (Imuran)

* Antifungal agents
  - Clotrimazole (Canesten), Tolnaftate (Chinofungin), Terbinafine (Lamisil), Ketoconazole (Nizoral), Fluconazole (Diflucan)

* Antimalarial agents
  - Quinine, Chloroquine (Delagil), Mefloquine (Lariam), Pyrimethamine (Diprofophos), Dexamethasone (Oradexon), Beclomethasone (Aldecin), Budesonide (Pulmicort), Mพาzipredone

* Antiinflammatory agents
  - Phenylbutazone, Etofenamate (Rheumon), Niflumic acid (Donalgin), Indometacin, Diclofenac (Voltaren, Cataflam), Ibuprofen (Solpaflex, Advil), Naproxen (Naprosyn, Aleve), Piroxicam (Hotemien, Feldene)

* Nonsteroidal analgesics and antipyretics
  - Salicylic acid, Acetylsalicylic acid (Aspirin), Paracetamol (Rubopenh), Phenacetin, Aminophenazon
  - Propiphenazon, Metamizol sodium (Algopyrin)

** Nonsteroidal antiinflammatory agents

* Antiseptics and desinfectans
  - Tosylchloramide sodium, Methenamine, Chlorhexidine

* Microbiological preservatives
  - Methyl p-hydroxybenzoate

* Chemotherapeutic sulphonamides
  - Sulfadimidine, Sulfamethoxazole
* Chemotherapeutic nitrocompounds: Nitrofurantoin, Metronidazole (Klion)
* Other chemotherapeutic compounds: Trimethoprim, Nalidixic acid (Neogramon)
* Fluoroquinolone 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 invertsugaars)
* 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 (Clomibegyt), raloxifen (Evista), Testosterone (Andriol), Nandrolone (Retabolil), Progesterone, Levonorgestrel
* Nonsteroidal agents acting on sexual activity: Sildenafil (Viagra), Apomorphine (Uprima)
* Vitamins: Retinol (vitamin A1), Ergocalciferol (vitamin D2), Cholecalciferol (vitamin D3), Menadione (vitamin K3), Thiamine chloride (vitamin B1), Riboflavin (vitamin B2), Pyridoxine (vitamin B6), 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 (Copeguis, Rebetol), Nevirapine (Viramune)
* Antibiotics: Benzylpenicillin, Ampicillin (Semicillin), Amoxicillin (Aktil), Oxacillin, Imipenem (Tienam), Subbactam, 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)
* Chloramphenicol (Identification: D, E; Informative test: 1)
Curriculum 2013/2014

Oxytetracycline 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 lacticium (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 to Pharmaceutical Technology I, General considerations
* Pharmaceutics
* Biopharmaceutics
* Classification of technological operations
* Types of dosage forms
* Quality for pharmaceutical products
* Introduction to Pharmaceutical Technology II
* Preformulation, formulation
* Drug formulation by neural network and factorial design
* Normatives in pharmaceutical technology
* GMP, ISO
* Validation, qualification
* Basics of industrial drug formulation
* Physico-chemical basics of pharmaceutical technology, theory and practice
* Interfacial phenomena
* Surface and interfacial phenomena
* Adsorption
* Adhesion
* Electrokinetic processes
* Rheology in pharmaceutical technology
* Concept of rheology
* Classification of rheological processes
* Rheology of disperse and coherent systems
* Connection between the pharmaceutical technology and the technical chemistry
* Water purifying methods
* Distillation
* Ion exchanging
* Reverse osmosis
* Seawater desalination
* Excipients in pharmaceutical technology
* Classification of excipients
* Dosage forms and excipients
* Liquid dosage forms
* Grouping
* Physicochemical characteristics
* Stability problems
* Biopharmaceutical considerations
* Emulsions and suspensions
* Types and stability
* Administration routes
* Excipients
* Liposomes
* Types and stability
* Administration routes
* Powders
* Particle size, distribution
* Mixing
* Extraction of plants
* Methods and equipment
* Types

