

University of Ljubljana  
Faculty of Medicine



**PRESENTATION DOCUMENT**

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

**DENTAL MEDICINE**

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**Title**

PRESENTATION DOCUMENT

UNIFORM SECOND-LEVEL MASTER'S PROGRAM

DENTAL 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 Dental Medicine lasts six years (12 semesters) and consists of a total of 360 credit points. The professional title acquired by the graduate is doctor of dental medicine (dr. dent. med.).

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

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

### General competencies

- Ability to analyse, 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 and dental 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 dental medicine,
- understanding the general structure of dental 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 dental medicine,
- use of information and communication technologies and systems in the field of dental medicine.

### Dental medicine-specific competencies

- 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 the place and role of dental medicine in society,
- knowledge of the molecular basis and mechanisms of normal and pathological functioning of the human organism,
- communication skills with patients,
- knowledge of public health problems treatment methods,
- the ability to examine a patient with emphasis on the orofacial region,
- knowledge of the role of environment in the emergence and development of diseases,
- understanding of disease states, their signs and symptoms with emphasis on the orofacial region,

- knowledge of the role of lifestyle in the formation and development of diseases, communication skills with patients,
- knowledge of disease diagnostics and treatment with particular emphasis on the orofacial region,
- knowledge of preventive measures in dental medicine,
- integration of knowledge and skills at work with a patient at clinical practical course,
- scientific research in the field of dental medicine.

### 3. Admission requirements and criteria for selection at limited enrolment

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

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

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

- the general grade in the general maturity examination 35% of points
- the general grade in third and fourth year 20% of points
- success in individual subjects of the general maturity examination:  
mathematics, a foreign language and one natural science subject  
(biology, physics or chemistry) 45% of points

Candidates under point b), by:

- the general grade in the final examination 35% of points
- the general grade in third and fourth year 20% 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 45% of points

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

Knowledge and skills acquired prior to enrolment in the program shall not be considered as enrolment conditions or criteria for selection in case of limited enrolment.

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

- Terms for advancing from year to year

A student 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 fulfill the following requirements:

- 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 exams in Anatomy 1, Biophysics, Cell Biology, Biochemistry 1, Emergency Medical Care 1
- 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 exams in Anatomy 1, Biophysics, Cell Biology, Biochemistry 1, Emergency Medical Care 1, Anatomy 2, Biochemistry 2, Physiology, Histology and Embryology, Oral Biology
- 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 exams in Anatomy 1, Biophysics, Cell Biology, Biochemistry 1, Emergency Medical Care 1, Anatomy 2, Biochemistry 2, Physiology, Histology and Embryology, Oral Biology, General Pharmacology and Toxicology, Microbiology, Immunology and Oral Microbiology, Pathology and Oral Pathology, Pathophysiology, Emergency Medical Care 2, Pre-clinical Practicum, Dental Materials and Dental Materials Technology, Internal Propedeutics, Clinical Physiology of the Stomatognathic System

- from the 5<sup>th</sup> to the 6<sup>th</sup> year of study: 54 credit points or exceptionally 46 credit points from the 5<sup>th</sup> year of study and passed exams in Anatomy 1, Biophysics, Cell Biology, Biochemistry 1, Emergency Medical Care 1, Anatomy 2, Biochemistry 2, Physiology, Physiology of the Nervous System, Histology and Embryology, General Pharmacology and Toxicology, Special Pharmacology and Toxicology, Microbiology, Immunology and Oral Microbiology, Pathology and Oral Pathology, Pathophysiology, Emergency Medical Care 2, Pre-clinical Practicum, Dental Materials and Dental Materials Technology, Internal Propedeutics, Propedeutics of Dental Medicine, Medical Clinic 1, Surgery, General and Dental Radiology, Infectious Diseases and Epidemiology, Internal Medicine, Dental Diseases 1, Oral Diseases and Periodontology 1, Paediatric and Preventive Dentistry 1, Maxillofacial and Oral Surgery 1, Fixed Prosthodontics 1, Removable Prosthodontics 1, Orthodontics and Dentofacial Orthopedics 1, Clinical Physiology of the Stomatognathic System, Oral Diseases and Periodontology 2

Exceptionally and due to justifiable reasons, a student can advance to the next year if he has collected 46 credit points with passed exams in subjects which are necessary for a successful work in the next year of study.

