

University of Ljubljana  
Faculty of Medicine



**PRESENTATION DOCUMENT**

**UNIFORM SECOND-LEVEL MASTER'S PROGRAM**

**MEDICINE**

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## **Title**

PRESENTATION DOCUMENT  
UNIFORM SECOND-LEVEL MASTER'S  
PROGRAM MEDICINE

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## PRESENTATION OF THE PROGRAM

### 1. Information about the course of study

The uniform second-level Master's degree study of Medicine lasts six years (12 semesters) and consists of a total of 360 credit points.

### 2. The basic objective of the program and obtained competences

The essential goal of the uniform Master's study program of Medicine is to train an expert to perform professional duties and tasks in the field of medicine, and also give him a sound basis for further professional training in the field of specializations and/or continuing the study onto the PhD level.

#### General competencies

- Ability to analyze, synthesize and envisage solutions and consequences,
- mastery of research methods, procedures and processes, development of critical and self-critical judgement,
- ability to apply knowledge in practice,
- autonomy in professional work,
- development of communication abilities and skills,
- ethical reflection and commitment to professional ethics,
- cooperativeness, teamwork, and working in an international environment.

#### Subject-specific competencies

- Knowledge and understanding of the role and development of medicine,
- the ability to solve specific work problems using scientific methods and procedures,
- specific mastery of basic knowledge, and the ability to integrate knowledge from different fields and its use,
- the ability to include new information and interpretations in the context of medicine,
- understanding the general structure of medicine and the connection between its sub-disciplines,
- understanding and use of methods of critical analysis, development theories and their usage in solving specific work problems,
- development of skills and abilities in the use of knowledge in the field of medicine,
- use of information and communication technologies and systems in the field of medicine.

#### Medicine-specific competencies

- Knowledge of the molecular basis and mechanisms of normal and pathological functioning of the human organism,
- knowledge of normal and pathological structures on the cellular level and on the level of human organism,
- knowledge of basic biological, behavioral and social factors of health and disease development,
- understanding of the place and role of medicine in society,
- communication skills with patients,
- knowledge of public health problems treatment methods,
- knowledge of patient care basic principles,
- the ability to examine a patient,
- knowledge of the role of environment in the emergence and development of diseases,
- understanding of disease states, their signs and symptoms,
- knowledge of the role of lifestyle on the formation and evolution of diseases,
- knowledge of disease diagnostics and disease treatment,
- knowledge of preventing diseases and their rehabilitation,
- integration of knowledge and skills at work with a patient in a hospital, clinic or at home,
- scientific research in the field of medicine

### 3. Curriculum evaluation and credit requirements according to ECTS

See Annexes 1 and 2.

### 4. Conditions and requirements for enrolment

In the Uniform second-level Master's degree of Medicine may be enrolled:

- a. those that have passed the general maturity examination,
- b. those who have completed any four-year secondary school program before June 1<sup>st</sup> 1995.

All applicants must demonstrate knowledge of the Slovenian language at B2 level according to the Common European Framework of Reference for Languages (CEFR) and provide appropriate certification.

Relevant proof of compliance for this entry condition shall be:

- a pass certificate from an examination of the Slovenian language at B2 level or an equivalent certificate,
- a Republic of Slovenia elementary school certificate of completion, or completion from a foreign elementary school where Slovenian was a taught language,
- a high school graduation certificate or a certificate of completion of the final year of a high school vocational program in which one completed subject was Slovenian,
- a certificate of completion in bilingual high school education (Slovenian and a foreign language) or completion from a foreign high school institution where Slovenian was a taught language,
- a diploma of acquired education in a study program from a higher education institution in the Republic of Slovenia, and a certificate (statement) that the candidate completed the program in the Slovenian language.

Candidates who undertake (have undertaken) a general high school examination or high school vocational examination in the Republic of Slovenia need not send proof of knowledge in the Slovenian language, the required information is submitted to the higher education and information service by the State Examination Centre.

In the case of limited enrolment, the applicants under a) will be selected according to:

- the general grade in the general maturity examination, 30 % of points
- the general grade in third and fourth year, 10 % of points
- success in individual subjects of the general maturity examination:  
mathematics, a foreign language and one natural science subject  
(biology, physics or chemistry). 60 % of points

Candidates under point b), by:

- the general grade in the final examination, 30 % of points
- the general grade in third and fourth year, 10 % of points
- grade in mathematics or a foreign language in the final examination  
and grade from one of the natural science subjects (physics, chemistry  
or biology) in the final exam or in the last year of secondary school,  
when the subject was taught. 60 % of points

### 5. Criteria for recognition of knowledge and skills acquired prior to enrolment in the program

UL MF recognizes acquired knowledge, qualifications or abilities to candidates only in case when this knowledge is acquired in formal forms of education, when candidates transfer to UL MF from other medical study programs. The recognition process is led by the Commission for Student Affairs individually for each candidate. On the basis of the reports of the course lecturers, the Commission identifies differences in the program and recognizes only formally acquired knowledge that corresponds to the general or subject-specific competencies defined in the uniform Master's study program of Medicine.

## 6. Evaluation method

Evaluation method is specified in Regulations for assessment of knowledge and skills for the uniform master's study programs of medicine and dental medicine, which is available on the web site of Medical Faculty.

Final grades for the course exams are as follows:

- 10 – (excellent: exceptional knowledge without or with negligible faults),
- 9 – (very good: very good knowledge with some minor faults),
- 8 – (very good: good knowledge with certain faults),
- 7 – (good: solid knowledge but with several faults),
- 6 – (satisfactory: knowledge only meets minimal criteria),
- 5 – (unsatisfactory: knowledge does not meet minimal standards).

For visiting students, the obtained grades are converted into the ECTS system:

- A – excellent (10),
- B – very good (9),
- C – good (8),
- D – satisfactory (7),
- E – sufficient (6),
- F – insufficient (5),

## 7. The requirements for advancement in the program

The requirements for advancement in the program are distinctly specified in the document called »Pravila študija UL Medicinske fakultete za Enovita magistrska študijska programa 2. stopnje Medicina in Dentalna medicina«. A student of the Uniform second-level Master's study programme of Medicine who enrolled into the first year of study in the academic year 2017/2018 or later, may progress to the next year if he fulfils the requirements defined in the program. To advance to the next year of study, the student must collect at least 54 credit points from the current year of study with passed exams in subjects, which are necessary for a successful work in the next year of study.

### 7.1. The requirements for advancement in the program

**From the 1<sup>st</sup> to the 2<sup>nd</sup> year of study:** 54 credit points.

**From the 2<sup>nd</sup> to the 3<sup>rd</sup> year of study:** 54 credit points from the 2<sup>nd</sup> year of study and passed all exams in the 1<sup>st</sup> year of study.

**From the 3<sup>rd</sup> to the 4<sup>th</sup> year of study:** 54 credit points from the 3<sup>rd</sup> year of study and passed all exams in the 1<sup>st</sup> and 2<sup>nd</sup> year of study.

**From the 4<sup>th</sup> to the 5<sup>th</sup> year of study:** 54 credit points from the 4<sup>th</sup> year of study and passed all exams in the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> year of study.

**From the 5<sup>th</sup> to the 6<sup>th</sup> year of study:** 54 credit points from the 5<sup>th</sup> year of study, passed all exams in the 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> year of study and passed the following exams at subjects in the 5<sup>th</sup> year of study: General paediatrics, Ophthalmology and Otorhinolaryngology.

The contents that must be achieved by a student for advancement to a higher year after the repetition of a year, interruption and/or exceptional extension of a student status are determined in the document called »Pravila študija UL Medicinske fakultete za Enovita magistrska študijska programa 2. stopnje Medicina in Dentalna medicina«.

## 7.2 Advancement in the program—exceptional advancement to the next year of study

A student of the Uniform second-level Master's degree study of Medicine may progress exceptional to the next year of study—exceptional advancement to the next year of study, even if he fails to meet conditions (54 credit points) if he:

- has justifiable and sufficient reasons,
- has collected at least 46 credit points with passed exams in subjects from the current year of study or has only one failed 2<sup>nd</sup> year exam in the transition from 2<sup>nd</sup> to 3<sup>rd</sup> year (Physiology) and has:
  - From the 2<sup>nd</sup> to the 3<sup>rd</sup> year of study: passed all exams in the 1<sup>st</sup> year of study.
  - From the 3<sup>rd</sup> to the 4<sup>th</sup> year of study: passed all exams in the 1<sup>st</sup> and 2<sup>nd</sup> year of study.
  - From the 4<sup>th</sup> to the 5<sup>th</sup> year of study: passed all exams in the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> year of study.
  - From the 5<sup>th</sup> to the 6<sup>th</sup> year of study: passed all exams in the 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> year of study.

## 7.3 Terms for repetition of a year

A student who has not completed the requirements for advancing to the next year can re-enter a year of study once during the period of study if he has fulfilled at least half of the requirements from the current year of study (30 credit points) and has during the period of study not yet changed the study program or study course.

The Commission for Student Affairs may exceptionally permit enrolment of a student who does not meet the conditions for re-enrolment (exceptional extension of a student status), if the statutory requirements were not met because of the justifiable reasons, which are defined in the document »Pravila študija UL Medicinske fakultete za Enovita magistrska študijska programa 2. stopnje Medicina in Dentalna medicina«.

## 8. Transitions between study programs

According to the Criteria for transfers between study programs, the Senate of the Faculty of Medicine defines the number of available places for continuation of study for each year. The terms and number of available places are published in Call for enrolment.

Transition is understood as termination of studies in one study program and continuation of studies in a new study program on the Faculty of Medicine—Uniform second-level Master's degree study of Medicine.

Applications for transitions between study programs in Medicine or Dental Medicine are examined by the Commission for Student Affairs. If there are more applications than free enrolment places, the candidates will be selected on the basis of the average grade of the study so far.

Transitions between study programs are possible:

1. if both study programs ensure acquisition of comparable competences after their completion,
2. if it is possible to acknowledge at least half of the obligations from the first study program under the European Credit Transfer and Accumulation System (hereinafter: ECTS), which are similar to the obligatory courses of the second study program.

The transition from other study programs to the uniform Master's study program of Medicine is possible to the second or third year of study. The candidate must fulfil the requirements for enrolment in to the first year of study regarding the knowledge of the Slovenian language. He must have also passed the general maturity examination, successfully completed the first or the first two years of his current study program (he must have gained 60 credit points for each year of study) and have an average grade of at least 8,5.

The Commission for Student Affairs checks the number of credit points and average grade of the 1<sup>st</sup> year of study or 1<sup>st</sup> and 2<sup>nd</sup> year of the medicine study for candidates who requests for advancement to the 2<sup>nd</sup> or 3<sup>rd</sup> year of study, according to the Criteria for transfers between study programs.

The Commission for Student Affairs defines bridging examination for the subjects, which differ from the study program of the uniform Master's study program of Medicine.

The application for the transition between study programs of medicine or dental medicine must be accompanied by certified photocopies (report cards from 3<sup>rd</sup> and 4<sup>th</sup> years of high school, general certificate of high school education with a report card for the general high school examination and a certificate of passed examinations in a previous course of medicine or dental medicine, including the course of study—for the latter two the document must include information on the scope of the subjects and assessments of completed exams according to ECTS).

Transition is possible if the candidate meets the general requirements for enrolment in accordance with the Higher Education Act of the Republic of Slovenia and the uniform Master's study program of Medicine.

Transitions between study programs is possible only if The Commission for Student Affairs confirms the candidates

Application and only under the conditions, which are defined by The Commission for Student Affairs.

## 9. The mode of study

The Uniform second-level Master's degree study of Medicine is available to study as full-time study program.

## 10. Conditions for completing the program

A student completes his study program and graduates when he completes all obligations of the study program and achieves 360 credit points.

## 11. Field of study program according to the classification KLASIUS and scientific discipline according to the Field of Science and Technology classification FRASCATI

The Uniform second-level Master's degree study of Medicine is classified on classification KLASIUS:

On the first classification level KLASIUS-P-16, the study program is classified under field Health and Welfare.

On the second classification level KLASIUS-P-16, the study program is classified under field Health.

On the third classification level KLASIUS-P-16, the study program is classified under field Medicine.

1<sup>ST</sup> LEVEL 09

2<sup>ND</sup> LEVEL 091

3<sup>RD</sup> LEVEL 0912

The study program is according to the classification FRASCATI classified under Medical Sciences, which include subgroups Basic Medicine, Clinical Medicine and Public Health.

## 12. Classification within the Slovenian Qualifications Framework, Framework for Qualifications of the European Higher Education Area and European Qualifications Framework

Slovenian Qualifications Framework /SQF/: level 8

## 13. Professional title acquired with completing the program

The professional title acquired by the graduate is "Doctor of Medicine" (M.D.).

## Annex No. 1: Study program subjects with lecturers

Legend:

L – Lectures; S – Seminars; PPC – Preclinical Practical Courses; CPC – Clinical Practical Courses; OFS – Other Forms of Study; SIW – Student's Individual Work; ECTS Credits – European Credit Transfer and Accumulation, System Credits

1 <sup>st</sup> year of study, 1 <sup>st</sup> semester										
Seq. No.	Subject	Lecturer	Contact hours					SIW	Total hours	ECTS credits
			L	S	PPC	CPC	OFS			
1.	<a href="#">Anatomy</a>	Erika Cvetko Marija Hribernik Marija Meznarič	13	21	26			60	120	4
2.	<a href="#">Medical Biophysics</a>	Jure Derganc	25		25		25	75	150	5
3.	<a href="#">Medical Cell Biology</a>	Peter Veranič Mateja Erdani Kreft	44		48		13	105	210	7
4.	<a href="#">Principles of Biochemistry</a>	Marko Goličnik	55	22	33		25	135	270	9
5.	<a href="#">Introduction to Clinical Medicine 1</a>	Jože Balažič Sergej Pirkmajer Zvonka Zupanič Slavec Maja Šoštarič Marija Petek Šter	15	10	5		15	15	60	2
6.	<a href="#">Elective</a>		10	20	15			45	90	3
TOTAL			162	73	152		78	435	900	30

1 <sup>st</sup> year of study, 2 <sup>nd</sup> semester										
Seq. No.	Subject	Lecturer	Contact hours					SIW	Total hours	ECTS credits
			L	S	PPC	CPC	OFS			
1.	<a href="#">Anatomy</a>	Erika Cvetko Marija Hribernik Marija Meznarič	32	54	64			150	300	10
2.	<a href="#">Research in Medicine 1</a>	Damjana Rozman Ksenija Geršak Maja Pohar Perme	6	21	18			45	90	3
3.	<a href="#">Histology and Embryology</a>	Danijel Petrovič Ines Cilenšek	32	26	52		10	120	240	8
4.	<a href="#">Introduction to Clinical Medicine 1</a>	Jože Balažič Sergej Pirkmajer Zvonka Zupanič Slavec Maja Šoštarič Marija Petek Šter	49	22	19		45	45	180	6
5.	<a href="#">Elective</a>		10	20	15			45	90	3
TOTAL			129	143	168		55	405	900	30/60