**6th semester**

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<tr>
<td>* Preparations</td>
<td>Dispensing of solutions</td>
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<tr>
<td>* Theory and practice of sterilization</td>
<td>„A” measuring of liquids</td>
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<tr>
<td>* Theory of sterilization</td>
<td>„B” measuring of powders</td>
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<tr>
<td>* Methods</td>
<td>Writing of prescriptions</td>
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<tr>
<td>* Control of sterilizing</td>
<td>Liquid dosage forms</td>
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<tr>
<td>* Aseptic dosage forms</td>
<td>Solutio</td>
</tr>
<tr>
<td>* Requirements of parenteral preparations</td>
<td>Diluendum, aqua aromatica, gargarisma, elixirium, mixtura, sirupus, klysma</td>
</tr>
<tr>
<td>* Clean air technology</td>
<td>Solubility, right order of dissolving, dilution, calculation</td>
</tr>
<tr>
<td>* Application routes</td>
<td>Solvents, excipients</td>
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<tr>
<td>* Excipients</td>
<td>Calculation</td>
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<tr>
<td>* Containers</td>
<td>Solutio acriflavini (FoNo VII. 20,0 g)</td>
</tr>
<tr>
<td>* Elements of homeostasis</td>
<td>Solutio contra rhagades mamillae (FoNo VII. 33,6 g)</td>
</tr>
<tr>
<td>* Tests for pyrogens</td>
<td>Gargarisma chlorogenii (FoNo VII. 100,0 g)</td>
</tr>
<tr>
<td>* Dosage forms</td>
<td>Sirupus zinci (FoNo VII. 100,0 g)</td>
</tr>
<tr>
<td>* Industrial methods</td>
<td>Solutio noraminophenazoni pro parvulo (FoNo VII. 100,0 g)</td>
</tr>
<tr>
<td>* Microbiological preservation of liquid dosage forms</td>
<td>Mixtura pectoralis (FoNo VII. 100,0 g)</td>
</tr>
<tr>
<td>* Requirements of preservatives</td>
<td>Solutio pepsini (FoNo VII. 100,0 g)</td>
</tr>
<tr>
<td>* Efficacy of preservatives</td>
<td>Magistral preparation (50,0g)</td>
</tr>
<tr>
<td>* Preservatives</td>
<td>Mixtura solvens (FoNo VII. 100,0 g)</td>
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<td>* Ophthalmic dosage forms</td>
<td>Gutta, Klysma</td>
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<tr>
<td>* Eye drops</td>
<td>Checking the dose</td>
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<td>* Eye cleaning solutions</td>
<td>Ototgutta, nasogutta</td>
</tr>
<tr>
<td>* Semisolid dosage forms</td>
<td>Dilutio, trituratio</td>
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<tr>
<td>* Classification of dermatological preparations</td>
<td>Gutta methylhomatropini composita (FoNo VII. 10,0 g)</td>
</tr>
<tr>
<td>* Types of ointment bases</td>
<td>Ootgutta peroxydi (FoNo VII. 10,0 g)</td>
</tr>
<tr>
<td>* Production of ointments</td>
<td>Klysma chlorali pro infante (FoNo VII. 80,0 g)</td>
</tr>
<tr>
<td>* Investigation of ointments</td>
<td>Nasogutta zinci cum ephedrino (FoNo VII. 10,0 g)</td>
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<tr>
<td>* Choice of ointments, therapeutic and practical considerations</td>
<td>Solutio theophyllini (FoNo VII. 100,0 g)</td>
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<tr>
<td>* Gels</td>
<td>Solutio nephrolitica (FoNo VII. 100,0 g) Incompatibility</td>
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<tr>
<td>* Polymers in pharmaceutical technology</td>
<td>AUV preparations</td>
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<tr>
<td>* Hydrogels</td>
<td>Oily and alcoholic solutions</td>
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<td>* Stimuli responsive hydrogels</td>
<td>Incomp II (sol. 150,0g)</td>
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<tr>
<td>* Nasal drug delivery systems</td>
<td>Ototgutta fungicida (FoNo III Vet)</td>
</tr>
<tr>
<td>* Basic concepts of administration</td>
<td>Solutio metronidazoli (FoNo VII. 30,0g)</td>
</tr>
<tr>
<td>* Factors affecting bioavailability</td>
<td>Spiritus iododalicylatus (FoNo VII. 30,0g)</td>
</tr>
<tr>
<td>* Dosage forms and excipients</td>
<td>Self-made preparation</td>
</tr>
<tr>
<td>* Rectal and vaginal dosage forms</td>
<td>Incomp I (gutta 20,0g)</td>
</tr>
<tr>
<td>* Therapeutic considerations</td>
<td>Oleum pro inhalatione (FoNo VII. 20,0g)</td>
</tr>
<tr>
<td>* Dosage forms</td>
<td>Gutta antipyretica (FoNo Vet. III. 100,0g)</td>
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<tr>
<td>* Additives</td>
<td>Galenic Practice</td>
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<td>* Granulation and granules</td>
<td>Introduction</td>
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<td>Topics</td>
<td>Functions</td>
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<td>----------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------</td>
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<tr>
<td>Types of granules</td>
<td>Functions of a galenic pharmacy</td>
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<tr>
<td>Particle binding mechanisms</td>
<td>Galenic preparations of the Pharmacopoea</td>
</tr>
<tr>
<td>Methods of granulation</td>
<td>Calculations</td>
</tr>
<tr>
<td>Investigation of granules</td>
<td>Dosage form investigations of the Pharmacopoea (Ph.Eur., USP, Br.Ph.)</td>
</tr>
<tr>
<td>Pressing of solid particles, compressibility and process</td>
<td>Quality control, Operation methods, Production sheets</td>
</tr>
<tr>
<td>Tablet compression</td>
<td>Safety precaution, fire protection, material safety data sheets</td>
</tr>
<tr>
<td>Tablet compression machinery</td>
<td>Measurement of mass, balances</td>
</tr>
<tr>
<td>Compressibility and its measurement</td>
<td>Definitions, types, general rules</td>
</tr>
<tr>
<td>Tablet making and texture of tablets</td>
<td>Mechanical balances:</td>
</tr>
<tr>
<td>Development of solid dosage forms</td>
<td>mass-comparative balances: equal arm balances (Berkel), unequal-arm balances (OWA, Metripod, cg quick balance); deformation principles balances (coil, spiral and bent spring);</td>
</tr>
<tr>
<td>Methods</td>
<td>Electronical (strain-gauge) balances: advantages, different functions, types (analytical, precision and industrial platform balances, moisture analyser balance), adjusting/calibration (inner, external).</td>
</tr>
<tr>
<td>Excipients</td>
<td></td>
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<tr>
<td>Characteristics of texture</td>
<td></td>
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<tr>
<td>Preformulation tests</td>
<td>Distillation: definition, parts, sets of operation/material/heat, laboratory distillator, thermocompression, products;</td>
</tr>
<tr>
<td>Tests of tablets</td>
<td>Ion-exchange/demineralization: theory, synthetic resins, capacity, process, products;</td>
</tr>
<tr>
<td>Influencing factors on the physical parameters</td>
<td>Reverse osmosis (RO): theory, RO membrane, process, product;</td>
</tr>
<tr>
<td>Problems during tableting</td>
<td>Centrifugation: definition, factors, alignment, parts, types of rotors (e.g. swing-out)</td>
</tr>
<tr>
<td>Equipment for the tablet making</td>
<td>rotor, angle rotor.</td>
</tr>
<tr>
<td>Desintegration</td>
<td></td>
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<tr>
<td>Crushing, pulverization</td>
<td></td>
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<tr>
<td>Process of milling</td>
<td>mills (mortar and pestle, ball, vibratory ball, centrifugal ball, planetary ball, disk, cutting, industrial jet and colloid mill), rotary cone sample divider;</td>
</tr>
<tr>
<td>Particle size analysis (PSA) and its application</td>
<td>importance, FDA guide, USP tests, US and UK standard sieves, frequency of distribution, cumulated plots, microscopic measurement, laser diffractometer.</td>
</tr>
<tr>
<td>Homogenization</td>
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<tr>
<td>Mixing</td>
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<tr>
<td>Liquid mixing</td>
<td>paddle, anchor and propeller type, high shear homogenizer, circular flow and turbine mixer, shakers;</td>
</tr>
<tr>
<td>Mixing of semisolids</td>
<td>planetary mixer, kneaders, dispersers, curved blade impeller;</td>
</tr>
<tr>
<td>Mixing of solids</td>
<td>cylindric, cubic, tumbler, double cone, twin shell and vertical screw mixers.</td>
</tr>
<tr>
<td>Material transfers</td>
<td></td>
</tr>
<tr>
<td>Drying</td>
<td>definitions, purpose, efficiency, industrial microwave drying, vacuum drying, spray drying (nozzle, atomizer) and its application;</td>
</tr>
<tr>
<td>Dissolution</td>
<td>solutions, theory, definitions, expressions of concentration, pharmaceutical applications, dosage</td>
</tr>
</tbody>
</table>
Curriculum 2013/2014