- from the 1<sup>st</sup> to the 2<sup>nd</sup> year of study: 46 credit points
- from the 2<sup>nd</sup> to the 3<sup>rd</sup> year of study: 46 credit points from the 2<sup>nd</sup> year of study and passed exams in Anatomy 1, Biophysics, Cell Biology, Biochemistry 1, Emergency Medical Care 1
- from the 3<sup>rd</sup> to the 4<sup>th</sup> year of study: 46 credit points from the 3<sup>rd</sup> year of study and passed exams in Anatomy 1, Biophysics, Cell Biology, Biochemistry 1, Emergency Medical Care 1, Anatomy 2, Biochemistry 2, Physiology, Histology and Embryology, Oral Biology
- from the 4<sup>th</sup> to the 5<sup>th</sup> year of study: 46 credit points from the 4<sup>th</sup> year of study and passed exams in Anatomy 1, Biophysics, Cell Biology, Biochemistry 1, Emergency Medical Care 1, Anatomy 2, Biochemistry 2, Physiology, Histology and Embryology, Oral Biology, General Pharmacology and Toxicology, Microbiology, Immunology and Oral Microbiology, Pathology and Oral Pathology, Pathophysiology, Emergency Medical Care 2, Pre-clinical Practicum, Dental Materials and Dental Materials Technology, Internal Propedeutics, Clinical Physiology of the Stomatognathic System
- from the 5<sup>th</sup> to the 6<sup>th</sup> year of study: 46 credit points from the 5<sup>th</sup> year of study and passed exams in Anatomy 1, Biophysics, Cell Biology, Biochemistry 1, Emergency Medical Care 1, Anatomy 2, Biochemistry 2, Physiology, Physiology of the Nervous System, Histology and Embryology, Pharmacology and Toxicology, Microbiology, Immunology and Oral Microbiology, Pathology and Oral Pathology, Pathophysiology, Emergency Medical Care 2, Pre-clinical Practicum, Dental Materials and Dental Materials Technology, Internal Propedeutics, Propedeutics of Dental Medicine, Medical Clinic 1, Surgery, General and Dental Radiology, Infectious Diseases and Epidemiology, Internal Medicine, Dental Diseases 1, Oral Diseases and Periodontology 1, Paediatric and Preventive Dentistry 1, Maxillofacial and Oral Surgery 1, Fixed Prosthodontics 1, Removable Prosthodontics 1, Orthodontics and Dentofacial Orthopedics 1, Oral Diseases and Periodontology 2, Clinical Physiology of the Stomatognathic System

- 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). The Board for Student Affairs may exceptionally permit re-enrolment of a student who does not meet the conditions for re-enrolment (who has less than 30 credit points) if the statutory requirements were not met because of the following justifiable reasons: longer absence due to illness or treatment, birth or difficult social conditions that are proven with appropriate documents. The student is permitted to repeat or exceptionally repeat a year of study only once during his period of study.

In case of questions regarding the study program students can approach heads of the departments, representatives of the Student Council, tutors, the Board for Student Affairs, the Head of the Department of undergraduate study and the Dean of the Faculty of Medicine.

## 6. 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.

## 7. Transitions between study programs

Transition is understood as termination of studies in one study program and continuation of studies in a new study program. Applications for transitions between study programs in Dental Medicine are examined by the Board for Student Affairs. If there are more applications than free enrollment places, the candidates will be selected on the basis of the average grade of the study so far.

Transitions between study programs are possible:

- if both study programs ensure acquisition of comparable competences after their completion,
- if it is possible to acknowledge at least half of the obligations from the first study program (30 credit points), 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 Dental Medicine is possible up to and including the second year of study under the following conditions: the candidate must have passed the general maturity examination and he must have successfully completed the first year of his current study program (60 credit points) with an average grade of at least 8,5. The Board for Student Affairs defines bridging examination for the subjects which differ from the study program of the uniform Master's study program of Dental Medicine.

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 Dental Medicine.

## 8. Evaluation method

Knowledge of students is tested and assessed in individual subjects so that the learning process for each subject ends with an examination. Curricula of subjects define obligations of students and the form and method of examination. Various forms of student progress evaluation, which are defined in the curriculum, are considered in the final examination grade. The process of testing and assessment of knowledge is regulated by the examination regulations book of UL MF.