2 <sup>nd</sup> year of study, 3 <sup>rd</sup> semester										
Seq. No.	Subject	Lecturer	Contact hours					SIW	Total hours	ECTS credits
			L	S	PPC	CPC	OFS			
1.	<a href="#">Human Physiology</a>	Žarko Finderle, Ksenija Cankar, Helena Lenasi	23	7	30			60	120	4
2.	<a href="#">Research in Medicine 2</a>	Maja Pohar Perme	13	17	15			45	90	3
3.	<a href="#">Functional and Clinically Applicative Histology and Anatomy</a>	Danijel Petrovič, Erika Cvetko, Katarina Šurlan Popović, Peter Popović, Vladka Salapura	3	9	3			15	30	1
4.	<a href="#">Structure and Function of Nervous System</a>	Danijel Petrovič, Ruda Zorc Pleskovič, Aleksandra Milutinović Živin, Ines Cilenšek, Erika Cvetko, Marija Meznarič, Žarko Finderle, Ksenija Cankar, Helena Lenasi	45	13	54		8	120	240	8
5.	<a href="#">Medical Molecular Genetics</a>	Vita Dolžan	26	20	16		13	75	150	5
6.	<a href="#">Immunology</a>	Alojz Ihan	15	15	15			45	90	3
7.	<a href="#">Introduction to Clinical Medicine 2</a>	Davorina Petek, Jana Brguljan Hitij, Maja Rus Makovec, Marko Kolšek, Metka Moharič	13	6	2	24	20	25	90	3
8.	<a href="#">Elective</a>		15	15	15			45	90	3
TOTAL			153	102	150	24	41	430	900	30

2 <sup>nd</sup> year of study, 4 <sup>th</sup> semester										
Seq. No.	Subject	Lecturer	Contact hours					SIW	Total hours	ECTS credits
			L	S	PPC	CPC	OFS			
1.	<a href="#">Human Physiology</a>	Žarko Finderle, Ksenija Cankar, Helena Lenasi	47	13	60			120	240	8
2.	<a href="#">Functional and Clinically Applicative Histology and Anatomy</a>	Danijel Petrovič, Erika Cvetko, Katarina Šurlan Popović, Peter Popović, Vladka Salapura	5	18	7			30	60	2
3.	<a href="#">Introduction to Clinical Medicine 2</a>	Davorina Petek, Jana Brguljan Hitij, Maja Rus Makovec, Marko Kolšek, Metka Moharič	26	13	3	48	40	50	180	6
4.	<a href="#">Medical Biochemistry</a>	Vita Dolžan, Katarina Trebušak Podkrajšek	46	19	24		16	105	210	7
5.	<a href="#">Public Health</a>	Lijana Zaletel Kragelj, Ivan Eržen	30	14	16			60	120	4
6.	<a href="#">Elective</a>		15	15	15			45	90	3
TOTAL			169	92	125	48	56	410	900	30/60

3 <sup>rd</sup> year of study, 5 <sup>th</sup> semester										
Seq. No.	Subject	Lecturer	Contact hours					SIW	Total hours	ECTS credits
			L	S	PPC	CPC	OFS			
1.	<a href="#">Pharmacology</a>	Mojca Kržan Metoda Lipnik Štangelj Katarina Černe	12	4	24			50	90	3
2.	<a href="#">Clinical Biochemistry and Laboratory Diagnostics</a>	Katarina Trebušak Podkrajšek	24	12	9			45	90	3
3.	<a href="#">Clinical Microbiology</a>	Alojz Ihan, Miroslav Petrovec, Katja Seme, Eva Ružič Sabljic, Tadeja Matos, Mateja Pirš, Polona Maver Vodičar	30	30	30			90	180	6
4.	<a href="#">Pathology</a>	Margareta Strojjan Fležar Nina Zidar	45	15	30			90	180	6
5.	<a href="#">Pathophysiology</a>	Samo Ribarič, Dušan Šuput, Marko Živin	15	15	30		14	46	120	4
6.	<a href="#">Clinical Medicine</a>	Davorina Petek, Jana Brguljan Hitij, Marko Snoj, Primož Gradišek, Uroš Golobič Ahčan	30	5	20	5		30	90	3
7.	<a href="#">Research in medicine 3</a>	Aleš Blinc, Damjana Rozman, Ksenija Geršak, Maja Pohar perme	8	10			12	30	60	2
8.	<a href="#">Elective</a>		15	15	15			45	90	3
TOTAL			179	106	158	5	26	426	900	30

3 <sup>rd</sup> year of study, 6 <sup>th</sup> semester										
Seq. No.	Subject	Lecturer	Contact hours					SIW	Total hours	ECTS credits
			L	S	PPC	CPC	OFS			
1.	<a href="#">Pharmacology</a>	Mojca Kržan Metoda Lipnik Štangelj Katarina Černe	40	40				70	180	6
2.	<a href="#">Radiology and diagnostic imaging</a>	Katarina Šurlan Popović, Peter Popović, Vladka Salapura	24	11		10		45	90	3
3.	<a href="#">Pathophysiology</a>	Samo Ribarič, Dušan Šuput, Marko Živin	30	15	30		15	90	180	6
4.	<a href="#">Research in medicine 3</a>	Aleš Blinc, Damjana Rozman, Ksenija Geršak, Maja Pohar Perme	5	6			4	15	30	1
5.	<a href="#">Pathology</a>	Margareta Strojjan Fležar Nina Zidar	20	10	20			40	90	3
6.	<a href="#">Clinical Medicine</a>	Davorina Petek, Jana Brguljan Hitij, Marko Snoj, Primož Gradišek, Uroš Golobič Ahčan	46		3	65	66	90	270	9
7.	<a href="#">Elective</a>		15	15	15			45	90	3
TOTAL			180	97	68	75	85	395	900	30

4 <sup>th</sup> year of study, 7 <sup>th</sup> semester										
Seq. No.	Subject	Lecturer	Contact hours					SIW	Total hours	ECTS credits
			L	S	PPC	CPC	OFS			
1.	<a href="#">Nervous System</a>	Zvezdan Pirtošek	21	20		75	15	169	300	10
2.	<a href="#">Mental Disease</a>	Peter Pregelj	16	20		60	24	120	240	8
3.	<a href="#">Musculoskeletal System</a>	Matej Drobnič Blaž Mavčič Metka Moharić	45	17		46		102	210	7
4.	<a href="#">Digestive Organs</a>	Borut Štabuc	25	15		35		75	150	5
TOTAL			107	72		216	39	466	900	30

4 <sup>th</sup> year of study, 8 <sup>th</sup> semester										
Seq. No.	Subject	Lecturer	Contact hours					SIW	Total hours	ECTS credits
			L	S	PPC	CPC	OFS			
1.	<a href="#">Skin and Venereal Diseases</a>	Tomaž Lunder Mateja Dolenc Voljč	20	20		40		100	180	6
2.	<a href="#">Infectious Diseases</a>	Janez Tomažič	45	15		100	20	180	360	12
3.	<a href="#">Urinary Tract Diseases</a>	Jadranka Buturović Ponikvar Tomaž Smrkolj Andreja Marn Pernat	20	11	1	13		45	90	3
4.	<a href="#">Rheumatic and Immune Mediated Diseases</a>	Alojz Ihan Matija Tomšič Mihaela Zidarn	20	12	2	7	4	45	90	3
5.	<a href="#">Elective</a>		30	30	30			90	180	6
TOTAL			135	88	33	160	24	460	900	30/60

5 <sup>th</sup> year of study, 9 <sup>th</sup> semester										
Seq. No.	Subject	Lecturer	Contact hours					SIW	Total hours	ECTS credits
			L	S	PPC	CPC	OFS			
1.	<a href="#">Circulatory System</a>	Dušan Štajer Borut Geršak Katja Prokšelj	36	42	7	25	10	120	240	8
2.	<a href="#">Forensic Medicine</a>	Jože Balažič Tomaž Zupanc	36			40		74	150	5
3.	<a href="#">Maxillofacial Surgery with Fundamentals of Dental Medicine</a>	Nataša Ihan Hren	13	10		14	8	45	90	3
4.	<a href="#">Otorhinolaryngology</a>	Irena Hočevnar Boltežar	14	7		30	24	75	150	5
5.	<a href="#">Ophthalmology</a>	Polona Jaki Mekjavić	17	6		30	31	66	150	5
6.	<a href="#">Elective</a>		15	15	15			45	90	3
TOTAL			131	80	22	139	73	425	870	29

5 <sup>th</sup> year of study, 10 <sup>th</sup> semester										
Seq. No.	Subject	Lecturer	Contact hours					SIW	Total hours	ECTS credits
			L	S	PPC	CPC	OFS			
1.	<a href="#">Gynaecology and Obstetrics</a>	Ksenija Geršak Špela Smrkolj	23			60	52	135	270	9
2.	<a href="#">General Paediatrics</a>	Tadej Battelino David Neubauer Janez Jazbec Rok Orel	42	20		18		40	120	4
3.	<a href="#">Respiratory System</a>	Matevž Harlander Tomaž Štupnik	10	21	3	16	10	60	120	4
4.	<a href="#">Endocrinology and Metabolic Diseases</a>	Tomaž Kocjan Vilma Urbančič Rovan	17	15		18	10	60	120	4
5.	<a href="#">Oncology</a>	Primož Strojjan, Jasna But Hadžić	15	16		29		60	120	4
6.	<a href="#">Blood</a>	Samo Zver	14	11	5	15		45	90	3
7.	<a href="#">Elective</a>		15	15	15			45	90	3
TOTAL			136	98	23	156	72	445	930	31

6 <sup>th</sup> year of study, 11 <sup>th</sup> semester										
Seq. No.	Subject	Lecturer	Contact hours					SIW	Total hours	ECTS credits
			L	S	PPC	CPC	OFS			
1.	<a href="#">Internal Medicine</a>	Aleš Blinc		18		470		22	510	17
2.	<a href="#">Clinical Paediatrics</a>	Tadej Battelino David Neubauer Darja Paro Panjan Tadej Avčin	18	30		152		40	240	8
3.	<a href="#">Elective</a>		30	30	30			90	180	6
TOTAL			48	78		622		152	930	31

6 <sup>th</sup> year of study, 12 <sup>th</sup> semester										
Seq. No.	Subject	Lecturer	Contact hours					SIW	Total hours	ECTS credits
			L	S	PPC	CPC	OFS			
1.	<a href="#">Surgery</a>	Borut Geršak	40			255		65	360	12
2.	<a href="#">Primary Health Care</a>	Igor Švab Marjan Bilban	14	60		60	120	76	330	11
3.	<a href="#">Perioperative Medicine</a>	Maja Šoštarič	15	10	10	15	5	35	90	3
4.	<a href="#">Geriatrics</a>	Janez Rifel Mišo Šabovič	9	11		25		45	90	3
TOTAL			78	81	10	355	125	221	870	29/60

## Information on elective subjects

Elective subjects in 1 <sup>st</sup> year of study										
Seq. No.	Subject	Lecturer	Contact hours					SIW	Total hours	ECTS credits
			L	S	PPC	CPC	OFS			
1.	Selected topics in Biochemistry (1st sem.)	Marko Goličnik	45					45	90	3
2.	Selected topics in Biophysics (1st sem.)	Bojan Božič Gregor Gomišček	15	10			20	45	90	3
3.	Selected topics in Cell Biology (1st sem.)	Mateja Erdani Kreft Peter Veranič Rok Romih Damjan Glavač	15	15	5		10	45	90	3
4.	Selected topics of Anatomy (2nd sem.)	Erika Cvetko Marjana Hribernik Marija Meznarič	15		15		15	45	90	3
5.	Selected topics from Histology and Embryology (2nd sem.)	Danijel Petrovič Ines Cilenšek Aleksandra Milutinović Živin Ruda Zorc Pleskovič	5	40				45	90	3
6.	Selected topics in Research in Medicine 1 (2nd sem.)	Ksenija Geršak Damjana Rozman Maja Pohar Perme					45	45	90	3
7.	Selected topics from Clinical Medicine 1 (2nd sem.)	Jože Balažic Sergej Pirkmajer Zvonka Zupanič Slavec Maja Šoštarič Marija Petek Šter	15	15	15			45	90	3

Elective subjects in 2 <sup>nd</sup> year of study											
Seq. No.	Subject	Lecturer	Contact hours					SIW	Total hours	ECTS credits	
			L	S	PPC	CPC	OFS				
1.	Research in Medicine (1st and 2nd sem.)	All lecturers of the programme		10				5	75	90	3
2.	Selected Themes in Physiology (1st and 2nd sem.)	Helena Lenasi, Ksenija Cankar, Nejka Potočnik, Žarko FINDERLE, Živa Melik		20				25	45	90	3
3.	Selected Topics in Functional and Clinically Applicative Histology and Anatomy (2nd sem.)	Danijel Petrovič, Erika Cvetko, Katarina Šurlan Popović	5	30	10				45	90	6
4.	Selected chapters in Immunology (1st sem.)	Alojz Ihan	15	15	15				45	90	3
5.	Selected topics in public health (1st sem.)	Andreja Kukec Barbara Artnik	10	10			25		45	90	3
6.	Selected topics of clinical medicine 2 (2nd sem.)	Davorina Petek, Jana Brguljan Hitij, Maja Rus Makovec, Marko Kolšek, Metka Moharič	15	15				15	45	90	3
7.	Selected Topics in Medical Biochemistry (2nd sem.)	Nataša Debeljak, Petra Hudler, Vita Dolžan	15	15				15	45	90	3
8.	Selected Topics in Medical Molecular Genetics (1st sem.)	Vita Dolžan	15	15				15	45	90	3
9.	Selected themes in the Structure and function of the nervous system (2nd sem.)	Aleksandra Milutinović Živin, Danijel Petrovič, Erika Cvetko, Helena Lenasi, Ines Čilenšek, Ksenija Cankar, Marija Meznarič, Ruda Zorc Pleskovič, Žarko FINDERLE		15	15			15	45	90	3
10.	Selected topics in medical research 2 (1st sem.)	Damjana Rozman, Ksenija Geršak, Maja Pohar Perme	5	20	20				45	90	3
11.	Research work for the Prešeren student award (1st and 2nd sem.)	All lecturers of the programme		20				5	155	180	6

Elective subjects in 3 <sup>rd</sup> year of study										
Seq. No.	Subject	Lecturer	Contact hours					SIW	Total hours	ECTS credits
			L	S	PPC	CPC	OFS			
1.	Selected Topics in Pathology	Margareta Strojan Fležar	15	5	23	2		45	90	3
2.	Selected topics in diagnostics	Katarina Šurlan Popović, Katarina Trebušak Podkrajšek, Peter Popović, Vladka Salapura	25	20				45	90	3
3.	Selected Topics in Pharmacology	Katarina Černe, Metoda Lipnik Štangelj, Mojca Kržan		45				45	90	3
4.	Selected Topics of Clinical Medicine 3	Davorina Petek, Jana Brguljan Hitij, Marko Kolšek, Marko Snoj, Matjaž Veselko, Mitja Košnik, Primož Gradišek, Uroš Golobič Ahčan	15	15			15	45	90	3
5.	Selected Topics in Microbiology	Barbara Šoba Šparl, Eva Ružič Sabljic, Katja Seme, Mateja Pirš, Miroslav Petrovec, Polona Maver Vodičar, Tadeja Matos	15	15			15	45	90	3
6.	Selected Pathophysiology Topics	Dušan Šuput, Fajko Bajrovič, Helena Chowdhury, Jernej Jorgačevski, Mara Bresjanac, Marko Kreft, Marko Živin, Matjaž Stenovec, Nina Vardjan, Robert Zorec, Samo Ribarič, Sergej Pirkmajer, Uroš Kovačič	10	10			25	45	90	3
7.	Selected Topics in Research in Medicine 3	Aleš Blinc, Damjana Rozman, Ksenija Geršak, Maja Pohar Perme	13	16			16	45	90	3
8.	Research in medicine	All lecturers of the programme		10			5	75	90	3
9.	Research work for the Prešeren student award	All lecturers of the programme		20			5	155	180	6