* 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.
* Extraction and extracts: definition, types of process and
equipments (maceration,
turboextraction, vibroeextraction, percolation), dosage
forms (preparation, requirements, storage): extracts,
tinctures.
* 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: suspensions, definitions, classification,
flocculation, industrial manufacturing methods,
equipments, kinetics of sedimentation.
* Semisolid dosage forms
* 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, and preparation of
suppository bases, laboratory and industrial
preparation of suppositories (suppository moulding
equipments), types of moulds (metal, plastic), form-fill-
seal.

PATHOPHYSIOLOGY
5th semester

LECTURE

Introduction to Pathophysiology;
Inflammation I.: Definition, causes, mediators
and signs of acute inflammation. Regulation and
outcome of acute inflammation.
Inflammation II.: Chronic inflammation. Local
and generalized reactions of inflammation: fever,
inflammatory pain.

Pathophysiology of leukocytes I.:
Immunology: In vivo allergic reactions,
autoimmunity, immunodeficiency.
Endocrinology I.: Disturbances of endocrine
regulation. Diseases of hypothalamus, hypophysis
and thyroid gland. Hyperparathyreoidism.

SEMINAR/PRACTICE

Safety regulations. Review of physiologic background
of circulation and normal ECG.
In the practice room: Registration and analysis of
ECG. Determination of spirometric parameters.

Seminar: Inflammation I. (Lecture topic of the 1st
week).
In the practice room: Registration and analysis of
ECG. Determination of spirometric parameters.

Seminar: Inflammation II.
(Lecture topic of the 2nd week).

Seminar: Pathophysiology of leukocytes I.:
Immunology (Lecture topic of the 3rd week).

Seminar: Endocrinology I. (Lecture topic of the 4th week).

Seminar: Endocrinology II. (Lecture topic of the 5th week).

Starvation and obesity.
Diabetes mellitus, hypoglycemia
Diabetes mellitus causes, types, clinical signs, pathogenesis and consequences. Hypoglycemia


Seminar: Cardiovascular system I. (Lecture topic of the 7th week).

Cardiovascular system II.: Pathogenesis and consequences of atherosclerosis. Primary and secondary hypertension.

Seminar: Cardiovascular system II. (Lecture topic of the 8th week).

Cardiovascular system III.: Pathophysiology and ECG of acute coronary syndromes: angina pectoris, myocardial infarction

Seminar: Cardiovascular system III. (Lecture topic of the 9th week).


Seminar: Cardiovascular system IV. (Lecture topic of the 10th week).

Peripheral circulatory diseases:

Seminar: Peripheral circulatory disease (Lecture topic of the 11th week).

Pathophysiology of salt-water balance I.: Volume excess, hyper- and hyponatremia, hyper- and hypocalcemia

Seminar: Pathophysiology of salt-water balance I (Lecture topic of the 12th week).

Pathophysiology of salt-water balance II.: Hyper- and hypokalemia, disturbances of trace elements and vitamins.

Seminar: Pathophysiology of salt-water balance II (Lecture topic of the 13th week).

Cardiovascular system V.: Disturbances of electrical impulse generation and conduction.

Cardiovascular system VI.: Disturbances of electrical impulse generation and conduction.

6th semester

LECTURE
Pathophysiology of kidney diseases I.: Proteinuria, hematuria, glycosuria, ketonuria, pyuria, bacteruria, polyuria, oliguria and anuria.


Pulmonary diseases I: Abnormal breathing patterns, dyspneas. Obstructive pulmonary diseases: CODP, asthma bronchiale, cystic fibrosis.

SEMINARY/PRACTICE
Safety regulations. Seminar: Thermoregulation. (Please download and study the material from our website or coospace before class).

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.

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.
<table>
<thead>
<tr>
<th>Topic</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>Pulmonary diseases II:</strong></td>
<td>Restrictive pulmonary diseases (pleural disorders, pulmonary edema, embolism, hypertension), hypoxias, respiratory failure.</td>
</tr>
<tr>
<td><strong>Disturbances of acid-base metabolism:</strong></td>
<td>Respiratory acidosis and alkalosis. Metabolic acidosis and alkalosis.</td>
</tr>
<tr>
<td><strong>Gastrointestinal diseases I.:</strong></td>
<td>Nausea, vomiting, dysphagia. Abnormalities of gastric juice secretion, peptic ulcer.</td>
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<tr>
<td><strong>Gastrointestinal diseases II.:</strong></td>
<td>Diseases of absorption, diarrhea, constipation. Intestinal obstruction. Acute and chronic pancreatitis.</td>
</tr>
<tr>
<td><strong>Diseases of liver and biliary tract:</strong></td>
<td>Diseases of bilirubin metabolism: hemolytic, hepatocellular and obstructive jaundice. Causes, pathogenesis and consequences of hepatic cirrhosis.</td>
</tr>
<tr>
<td><strong>Pathophysiology of leukocytes:</strong></td>
<td>Leucopenia. Proliferative diseases: reactive and malignant diseases (leukemias, lymphomas).</td>
</tr>
<tr>
<td><strong>Red blood cell diseases I.:</strong></td>
<td>Polycytemias, Anemias - ineffective erythropoiesis.</td>
</tr>
<tr>
<td><strong>Red blood cell diseases II.:</strong></td>
<td>Anemias due to blood loss, hemolysis. <strong>Hemostasis I.:</strong> Bleeding disorders (platelet disturbances).</td>
</tr>
<tr>
<td><strong>Hemostasis II.:</strong></td>
<td>Bleeding disorders (vascular, clotting factor disturbances), thrombosis and embolism.</td>
</tr>
<tr>
<td><strong>Pathophysiology of the CNS I.:</strong></td>
<td>Multiple sclerosis, neurodegenerative diseases: Alzheimer's, Parkinson's and Huntington's disease. Pathogenesis of psychiatric disorders.</td>
</tr>
<tr>
<td><strong>Pathophysiology of the CNS II.:</strong></td>
<td>Circulatory diseases of the CNS. Cerebral edema. Pain, headaches, seizures and epilepsy.</td>
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</tbody>
</table>