A student acquires the right to attend an exam of a subject if he fulfils all requirements. Attendance at practical courses is mandatory and is a prerequisite for the exam. Student must pass all required knowledge and skills, prescribed by the curriculum and pass the prescribed colloquium, which is a prerequisite for attending the exam.

## 9. 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.	Anatomy 1	Erika Cvetko Marija Hribernik	15	7	45			143	210	7
2.	Biophysics	Jure Derganc	60	15	30			105	210	7
3.	Cell Biology	Peter Veranič Mateja Erdani Kreft	75	15	60			120	270	9
4.	Communication	Marija Petek Šter Bojan Zalar	14	6	16		18	66	120	4
5.	Introduction to Medicine	Lijana Zaletel Kragelj Jože Balažič Zvonka Zupanič Slavec Janez Stare	30	15	12			33	90	3
TOTAL			194	58	163		18	467	900	30
SHARE			21,56	6,44	18,11		2	51,89	100	

1 <sup>st</sup> year of study, 2 <sup>nd</sup> semester										
Seq. No.	Subject	Lecturer	Contact hours					SIW	Total hours	ECTS
			L	S	PPC	CPC	OFS			
1.	Anatomy 1	Erika Cvetko Marija Hribernik	15	8	45			142	210	7
2.	Concepts of Biochemistry	Damjana Rozman Tea Lanišnik Rižner Marko Goličnik	75	45	45		50	145	360	12
3.	Emergency Medical Care 1	Uroš Golobič Ahčan Maja Šoštarich	15	15	30				90	3
4.	Introduction to Medicine	Lijana Zaletel Kragelj Jože Balažič Zvonka Zupanič Slavec Janez Stare	35	5	5			15	60	2
5.	Elective 1							180	180	6
TOTAL			140	73	125		50	512	900	30
SHARE			15,56	8,11	13,89		5,56	56,89	100	

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.	Anatomy 2	Erika Cvetko Marija Meznarič	30	15	60			45	150	5
2.	Medical Biochemistry and Molecular Genetics	Ana Plemenitaš Vita Dolžan	60	24	42		14	130	270	9
3.	Physiology	Martin Štrucl Žarko Finderle	38	5	50			87	180	6
4.	Histology and Embryology	Danijel Petrovič Aleksandra Milutinović Živin	18	15	30			57	120	4
5.	Oral Biology	Aleš Fidler Janja Jan Boris Gašpirc Ana Plemenitaš Peter Veranič	27	3			2	58	90	3
6.	Elective 2							90	90	3
TOTAL			173	62	182		16	467	900	30
SHARE			19,22	6,89	20,22		1,78	51,89	100,00	

2 <sup>nd</sup> year of study, 4 <sup>th</sup> semester										
Seq. No.	Subject	Lecturer	Contact hours					SIW	Total hours	ECTS
			L	S	PPC	CPC	OFS			
1.	Physiology	Martin Štrucl Žarko Finderle Ksenija Cankar	52	10	60			148	270	9
2.	Histology and Embryology	Danijel Petrovič Aleksandra Milutinović Živin	18	15	30		15	42	120	4
3.	Health and the Environment	Aleš Fidler Lijana Zaletel Kragelj	15	48	12			75	150	5
4.	Oral Biology	Aleš Fidler Janja Jan Boris Gašpirc Ana Plemenitaš Peter Veranič	48		45		3	54	150	5
5.	Basics of Biostatistics	Janez Stare	30		30			60	120	4
6.	Elective 3							90	90	3
TOTAL			163	73	177		18	469	900	30
SHARE			18,11	8,11	19,67		2	52,11	100	