Elective subjects in 4 <sup>th</sup> year of study										
Seq. No.	Subject	Lecturer	Contact hours					SIW	Total hours	ECTS credits
			L	S	PPC	CPC	OFS			
1.	Joints Biomechanics	Vane Antolič	25	15	15		20	105	180	6
2.	Non-Coding RNA	Metka Ravnik Glavač	5	25				60	90	3
3.	Functional Genomics in Medicine	Damjana Rozman	10	10	10			60	90	3
4.	Pharmacogenetics in Medicine	Vita Dolžan	10	20	15			45	90	3
5.	Basics of Molecular Epidemiology	Vita Dolžan	6	9	15	15		45	90	3
6.	Research in Family Medicine	Davorina Petek Marko Kolšek					60	120	180	6
Elective subjects in 4 <sup>th</sup> year of study (the subjects are carried out in the 8 <sup>th</sup> semester)										
7.	Research in Pharmacology—Selected Topics in Pharmacology	Metoda Lipnik Štangelj Mojca Kržan Katarina Černe				20	40	120	180	6
8.	Hyperbaric Physiology and Medicine	Žarko Finderle	5	20	5			60	90	3
9.	Research in Biochemistry	Marko Goličnik		20				160	180	6
10.	Hip Fractures and Pathology	Matjaž Veselko					45	135	180	6
11.	Osteosynthesis	Matej Cimerman					45	135	180	6
12.	Exploring Tissues	Matjaž Veselko					45	135	180	6
13.	Injuries of the Ligamental Joint Apparatus	Matjaž Veselko					45	135	180	6
14.	Dementias	Zvezdan Pirtošek	2	11	10			67	90	3
15.	Extrapyramidal Diseases	Maja Trošt	2	11	10			67	90	3
16.	Cerebrovascular Diseases	Janja Pretnar Oblak	2	11	10			67	90	3
17.	Peripheral Nerve Defects	Blaž Koritnik	2	11		10		67	90	3
18.	Research in Pathology	Nina Zidar		10	30	40		100	180	6
19.	Biomedicine between Laboratory and Hospital Bed	Mara Bresjanac	6	24				60	90	3
20.	Metabolic Diseases	Draženka Pongrac Barlovič Sergej Pirkmajer	10	20				60	90	3

21.	Pathophysiology of Critical Conditions 1	Tomaž Marš Matej Podbregar Fajko Bajrovič Uroš Kovačič Sergej Pirkmajer	15		10	6		59	90	3
22.	Modeling in Biochemistry	Jure Stojan	5	25	120			30	180	6
23.	Practical Medical Genetics	Ksenija Geršak	5		10			75	90	3
24.	Psychiatry	Borut Škodlar					30	60	90	3
25.	Basics of Genetic Engineering and Molecular Medicine	Damjana Rozman Alja Videtič Paska	15	5			5	65	90	3
26.	Research in Public Health	Lijana Zaletel Kragelj Ivan Eržen	5	15	10			150	180	6
27.	Physiology of Sports	Helena Lenasi	5	20				65	90	3
28.	Physiology— Microcirculation	Ksenija Cankar	5	20				65	90	3
29.	Neurophysiology	Ksenija Cankar	5	20				65	90	3
30.	Biochemistry of Steroids	Tea Lanišnik Rižner	6	16			8	60	90	3
31.	Dermatovenerology	Mateja Dolenc Voljč Tomaž Lunder	10	10			10	60	90	3
32.	Physiology— Electrocardiography (ECG)	Živa Melik	5	20	5			60	90	3
33.	Disaster Medicine	Radko Komadina	30	30				30	90	3
34.	Gene technology Applications in Medicine	Nataša Debeljak	10	15			20	45	90	3
35.	Elective Subject— Orthopaedics	Vane Antolič	15					75	90	3
36.	Interprofessional Collaboration	Lijana Zaletel Kragelj	30	60				90	180	6
37.	Open Airway Management: from Basic Tools to Difficult Intubation	Iztok Potočnik	6	10	14		60		90	3
38.	Elective course: Student Research Project in Pathophysiology	Samo Ribarič Robert Zorec			30			150	180	6
39.	Contemporary Informatics in Biomedicine 1	Maja Pohar Perme	8	30	12			40	90	3
40.	Research in Medicine	Habilitated lecturer		20				160	180	6
41.	Rural and Remote Medicine	Marija Petek Šter	5	10			60	105	180	6
42.	Practical Bioinformatic Approaches in Medicine	Petra Hudler	10	15				65	90	3
43.	Experimental Methods in Pharmacogenetics	Vita Dolžan	5	25	60			90	180	6

44.	Tissue Engineering in Research Studies and Regenerative Medicine	Mateja Erdani Kreft Peter Veranič	30	30	5		30	85	180	6
45.	Molecular Biology of Mind-Body Association	Metka Ravnik Glavač	4	26				60	90	3
46.	Cell Biotechnology: Advanced Cell-Based Medicines	Robert Zorec	35	35	35			75	180	6
47.	Clinical Nutrition 1	Nada Rotovnik Kozjek	10	10		5	20	45	90	3
<b>Elective subjects in 4<sup>th</sup> year of study (the subjects are carried out in the 8<sup>th</sup> semester)</b>										
48.	Biochemical Markers	Tea Lanišnik Rižner	6	16			8	60	90	3
49.	Epigenetics in Oncology	Petra Hudler Nataša Debeljak	10	35				45	90	3
50.	Scientific Methods in Biomedicine	Metka Lenassi	10	10			10	60	90	3
51.	Radiological Anatomy	Katarina Šurlan Popović	15		15	15		45	90	3
52.	Clinical and Biochemical aspects of Hormone Dependent Gynecological and Urological Diseases	Helena Ban Frangež Špela Smrkolj Tea Lanišnik Rižner Tomaž Smrkolj	15	25			10	40	90	3
53.	Physics of the Diagnostic Methods in Neurology	Maja Trošt	10	15	20			45	90	3

<b>Elective subjects in 5<sup>th</sup> year of study</b>										
Seq. No.	Subject *the subject is carried out in the winter and summer semester	Lecturer	Contact hours					SIW	Total hours	ECTS credits
			L	S	PPC	CPC	OFS			
1.	Joints Biomechanics (10 <sup>th</sup> sem.)	Vane Antolič	25	15	15		20	105	180	6
2.	Non-Coding RNA (10 <sup>th</sup> sem.)	Metka Ravnik Glavač	5	25				60	90	3
3.	Functional Genomics in Medicine*	Damjana Rozman	10	10	10			60	90	3
4.	Pharmacogenetics in Medicine*	Vita Dolžan	10	20	15			45	90	3
5.	Basics of Molecular Epidemiology*	Vita Dolžan	6	9	15	15		45	90	3
6.	Research in Family Medicine*	Davorina Petek Marko Kolšek					60	120	180	6
7.	Research in Pharmacology—Selected Topics in Pharmacology*	Metoda Lipnik Štangelj Mojca Kržan Katarina Černe				20	40	120	180	6
8.	Hyperbaric Physiology and Medicine (10 <sup>th</sup> sem.)	Žarko Finderle	5	20	5			60	90	3
9.	Gynaecology and Obstetrics*	Ksenija Geršak Špela Smrkolj		18				72	90	3

10.	Research in Biochemistry*	Marko Goličnik		20				160	180	6
11.	Tropical and Travel Medicine*	Tatjana Lejko Zupanc Janez Tomažič	84	20	10	10	24	32	180	6
<b>Elective subjects in 5<sup>th</sup> year of study</b>										
12.	Evidence-based Public Health*	Andreja Kukec	5	15		25		45	90	3
13.	Public Health Approaches to Management of Cardiovascular Diseases (9 <sup>th</sup> sem.)	Lijana Zaletel Kragelj	10		35			45	90	3
14.	Laparoscopic Surgery*	Mirko Omejc					45	135	180	6
15.	Urology: Functional Morphological Tests in Urology (10 <sup>th</sup> sem.)	Tomaž Smrkolj	5	5		35		135	180	6
16.	Research in Maxillofacial Surgery*	Nataša Ihan Hren					75	105	180	6
17.	Selected Topics in Maxillofacial Surgery (9 <sup>th</sup> sem.)	Nataša Ihan Hren					35	55	90	3
18.	Dementias (10 <sup>th</sup> sem.)	Zvezdan Pirtošek	2	11	10			67	90	3
19.	Extrapyramidal Diseases (10 <sup>th</sup> sem.)	Maja Trošt	2	11	10			67	90	3
20.	Cerebrovascular Diseases (10 <sup>th</sup> sem.)	Janja Pretnar Oblak	2	11	10			67	90	3
21.	Peripheral Nerve Failures (10 <sup>th</sup> sem.)	Blaž Koritnik	2	11		10		67	90	3
22.	Research in Neurology*	Blaž Koritnik					75	105	180	6
23.	Research in Otorhinolaryngology*	Irena Hočevnar Boltežar					75	105	180	6
24.	Research in Pathology*	Nina Zidar		10	30	40		100	180	6
25.	Biomedicine between Laboratory and Hospital Bed*	Mara Bresljanac	6	24				60	90	3
26.	Metabolic Disorders*	Draženka Pongrac Barlovič Sergej Pirkmajer	10	20				60	90	3
27.	Pathophysiology of Critical Conditions 2 (10 <sup>th</sup> sem.)	Tomaž Marš Matej Podbregar Fajko Bajrovič Uroš Kovačič Sergej Pirkmajer	15		10	6		59	90	3
28.	Forensic Medicine—the elective subject (10 <sup>th</sup> sem.)	Jože Balažič	10				5	75	90	3
29.	Modelling in Biochemistry*	Jure Stojan	5	25	120			30	180	6
30.	Practical Medical Genetics*	Ksenija Geršak	5		10			75	90	3

Elective subjects in 5 <sup>th</sup> year of study										
Seq. No.	Subject *the subject is carried out in the winter and summer semester	Lecturer	Contact hours					SIW	Total hours	ECTS credits
			L	S	PPC	CPC	OFS			
31.	Research in Public Health*	Lijana Zaletel Kragelj Ivan Eržen	5	15	10			150	180	6
32.	Physiology of Sports (10 <sup>th</sup> sem.)	Helena Lenasi	5	20				65	90	3
33.	Physiology— Microcirculation (10 <sup>th</sup> sem.)	Ksenija Cankar	5	20				65	90	3
34.	Neurophysiology (10 <sup>th</sup> sem.)	Ksenija Cankar	5	20				65	90	3
35.	Biochemistry of Steroids*	Tea Lanišnik Rižner	6	16			8	60	90	3
36.	Physiology— Electrocardiography (ECG) (10 <sup>th</sup> sem.)	Živa Melik	5	20	5			60	90	3
37.	Scientific Degree Project for International Medical Students*	Igor Švab Samo Ribarič Tomaž Marš				300		300	600	20
38.	Disaster Medicine*	Radko Komadina	30	30				30	90	3
39.	Clinical Electrocardiography (10 <sup>th</sup> sem.)	Dušan Štajer	15					75	90	3
40.	Elective Subject— Orthopaedics (10 <sup>th</sup> sem.)	Vane Antolič	15					75	90	3
41.	Gene technology Applications in Medicine (10 <sup>th</sup> sem.)	Nataša Debeljak	10	15			20	45	90	3
42.	Basics of Genetic Engineering and Molecular Medicine (10 <sup>th</sup> sem.)	Damjana Rozman Alja Videtič Paska	15	5			5	65	90	3
43.	Interprofessional Collaboration*	Lijana Zaletel Kragelj	30	60				90	180	6
44.	Implementation of Ultrasound in Anesthesia Practice (10 <sup>th</sup> sem.)	Maja Šoštarič	6	10		8	6	60	90	3
45.	Elective course: Student Research Project in Pathophysiology*	Samo Ribarič Robert Zorec			30			150	180	6
46.	Contemporary Informatics in Biomedicine 2 (9 <sup>th</sup> sem.)	Maja Pohar Perme	6	32	12			40	90	3
47.	Research in Medicine*	Habilitated lecturer		20				160	180	6
48.	Selected Topics in Internal Medicine (10 <sup>th</sup> sem.)	Mitja Košnik Aleš Blinc	5	10		15	15	45	90	3
49.	Practical Bioinformatic Approaches in Medicine*	Petra Hudler	10	15				65	90	3
50.	Experimental Methods in Pharmacogenetics*	Vita Dolžan	5	25	60			90	180	6

Elective subjects in 5 <sup>th</sup> year of study										
Seq. No.	Subject *the subject is carried out in the winter and summer semester	Lecturer	Contact hours					SIW	Total hours	ECTS credits
			L	S	PPC	CPC	OFS			
51.	Research in Ophthalmology*	Marko Hawlina					75	105	180	6
52.	Molecular Biology of Mind-Body Association) *	Metka Ravnik Glavač	4	26				60	90	3
53.	Dialysis Therapy (9 <sup>th</sup> sem.)	Jadranka Buturovič Ponikvar	10	10		10		60	90	3
54.	Emergency Medicine (9 <sup>th</sup> sem.)	Primož Gradišek	6	10		14		60	90	3
55.	Clinical Nutrition 1 (10 <sup>th</sup> sem.)	Nada Rotovnik Kozjek	10	10		5	20	45	90	3
56.	Clinical Nutrition 2*	Nada Rotovnik Kozjek	10	10		5	20	45	90	3
57.	Biochemical Markers*	Tea Lanišnik Rižner	6	16			8	60	90	3
58.	Epigenetics in Oncology (10 <sup>th</sup> sem.)	Petra Hudler Nataša Debeljak	10	35				45	90	3
59.	Psychosomatics and Behavioral Medicine*	Maja Rus Makovec	10	4		10	16	50	90	3
60.	Clinical Application of Extracellular Vesicles*	Metka Lenassi	10	10			10	60	90	3
61.	Spatial epidemiology with basics in Geographical Information System (GIS)*	Andreja Kukec	20	30				40	90	3
62.	Radiological Anatomy (10 <sup>th</sup> sem.)	Katarina Šurlan Popović	15		15	15		45	90	3
63.	Cardiovascular Ultrasound*	Borut Jug Katja Prokšelj	8	8	15	15		44	90	3
64.	Clinical and Biochemical aspects of Hormone Dependent Gynecological and Urological Diseases*	Helena Ban Frangež Špela Smrkolj Tea Lanišnik Rižner Tomaž Smrkolj	15	25			10	40	90	3