**MICROBIOLOGY AND IMMUNOLOGY**

**5th semester**

<table>
<thead>
<tr>
<th>LECTURE</th>
<th>PRACTICE</th>
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<td>(4hrs/week)</td>
<td>(2hrs/week)</td>
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</tbody>
</table>

**In the practice room:** Determination of WBC, RBC, platelet, eosinophil and reticulocyte count. Staining and analysis of blood smear.
Factory hygiene and good manufacturing practice.
Microbiological requirements and purity classes of pharmaceutical products.
Antigen recognition by and activation of T and B cells.
Pharmaceutical products of microbial origin.
Microorganisms in pharmaceutical industry.
Production of pharmaceuticals by recombinant DNA technology.
The histocompatibility complex (MHC). Antigen presentation by MHC.
* 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
* Streptococcus, Neisseria,
Enterococcus,
Staphylococcus
Complement system.
* Gram negative rods I.
Enteric and extraintestinal pathogens
Mycobacterium.
* Gram negative rods II.
Bacteria related to respiratory tract
(\textit{Haemophilus}, \textit{Bordetella}, \textit{Legionella})
Pathogens of zoonoses (\textit{Yersinia}, \textit{Francisella})
Gram positive aerob rods
(\textit{Corynebacterium}, \textit{Listeria})
Cytokines I.

Gram positive anaerob rods
(\textit{Clostridium}) B. anthracis
Spirohatales.
Cytokines II.

holidays

* General properties and structure of viruses.
Reproduction of viruses.
Viral pathogenesis, chemotherapy of viral infections
Obligate intracellular bacteria
(\textit{Chlamydia}, \textit{Coxiella burnetii},
\textit{R. slovaca}, \textit{R. prowazekii})
Mechanisms of immunotolerance. Immunology of transplantation. Autoimmunity

* Hepatitis viruses
DNA viruses.
Herpesviruses, human papillomaviruses
Hypersensitivity reaction. Immunodeficiencies.

* RNA viruses II.
Slow viruses. Retroviridae, AIDS
RNA viruses I.
Influenzaviruses, measles-, mumps-, rubeola viruses.
Immunization against microbes.
Vaccination

* RNA viruses III
Poliovirus, coxsackie viruses
Rabies virus.
Manufacture of immunological products and their quality control.

Culture media. Inoculation and plating bacterial culture.
Haemoculture. Colony morphology.

Biochemical tests. Anaerobic cultivation.

Test of bacterial resistance to antibiotics. Enumeration of bacteria.

Sterility and pyrogenicity testing of pharmaceutical products

Precipitation, agglutination.

Summary of the most important human pathogenic bacteria I.

Summary of the most important human pathogenic bacteria II.

Propagation and assay of viruses.

Serological methods in virology.

Consultation

**BIOPHARMACY**

**LECTURE**
Basic principles


Drug metabolism, first-pass effect, factors influencing metabolism.

Drug elimination, clearance. Pharmacokinetics of repeated dose administration, plato phenomenon.

Pharmacokinetic model systems.

Concept and determination of AUC. Model independent pharmacokinetics.

Physiological and Biological availability. Equivalences.

Factors influencing biological effects of drugs.

Dose - response relationships.

Drug interactions. Synergism, antagonism.

Receptors, signal transduction.

Drug allergy, idiosyncratic drug reactions, polymorphisms.

Therapeutic drug monitoring. Non-linear pharmacokinetics.

**PRACTICE**
Basic principles, drug administration.

Absorption, distribution. Blood plasma curve of one compartment intravascular model system.

Drug metabolism. Blood plasma curve of one compartment extravascular model system.

Pharmacokinetic of Infusion. Blood plasma curve of repeated dose administration.

Blood plasma curve of two compartment intravascular model system.

Calculation of physiological availability and absolute and relative bioavailability. Multi dose schedule for subject with renal impairment.

Multi dose schedule for subject with hepatic dysfunction. Dosage schedule for children and elderly subjects.

Dose-response curves. Calculation of ED\(_{50}\), pD\(_2\).

Synergism, antagonism, dose-response curves. Calculation of ED\(_{50}\), pD\(_2\), pA\(_2\), pD\(_2\)'.

Non-linear pharmacokinetics, Michaelis-Menten 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.


* Classification of drugs. Drug types. Standard expressions and phrases.


* 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.


* Infections. Antibacteril and antiviral drugs. Influenza. Pharmacist-patient dialogue
2nd semester

PRACTICE
(3 hrs/week)

* Vaccination. Resistance to infections. Medical leaflets for educational purposes.
* Revision of previous topics. Test.

* The GI tract and drugs. Antidiarrhoal drugs and laxatives. Emetics and antiemetics. Role play.
* Revision of previous topics. Mid-term test.
* Drugs for IBS and IBD. Diet and regimen. Discussion.
* Diabetes. IDDM, NIDDM. Oral anti-diabetics. The importance of good control.
* 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
Pharmaceutical Analysis and Drug Control

**Lecture**

* 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.

* Electrometric methods: voltammetry, polarography, amperometry, potentiometry, conductometry and oscilometry.

* Spectrophotometry, spectrophotometers, atomic and molecular spectra, 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 atomic absorption spectrophotometry and flame photometry.

* Nuclear magnetic resonance spectroscopy (NMR).

* Mass spectrometry (MS) and combinations of gas chromatography and high-pressure liquid chromatography with MS. Field ionization and chemical ionization mass spectrometry.

* Thermoanalytical methods (TG DTG DTA DSC).

* Optical rotation (ORD CD), refraction and molecular refraction.

* X-ray diffraction (XRD), XRD analysis of solid pharmaceuticals and determination of particle size.


* 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.

* Chromatographic methods: adsorption column, partition column, paper chromatography, thin-layer chromatography (TLC), gas chromatography (GC), high-performance liquid chromatography (HPLC), ion-exchange chromatography, molecular sieves, gel permeation (filtration), zone electrophoresis and counter-current distribution.