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.	General Pharmacology and Toxicology	Mojca Kržan Metoda Lipnik Štangelj Katarina Černe	20	5	15			50	90	3
2.	Microbiology, Immunology and Oral Microbiology	Mario Poljak Srečko Koren Alojz Ihan Manca Mueller-Premru Katja Seme Miroslav Petrovec Eva Ružič Sabljčič Tadeja Matos	30	30	30			120	210	7
3.	Methods of Public Health	Lijana Zaletel Kragelj	15	15				60	90	3
4.	Pathology	Nina Zidar Metka Volavšek	45		15			30	90	3
5.	Pathophysiology	Samo Ribarič Zoran Grubič Dušan Šuput	15	15	30			90	150	5
6.	Pre-clinical Practicum	Igor Kopač Janja Jan Aleš Fidler	30		57			33	120	4
7.	Internal Propedeutics	Matjaž Sever	15		45			30	90	3
8.	Emergency Medical Care 2	Uroš Golobič Ahčan Maja Šoštarič	30		30			30	90	3
TOTAL			200	65	222			443	930	31
SHARE			21,51	6,99	23,87			47,63	100	

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.	Pre-clinical Practicum	Igor Kopač Janja Jan Aleš Fidler	62	3	113			2	180	6
2.	Pathology	Nina Gale Nina Zidar	45		30			105	180	6
3.	Pathophysiology	Samo Ribarič Zoran Grubič Dušan Šuput	30	15	30			45	120	4
4.	Dental Materials and Dental Materials Technology	Čedomir Oblak Aleš Fidler	56	4				60	120	4
5.	Special Pharmacology and Toxicology	Mojca Kržan Metoda Lipnik Štangelj Katarina Černe	10	30				50	90	3
6.	Elective 4							180	180	6
TOTAL			203	52	173			442	870	29
SHARE			23,33	5,98	19,89			50,80	100	

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.	Propedeutics of Dental Medicine	Boris Gašpirc Janja Jan Maja Ovsenic Alenka Pavlič Ksenija Rener Sitar	30	40		60		20	150	5
2.	General and Dental Radiology	Aleš Fidler Nataša Ihan Hren Katarina Šurlan Popovič	10	15		15		50	90	3
3.	Infectious Diseases and Epidemiology	Janez Tomažič	11	7		27		75	120	4
4.	Internal Medicine	Matjaž Sever		44				46	90	3
5.	Surgery	Matjaž Veselko	45			15		60	120	4
6.	Medical Clinic 1	Tomaž Lunder Mateja Dolenc-Voljč David B. Vodušek Peter Pregelj	65	20		25	10		120	4
7.	Dental Diseases 1	Janja Jan	30		45			45	120	4
8.	Elective 5							90	90	3
TOTAL			191	126	45	142	10	386	900	30
SHARE			21,22	14	5	15,78	1,11	42,89	100	

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.	Oral Diseases and Periodontology 1	Milan Petelin	15			30		45	90	3
2.	Paediatric and Preventive Dentistry 1	Alenka Pavlič	15			30	5	40	90	3
3.	Dental Diseases 1	Janja Jan				45	5	70	120	4
4.	Maxillofacial and Oral Surgery 1	Nataša Ihan Hren Andrej Kansky	30			30		30	90	3
5.	Fixed Prosthodontics 1	Čedomir Oblak Igor Kopač	15				30	45	90	3
6.	Removable Prosthodontics 1	Milan Kuhar Peter Jevnikar	15	7		30	38		90	3
7.	Clinical Physiology of Stomatognathic System	Ksenija Rener Sitar	30	22		38		60	150	5
8.	Orthodontics and Dentofacial Orthopedics 1	Maja Ovsenic Martina Drevenšek	15	8		30		37	90	3
9.	Elective 6							90	90	3
TOTAL			135	37		233	78	417	900	30
SHARE			15	4,11		25,89	8,67	46,33	100	

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.	Medical Clinic 2	Primož Strojan Saba Battelino Marko Hawlina	32	12		35	10	61	150	5
2.	Pediatrics with Clinical Genetics	Tadej Battelino Janez Jazbec, Tadej Avčin	17	28		14		35	90	3
3.	Paediatrics and Preventive Dentistry 2	Alenka Pavlič	10		5	30	5	40	90	3
4.	Dental Diseases 2	Janja Jan	15			75			90	3
5.	Maxillofacial and Oral Surgery 2	Nataša Ihan Hren Andrej Kansky	30			30		30	90	3
6.	Removable Prosthodontics 2	Milan Kuhar Peter Jevnikar	10	5		45		30	90	3
7.	Fixed Prosthodontics 2	Čedomir Oblak Igor Kopač	15	10		45		50	120	4
8.	Oral Diseases and Parodontology 2	Boris Gašpirc	15			30		45	90	3
9.	Elective 7							90	90	3
TOTAL			144	55	5	304	15	381	900	30
SHARE			16	6,11	0,56	33,78	1,67	42,33	100	