Elective subjects in 6 <sup>th</sup> year of study (the subjects are carried out in the 11 <sup>th</sup> semester)										
Seq. No.	Subject	Lecturer	Contact hours					SIW	Total hours	ECTS credits
			L	S	PPC	CPC	OFS			
1.	Pain	Jasmina Markovič Božič, Mara Bresjanac, Mojca Kržan	6	10		8	6	60	90	3
2.	Anesthesiology	Iztok Potočnik	6	10		14		60	90	3
3.	Joints Biomechanics	Vane Antolič	25	15	15		20	105	180	6
4.	Non-Coding RNA	Metka Ravnik Glavač	5	25				60	90	3

Elective subjects in 6 <sup>th</sup> year of study (the subjects are carried out in the 11 <sup>th</sup> semester)										
Seq. No.	Subject	Lecturer	Contact hours					SIW	Total hours	ECTS credits
			L	S	PPC	CPC	OFS			
5.	Functional Genomics in Medicine	Damjana Rozman	10	10	10			60	90	3
6.	Biochemical and Molecular Diagnostics of Congenital Metabolic Diseases	Tadej Battelino Vita Dolžan	5	15	25			45	90	3
7.	Pharmacogenetics in Medicine	Vita Dolžan	10	20	15			45	90	3
8.	Basics of Molecular Epidemiology	Vita Dolžan	6	9	15	15		45	90	3
9.	Biochemical and Molecular Diagnostics of Inborn Metabolic Disorders (IRS)	Tadej Battelino Vita Dolžan	5	15	45		25	90	180	6
10.	Research in Family Medicine	Davorina Petek Marko Kolšek					60	120	180	6
11.	Research in Pharmacology—Selected Topics in Pharmacology	Metoda Lipnik Štangelj Mojca Kržan Katarina Černe				20	40	120	180	6
12.	Hyperbaric Physiology and Medicine	Žarko Finderle	5	20	5			60	90	3
13.	Research in Biochemistry	Marko Goličnik		20				160	180	6
14.	Research in Pathology	Nina Zidar		10	30	40		100	180	6
15.	Tropical and Travel Medicine	Tatjana Lejko Zupanc Janez Tomažič	84	20	10	10	24	32	180	6
16.	Evidence-based Public Health	Andreja Kukec	5	15		25		45	90	3
17.	Basics of Management in Health Care	Ivan Eržen	10		35			45	90	3
18.	Medicine of Sports	Marjan Bilban	10	25		10		45	90	3
19.	Research in Maxillofacial Surgery	Nataša Ihan Hren					75	105	180	6
20.	Dementias	Zvezdan Pirtošek	2	11	10			67	90	3
21.	Extrapyramidal Diseases	Maja Trošt	2	11	10			67	90	3
22.	Cerebrovascular Diseases	Janja Pretnar Oblak	2	11	10			67	90	3
23.	Peripheral Nerve Defects	Blaž Koritnik	2	11		10		67	90	3
24.	Research in Neurology	Blaž Koritnik					75	105	180	6

Elective subjects in 6 <sup>th</sup> year of study (the subjects are carried out in the 11 <sup>th</sup> semester)											
Seq. No.	Subject	Lecturer	Contact hours					SIW	Total hours	ECTS credits	
			L	S	PPC	CPC	OFS				
25.	Research in Otorhinolaryngology	Irena Hočevnar Boltežar						75	105	180	6
26.	Biomedicine between Laboratory and Hospital Bed	Mara Bresjanac	6	24					60	90	3
27.	Metabolism Disorders	Draženka Pongrac Barlovič Sergej Pirkmajer	10	20					60	90	3
28.	Modelling in Biochemistry	Jure Stojan	5	25	120				30	180	6
29.	Practical Medical Genetics	Ksenija Geršak	5		10				75	90	3
30.	Research in Public Health	Lijana Zaletel Kragelj Ivan Eržen	5	15	10				150	180	6
31.	Physiology of Sports	Helena Lenasi	5	20					65	90	3
32.	Physiology— Microcirculation	Ksenija Cankar	5	20					65	90	3
33.	Neurophysiology	Ksenija Cankar	5	20					65	90	3
34.	Scientific Degree Project for International Medical Students	Igor Švab Samo Ribarič Tomaž Marš			300				300	600	20
35.	Biochemistry of Steroids	Tea Lanišnik Rižner	6	16				8	60	90	3
36.	Physiology— Electrocardiography (ECG)	Živa Melik	5	20	5				60	90	3
37.	Disaster Medicine	Radko Komadina	30	30					30	90	3
38.	Clinical Electrocardiography	Dušan Štajer	15						75	90	3
39.	Health Promotion in Hospitals	Jerneja Farkaš Lainščak	5	25	15				45	90	3
40.	Gene technology Applications in Medicine	Nataša Debeljak	10	15				20	45	90	3
41.	Basics of Genetic Engineering and Molecular Medicine	Damjana Rozman Alja Videtič Paska	15	5				5	65	90	3
42.	Interprofessional Collaboration	Lijana Zaletel Kragelj	30	60					90	180	6
43.	Elective course: Student Research Project in Pathophysiology	Samo Ribarič Robert Zorec			30				150	180	6
44.	Contemporary Informatics in Biomedicine 2	Maja Pohar Perme	6	32	12				40	90	3
45.	Research in Medicine	Habilitated lecturer		20					160	180	6

Elective subjects in 6 <sup>th</sup> year of study (the subjects are carried out in the 11 <sup>th</sup> semester)										
Seq. No.	Subject	Lecturer	Contact hours					SIW	Total hours	ECTS credits
			L	S	PPC	CPC	OFS			
46.	Selected Topics in Internal Medicine (11 <sup>th</sup> , 12 <sup>th</sup> sem.)	Mitja Košnik Aleš Blinc	5	10		15	15	45	90	3
47.	Practical Bioinformatic Approaches in Medicine	Petra Hudler	10	15				65	90	3
48.	Experimental Methods in Pharmacogenetics	Vita Dolžan	5	25	60			90	180	6
49.	Subspecialty and Research in Paediatrics	Tadej Battelino Tadej Avčin Janez Jazbec Rok Orel Štefan Grosek Darja Paro Panjan Matjaž Homan David Neubauer	10		10	30	30	100	180	6
50.	Research in Ophthalmology	Marko Hawlina					75	105	180	6
51.	Molecular Biology of Mind-Body Association	Metka Ravnik Glavač	4	26				60	90	3
52.	Clinical Nutrition 1	Nada Rotovnik Kozjek	10	10		5	20	45	90	3
53.	Clinical Nutrition 2	Nada Rotovnik Kozjek	10	10		5	20	45	90	3
54.	Biochemical Markers	Tea Lanišnik Rižner	6	16			8	60	90	3
55.	Epigenetics in Oncology	Petra Hudler Nataša Debeljak	10	35				45	90	3
56.	Atrial Fibrillation Surgery—Research	Borut Geršak					45	135	180	6
57.	Psychosomatics and Behavioral Medicine	Maja Rus Makovec	10	4		10	16	50	90	3
58.	Clinical Application of Extracellular Vesicles	Metka Lenassi	10	10			10	60	90	3
59.	Spatial epidemiology with basics in Geographical Information System (GIS)	Andreja Kukec	20	30				40	90	3
60.	Medical doctor and Society	Peter Pregelj Janez Tomažič Tomaž Zupanc Danica Rotar Pavlič Igor Švab Tomaž Marš Janja Jan Metoda Lipnik Štangelj	25	10			10	45	90	3

## Annex No. 2: Presentation of individual subjects

### Anatomy (14 ECTS)

#### Aims

Anatomy will be approached from a functional perspective, with particular emphasis on the clinical anatomy of the adult. At clinically relevant body parts, the student will get the knowledge about the anatomy of a child and adolescent and also about woman's anatomy in pregnancy. The student will be qualified to find and identify those anatomical structures on or in the chest, abdomen and limbs which he will encounter later on at daily clinical work. He will become familiar with clinically significant variations, which could significantly affect the establishment of clinical diagnosis and treatment. On extremities, he will get to know the mechanics of joint motion, he will be able to demonstrate it and to understand its purpose in clinical investigation.

#### Contents

Upper extremity: Osteology. Functional anatomy of joints and muscles. Spinal nerve, brachial plexus and peripheral nerves. Superficial and deep vessels and lymph nodes. Topographical regions.

Lower extremity: Osteology. Functional anatomy of joints and muscles. Lumbosacral and pudendal plexuses and peripheral nerves. Superficial and deep vessels and lymph nodes. Topographical regions.

Thorax: Osteology. Functional anatomy of joints and muscles. Diaphragm. Mammary gland. Esophagus, trachea, bronchial tree and lung. Pleura. Heart: chambers, valves, blood vessels, innervation. Pericardium. Pulmonary blood system. Fetal circulatory system. Mediastinum. Lymph vessels and lymph nodes. Auscultatory points of the heart and lungs. Topographical regions.

Abdomen: Abdominal wall and inguinal canal. Stomach, duodenum, small and large intestine, rectum. Liver and pancreas, spleen. Development and situs of the organs. Peritoneum. Abdominal blood vessels. Kidney and suprarenal gland, urether, bladder. Pelvis major and minor. Male and female urethra. Female reproductive system, pregnancy. Male reproductive system, descent of the testis. Retro- and subperitoneal space. Lymph vessels and lymph nodes. Topographical regions.

Head and neck: Osteology. Topographic regions of head and neck: scalp, trigonum colli laterale, trigonum submandibulare, trigonum caroticum, retromandibular fossa, infratemporal fossa. Nasal cavity. Oral cavity and salivary glands. Pharynx. Larynx. Blood vessels, lymphatics and nerves.

### Medical Biophysics (5 ECTS)

#### Aims

The student will get acquainted with the physical image of the world in detail. The emphasis will be on physical principles that are important for the formation of biological structures and for the functioning of biological systems. He will get to know the physical phenomena which are the basis of physiological processes. He will get acquainted with the physical fundamentals of measurement methods used in diagnostics, and the physical phenomena which some methods of treatment are based on. He will get to know the basics of certain devices used in medical practice. The student will become used to quantitative treatment of physical and other phenomena. He will be acquainted with a scientific, analytically-synthetic method of thinking.

#### Contents

Quantitative description of phenomena in medical sciences. Exponential change. Graph plotting, linearization. Equilibrium and motion of the body. Forces and torques in the muscles and the skeleton with examples from orthopedics and orthodontics. Energetics of motion. Molecular motors. Mechanical properties of solids. Mechanical properties of liquids: pressure, buoyancy, viscosity, surface tension, capillary action, Law of Laplace. Viscous drag. Sedimentation rate. Blood circulation, aneurysm, stenosis. Viscoelasticity. Lungs, compliance, surfactants. Periodic phenomena, vibration, natural frequencies of molecular vibrations.

Laws of thermodynamic. Temperature. Calorimetry. Chemical reactions, enthalpy, entropy, free enthalpy, chemical potential. Solubility of gases and decompression sickness. Osmotic pressure. Air humidity. Transport of heat, diffusion, generalized Ohm's Law. Trans-membrane transport.

Electric and magnetic properties of matter. Dipole. Electrostatic interactions between molecules. Electric conductivity of solutions. Origins of membrane potential, Nernst equation, Goldman equation. Electric current, propagation of nerve impulses. Biological effects of electric and magnetic fields. Electrocardiography, electromyography, electroencephalography, magnetoencephalography.

Structure of matter and molecular interactions. Nuclear medicine. Nuclear stability and decay.

Wave phenomena, refraction, diffraction, interference, scattering. Absorption, photometry and spectroscopy, pulse oximetry. Sound and the ear. Ultrasound. Biological effects of ultrasound. Electromagnetic spectrum. Light and the properties of the eye. Laser. Optical instruments, microscope. Biological effects of electromagnetic radiation.

Ionizing radiation. Biological effects of ionizing radiation and radiotherapy. Diagnostic imaging. X-ray imaging, CT, MRI, ultrasound, PET, scintigraphy.

## Medical Cell Biology (7 ECTS)

### Aims

The student will acquire basic knowledge about the structure and function of cells as building blocks of organisms. He will learn about the processes of cell division, differentiation and intercellular communication, principles and role of cell death, which is required knowledge for understanding of cellular basics of disease processes. He will get familiar with chromosomal abnormalities and with basics of hereditary disease transmission in terms of classical Mendelian genetics.

### Contents

Biological membranes, membrane transport principles - interconnections between different transport systems, cell junctions, cell polarity, intracellular communication and signaling. Cytoskeleton and cell movement: Microtubules, actin and intermediate filaments. Abnormal cytoskeleton structure and function as the foundation of the occurrence of certain diseases. Biosynthetic secretory pathways and endomembranic system: Endoplasmic reticulum, Golgi apparatus, vesicles and intercellular transport, lysosomes and degradation of macromolecules, exocytotic and endocytotic pathways. Endocytotic pathways: Endosomes and the different pathways of macromolecules in the cell. Normal and abnormal exo- and endo-cytotic pathways. Energy conversion organelles: Mitochondria. Nucleus – genome carrier. Definition of gene, types of genes in genome. Interphase nucleus, transport in/out of nucleus, nucleolus, chromatin packing, chromosomes. Gene, chromosome and genome mutations. Epigenetic modification. Genome imprinting. Regulation of cell cycle: phases of cycle, checkpoints, signal transduction in normal and cancer cells, replication of DNA, telomeres, mitotic and meiotic cell divisions, gene recombination. Homologous recombination in meiosis and DNA repair. Nonhomologous recombination. Cell aging, cell death as a balance of cell division, necrosis and apoptosis. Mendel's law of segregation and inheritance at the cellular level, different types of inheritance, autosomal dominant and recessive inheritance, x linked (recessive and dominant) inheritance and y linked inheritance. Exceptions to Mendel's law. Mitochondrial inheritance, polygene and multifactorial inheritance. Gene polymorphism and the principles of genetics of immunity, Progenitor cells and stem cells, spermatogenesis and oogenesis. Cellular and molecular basis of fertilization, sex determination. Early stages of embryonic development.

## Research in Medicine 1 (3 ECTS)

### Aims

The aim of the course is to provide the student with a basic understanding of medicine as an evidence-based science that requires the incorporation of the best research evidence into the clinical knowledge, in line with unique values and circumstances of the patient. The aim is also to encourage critical thinking about science and to equip students with knowledge that will allow them to find, understand and critically evaluate professional resources, the findings of which can help in later decision-making in clinical work.

The student will gain competencies for the critical appraisal of “best research evidence” in relevant research, ranging from basic to patient-centered clinical research.