* Methods of drug registration, preclinical requirements, clinical trials (phases I-III), quality control during manufacturing (GMP) and quality control in post-marketing phase.

**Practice**

* Pulvis neutracisus (FoNo) (a multicomponent divided powder)

  Identity tests: frangula bark, sodium, carbonate, bismuth, magnesium.

  Assay: bismuth, magnesium.

* Pilula somniferens (FoNo)

  Identity tests: hexobarbital, phenobarbital, lactose.

  Assay: hexobarbital phenobarbital.

* Spiritus iodosalicylatus (FoNo)

  Identity tests: iodine, potassium, ethanol, iodide, salicylic acid.

  Assay: iodine and salicylic acid

* Pulvis antidoloricus (FoNo)

  Identity tests: ethylmorphine, caffeine, phenacetin, acetylsalicylic acid.

  Assay: ethylmorphine, acetylsalicylic acid.

* Unguentum hydrargyri amidochlorati (FoNo)

Assay: marcury(II)amidochloride,

Suppositorium aminophenazoni (FoNo)
Identity tests: aminophenazone
Assay: aminophenazone

Suppositorium antiemeticum (FoNo)
Identity tests: lidocaine, atropine, caffeine.
Assay: lidocaine, caffeine.

Injectio algopyrini 50%
Identity tests: noraminophenazonium sodium mesilate
Assay: noraminophenazonium natrium mesilicum

Solution theobromoidati (FoNo)
Identity tests: theobromine, sodium, potassium, iodide, salicylic acid.
Assay: theobromine, iodide.

The constituents of the following dosage forms are identified by thin layer chromatography (TLC):

Pulvis asthmalyticus fortis (FoNo)
Pulvis asthmalyticus fortis cum atropino in tablettae (FoNo)
Antineuralgica tablet
Barbamid tablet
Nasogutta ephedrini (FoNo)
Identity tests: ephedrine
Assay: ephedrine

Chromatographic methods prescribed in the Pharmacopoeia VII.

Sparsorium sulfaboricum (FoNo)
Identity tests: sulphanilamide, boric acid.
Assay: sulphanilamide.

Measurement of physical data prescribed in pharmacopoeias (melting, boiling range, optical rotation, specific rotation, refraction, etc.)

Identification of 20 pharmaceutical substances on the basis of pharmacopoeial tests.

Methods of instrumental analysis.
Acidi-alkalimetry, direct titrations of strong acids and bases and weak acids and bases, back titrations, determination of organically combined nitrogen. Related with these all of the methods of pharmacopoeias and the prescriptions of the National Institute of Pharmacy (NIP) should be interpreted.


Oxidation reduction titrations with potassium permanganate, iodine, potassium iodate, potassium bromate, cerium(IV) sulphate solutions. Karl-Fischer titrations (aquametry).

Argentometric titrations.

Complexometric methods: direct and back titrations. Gravimetric methods in Ph. Hg. VII.

Separation of complex mixtures of pharmaceuticals on the basis of chemical characters (weak acids, bases, amphoteric and neutral) of the components.

PHARMACEUTICAL TECHNOLOGY

7th semester

**LECTURES**

* General instruction
* Coating process of solid dosage forms
* Requirements of coating process
* Sugarcoating, filmcoating, melted coating
* Instrumentation of coating process
* Capsules
* Categories of capsules
* Soft and hard gelatin capsules
* Capsule filling
* Tests for capsules
* Soaps, patches, preparations for veterinary use
* Application of soaps
* Process of preparation
* Medicated plasters
* FoNo VET and preparations
* Homeopathy
* Preparation of mather tincture
* Preparation of potencies
* Dosage forms
* Drying
* Classification of methods
* Convective and radiation drying
* Driers
* Freeze drying
* Crystallization processes
* Operations and methods
* Crystallization from melt
* Spherical crystallization

**PRACTICE**

Prescription pharmacy 2

General information

Fire safety

Solutions, repetition)

Ph.Hg.VIII, FoNo VII.)

Calculations
decoctum, infusum

* Collodium cum acido salicylico Fo No VII. dos. I (10,0 g)

* Gutta analpectica FoNo VI. dos. ½ (10,0 g).

* Otogutta chloramphenicol FoNo Vet III. dos I (10,0 g)

* Suspensions

* Emulsions

* Units, Latin number

* Solution against perspiration (Husz-Regdon) (50,0 g)

* Solutio gingivalis FoNo VII. dos. I (30,15 g)

* Nasogutta containing protargol Manuale

* Pharmaceuticum dos. ½ (16,8 g)

* Decoctum saponariae FoNo VII. dos. ½ (100,0 g)

* Self-made preparations

* Checking the dose

* Infusum sennea cum magnesio sulfurico (100,0 g)

* Suspensio bismuthi subsalicylici pro infante FoNo VI. dos. I. (100,0 g)

* Suspensio expectorans FoNo VII. dos ½ (100,0 g)

* Emulsio olei jecoris FoNo VII. dos. ½ (100,0 g)

* Linimentum scabicidum FoNo VII. dos. ½ (50,0 g)

* Linimentum sulfadimidini FoNo Vet. II. dos. I. (50,0 g)

* Suspensio anaesthetica FoNo VII. dos. I (100,0 g)

* ½ cs

* Suspensio salicylamidi 2% cum sorbito FoNo VI. dos. I (100,0 g)