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.	Paediatrics and Preventive Dentistry 2	Alenka Pavlič	10		5	30	5	70	120	4
2.	Oral Diseases and Periodontology 2	Boris Gašpirc	15			30		45	90	3
3.	Maxillofacial and Oral Surgery 2	Nataša Ihan Hren Andrej Kansky	30			30		30	90	3
4.	Dental Diseases 2	Janja Jan				60		60	120	4
5.	Orthodontics and Dentoafacial Orthopedics 2	Maja Ovsenik Martina Drevenšek	15	10		30		35	90	3
6.	Forensic Medicine and Dentistry	Tomaž Zupanc	30			15		45	90	3
7.	Fixed Prosthodontics 2	Čedomir Oblak Igor Kopač	10	15		45		20	90	3
8.	Removable Prosthodontics 2	Milan Kuhar Peter Jevnikar	15	5		45		55	120	4
9.	Elective 8							90	90	3
TOTAL			125	30	5	285	5	450	900	30
SHARE			13,89	3,33	0,56	31,67	0,56	50	100	

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.	Paediatrics and Preventive Dentistry 3	Alenka Pavlič	5	10		40	5	60	120	4
2.	Removable Prosthodontics 3	Milan Kuhar Peter Jevnikar	5	10		45		60	120	4
3.	Dental Diseases 3	Janja Jan		5		75		40	120	4
4.	Fixed Prosthodontics 3	Čedomir Oblak Igor Kopač	5	10		45		90	150	5
5.	Oral Diseases and Parodontology 3	Boris Gašpirc	15			45		60	120	4
6.	Orthodontics and Dentoafacial Orthopedics 2	Maja Ovsenik Martina Drevenšek	15	10		30	5	30	90	3
7.	Maxillofacial and Oral Surgery 3	Nataša Ihan Hren Andrej Kansky				90			90	3
8.	Elective 9							90	90	3
TOTAL			45	45		370	10	430	900	30
SHARE			5	5		41,11	1,11	47,77	100	

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.	Removable Prosthodontics 3	Milan Kuhar Peter Jevnikar		5		55		60	120	4
2.	Dental Diseases 3	Janja Jan		15		75		30	120	4
3.	Fixed Prosthodontics 3	Čedomir Oblak Igor Kopač		5		60		85	150	5
4.	Maxillofacial and Oral Surgery 3	Nataša Ihan Hren Andrej Kansky		15				105	120	4
5.	Oral Diseases and Periodontology 3	Boris Gašpirc	15			45		60	120	4
6.	Dental Implantology	Nataša Ihan Hren Čedomir Oblak Milan Kuhar Rok Gašperšič	15	5	5	5		60	90	3
7.	Geriatric Dentistry	Aleš Fidler Nataša Ihan Hren Rok Gašperšič Milan Kuhar Maja Šoštarčič	15	5		9		61	90	3
8.	Elective 10							90	90	3
TOTAL			45	50	5	249		551	900	30
SHARE			5	5,56	0,56	27,67		61,22	100	

## 10. Information on elective subjects

Legend:

\* – the subject is carried out in the winter semester; \*\* – the subject is carried out in the summer semester;

\*\*\* – the subject is carried out in the winter and summer semester

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.	Using Physics and Biophysics at Diagnostics and Treatment	Bojan Božič Jure Derganc	3	12				75	90	3
2.	Steroid Biochemistry	Tea Lanišnik Rižner	6	16			8	60	90	3
3.	Structure and Function of Proteins	Jure Stojan	4	10	6			70	90	3
4.	Basics of Genetic Technology and Molecular Medicine	Damjana Rozman	15	5			5	65	90	3
5.	Basics of Medical Cell Biology	Peter Veranič		15			15	60	90	3
6.	Health Care Services	Barbara Artnik	15	15	15			45	90	3
7.	E-learning Materials in Medicine	Janez Stare	8	34	8			40	90	3
8.	Health Informatics Practicum	Janez Stare	12	34	8			36	90	3
9.	Tissue Engineering in Research Studies and Regenerative Medicine	Mateja Erdani Kreft Peter Veranič	30	30	5		30	85	180	6
10.	Cell Biotechnology: Advanced Cell-Based Medicines	Robert Zorec	35	35	35			75	180	6
11.	Biocatalysis with Enzymology	Marko Goličnik	15	5				70	90	3
TOTAL			143	211	77		58	681	1170	39