### Contents

Introduction to informatics, biostatistics and evidence based medicine. Understanding the basic steps of evidence based medicine; the principles of basic and clinical research in medicine; the ability to define a simple research problem; understanding the need for reliable quantitative information related to diagnosis, prognosis, therapy, prevention and treatment of diseases; developing the ability to search scientific literature and to critically appraise it; knowing the basic measures and graphs of descriptive statistics; knowing the basic ideas of statistical inference; the basic informatics required for studies, clinical and research work in medicine. The ability to make a basic report (select appropriate variables / indicators, display data), the ability to distinguish between science and pseudo-science in medicine, to enhance the basic literature with relevant scientific literature, to produce a basic report based on clinical data,

basic understanding of basic and clinical research in medicine; the awareness of the evidence-based medicine as the scientific basis of medicine; the ability to think about the research that lead to the current clinical practice; the awareness of the role and the possibilities of informatics in studies, clinical and research work. The ability of critical thinking about medicine as science, to understand strategies for efficiently tracking down and appraising evidence (for its validity and relevance), to basically evaluate the results and search for the errors, basic ability to report on their work

## **Histology and Embryology (8 ECTS)**

### **Aims**

During the course students learn about basic preclinic and clinical characteristics of histology. Histology is to be addressed from functional point of view with the special emphasis on normal histology.

Students learn about major characteristics of human development. Embryology is to be addressed from functional point of view, with special emphasis on normal development and on disfunctional development.

### **Contents**

Epithelia and glands. Types of epithelia. Glandular epithelia. Regeneration of epithelia. Connective tissues. Cells in connective tissues. Interstitial fluid and fibres. Mesenchyme, dense and proper connective tissue. Cartilage. Adipose tissue. White and brown fat tissue. Bone. Types of ossification. Muscles. Histofiziology of muscles contraction. Peripheral and central nervous system. Neurons, neuroglia. Peripheral nerve, ganglion. Spinal cord marrow. Cerebellum. Synapses. Nerve endings. Choroid plexus. Skin. Structure and functional histology. Hair, nails, sweat glands. Mammary gland. Endocrine glands and functional histology of each of them. Thyroid gland. Parathyroid glands. Adrenal glands. Pituitary. The pineal gland. Diffuse endocrine system. Paraganglion. Blood and blood cells. Plasma. Hemopoiesis and phases of hemopoiesis. Immune and lymphatic organs. Lymph nodes. Spleen. Thymus. Tonsils. Circulatory system. Heart. Capillaries. Arterioles. Venules. Arteries. Veins. Lymph vessels. Gastrointestinal tract. Teeth. Tongue. Oral cavity. Esophagus. Stomach. Small and large intestine. Liver. Pancreas. Respiratory system. Nasal cavity. Larynx. Trachea. Lungs. Urinary system. Kidney. Ureter. Bladder. Uretra. Male reproductive system. Testis. Seminal duct. Accessory glands. Penis. Female reproductive system. Ovaries. Follicular growth. Ovulation. Oviduct. Uterus. Vagina. Sense organs. Eye. Ear. Embryology. Blastocyst formation. Embryo. Fetus. Branchial organs development. Placenta and fetal membranes development. Bone and cartilage development. Development of muscles. Skin, nails, teeth and hair development. Nervous system development. Heart development. Vessels development. Respiratory system development. Urogenital system development. Male and female genitals development. Gastrointestinal system development. Senses development: eye, ear. Teratology. Teratogenic substances. Congenital development irregularities. Anomalies caused by genetic and environmental factors.

## **Introduction to Clinical Medicine 1 (8 ECTS)**

### **Aims**

The student will get to know basic ethical principles in medicine, he will recognize the importance of health for society, he will get to know basic public health concepts and approaches, he will understand the development of medicine, changing of health and disease aspects over time, he will comprehend universality, internationality and interdisciplinarity of medicine and will master the basics of information systems and information technology tools in health care.

### **Contents**

Module 1 Set I presents lectures about national and international declarations, conventions, laws and codes with which the student will gain insight onto the physician's moral, material and criminal responsibility. Set II presents a series of 15 seminars, which will be attended in groups with the aim to study selected chapters of medical deontology in-depth and to meet with some ethical dilemmas faced by physicians in their practice. Module 2 Medicine, public health and public health medicine. Health and disease. Determinants of health. The definition of health determinants and risk factors. Overview of determinants of health. Health care. Methods of studying population health. Management of medical problems. Public health approaches and interventions. Large public health problems. Module 3 Development of medical science and practice throughout history – from ancient medicine to modern medicine. Achievements of Slovenian physicians abroad, of some foreign physicians in our country and development of organized medical associations,

hospitals and health care education among Slovenes.

Promoting student thinking and motivating students through seminars and excursions. Module 4 Data collection. Electronic medical records. Information systems in health care. Signals in medicine. Images in medicine. Telemedicine and telematics. Systems to support medical decision making. Information security and cryptography. Nomenclature and classification in medicine. Computer networking and the Internet as infrastructure for scientific information.

## Principles of Biochemistry (9 ECTS)

### Aims

Student will acquire knowledge about biomolecules in the human body and about fundamental laws and mechanisms of biochemical events that constitute the basis for understanding of life processes in healthy and disease state of human organism.

### Contents

Introduction: Atoms, chemical bonds, intermolecular forces.

Water: Structure, properties, H-bonds, hydrophobic interactions.

Solutions: Gas solutions, colligative properties, osmotic phenomena, ionization of water,  $K_w$ , pH, electrolytes, acids and basic substances, buffers.

Thermodynamics: Thermodynamic laws and functions, the standard state, chemical potential.

Chemical equilibrium: Chemical, kinetic and thermodynamic aspects; solubility product; coupled reactions and ATP, transport.

Oxidoreduction: Quantitative characterization, photosynthesis and respiration.

Velocity of chemical reactions: Order and molecularity; theories of the velocity of chemical reactions; influences on reaction velocity; catalysis.

Molecular basis of life: Bio-elements, ions and biomolecules.

Carbon atom: Structure, resonance, steric properties, chemical bonds.

Biomolecules: Isomerism; review of functional groups, mutual interactions.

Carbohydrates: Chemistry of sugars, mono-, oligo- and polysaccharides; glycosidic bonds; detoxification in the organism; glycoproteins; cell wall; membrane characteristics; blood groups.

Lipids: Classification, simple and complex: fatty acids, triacylglycerols, phospholipids, sphingolipids; lipoproteins, biological membranes; prostaglandins and terpenes, steroids.

Nucleotides: Purine and pyrimidine bases, nucleosides and nucleotides, energy transfer; cyclic nucleotides.

Nucleic acids: Classification, structure and biological role, gene, basics of DNA replication, transcription and translation; mutations; human genome, genomics, proteomics, genetic diseases.

Vitamins: Water soluble and lipid soluble vitamins; coenzymes and prosthetic groups.

Amino acids: Structure, properties, analytics. Peptides and biogenic amines: Structure and function.

Proteins: Classification, structure, self-assembly, conformation. Fibrillar proteins: alpha-keratin, collagen and elastin. Monomeric and oligomeric proteins: myoglobin and hemoglobin. Contractile proteins: muscular and non-muscular contractile proteins; muscle contraction. Membrane proteins: erythrocyte membrane proteins;  $\text{Na}^+/\text{K}^+$ -ATPase; receptors, G-proteins. Enzymes: enzyme mechanisms and kinetics, regulation, classification.

Other proteins: apolipoproteins, immunoglobulins.

Functional links: From biomolecules to complex cellular structures.

## Human Physiology (12 ECTS)

### Aims

The student learns about the normal function of the organism. She or he acquires the basic concepts in physiology and learns the principles of measurement of physiological events. She or he is encouraged, in accordance with the concepts, to interpret the results of the measurements. The course in physiology is based on the lessons learned from biophysics, biochemistry, biology and normal morphology. It develops the ability to independently solve problems and critical thinking and encourages the habit of self-education

### Contents

Physiological principles: physiology as a science, homeostasis. Transport phenomena in physiology in the body and across the cell membrane. System analysis and control in biological systems. Membrane potential. Electrical Communication (localized and propagating potentials). Skeletal muscle. Smooth muscle. Heart and circulation of blood, general description, distribution of flow, blood volume, cardiac cycle. Electrical activity of the heart. Cardiac muscle cell, cardiac energetics. Monitoring of cardiac function. Hemodynamics. Arteries and veins. Microcirculation (exchange, control). Control of cardiac output and arterial pressure. Breathing:

The relationship between the structure and function. Ventilation. Mechanics of breathing. Diffusion in the lungs. Pulmonary blood flow. Transport of blood gases. Coupling of ventilation, diffusion, perfusion. Control of breathing. The kidneys and electrolyte homeostasis. Relationship between structure and function. Glomerular filtration rate and renal blood flow. Renal function tests, renal clearance. Transtubular transport, renal counter current. Handling of water, osmolality, sodium and potassium in the body. Acid-base physiology - buffers and the Davenport diagram. Kidney and regulation of pH in the body. Gastrointestinal function: gastrointestinal wall structure and its impact on function, control of the gastrointestinal tract via nerves and chemical messengers, the characteristics of the movement of digestive tract, saliva, gastric secretion, exocrine pancreas, and the importance of bile secretion, nutrient absorption in the gastrointestinal tract. Endocrinology: principles of endocrine control of secretion of hormones, methods of operation of specific groups of hormones, the relationship nervous and endocrine system. Hormones and pituitary gland, thyroid and adrenal gland, calcium and phosphate homeostasis, sex hormones, pregnancy and childbirth. Metabolism: transformation of matter and energy in the body metabolism in different physiological states of the organism, regulation of blood glucose, basal metabolism, regulation of body temperature. Nervous system: general characteristics and functions of the nervous system, The organization of the nervous system, Neural homeostasis, Synaptic transmission, The general properties of sensory systems, The somatosensory system, The physiology of pain, control of instinctive behavior, The Visual optics, Photoreception, Neurophysiology of vision, Visual psychophysics, The conduction of sound to the inner ear and transduction, The psychophysics of hearing, Vestibular apparatus, Smell and taste, The general scheme of the motor system, The motor role of spinal cord, The motor role of the brainstem, The cortical control of movement, The motor functions of the cerebellum and basal ganglia, The control of eye movements, The role of vegetative nervous system, The integrative function of the brainstem, The nervous structure and function principle of the cerebral cortex, The physiology of emotion, Speech control, Specialization of brain hemispheres, The physiological basis of learning and memory

## Research in Medicine 2 (3 ECTS)

### Aims

Knowledge of the objectives and types of statistical methods; understanding the basics of statistical inference; being able to adequately present statistical data and results of statistical analyses; being able to correctly interpret results of statistical analyses; being able to plan collection of empirical data and select appropriate statistical methods to analyze them; being able to understand and critically appraise statistical analyses described in technical and scientific literature.

### Contents

Basic concepts of probability and statistics. Probability distributions: binomial and normal distribution. Principles and methods of graphing data. Fundamentals of parameter estimation and statistical hypothesis testing. Confidence intervals. Univariate analysis of numerical variables. Univariate analysis of categorical variables. Linear regression and correlation. Nonparametric statistical methods. Design of experiments and introduction to analysis of variance. Basic concepts on survival analysis.

## Functional and Clinically Applicative Histology and Anatomy (3 ECTS)

### Aims

Knowledge and understanding of the macroscopic and microscopic structural organization of the human body. The student is able to use knowledge of anatomy and histology to manage common general clinical conditions. Independently uses the knowledge, principles and facts of anatomical and histological sciences in clinical decision making.

### Contents

Functional and clinically applicative macroscopic anatomy of the human body. Functional and clinically applicative radiological anatomy of the human body. Functional and clinically applicative histology.

## Structure and Function of Nervous System (8 ECTS)

### Aims

Students get familiar with normal structure and function of the nervous system. They acquire knowledge of basic concepts in neurophysiology and learn the principles of measurement of neurophysiological phenomena. Students are encouraged to interpret the results of the measurements in accordance with basic physiological concepts. Students develop the ability to independently solve problems, to use critical thinking and develop the habit of self-education.

### Contents

Peripheral and central nervous system. Neurons, neuroglia. Peripheral nerve, ganglion. Spinal cord marrow.

Cerebellum. Synapses. Nerve endings. Choroid plexus. Nervous system development and abnormalities of the nervous system development. Spinal cord with somatic and vegetative part of the spinal nerve. Brainstem and cerebral nerves. Cerebellum. Diencephalon. The cerebral cortex and nuclei of the telencephalon. Limbic lobe. Overview of sensory pathways. Overview of motor pathways. Basal ganglion connections. Connections of the cerebellum. Meninges of the central nervous system and cerebral ventricles. Arteries and veins of the central nervous system and venous sinuses. Eye. Ear. Electrophysiology of neurons. Sensory systems and motor nervous system. The role of autonomic nervous system. The integrative function of the brainstem. The physiological basis of higher function of nervous system.

## Medical Molecular Genetics (5 ECTS)

### Aims

The objective is to understand medicine as a science and to acquire knowledge, skills, and competences in the field of molecular genetics, genetic technology, genetic diagnostics, medical genetics and basics of clinical genetics and gene therapy, which will enable independent use of this knowledge in further study of clinical courses and informed decision-making in clinical practice, solving of new complex problems and scientific research. The student will also acquire competencies that will enable critical and ethical decision-making regarding the use of appropriate genetic and genomic diagnostic methods and the ability for basic interpretation of the results of the main categories of genetic tests.

### Contents

Molecular genetics: Maintenance and transmission of genetic information (Replication in prokaryotes and eukaryotes, DNA polymerases, Replication of nuclear and mitochondrial DNA, Replication of viral genomes, DNA damage and repair, Mutations and genetic variability). Transcription and expression of genetic information (RNA biosynthesis, Co- and post-transcriptional RNA processing, Non-coding RNA, Genetic code, Translation, Co- and post-translational protein processing). Regulation of gene expression (Levels of regulation of gene expression, Epigenetic mechanisms of regulation of gene expression). Molecular genetics of cancer. Gene technology: Principles of recombinant DNA technology, Application of recombinant DNA technology in medicine, Molecular genetics in medicine, Genomics in medicine, Gene therapy; Ethical and legal aspects of gene therapy.

Molecular genetic diagnostics: Genetic testing and molecular genetic diagnostics of monogenic and complex diseases, Sanger and NGS sequencing, Interpretation of genetic test results, Cytogenetic diagnostics, FISH, Comparative genomic hybridization on microarrays, Molecular analysis of epigenetic changes, Molecular approaches for RNA and non-coding RNA analysis; Pharmacogenetic testing and personalized medicine; Ethical and Legal Aspects of Genetic Diagnostics.

Medical genetics: From personal to public health, Principles of inheritance and human population genetics (Mendelian inheritance, linked inheritance, gene imprinting, mitochondrial inheritance, mosaicism, chimerism, penetrance, expressiveness). Basics of clinical genetics: Human chromosomal abnormalities, Genetic counseling and its ethical and legal aspects; Prenatal genetic counseling and diagnostics; Neonatal screening; Presymptomatic genetic counseling and diagnostics.

## Immunology (3 ECTS)

### Aims

Comprehension of fundamentals of immune system composition, characteristics of effector molecules produced by immune cells, their function and meaning for the integrity of animal organism. Interrelationship between immune system and everyday environment, importance for health and disease. Learning of methods meaningful for studying functions of immune system.