* Suspensio zinci aquosa FoNo VII. dos. I (□100,0
Packaging, packaging materials
Requirements
Safety
Modification of biological activity
Interactions in pharmaceutical technology
Interaction and incompatibility
* Causes and types
  * directions and guidelines
  * Stability of drugs and dosage forms
  * Stability
  * ICH and structure of ICH
  * Shelf life, reaction kinetics
  * Automation, instrumentation and monitoring of
technological processes
  * Product manufacturing process
* On – line monitoring
* Process development and optimization
* Packaging, packaging materials
  * Zinkoxidshüttelmixtur NRF 2001 dos. I (100,0 g)
  * Zinkoxyd-Schüttelpinselung NFA dos. I (100,0 g)
  * Linimentum calcis FoNo VI. dos. ½ (50,0 g)
  * Linimentum ammonium FoNo VII. dos. ½ (50,0 g)
* Requirements
  * ZinkoxydSSchüttelpinselung NFA dos. I (100,0 g)
  * Requirements
* Safety
  * Incomp. III. (solution or suspension) (100,0 g)
  * Safety
* Modification of biological activity
  * Gargarisma antisepticum Fo No VII. dos. ½ (50,0 g)
* Causes and types
  * Powders
  * Divided and undivided powders
  * Stability
  * Capsula operculata
  * Incompatibility
  * Tea mixtures
* Interactions in pharmaceutical technology
  * Emulsions, suspensions
  * Powder dividing by eyes, checking with measurement
  * Powder dividing by Hunfalvyl, checking with measurement
  * Process development and optimization
  * Capsula operculata calibration
  * Pills
  * Calculation, writing of prescription
  * Infusum sennae cum magnesio sulfurico (100,0 g)
  * Pulvis coffeini 50 mg FoNo VII. dos. 1/3 (No. X)
  * Pilula coffeini 50 mg FoNo VII. dos. I (No. XXX)
  * Sparsorium antisudoricum FoNo VII. dos. ½ (34,2 g)
  * Pulvis calcii lactophosphorici FoNo VII. dos ½ (25,0 g)
  * Suppository
  * Preparing of suppository with moulding and hand-made method
  * Calibration of moulding forms
  * Suppository containing Bismuthum subgallicum
    (No. X)
  * Hard gelatine capsules containing Ascorbic acid
    (No. XX)
  * Pulvis bismuthi tannici FoNo VII. dos. ½ (No. X)
  * Suppositorium analgeticum forte FoNo VII. dos. ½
    (No. III)
  * Suppositorium antipyreticum pro infante FoNo. VII.
    dos. I (No. VI)
  * Suppositorium paracetamoli 60 mg FoNo VII. dos.
    I (No. X)
  * Vaginal dosage forms
  * Stifts
  * Powders
  * Calculation for moulding and hand-made method
  * Sal ad rehydrationem cum natrio
    hydrogencarbonico pro parvulo FoNo VII. dos. I
    (30,8 g)
  * Oralytpulver 60 SR 2001 dos. I (28,0 g)
  * Oral Rehydration Salts BP 1998 dos. I (27,9 g)
  * Emulsio paraffini cum phenolphthaleino FoNo VII.
    dos. ½ (100,0 g)
  * Globulus containing Zincum sulfuricum (No. IV)
  * Suppositorium laxans FoNo. VII. dos. I (No. X)
  * Pilula tonisans FoNo VI. dos. ½ (No. XXV)
  * Ovulum metronidazoli FoNo VII. dos. I (No. X)
Suppositorium ad nodum FoNo. VII. dos. I (No. X)
Suppository containing Benzocainum Manuale
Pharmaceuticum dos. 1/10 (No. X)
Inkomp. VI. dusting powder (50.0 g)
Eoszacharum containing barbitalum (No. X)
Suppository
Calculation of prescription components
Globulus metronidazoli compositus FoNo VII. dos. I. (No. X) ½ g.globulus
Suppositorium expectorans FoNo VI. dos. I. (No. VI)
Suppository for children Manuale Pharmaceuticum dos. I (No. X)
Effervescent powder for x-ray (Manuale Pharmaceuticum dos. I (16.6 g)
SELF-MADE PREPARATIONS
Preparation of sterile and aseptic dosage forms
Aseptic preparation
Eye-drops
Solutions for eye-drops
Solutio ophthalmica
cum benzalkonio
Solvens pro oculoguttis
cum benzalkonio
cum thiomersalo
Solvens viscosa pro oculoguttis
cum thiomersalo
cum cetrimido
Hydrogelum carbomerae pro oculoguttis
FoNo preparations
Oculogutta antidota
Oculogutta atropini
Oculogutta carbomerae
Oculogutta chloramphenicoli
Oculogutta erythromycini
Oculogutta gentamicini
Oculogutta homatropini
Oculogutta indosoli
Oculogutta naphazolinii
Oculogutta neomycini
Oculogutta neonatorum
Oculogutta pilocarpini
Oculogutta polymyxini
Oculogutta rifampicini
Oculogutta scopolamini
Oculogutta tetracaini
Oculogutta viscosa
Oculogutta zinci
Eye ointments
Bases of eye ointments
Oculentum simplex
Oculentum hydrosom
Oculentum basis
FoNo preparations
Oculentum dionini
Oculentum erythromycini
Oculentum neomycini
Oculentum neomycini cum prednisolono
Aerosols, inhalasols
Concentration of infusion solutions, isotonic
calculations
Sterilization
* Pyrogens, pyrogen removal methods
* Filtration
* Large volume parenteral preparations
* Infusions with electrolyte
* \textit{Infusio natrii chlorati}
* \textit{Infusio salina}
* Infusions with sugars
* \textit{Infusio glucosi}
* \textit{Infusio manniti}
* \textit{Infusio sorbiti}
* Infusions with electrolyte and sugars
* \textit{Infusio glucosi cum kalio}
* \textit{Infusio glucosi salina}
* Investigation of large volume parenteral preparations
* Supplementary infusions
* Stock solution
* \textit{Natrium lacticum solutum 20\% pro infusione}
* Infusions for correction of acidosis
* \textit{Infusio natrii lacticci}
* \textit{Infusio natrii hydrogencarbonici}
* Infusions for correction of alkalosis
* \textit{Infusio gastrica}
* Dialysis
* Peritoneal dialysis solutions
* \textit{Solutio pro dialysi peritoniale I.}
* \textit{Solutio pro dialysi peritoniale II.}
* Perfusion solutions
* Plasma substitute infusions
* \textit{Infusio dextrani}
* Parenteral nutrition
* Preparation of parenteral nutrition infusion
* \textit{Magistral parenteral nutrition infusion}
* Injections
* \textit{Injectio natrii chlorati}
* \textit{Injectio glucosi}
* \textit{Injectio papaverinii chlorati}
* \textit{Injectio coffeini natrii benzoici}
* Investigation of injections
* Non-heat sterilizable injections
* \textit{Injectio urea}
* \textit{Injectio aethylmorphinii chlorati}
* Multidosage injections
* \textit{Injectio procainii chlorati}
* \textit{Injectio atropinii sulfurici}
* Powder ampoules
* \textit{Kalium chloratum sterilizatum}
* \textit{Injectio trometamoli cryosiccata}
* Liofilization
* Emulsion and suspension type injections
* Visit in the Central Pharmacy
**LECTURE**