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.	Clinically Applied Anatomy of the Head and Neck*	Erika Cvetko	2		13			75	90	3
2	Clinical Biochemical Aspects of Diseases and Teeth Structure**	Aljoša Bavec Janja Jan	15	15				60	90	3
3.	Basics of Genetic Technology and Molecular Medicine	Damjana Rozman	15	5			5	65	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			
4.	Biochemistry of Steroids	Tea Lanišnik Rižner	6	16			8	60	90	3
5.	Research in Biochemistry	Ana Plemenitaš		20				160	180	6
6.	Alternative Nutrition	Barbara Artnik	15	30				45	90	3
7.	Embryology	Danijel Petrovič	3	12				75	90	3
8.	Gene Technology Applications in Dental Medicine	Nataša Debeljak Petra Hudler	10	15			20	45	90	3
9.	Research in Dental Medicine***			20				160	180	6
10.	E-education and E-learning Materials in Medicine	Janez Stare	8	34	8			40	90	3
11.	Biochemistry and Molecular Biology of Teeth and Bones**	Aljoša Bavec Petra Hudler	3	42				45	90	3
12.	Practical Bioinformatic Approaches in Medicine	Petra Hudler	10	15				65	90	3
13.	Molecular Biology of Mind-Body Association	Metka Ravnik Glavač	4	26				60	90	3
14.	Tissue Engineering in Research Studies and Regenerative Medicine	Mateja Erdani Kreft Peter Veranič	30	30	5		30	85	180	6
15.	New Insights in Selected Metabolic Processes	Ana Plemenitaš Vita Dolžan Nataša Debeljak	4	44				42	90	3
TOTAL			125	324	26		63	1082	1620	54

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.	Research Elective – Physiology**	Martin Štrucl					75	105	180	6
2.	Modern Materials for Care in Aesthetic Dentistry**	Igor Kopač Aleš Fidler	5	15				70	90	3
3.	Oral Pharmacology**	Mojca Kržan Metoda Lipnik Štangelj Katarina Černe		45				45	90	3
4.	Motivational Techniques**	Marko Kolšek	3	4	10			73	90	3
5.	Research in Pharmacology – Selected Topics in Pharmacology	Metoda Lipnik Štangelj Mojca Kržan Katarina Černe			20		40	120	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			
6.	Prevention of Infection in Dentistry	Manica Mueller-Premru	10	5				75	90	3
7.	Pathophysiology – New Approaches, Enhancing and Integration**	Samo Ribarič	6		24			60	90	3
8.	Biomedicine Between Laboratories and Hospitalization**	Mara Bresjanac	6				24	60	90	3
9.	Pathology of Organic Systems	Metka Volavšek	30	15				45	90	3
10.	Hyperbaric Physiology and Medicine	Žarko Finderle	5	20	5			60	90	3
11.	Neurophysiology	Martin Štrucl	5	20				65	90	3
12.		Damjana Rozman	15	5			5	65	90	3
13.	Physiology – Electrocardiography (ECG)	Živa Melik	5	20	5			60	90	3
14.	Physiology of Sports	Helena Lenasi	5	20				65	90	3
15.	Physiology – Microcirculation	Ksenija Cankar	5	20				65	90	3
16.	Steroid Biochemistry	Tea Lanišnik Rižner	6	16			8	60	90	3
17.	Gene Technology Applications in Dental Medicine	Nataša Debeljak Petra Hudler	10	15			20	45	90	3
18.	Contemporary Informatics in Biomedicine 1**	Jenez Stare	8	30	12			40	90	3
19.	Tissue Engineering in Research Studies and Regenerative Medicine	Mateja Erdani Kreft Peter Veranič	30	30	5		30	85	180	6
20.	Research in Dental Medicine**			20				160	180	6
21.	Experimental Methods in Pharmacogenetics	Vita Dolžan	5	25	60			90	180	6
22.	Practical Bioinformatic Approaches in Medicine	Petra Hudler	10	15				65	90	3
23.	Research in Biochemistry	Ana Plemenitaš		20				160	180	6
24.	Pharmacogenetics in Medicine	Vita Dolžan	10	20	15			45	90	3
25.	Molecular Biology of Mind-Body Association	Metka Ravnik Glavač	4	26				60	90	3
26.	Cell Biotechnology: Advanced Cell-Based Medicines	Robert Zorec	35	35	35			75	180	6
TOTAL			218	441	191		202	1918	2970	99