### Contents

Student acquires basic knowledge of composition and function of the immune system on the level of organs, cells and molecules. Their function is explained in relevance to natural and adoptive immunity, specificity of response, importance of antibodies and cellular immunity and their participation in health and disease. Antigens, antibodies, molecular organization, expression of immunoglobulin genes, origin of diversity and interaction between antigens and antibodies are presented in detail. Further molecules of the major histocompatibility system (genetic background, molecular structure, function, regulation of expression, processing and presentation of antigen) are discussed. The students' attention is drawn to the characteristics of lymphocytes, formation of the specific lymphocyte repertoire, activation, differentiation and function. Cytokines – their structure, function, receptors and regulation are presented. There will be discussion of the phenomenon of autoimmunity, problems of transplantation, cancer and particular infections.

## Introduction to Clinical Medicine 2 (9 ECTS)

### Aims

The course assists the student to: be able to use knowledge and clinical skills for a team approach and patient-centered care; be able to work safely in a clinical environment; increase the ability to self-understand the processes of the latest learning of clinical medicine and the motivation to develop their abilities throughout life; develop the ability to cooperate and work in multi-professional times; be capable of empathic and holistic psychosomatic communication with patients, their owners and co-workers; develop respectful confidentiality and cultural and social diversity; be able to recognize personal limitations, take responsibility for one's own actions in seeking advice and assistance; take care of personal mental, physical and relationship health; adhere to high ethical and professional standards.

### Contents

Essential clinical examination. Physician and patient, team work. Medical psychology.

## Medical Biochemistry (7 ECTS)

### Aims

The course aims to give the student an understanding and basic knowledge of vital processes and their regulation at the molecular level. It introduces theoretical and practical aspects of basic biochemistry and molecular biology processes. The course deals with special topics concerning the maintenance of cell constituents, body fluids and the processes involved in tissue growth and reproduction. Students will get the knowledge of basic concepts in molecular genetics that will help them to understand molecular basis of genetic disorders.

### Contents

General introduction: The role of biochemistry in medicine. Intermediary metabolic pathways. General aspects of regulatory mechanisms. Fuel oxidation and generation of energy. Carbohydrates: Digestion. Cellular degradation and biosynthesis. Regulation of metabolic pathways. Clinical correlations of carbohydrate metabolism. Lipids: Digestion of lipids. Cellular degradation and synthesis of simple and complex lipids. Metabolism of cholesterol and bile acids. Metabolism of lipoproteins. Metabolism of eicosanoids. Regulation of lipid metabolism. Clinical correlations of lipid metabolism. Amino acids: Protein digestion. Intracellular protein degradation. Amino acid catabolism. Biosynthesis of nonessential amino acids and regulation. Clinical correlations of amino acids. Amino acids as precursors of various biosynthesis. Metabolism of nucleotides and its regulation. Clinical correlations of nucleotide metabolism. Molecular biology: DNA replication and repair. Biosynthesis of RNA. Co- and posttranscriptional modifications. Regulation of transcription. Genetic code. Degradation of nucleic acids. Genetic diseases. Proteins: Protein biosynthesis. Posttranslational modification. Regulation of protein biosynthesis. Biosynthesis of selected proteins. Molecular genetics: Genetics of metabolic disorders. Molecular genetics of cancer. Epigenetics. Pharmacogenetics. Principles of genetic engineering: Gene therapy. Recombinant DNA technology. DNA sequencing. Recombinant DNA techniques in medicine. Hormones: Hormone biosynthesis. Hormonal cascade system. Hormonal inactivation and degradation. Mechanisms of action. Cell signaling. Hormones in regulation of metabolic processes. Hormones and homeostasis. Tissue metabolism: Liver. Adipose tissue. Skeletal muscle. Heart muscle. Kidney. Other tissues. Metabolic interrelationships in humans.

## Public Health (4 ECTS)

### Aims

To understand basic public health concepts. To understand basic health determinants of social and physical environment and their impact on human health. To understand complex health determinants and their impact on human health. To understand methods of studying public health. To understand public health measures for controlling risks in social and physical environment. Understands what major public health problems are and roughly knows the biggest ones. Understands which population groups are at risk and / or vulnerable and why.

### Contents

I. Basic public health concepts. II. Basic determinants of health of social and physical environment. III. Complex determinants of health. IV. Methods of studying population health. V. Public health measures. VI. major public health problems and vulnerable population groups.

## Pharmacology (8 ECTS)

### Aims

The student will recognize the importance of pharmacology in the context of therapy and of prevention of diseases, he will get to know and to understand the mechanisms of action of drugs, the effects of drugs on the organism and will get to know about the fate of drugs in the organism. The acquired knowledge will represent an upgrade of the knowledge of physiological and pathological processes on which therapeutic drugs have an effect.

### Contents

General pharmacology: Definition of pharmacology, its relationship to other disciplines, drugs and drug target molecules, mechanisms of drug action, concentration – effect relationship analysis, drug receptors, pharmacokinetic processes and the fate of drugs in the organism, pharmacokinetic parameters, non-clinical drug testing.

Basics of toxicology: Mechanisms of toxic effects of exogenous substances, toxicokinetics.

## Clinical Biochemistry and Laboratory Diagnostics (3 ECTS)

### Aims

The aim of the course is to understand medicine as a science. In doing so, the student will acquire competencies for independent use of knowledge about the biochemical and metabolic processes in the human body and related laboratory investigations enabling independent use of knowledge, principles, and facts of basic biomedical sciences in clinical decision-making.

### Contents

- Importance and organisation of laboratory diagnostics and clinical biochemistry.
- Types of biological samples.
- Analytical methods in laboratory diagnostics.
- Reference values and quality assurance.
- Basic investigations in haematology, analysis of urine, electrolytes, nonprotein nitrogenous compounds, enzymes, acid-base balance, oxygen transport, plasma proteins, lipids, tumor markers.
- Basic tests to assess the function of the liver, pancreas, kidneys, thyroid, gastrointestinal tract, disturbances in carbohydrate metabolism and other inborn errors of metabolism, myocardial infarction and iron status.
- Point of care testing.

## Clinical Microbiology (6 ECTS)

### Aims

Students are familiar with basic characteristics of microbiology, immunology and parasitology. In seminar work students get additional knowledge on subjects, important for epidemiology of infectious diseases. In practical work students get acquainted with basic microbiological techniques, time necessary to obtain the results and the importance of microbiological testing.

### Contents

Bacterial cell. Metabolism, bacterial reproduction, bacterial genetics, bacterial classification, spread of germs. Normal bacterial flora. Diagnostics of bacterial infections. Collection and transport of samples for bacterial examination. Disinfection and sterilization. Antibiotics and chemotherapeutics. The purpose of the use of antibiotics. Mechanisms of bacterial resistance against antibiotics. Current problems in bacterial resistance, antibiogram.

General properties of viruses. Replication of viruses. Genetics of viruses and origin of viruses. Direct and indirect methods for detection of viruses. Pathogenesis of viral infections. Viral oncogenesis. Natural antiviral resistance in immune antiviral response. Chemotherapy of viral diseases.

Characteristics of fungi and mold, dimorphism. The agents of cutaneous mycosis, dermatophytes. The agents of subcutaneous and systemic fungal infections.

Characteristics of parasites causing infections in humans and animals.

Natural immunity. Complement system. Immune system. Antigens. Antibodies. T cell receptor and MHC molecules. Activation of lymphocytes, immune tolerance. Regulation of immune response. Immune response in microbial infections. Infections due to lowered resistance. Immunosuppression. Microbiological and immunological diagnostics in organ transplantation. Vaccines and regular vaccination program. Historical overview of microbiology.

## Pathology (9 ECTS)

### Aims

Students will learn etiology, basic pathogenetic mechanisms, morphologic changes (macroscopical, microscopical, ultrastructural) at cell, tissue and organ level of various disease processes, as well as diagnostic criteria and prognostic factors.

Students will also learn about the most common pathologic methods for obtaining tissue samples (biopsy, autopsy), about the basic techniques used in pathology for examination of tissue samples (basic staining methods, histochemical, immunohistochemical and molecular methods) as well as about the role of pathology in the diagnostic procedure.

### Contents

Students learn about basic pathologic processes – their etiology and pathogenesis, and are introduced to the analysis of morphological changes in diseased cells, tissues and organs with light microscopy. They familiarize with clinical pictures, basic imaging diagnostic, macroscopic and microscopic changes of the most important disease processes through clinico-pathologic study of typical cases.

The basic pathology course deals with cell injury and adaptation, inflammation, regeneration and reparation, circulatory disorders, immunopathology, neoplasms, genetic and pediatric disorders, infectious diseases, environmental and nutritional diseases.

The organ pathology course deals with the most important diseases of the cardiovascular, gastrointestinal, respiratory systems, kidney, liver, pancreas and biliary tract, central and peripheral nervous system, female genital tract and breast, musculoskeletal and hematopoietic systems.

## Pathophysiology (10 ECTS)

### Aims

Students obtain the ability to understand the causes and mechanisms of diseases and pathologic processes in human beings on the basis of physiological and biochemical disfunctions in the body. During practicals, seminars and problem based learning they acquire the competence to use their knowledge for understanding the signs and symptoms of diseases, their course and complications and the rational basis for prevention and treatment.

### Contents

The content encompasses pathophysiology of the following diseases and processes:

Changes of body temperature. Starvation. Obesity, Diabetes. Hypoglycemia. Diseases of the thyroid gland. Inborn errors of metabolism. Electric injury. Burns. Radiation disease. Disturbances of homeostasis. Cell death. Toxin actions. Inflammation. Response to stress. Free radicals and disease. Cancerogenesis and neoplastic cell.

Ageing. Pathophysiology and medicine as science. Changes in body fluids composition. Dehydration. Acidosis and alkalosis. Changes in calcium and phosphorus metabolism. Renal failure and tests of renal function. Diseases of adrenal gland.

Anemia. Hemorrhagic states. Thrombosis. Changes of plasma proteins. Respiratory dysfunction. Hypoxia and cyanosis. Dysfunctions due to changes of air pressure. Cough. Dyspnea. Obstructive lung diseases. Pneumothorax. Respiratory distress. Bleeding and shock. Hypertension. Hypotension. Heart failure. Arrhythmia. Cardiac valvular disease. Edema. Atherosclerosis and plasma lipids. Complications of blood transfusion. Ischemic muscle necrosis. Liver diseases and liver tests. Pathobiochemistry of alcoholism. Peptic ulcer disease. Disturbances of gastrointestinal function. Dysfunction of neuromuscular transmission. Organophosphate poisoning. Disturbances of consciousness. Dysfunction of locomotion and paralysis. Drug addiction. Pathologic pain. Headache. Increased intracranial pressure. Dysfunctions of basal ganglia. Psychic and psychosomatic diseases. Dementia. Stroke.

## Clinical Medicine (12 ECTS)

### Aims

The course assists the student to:

- be able to use knowledge and clinical skills to manage common general clinical conditions
- be competent to manage life threatening conditions
- be able to work safely in a clinical environment;
- be curious, motivated for life-long learning of clinical medicine and motivated for professional development;
- understand the concept of interprofessional collaboration
- develop the ability to cooperate and work in multi-professional teams;
- be capable of empathic and holistic psychosomatic communication with patients, their relatives and co-

workers;

- make decisions accordant to ethics and evidence-based medicine
- be able to recognize personal limitations, take responsibility for his/her actions in seeking advice and assistance;
- adhere to high ethical and professional standards.

#### Contents

Special clinical examination and clinical skills, Advanced life support and emergencies, Introduction to surgery, Interprofessional collaboration

### Research in medicine 3 (3 ECTS)

#### Aims

To build upon the knowledge gained in the first two years and be able to transfer the gained competences to critical appraisal of the literature and active research.

Student gets an insight into the theory and practice of modern biomedical technologies and approaches. She/he learns the importance of bioinformatics for storing and analysis the large amount of data arising from post-genome technologies as well as image analyses.

#### Contents

Methods in research, Technology in medicine

### Radiology and diagnostic imaging (3 ECTS)

#### Aims

The course aims to understand radiological and nuclear medicine diagnostic and therapeutic methods as essential in clinical medicine. The student will acquire competencies for the independent use of radiological anatomy and indications for diagnostic and treatment methods. The student will learn the essential radiological characteristics of the most common disease states, which they will use in clinical decision-making.

#### Contents

- Importance and organisation of radiology and nuclear medicine.
- Radiological diagnostic methods.
- Radiological invasive diagnostic and therapeutic methods.
- Nuclear medicine diagnostic and therapeutic methods.
- Radiological anatomy.
- Radiological and other imaging signs of the most common clinical conditions.
- Point of care diagnostic.

### Nervous System (10 ECTS)

#### Aims

The student will develop the ability to gradually make a diagnosis of neurological disease on the basis of anamnestic data, physical examination, laboratory investigation, imaging data and other methods. He will become able to autonomously provide the emergency medical aid in neurological patients. He will master current methods of treatment and rehabilitation. He will get acquainted with possible future development of treatment and rehabilitation methods. He will acquire holistic understanding of neurological diseases and will become able to recognize the influence of these diseases on the entire organism, also in the psychosocial terms. On the other hand, he will understand the impact of other diseases on the nervous system and on the neurological disease.

#### Contents

Functional units of the nervous system, symptoms and signs of nervous system diseases, classification of neurological diseases, ways to neurological diagnoses, emergency situations in neurology, chronic neurological diseases, borderline areas between neurology and psychiatry, infectious diseases which have an effect on the nervous system, operable neural diseases, neurological complications of diseases of other systems, treatment of neurological diseases and of pain (pharmacological and other treatments). Rehabilitation in neurology.

### Mental Disease (8 ECTS)

#### Aims

Understanding the psychological, social and somatic factors in the etiology of mental disorders. Psychiatric examination. Diagnostics and classification of mental disorders. Knowledge of the clinical picture and therapeutic treatment of individual disorders. The role of a family physician in treatment of patients with mental disorders. Autonomous action in emergency situations. Holistic treatment in the community. Public

health aspects of mental health.

#### **Contents**

Symptoms and signs of particular categories of mental disorders. Classification and diagnostic procedure. Mental disorders in neurological and other somatic diseases. Treatment: psychopharmacotherapy and psychotherapy. Rehabilitation and preventive measures.

### **Musculoskeletal System (7 ECTS)**

#### **Aims**

The student will get acquainted with the most common diseases and injuries of the skeleton, musculoskeletal system and skin.

He will develop the ability to gradually make a diagnosis of musculoskeletal disease or injury on the basis of anamnestic data, physical examination, laboratory investigation, imaging data and other methods. He will become able to autonomously provide the emergency medical aid in musculoskeletal patients. He will master current methods of treatment and rehabilitation. He will get acquainted with possible future development of treatment and rehabilitation methods. He will acquire holistic understanding of musculoskeletal diseases and injuries and will become able to recognize the influence of these disorders on the entire organism, also in the psychosocial terms. On the other hand, he will understand the impact of other diseases on the condition of the musculoskeletal system and skin and on the musculoskeletal disease or injury.

#### **Contents**

The subject is substantially divided into modules: Musculoskeletal system diseases, injuries of the musculoskeletal system, diseases and injuries of arms, locomotor physical medicine and rehabilitation. This section encompasses the topographical anatomy of the musculoskeletal system, physical and physiological basics of musculoskeletal system kinematics, descriptions of musculoskeletal diseases and injuries, ways of determining musculoskeletal diseases and injuries, treatment and rehabilitation methods for diseases and injuries of the musculoskeletal systems, instruction for determining the final state (disability) after the disease or injury of the musculoskeletal system and methods for preventing injuries and diseases of the musculoskeletal system.