* Pharmaceutical technology and biopharmaceutics
* LADERM
* Biopharmaceutical considerations in drug product design
* Bioavailability
* Biopharmaceutical Classification System
* Effect of the physico-chemical properties of the drugs and the type of dosage forms on the biological response
* Physico-chemical profiling of the drug
* Solubility, lipophylicity, ionization (pKa), log P
* Permeability
* Absorption in the GI tract
* Absorption in the mouth
* Absorption in the gastric tract
* Absorption in the intestinal tract
* Colon therapy
* Rectal therapy
* Traditional and modified drug release preparations
* Parenteral application and pharmaceutical parameters
* Pharmacokinetics models
* Clearance

* Factors effecting drug absorption by injection
* Inhalasols
* Lung and its biopharmaceutical aspects
* Dosage forms and their special requiremets
* Lung delivery systems
* Dermal and transdermal drug delivery systems
* Skin parameters
* Permeation enhancers
* Ointment bases and application
* Patches and their mechanism
* Biopharmaceutical aspects of
  * dental,
  * vaginal
  * ophthalmic
  * otic and
  * nasal preparations
* Rectal drug delivery systems
* Rectal dosage forms
* Formulation factors
* Drug absorption modifiers
* Pediatric dosing and dosage forms
* Pediatric pharmacokinetics and pharmacodynamics
* Excipients
* Administration routes
* Therapeutic systems I

**PRACTICE**

* Prescription pharmacy 3
* General rules
* Repetition of liquid dosage forms
* Suspensio bismogeli (FoNo VII., 100 g)
* Sirupus kali chlorati (FoNo VII., 100 g)
* Repetition of solid dosage forms
* Sparsorium antymycoticum (FoNo VII., 50 g)
* Suppositorium noraminophenazoni 500 mg (FoNo VII., N° VI.)
* Ointments, Creams, Pastes, Hydrogels
* Globulus glycerini boraxati (FoNo VII., N° X.)
* Ung. salicylatum 1% (FoNo VII., 30,0 g)
* Ung. boraxatum (FoNo VII., 50,0 g)
* Hydrogelum antisudoricum (FoNo VII., 25,0 g)
* Ung. nystatini (FoNo VII., 50,0 g)
* Ung. carbamidi (FoNo VII., 25,0 g)
* Ung. dithranoli 0,1%
* Incompatibilities
* Inomp. IV. – ointment 30,0 g
* Ung. camphoratum ad pernionem (FoNo VII., 30,0 g)
* Ung. lidocaini ad rhagades (FoNo VII., 175,0 g (1/2 dőzis))
* Pasta antirheumatica (FoNo VII., 175,0 g
* Ung. contra panaritium (FoNo Vet., III., 50,0 g)
* Ung. nasale (FoNo VII., 10,0 g)
* Detergens sulfuratum (FoNo VII., 100,0 g)
* Zincum gelatinosum 50,0 g (FoNo VI. előirata)
* Lanstein pastza Manuale Pharmaceuticum 100,0 g
* Hydrophile Metronidazol-Creme 2% Standardisierte Rezepturen 2001 (NRF/SR) 100,0 g
* Aniónische Nystatin-Creme 100,0 g
* 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
| * Solid systems | Preparing granules (binder granulation with LuxRoyal equipment). |
| * Biodegradable polymers | Preparing granules with centrifugal granulator (binder granulation with Freund CF-360 equipment). |
| * Therapeutic systems II | Preparing granules with fluid granulator (binder granulation with Strea-1 equipment). |
| * Semisolid systems | Capsule filling and blistering. Mass control of filled capsules. |
| * TTS | Compressibility investigation of different materials with the use of different compression forces. Recording and analysing different pressure curves. |
| * Lyotropic liquid crystals | Geometrical investigation of tablets prepared by different compression forces. |
| * Micro- and multiple emulsions | Physical investigation of different tablets (breaking hardness, friability, etc.). |
| * Microsferes, liposomes | Tablet preparation by direct compressing without auxiliary materials with the use of eccentric tablet machine. |
| * In vitro dissolution test methods | Tablet preparation by direct compression with auxiliary materials with the use of eccentric tablet machine. |
| * Ex vivo and in vivo methods | Tablet preparation with rotary tablet machine. |
| * Characterisation of dissolution profiles | Preparing and mechanical investigation of tablets with effective materials compressed with different compression forces. |
| * Comparision of dissolution profiles IVIVC | Water absorbing capacity of different tablets. |
| * Biopharmaceutical aspects of original and generic preparations | Dissolution and solution test of different tablets. Sartorius resorption test. |

**Cycle 2**

- **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.**
- **Investigation of suspensions:**
  - distributional stability investigations of flocculated and non-flocculated suspensions
  - determination 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 hydrophilic sols’ viscosity changing:
  - Study the viscosity changing by electrolytes of the Mucilago methylcellulose and Mucilago hydroxyethylcellulose.

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 determining viscosity, spreadability and adhesion.

Determination of average molecular weight of dextrane:
  - Determination of average molecular weight of dextrane with measuring density and viscosity.

Water-absorption of polymers:

Light permeability determination of glass containers:
  - Investigation of transmittancy of glass containers with different colours in a given wavelength 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.

PHARMACODYNAMICS-TOXICOLOGY

7th semester

LECTURE
* Pharmacology of sympathomimetics

PRACTICE
Administration of drugs to experimental animals. Demonstration of the local and systemic effect. Enteral and parenteral route of administration.

Curriculum 2013/2014

* Diuretics and antiuretics

* Antianginal agents. Antihyperlipidemic agents
  Investigation of local anaesthetics on frog skin and rabbit cornea. In vitro demonstration of nerve block anaesthesia.

* Cardiontonics, 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
  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.
  Effect of cardiontonics on isolated frog heart. Demonstration of cardiac action with the help of ECG.

* Pharmacology of insulin and its congeners. Orally acting antidiabetics
  Antitussive agents and mucoregulators. Antiasthmatic agents.
  Diuretic effect of drugs in rats and in anaesthetized rabbit.