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.	Research Elective – Physiology	Martin Štrucl					75	105	180	6
2.	Research in Pharmacology – Selected Topics in Pharmacology	Metoda Lipnik Štangelj Mojca Kržan Katarina Černe			20		40	120	180	6
3.	Pathology of Organic Systems	Metka Volavšek	30	15				45	90	3
4.	Biomedicine Between Laboratories and Hospitalization***	Mara Bresjanac	6				24	60	90	3
5.	Diagnostics in Endodontics and Conservative Dentistry	Janja Jan	3	31		12		44	90	3
6.	Research Elective – Dental Diseases	Janja Jan					75	105	180	6
7.	Elective Pathophysiology Subject: Students' Research Work for the Prešern's Award or Recognition***	Samo Ribarič Robert Zorec			30			150	180	6
8.	Hyperbaric Physiology and Medicine	Žarko Finderle	5	20	5			60	90	3
9.	Neurophysiology	Martin Štrucl	5	20				65	90	3
10.	Physiology – Electrocardiography (ECG)	Živa Melik	5	20	5			60	90	3
11.	Physiology of Sports	Helena Lenasi	5	20				65	90	3
12.	Physiology – Microcirculation	Ksenija Cankar	5	20				65	90	3
13.	Disaster Medicine***	Radko Komadina	30	30				30	90	3
14.	Steroid Biochemistry	Tea Lanišnik Rižner	6	16			8	60	90	3
15.	Research in Pathology	Nina Zidar		10	30	40		100	180	6
16.	Gene Technology Applications in Dental Medicine	Nataša Debeljak Petra Hudler	10	15			20	45	90	3
17.	Functional Genomics in Medicine	Damjana Rozman	10	10	10			60	90	3
18.	Contemporary Informatics in Biomedicine 1**	Janez Stare	8	30	12			40	90	3
19.	Research in Dental Medicine***			20				160	180	6
20.	Basics of Genetic Technology and Molecular Medicine	Damjana Rozman	15	5			5	65	90	3
21.	Experimental Methods in Pharmacogenetics	Vita Dolžan	5	25	60			90	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			
22.	Practical Bioinformatic Approaches in Medicine	Petra Hudler	10	15				65	90	3
23.	Research in Biochemistry	Ana Plemenitaš		20				160	180	6
24.	Pharmacogenetics in Medicine	Vita Dolžan	10	20	15			45	90	3
25.	Molecular Biology of Mind-Body Association	Metka Ravnik Glavač	4	26				60	90	3
26.	Cell Biotechnology: Advanced Cell-Based Medicines	Mateja Erdani Kreft Peter Veranič	30	30	5		30	85	180	6
27.	Clinical Nutrition 1	Nada Rotovnik Kozjek	10	10		5	20	45	90	3
TOTAL			212	428	192	57	297	2054	3240	108

Elective subjects in 5 <sup>th</sup> year of study										
Seq. No.	Subject	Lecturer	Contact hours					SIW	Total hours	ECTS credits
			L	S	PPC	CPC	OFS			
1.	Research Elective – Physiology	Martin Štrucl					75	105	180	6
2.	Research in Pharmacology – Selected Topics in Pharmacology	Metoda Lipnik Štangelj Mojca Kržan Katarina Černe			20		40	120	180	6
3.	Biomedicine Between Laboratories and Hospitalization***	Mara Bresjanac	6				24	60	90	3
4.	Research Elective – Dental Diseases	Janja Jan					75	105	180	6
5.	Interceptive Orthodontic Treatment in Children Dentistry**	Maja Ovsenik Alenka Pavlič	5	10		15	60	0	90	3
6.	Elective Pathophysiology Subject: Students' Research Work for the Prešern's Award or Recognition***	Samo Ribarič Zoran Grubič			30			150	180	6
7.	Environment and Health – Nutrition in Different Age Periods and Oral Health**	Barbara Artnik	15	30				45	90	3
8.	Modern Clinical Methods in Endodonty	Janja Jan	6	21	18			45	90	3
9.	Research Elective – Maxillofacial Surgery	Nataša Ihan Hren					75	105	180	6