### **Digestive Organs (5 ECTS)**

#### **Aims**

The student will be acquainted with the epidemiology, diagnostics and clinical features of gastrointestinal diseases and imaging diagnostics of mentioned diseases. The student will become familiar with preparation of the patient prior to surgical procedure, with general and regional anaesthesia, and with pain management and resuscitation. After finishing this section, a medical student will be able to treat a patient with the clinical picture of an acute abdomen, with hidden and evident signs of gastrointestinal disease. He will be able to consult other specialists before deciding indication for surgical treatment. He will be able to make a diagnosis with a clinical examination and diagnostic investigations. He will be familiar with differential diagnostics and the principles and methods of treatment and prevention of gastrointestinal diseases.

#### **Contents**

The student will become familiar with epidemiology, etiology, pathogenesis, clinical picture, complications, differential diagnostics, gradual diagnostics of these diseases and with interdisciplinary cooperation. He will get familiar with the most common causes of the acute abdomen and he knows the methods of treatment. He will become acquainted with the basic principles of the surgical treatment of benign and malignant gastrointestinal tract diseases. Students become familiar with the influence of concomitant diseases on the perioperative management, with procedures to improve the patient's general condition prior to surgical procedure, with general, regional and combined anaesthesia, with prevention and management of major complications, and with pain management and resuscitation. The student gets familiar with the principles of radiological diagnostics and interventional radiology.

## Skin and Venereal Diseases (6 ECTS)

### Aims

The student will get to know the most common skin diseases and venereal diseases and will become aware how to make a stepwise diagnosis of skin diseases from the anamnestic data and examinations. The current ways of treatment of skin and venereal diseases and possible advances in the treatment will be presented. The students will be directed towards the holistic comprehension of the skin and venereal diseases, the influence of the skin diseases on the whole organism, also in psycho-social respect will be stressed. The manifestations and influences of non-dermatological non-musculoskeletal diseases on the status of the skin and musculoskeletal system will be emphasized.

### Contents

In the subject, topographic anatomy, physiology and histology of the skin will be resumed. Skin diseases and venereal diseases, the possibilities to state the diagnosis of skin and venereal diseases and the ways of the treatment of skin and venereal diseases, instructions for determining the final state (disability) after the skin and venereal disease and methods for preventing injuries and diseases of the musculoskeletal system and skin and venereal diseases will be presented.

## Infectious Diseases (12 ECTS)

### Aims

The student will get acquainted with the epidemiology, diagnostics and clinical picture of infectious diseases. He will acquire knowledge about internal and surgical diseases of the gastrointestinal tract, diseases of the blood and blood forming organs, imaging diagnostics of these diseases, pharmacodynamic and pharmacokinetic properties of antimicrobial substances, cytostatics and immunosuppressive medications. The student will become familiar with preparation of the patient prior to surgical procedure, with general and regional anaesthesia, with pain management and resuscitation. He will be able to make a diagnosis with a clinical examination and diagnostic investigations and will be able to consult other specialists. He will be familiar with differential diagnostics, principles and methods of treatment and prevention of infectious diseases, which are caused by microorganisms, diseases of gastrointestinal tract and diseases of blood and blood forming organs.

### Contents

Epidemiology, pathophysiology, clinical, imaging, laboratory and microbiological diagnostics of diseases which are caused by microbes. The following contents will be presented: infections by organ systems, systemic infections, approaches to a patient with the most common symptoms, infections among people with impaired immunity, infections in all age groups, nosocomial infections, important zoonoses and tropical diseases. The clinical approach to the treatment with antimicrobial drugs, mechanisms of microbial resistance to antimicrobial drugs, methods of detection of microbial resistance.

## Blood (3 ECTS)

**Aims** Students get knowledge about pathogenesis, epidemiology, early detection, diagnostics and treatment of hematologic diseases. They learn an approach to patients with hematologic diseases. They are able to establish diagnosis using anamnesis, clinical examination and basic laboratory tests. Interpretation of blood picture is considered as kind of »hematological ECG«.

### Contents

Students learn on epidemiology, etiology, pathogenesis, clinical presentation, complications, differential diagnosis, diagnostic approach to diseases of hemopoietic system and interdisciplinary approach in hematology.

Students get familiar with blood cells morphology. Ultimate goal is to obtain knowledge on the level of general practitioner. Emphasis is on anamnesis, clinical examination, interpretation of blood picture and essential laboratory parameters.

## Circulatory System (8 ECTS)

### Aims

The student will develop the ability to gradually make a diagnosis of cardiovascular disease on the basis of anamnestic data, physical examination and laboratory investigation. He will become able to autonomously provide the emergency medical aid in cardiovascular patients. He will master current methods of treatment and rehabilitation. He will get acquainted with possible future development of treatment and rehabilitation methods. He will acquire holistic understanding of cardiovascular diseases and will become able to recognize

the influence of these diseases on the entire organism, also in the psychosocial terms. On the other hand, he will understand the impact of other diseases on the condition of the cardiovascular system and on the cardiovascular disease.

#### **Contents**

The following specialties are included in this subject: Internal medicine (cardiology, hypertensiology, vascular diseases, intensive-care internal medicine), surgery (cardiovascular surgery), imaging diagnostics, (clinical) pharmacology.

Contents include: epidemiology of cardiovascular diseases, pathophysiology and pathomorphology of cardiovascular diseases, symptoms and signs of cardiovascular diseases, causes of cardiovascular diseases (genetic factors, congenital abnormalities, degenerative changes, infections, injuries, etc.), diagnostic procedures, acute diseases of the cardiovascular system, chronic diseases of the cardiovascular system, urgent conditions in cardiovascular diseases, treatment of cardiovascular diseases (non-pharmacological, pharmacological, percutaneous transluminal angioplasty—PTA, stenting, surgical treatment), rehabilitation, prevention of cardiovascular diseases (primary, secondary), principles of treatment after transplantation.

### **Forensic Medicine (5 ECTS)**

#### **Aims**

The student will get familiar with the mechanisms of injuries, their classification and their evaluation. He will be able to distinguish between most common intoxications, he will master the basics of forensic hematology and he will be able to recognize all those emergency situations where ethical, criminal and indemnifying responsibility of physician is possible. He will be acquainted with basic forensic medical tasks of general practitioner. He will acquire knowledge about the most important forensic rules and ethical principles necessary for efficiently performing his future profession.

#### **Contents**

The student becomes familiar with basics of classical forensic medicine from the mechanisms of natural and violent death to the signs of death. He acquires knowledge about the basics of identification, injury mechanisms and their forensic medical characteristics. He becomes acquainted with physical and gun-shot injuries, suffocations, the basics of forensic toxicology and hematology. He gets familiar with legislation (both health and criminal), with the basics of expert work with special emphasis on assessing body injuries. At the lectures he gets familiar with emergency situations, which may indicate criminal and indemnifying responsibility. He upgrades his knowledge of moral, ethical and deontological principles regarding the work of physician. The student integrates the knowledge of all preclinical and the majority of clinical subjects, consolidates his knowledge about shock, acquires the basics of physician's work in emergency medicine, he becomes familiar with physician's tasks in the case of infanticide as well as with medical error and iatrogenic injuries. He acquires knowledge about interdisciplinary cooperation in forensic medicine.

### **Maxillofacial Surgery with Fundamentals of Dental Medicine (3 ECTS)**

#### **Aims**

The student will become familiar with facial skeleton diseases, diseases of facial soft tissues and diseases of the oral cavity, including basic dental and parodontal tissue diseases. At clinical practical course he will learn how to perform an oral and maxillofacial examination, basics of differential diagnostics and first medical aid.

#### **Contents**

Characteristics of facial, oral and neck anatomy which are associated with congenital abnormalities, injuries, infections, tumors, degenerative diseases and acquired facial irregularities, pre-prosthetic needs of treatment, temporomandibular joint diseases and dental and parodontal tissue dependent pathology. The student gets familiar with etiology, epidemiology, pathogenesis, clinical picture, diagnostics and interdisciplinary treatment of maxillofacial and oral diseases.

### **Otorhinolaryngology (5 ECTS)**

#### **Aims**

The student will become familiar with ear diseases, nose and paranasal sinuses diseases, oral cavity diseases, pharyngeal and laryngeal diseases, with diseased changes on the neck, with causes for hearing, sense of smell and taste disorders. At clinical practical course he will learn otorhinolaryngological (ORL) examination techniques, first medical aid, treating an otorhinolaryngological patient and will test his skills in contact with patients.

#### **Contents**

Special features of the anatomy and physiology of ear, nasal organ, oral cavity, pharynx, larynx and neck

with special emphasis on disease processes in this area. Physiology of hearing, equilibrium, smell and taste. Congenital abnormalities, injuries, inflammations, tumors of the ear, nose and paranasal sinuses, oral cavity, pharynx, larynx and neck. Epidemiology, etiology, pathogenesis, patient's signs and symptoms of ORL disease. Diagnostic procedures in the determination of mentioned pathological conditions, treatment options and efficiency of treatment. Interdisciplinary cooperation.

## **Ophthalmology (5 ECTS)**

### **Aims**

The student will become familiar with eye and ocular appendages diseases and diseases of other organ systems which reflect on eyes or vision. At clinical practical course he will learn ophthalmological examination techniques and will test his skills in contact with patients.

He will acquire knowledge about orbital diseases, intracranial processes that result in loss of vision and with diseases and injuries of the orbit and paranasal sinuses which affect vision. He will also get familiar with specifics of eye diseases among children and with systemic and genetic diseases that affect vision. At clinical practical course he will learn ophthalmological and oriented neuro-ophthalmological examination, basics of differential diagnostics and first medical aid.

### **Contents**

Specialties of anatomy and physiology of eyes, ocular appendages and orbit with special emphasis on disease processes in this area. Physiology of vision and ocular movements. Congenital abnormalities, injuries, inflammations, eye tumors and tumors of the orbit and paranasal sinuses. Epidemiology, etiology, pathogenesis, patient's signs and symptoms. Diagnostic procedures in determining mentioned pathological conditions, possibilities and efficiency of treatment. Interdisciplinary cooperation.

## **Gynaecology and Obstetrics (9 ECTS)**

### **Aims**

The student will become familiar with the physiology of the menstrual cycle, pregnancy, menstrual cycle disorders, with abnormalities in development of female genitals and with gynaecological endocrinopathies. He will get familiar with inflammatory diseases, benign and malignant tumors of the reproductive system and static disorders of the pelvic floor. He will acquire knowledge about reproductive health, hormone treatment, infertility diagnostics and treatment in particular.

At clinical practical course in gynecology the student will acquire knowledge about targeted anamnesis, he will learn to identify irregularities of the menstrual cycle and will become familiar with characteristics of other pathological processes of reproductive organs. He will get acquainted with gynecological examination techniques including Papanicolaou test and bimanual palpation. He will gain fundamental information on non-invasive imaging investigations for identification of basic pathological processes in gynecology. He will monitor basic invasive diagnostic and therapeutic procedures of reproductive system diseases.

The student will become familiar with the physiology of pregnancy, with the course and supervision of a healthy and diseased pregnant woman and her foetus, with the normal course of labour and with irregularities during labour and postpartum period. He will get acquainted with invasive and non-invasive screening tests and genetic counseling. He will get familiar with different pathological conditions of pregnancy (pre-eclampsia, deep venous thrombosis, diabetes, etc.), with premature birth and with basic problems of neonatal medicine. At clinical practical course in obstetrics the student will acquire knowledge about targeted anamnesis of a pregnant woman, about clinical examination of a pregnant woman and external obstetric investigations. He will get familiar with mandatory examinations during pregnancy and with reproductive health care. He will participate in non-invasive imaging examinations during pregnancy and at genetic counseling. He will monitor the course of a normal labor, instrumental labor and postpartum period. He will participate in the care of a healthy newborn and will get familiar with the treatment of prematurely born infants.

### **Contents**

Specialties of anatomy and physiology of the female reproductive organs, pregnancy and labour with special emphasis on disease processes in this area. Physiology of menstrual cycle. Abnormalities in development of the reproductive system, irregularities in menstrual cycle, gynecological endocrinopathies, different periods of hormonal activity. Reproductive organs injuries, inflammation of reproductive organs, benign and malignant tumors of reproductive organs, static disorders, etiology, epidemiology, pathogenesis, patient's symptoms and signs. Diagnostic procedures, treatments and interdisciplinary treatment. Physiology of pregnancy, infertility, types of treatment and treatment options for infertility. Legal and ethical aspects of reproductive medicine. Reproduction health, treatment with hormones, contraception. Physiology of pregnancy, the normal course of pregnancy and types of control, mandatory pregnancy examinations, monitoring of foetus development, normal childbirth and postpartum period. Non-invasive imaging tests, clinical monitoring of normal and

pathological pregnancy. Pathological pregnancy, etiology, epidemiology, pathogenesis, patient's signs and symptoms. Diagnostic procedures, types of treatment and interdisciplinary treatment. Adaptation of a newborn, prematurely born child. Physiology of lactation and lactation disorders, benign and malignant breast diseases; etiology, epidemiology, pathogenesis, patient's symptoms and signs. Diagnostic procedures, types of treatment and interdisciplinary treatment.

## General Paediatrics (4 ECTS)

### Aims

Knowledge of pathophysiological, biochemical, electrophysiological and genetic basics of the most common diseases and syndromes during childhood, adolescence and young adulthood. Knowledge of pediatric propedeutics and a holistic approach to the treatment of a child, adolescent and young adult, knowledge and the assessment of growth- and development-dependent changes of the organism. Knowledge of frequency of occurrence, clinical picture and differential diagnostics of pediatric diseases. Classification of diseases by etiology in different age periods. Knowledge of modern diagnostic procedures and their adaptation for the pediatric population, with emphasis on laboratory diagnostics, screening laboratory diagnostics, electrophysiological diagnostics, comprehensive imaging diagnostics, molecular-genetic and cytogenetic diagnostics, morphological and pathohistological diagnostics, psychosocial definition, nutritional analysis, functional diagnostics, invasive cardiopneumology, prenatal diagnostics. Knowledge of modern approaches to a holistic treatment, treatment of diseases with emphasis on age and developmental stages, treatment with basic types of medications including biological medications, nutritional treatment, physiotherapy and rehabilitation, logopedic treatment, pediatric and adolescent psychotherapy, genetic counseling, monitoring, tracking assessment of the treatment. Knowledge of basics of preventive pediatrics with vaccination, dispensary work, social pediatrics, monitoring and assessment of work quality.

Specific competences: Knowledge of practical approaches to a holistic treatment of a newborn, child, adolescent and a young adult, together with his family and specific adaptations of individual procedures and processes with regards to age and development level. Special emphasis is placed on monitoring of a chronically ill child or adolescent and his family.