* Drugs used in the treatment of peptic ulcer.

* 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

* 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

  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
Curriculum 2013/2014

* 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
7th semester
LECTURE (2 hrs/week)
* The history of public health. The aim and scope of public health. The concept of health and disease. The levels of prevention; basic principles of health promotion.
* Basic knowledge of demography.
* Basic knowledge of epidemiology. The uses of most important epidemiologic methods.
* Epidemiology of infectious diseases: airborne diseases.
* Epidemiology of infectious diseases: enteric diseases, toxicoinfections.
* Epidemiology of infectious diseases: hematogenic, cutaneous, and sexually transmitted diseases.
* Epidemiology of infectious diseases: zoonoses.
* Epidemiology of transmissible spongiform encephalopathies and health care associated infections (infection control, nosocomial surveillance).
* Epidemiology of chronic diseases – cardiovascular and cerebrovascular diseases.
* Epidemiology of chronic diseases – tumors.
* Epidemiology of chronic diseases – gastrointestinal and respiratory, diseases.
* Epidemiology of chronic diseases – metabolic and musculoskeletal diseases.
* Epidemiology of mental disorders, suicide and accidents.

PUBLIC HEALTH
8th semester
LECTURE (2 hrs/week)
* Health influencing factors – life style, environment, health care, genetics
* Food quality and safety.
* Epidemiology of smoking. Smoking cessation.
* Epidemiology of alcohol and drug consumption.
* Physical activity and health.
* Human ecology. Air pollutants and their effects on human health.
* Water pollutants and their effects on human health. Sewage, soil pollutions, waste management.
* General toxicology. Toxicology of metals, solvents and gases.
* Toxicology of persistent organic pollutants, plastics and agrochemicals.
* Occupational health. Occupational diseases caused by physical exposures.
* Occupational diseases caused by biological, ergonomic and psychosocial exposures. Health effects of dusts, occupational pneumoconiosis.
* Structure and operation of health systems. General aspects; hygiene of pharmacies.
* Health and health care in the family (mother, infants, youth, elderly).

ETHICS IN PHARMACY
Lectures
* 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, euthanasia, hospice
* Research ethics
* Sale and promotion of medicinal products, ethical aspects and regulations
* Ethics in pharmacy, Code of Pharmacy Practice

**Seminars**
* Ethics of pharmacy practice. Pharmaceutical care in pharmacy; Private life of a pharmacist
* Pharmacist and different relationships: patient, phsician, 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
* Basic 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: affiliation between economics and pharmaceutics, introduction of the necessity of the subject, statement of the syllabus
* Theoretical economics: efficacy, change and comparative benefits, act of decreasing border profit, formation of money and its functions
* Theoretical economics: market processes (demand, offer, rate, benefit, economic profit, inventory profit), market persons
* Theoretical economics: competition, monopoly, price searching (price flexibility, price discrimination)
* Theoretical economics: income allocation, externalies, markets and state, total performance of economic systems
* Theoretical economics: national economic policy, international change, employment and unemployment
* Accountancy and analysis: basic definitions (property, subject tools, etc.), movement of tools and sources, economic events, certificates
* Accountancy and analysis: accounting of economic events, definition of expenses and result, indexes of
financial state of employments
* Basics of marketing: marketing research, marketing channels, price policy, marketing communication
* Basics of marketing: marketing planning, marketing strategy, marketing service
* Business planning, financial planning: theory of development of business and financial plan
* Fiscal and monetary policy: functions of the state, subsystems of the finances, persons of financial system and their functions
* Basics of pharmacoeconomics: economic characterizations of the health care market, health care systems, comparability of medicine doses (ATC, DDD), comparative standard indexes of therapies’ efficiency (NNT, NNH, etc.)
* Basics of pharmacoeconomics: measurement of quality of life (QALY, questionnaires), pharmacoeconomic 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.
* Mid-term test.
* AIDS. Reading comprehension, discussion. Terminology exercise.
* Life expectancy in different countries. Discussion. Role play.
2nd semester

PRACTICE
(2 hrs/week)

* Pharmacotherapy. Reading comprehension. Vocabulary study.
* Interferon. Translation. Vocabulary study. Short news from “Magyar gyógyszerészet”.
* Revision. Mid-term test.
* Taleum nasal spray. Vocabulary study. Role play.
* 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
* -Immuonoanalytical 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**

(2 hrs/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 of 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
PHARMACODYNAMICS III.

9th semester

* Antineoplastic drugs: alkylating agents, antimetabolites
* Immunosuppressants and immunostimulants
* 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 management
* 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
* "Extravuterin" pregnancy
* Acute inflammatory diseases in obstetrics /"post partum" endometritis, 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
* Non-compliance
* Therapeutic drug monitoring
* Drug side-effects
* Drug side-effects. Classification, reasons of drug side-effects. Drug side-effect monitoring systems.
* Drug 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 traditional use
* Plants and the nervous system
  Anxiety, insomnia
  Depression
* Plants and the digestive system
  Stomatitis, gingivitis
  Dyspepsia
  Flatulence
  Gastritis, epptic 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
PHARMACEUTICAL PSYCHOLOGY (COMPULSORY ELECTIVE SUBJECT)

9th semester

LECTURE
(2 hrs/week)

1. Introducing into the psychology. The concept, object and methods of the psychology. The place of the psychology in the medical science.
8. The social context. Norms, roles and socialisation.
11. The basis processes of the communication. The channels of the non-verbal communication and the metacommunication.
12. The pain.
13. The consultation and the compliance. The general problems of the pharmacist patient contact.

PHARMACEUTICAL CARE

9th semester

LECTURE
(2 hrs/week)

Methods of patient counselling
Sunburn
Allergic rhinitis, atopic dermatitis
Asthma, COPD
Diabetes mellitus
EVERYDAY DERMATOLOGY (COMPULSORY ELECTIVE SUBJECT)

9th semester

LECTURE
(2 hrs/week)
Cutaneous structure; layers & typical cells
Basic physiological functions of the skin
Acne
Seborrhoeic 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
Syphilis
Scabies
Urticaria
Allergic contact dermatitis
Topical corticosteroids: recommendations 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/management
* 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
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.