### Contents

Pediatric propedeutics, general pediatrics, social pediatrics, preventive and dispensary treatment of children, adolescents and young adults, normal growth and development, neonatology, pediatric cardiology, pediatric haematology and oncology, pediatric neurology, pediatric nephrology, pediatric pulmonology, pediatric infectology, pediatric immunology and rheumatology, pediatric gastroenterology, pediatric endocrinology, diabetology and metabolic diseases, clinical genetics, pediatric intensive therapy, pediatric surgery and anesthesiology, pediatric psychiatry, pediatric nutritional sciences, pediatric imaging diagnostics, laboratory diagnostics, the psychology of a child, adolescent and young adult person and the ethics in pediatrics. Knowledge about comprehensive treatment of a pediatric patient and his family, knowledge about etiology, pathophysiology, pathohistology, treatments, including the treatment with the use of medical technologies, monitoring and reintegration into original environment.

## Respiratory System (4 ECTS)

### Aims

The student will get acquainted with the most common diseases of the respiratory system. He will develop the ability to gradually make a diagnosis of respiratory system disease on the basis of anamnestic data, physical examination and laboratory investigation. He will become able to autonomously provide the emergency medical aid in respiratory patients. He will master current methods of treatment and rehabilitation. He will get acquainted with possible future development of treatment and rehabilitation methods. He will acquire holistic understanding of respiratory diseases and will become able to recognize the influence of these disorders on the entire organism, also in the psychosocial terms.

### Contents

The following specialties are included in this subject: Internal medicine (pulmonology), surgery (thoracic), microbiology, imaging diagnostics.

Detailed contents: Epidemiology of respiratory diseases, pathophysiology, pathomorphology, genetics of respiratory diseases; signs and symptoms of respiratory diseases; etiology of respiratory diseases (congenital abnormalities, hereditary factors, infections, degenerative changes, injuries, cancer), prevention of respiratory diseases, diagnostic procedures for respiratory diseases, principles of laboratory diagnostics; acute respiratory diseases (infections, including tuberculosis, ischemia, vasculopathy), chronic respiratory diseases (degenerative, malignant), emergency situations in respiratory diseases (respiratory failure, bleeding, asphyxia); treatment of respiratory diseases (non-pharmacological, pharmacological, rehabilitation); principles of dia-

gnostics; treatment of pulmonary complications of an immunocompromised patient, guiding the patient before and after lung transplantation; principles of radiological diagnostics, interventional radiology procedures.

## Urinary Tract (3 ECTS)

### Aims

The student will get acquainted with the most common diseases of the kidneys and of the urinary tract. He will develop the ability to gradually make a diagnosis of kidney and urinary tract disorder on the basis of anamnestic data, physical examination and laboratory investigation. He will become able to autonomously provide the emergency medical aid in patients. He will master current methods of treatment and rehabilitation. He will get acquainted with possible future development of treatment and rehabilitation methods. He will acquire holistic understanding of kidney and urinary tract disorders and will become able to recognize the influence of these disorders on the entire organism, also in the psychosocial terms.

### Contents

The following specialties are included in this subject: Internal medicine (nephrology, nuclear medicine), surgery (urology), imaging diagnostics.

Detailed contents: Epidemiology of kidney and urinary tract diseases, pathophysiology, pathomorphology, genetics of kidney and urinary tract diseases; symptoms and signs of kidney and urinary tract diseases; etiology of kidney and urinary tract diseases (congenital abnormalities, hereditary factors, infections, degenerative changes, injuries, cancer); prevention of kidney and urinary tract diseases; diagnostic procedures for kidney and urinary tract diseases; principles of laboratory medicine; acute diseases of kidneys and urinary tract (infections, ischemia, vasculopathy); chronic diseases of kidneys and urinary tract (degenerative, malignant); emergency situations in kidney and urinary tract diseases (acute renal failure); kidney and urinary tract disease treatment (non-pharmacological, pharmacological, rehabilitation); principles of diagnostics and treatment in an immunocompromised patient; guiding the patient before and after transplantation; principles of radiological diagnostics, interventional radiology procedures.

## Endocrinology and metabolic diseases (4 ECTS)

### Aims

The student will get acquainted with the most common metabolic diseases. He will develop the ability to gradually make a diagnosis of metabolic disease on the basis of anamnestic data, physical examination and laboratory investigation. He will become able to autonomously provide the emergency medical aid in metabolically ill patients. He will master current methods of treatment and rehabilitation. He will get acquainted with possible future development of treatment and rehabilitation methods. He will acquire holistic understanding of metabolic diseases and will become able to recognize the influence of these disorders on the entire organism, also in the psychosocial terms.

### Contents

The following specialties are included in this subject: Internal medicine (endocrinology, nuclear medicine), surgery (thoracic).

Detailed contents: Epidemiology of endocrine diseases, pathophysiology, pathomorphology, genetics of endocrine diseases, symptoms and signs of endocrine diseases, etiology of endocrine diseases (congenital abnormalities, hereditary factors, infections, degenerative changes, injuries, cancer), prevention of endocrine diseases, diagnostic procedures in endocrine disorders, principles of laboratory medicine in endocrinology, acute and chronic endocrine diseases, complications on other organs in endocrine diseases, emergency situations in endocrine disorders, treatment of endocrine diseases (non-pharmacological, pharmacological, surgical, rehabilitation), principles of imaging diagnostics in endocrine diseases.

## Onkology (4 ECTS)

### Aims

Students get knowledge about pathogenesis, epidemiology, early detection, diagnostics and treatment of malignant diseases. Students realize general oncological principles, multidisciplinary approach to the patient, specific oncologic history taking, assesment of patient's performance status, diagnostic methods and treatment.

### Contents

The following specialties are included in this subject:

- Tumor biology (cancerogenesis, genetics, immunology)
- Epidemiology (epidemiology of cancers, risk factors, cancer registries)
- Screening methods and early detection of cancer
- General principles in oncology (levels of oncological health care, TNM)

classification, multidisciplinary, approach to the patients and ethics, statistical methods in oncology).

- Oncological pathology
- Oncological cytology
- Laboratory diagnostics (hematologic, biochemistry, tumor markers, molecular and cytogenetic diagnostics)
- Imaging in oncology (X-ray, ultrasound, computed tomography, magnetic resonance imaging, PET)
- Radiotherapy (teletherapy, brachytherapy, radiobiology, radiophysics)
- Oncological surgery
- Medical treatment
- Supportive and palliative care
- Clinical presentation of common tumors
- Oncological and hematological emergencies, complications of cancers
- Treatment of pain

### **Rheumatic and Immune Mediated Diseases (3 ECTS)**

#### **Aims**

The student will develop the ability to gradually make a diagnosis of the disease on the basis of anamnestic data, physical examination and laboratory investigation. He will become able to autonomously provide the emergency medical aid in rheumatologic, allergic and other immune-diseased patients.

He will get acquainted with current therapeutic and rehabilitation methods and with their possible future development. He will acquire holistic understanding of rheumatic, allergic and other immune disorders and will become able to recognize the influence of these disorders on the entire organism, also in the psychosocial terms. He will become acquainted with clinical immunology as a modern interdisciplinary science that deals with immune-dependent diseases. He will get familiar with clinical characteristics of immune disorders, with diagnostic immunological techniques, with duration and importance of immunological examinations.

#### **Contents**

The following specialties are included in this subject: Internal medicine (rheumatology, allergology), surgery (thoracic), microbiology and immunology (clinical immunology).

The subject is substantially divided into modules: Rheumatic diseases, allergology, clinical immunology, other immune-dependent diseases.

Detailed contents: Epidemiology of rheumatic and allergic diseases; pathophysiology, pathomorphology, genetics of rheumatic and allergic diseases; symptoms and signs of rheumatic and allergic diseases; etiology of rheumatic and allergic diseases (congenital abnormalities, hereditary factors, infections, degenerative changes); prevention of rheumatic and allergic diseases; diagnostic procedures of rheumatic and allergic diseases; principles of laboratory medicine in rheumatic and allergic diseases; acute rheumatic and allergic diseases; chronic rheumatic and allergic diseases; emergency situations in rheumatic and allergic diseases (anaphylaxis, temporal arteritis and other systemic vasculitides, septic arthritides); treatment of rheumatic and allergic diseases (non-pharmacological, pharmacological, rehabilitation); principles of diagnostics and treatment of an immunocompromised patient, guiding the patient before and after transplantation.

### **Internal Medicine (17 ECTS)**

#### **Aims**

Student trainees guided by clinical practice supervisors will be introduced to professional practice on the wards of internal medicine specialties.

#### **Contents**

Practice in the reception clinic, practice in internal medicine departments, practice in internal medicine ambulatory clinic, monitoring functional diagnostics and evaluating laboratory reports, writing records of ambulatory patients, writing records of hospitalized patients, treatment planning, participation at consilium, duty service in internal medicine departments, review of patients at ward meetings and seminars.

### **Clinical paediatrics (8 ECTS)**

#### **Aims**

Knowledge of pathophysiological, biochemical, electrophysiological and genetic basics of the most common diseases and syndromes during childhood, adolescence and young adulthood.

Knowledge of pediatric propedeutics and a holistic approach to the treatment of a child, adolescent and young adult, knowledge and the assessment of growth- and development-dependent changes of the organism.

Knowledge of frequency

of occurrence, clinical picture and differential diagnostics of pediatric diseases. Classification of diseases by etiology in different age periods. Knowledge of modern diagnostic procedures and their adaptation for the pediatric population, with emphasis on laboratory diagnostics, screening laboratory diagnostics, electrophysiological diagnostics, comprehensive imaging diagnostics, molecular-genetic and cytogenetic diagnostics, morphological and pathohistological diagnostics, psychosocial definition, nutritional analysis, functional diagnostics, invasive cardiopneumology, prenatal diagnostics. Knowledge of modern approaches to a holistic treatment, treatment of diseases with emphasis on age and developmental stages, treatment with basic types of medications including biological medications, nutritional treatment, physiotherapy and rehabilitation, logopedic treatment, pediatric and adolescent psychotherapy, genetic counseling, monitoring, tracking assessment of the treatment. Knowledge of basics of preventive pediatrics with vaccination, dispensary work, social pediatrics, monitoring and assessment of work quality.

Specific competences: Knowledge of practical approaches to a holistic treatment of a newborn, child, adolescent and a young adult, together with his family and specific adaptations of individual procedures and processes with regards to age and development level. Special emphasis is placed on monitoring of a chronically ill child or adolescent and his family.

### Contents

Pediatric propedeutics, general pediatrics, social pediatrics, preventive and dispensary treatment of children, adolescents and young adults, normal growth and development, neonatology, pediatric cardiology, pediatric haematology and oncology, pediatric neurology, pediatric nephrology, pediatric pulmonology, pediatric infectology, pediatric immunology and rheumatology, pediatric gastroenterology, pediatric endocrinology, diabetology and metabolic diseases, clinical genetics, pediatric intensive therapy, pediatric surgery, pediatric psychiatry, pediatric nutritional sciences, pediatric imaging diagnostics, laboratory diagnostics, the psychology of a child, adolescent and young adult person and the ethics in pediatrics. Knowledge about comprehensive treatment of a pediatric patient and his family, knowledge about etiology, pathophysiology, pathology, treatments, including the treatment with the use of medical technologies, monitoring and reintegration into original environment.

## Surgery (12 ECTS)

### Aims

Under mentor's supervision student will perform all the medical procedures on working positions of all surgical specialties.

### Contents

Practice in admission departments, practice in the emergency department, practice in check-up departments, assistance at large surgeries, outpatients' surgery, writing of medical records for inpatients and outpatients, treatment planning, participation at consiliary meetings, being on duty in emergency departments, review of patients at ward meetings and at multimedia conferences.

## Primary Health Care (11 ECTS)

### Aims

Comprehensive understanding of individual and working population health care.

Subject-specific competences: Clinical skills, focused on the problems of the first contact of a patient with a medical service, communication and relationship between a patient and a physician, cooperation with the environment in which the physician works, basics of economics and business, knowledge of the forms, methods and ways of studying risks at work, knowledge of the effects of work environment on the capacity of individual organs, organ systems and of the human as a whole, knowledge of the effects of the work environment on health and working ability, knowledge of work burdens and early effects of work burdens on health and working ability, knowledge of influences of work environment on specific negative health indicators of an individual or a group, knowledge of the basic principles of evaluation of temporary and permanent inability to work, knowledge of principles of vocational orientation, selection and rehabilitation, knowledge of basics of health promotion in the work environment.

### Contents

The following specialties are included in this subject: family medicine and occupational medicine. The subject contents are therefore divided into two parts, each part lasts six weeks.

Student trainee guided by supervisor will be introduced to professional practice in the ambulatory care units of both specialties. Part of training activities is organized for small groups of students.

### Perioperative medicine (3 ECTS)

#### Aims:

The aim of the course is to present the importance of optimal preoperative patient's condition, emphasize the importance of cooperation between physicians of different specialties. Students are familiarized with different anesthetic techniques, intraoperative control of the patient, early postoperative surveillance and the importance of treatment in the intensive care unit.

#### Contents

Presented topics: Optimization of patient's medical condition, Elective and urgent procedures, Interdisciplinary cooperation, Anesthesia technique, General anesthesia, Regional anesthesia, Pooperative control, Pooperative control, Treatment in Intensive care unit, Surgical treatment and anticoagulant and antiagregative drugs, Transplantation activity.

### Geriatrics (3 ECTS)

#### Aims

- Student should learn the valid principles of treatment and rehabilitation and get information on new treatment modalities, which are in the process of evaluation at the moment.
- Student should understand the comprehensive approach to the elderly patient, as advanced age influence the function of other organs as well, and influences the psycho-social situation of the patient.
- Acquire knowledge and skills in the management of acute/urgent medical illness in older patients.
- Acquire knowledge and skills in evaluation and management of common geriatric syndromes, including but not limited to delirium, dementia, immobility, malnutrition, poly-pharmacy, pre and post-operative complications, geriatric psycho-social problems, discharge planning, and elder abuse.
- Acquire experience in evaluation and management of frail elderly patients with multiple acute and chronic illnesses.
- To understand functional status and how it relates to inpatient geriatrics and discharge planning.
- Acquire knowledge in running family meetings.
- To learn how to address end of life decisions with patients and their family members.

#### Contents

Participating specialties: Family medicine, Internal medicine, Surgery, Oncology

Outline: Epidemiology of aging, physiology of aging, pharmacology of elderly, geriatric syndromes such as frailty, dementia, incontinence, and falls, presentations of common diseases that are unique in this population, symptoms and signs characteristic for elderly, diagnostic procedures and principles of evaluation of functional and laboratory diagnostic test in elderly, principles of care of acute diseases in elderly, principles of care of chronic diseases in elderly, emergency situations in elderly; Intensive care of elderly, hazards of hospitalization for older adults, assessment of functional status, holistic approach to the older patient in the context of their entire family unit, Geriatric rehabilitation, Definitions of palliative medicine, care and team, When to consider palliative care in a patient with an advanced chronic illness, Natural course of advanced chronic illnesses, Prognostics in palliative medicine, Managing of symptoms in palliative care (pain, dyspnea, nausea/vomiting, anorexia, cachexia, delirium), Communication in palliative care, breaking bad news, Evaluation of needs of patient and his family, Ethical dilemmas in palliative care, Process of dying, Procedures after patient's death