Elective subjects in 5 <sup>th</sup> year of study										
Seq. No.	Subject	Lecturer	Contact hours					SIW	Total hours	ECTS credits
			L	S	PPC	CPC	OFS			
10.	Clinical Treatment of Oromaxillofacial Patients	Nataša Ihan Hren					35	55	90	3
11.	Research Elective – Jaw and Teeth Orthopaedics	Maja Ovsenik					75	105	180	6
12.	Research Elective – Prosthetics	Milan Kuhar Igor Kopač					75	105	180	6
13.	Research Elective – ORL	Irena Hočevnar Boltežar	2		10		5	56	90	3
14.	Research Elective – Children and Preventive Dentistry	Alenka Pavlič					60	120	180	6
15.	Hyperbaric Physiology and Medicine	Žarko Finderle	5	20	5			60	90	3
16.	Neurophysiology	Martin Štrucl	5	20				65	90	3
17.	Physiology – Electrocardiography (ECG)	Živa Melik	5	20	5			60	90	3
18.	Physiology of Sports	Helena Lenasi	5	20				65	90	3
19.	Physiology – Microcirculation	Ksenija Cankar	5	20				65	90	3
20.	Disaster medicine***	Radko Komadina	30	30				30	90	3
21.	Steroid Biochemistry	Tea Lanišnik Rižner	6	16			8	60	90	3
22.	Research in Pathology	Nina Zidar		10	30	40		100	180	6
23.	Gene Technology Applications in Dental Medicine	Nataša Debeljak Petra Hudler	10	15			20	45	90	3
24.	Functional Genomics in Medicine	Damjana Rozman	10	10	10			60	90	3
25.	Contemporary Informatics in Biomedicine 2*	Janez Stare	6	32	12			40	90	3
26.	Research in Dental Medicine***			20				160	180	6
27.	Basics of Genetic Technology and Molecular Medicine	Damjana Rozman	15	5			5	65	90	3
28.	Gynaecology and Obstetrics	Ksenija Geršak		18		16		56	90	3
29.	Experimental Methods in Pharmacogenetics	Vita Dolžan	5	25	60			90	180	6
30.	Practical Bioinformatic Approaches in Medicine	Petra Hudler	10	15				65	90	3
31.	Research in Biochemistry	Ana Plemenitaš		20				160	180	6
32.	Pharmacogenetics in Medicine	Vita Dolžan	10	20	15			45	90	3

Elective subjects in 5 <sup>th</sup> year of study										
Seq. No.	Subject	Lecturer	Contact hours					SIW	Total hours	ECTS credits
			L	S	PPC	CPC	OFS			
33.	Molecular Biology of Mind-Body Association	Metka Ravnik Glavač	4	26				60	90	3
34.	Cell Biotechnology: Advanced Cell-Based Medicines	Mateja Erdani Kreft Peter Veranič	30	30	5		30	85	180	6
35.	Clinical Nutrition 1	Nada Rotovnik Kozjek	10	10		5	20	45	90	3
36.	Clinical Nutrition 2	Nada Rotovnik Kozjek	10	10		5	20	45	90	3
TOTAL			215	473	220	81	702	2702	4410	147

Elective subjects in 6 <sup>th</sup> year of study										
Seq. No.	Subject	Lecturer	Contact hours					SIW	Total hours	ECTS credits
			L	S	PPC	CPC	OFS			
1.	Research Elective – Physiology	Martin Štrucl					75	105	180	6
2.	Research in Pharmacology – Selected Topics in Pharmacology	Metoda Lipnik Štangelj Mojca Kržan Katarina Černe			20		40	120	180	6
3.	Biomedicine Between Laboratories and Hospitalization***	Mara Bresjanac	6				24	60	90	3
4.	Research Elective – Dental Diseases	Janja Jan					75	105	180	6
5.	Elective Pathophysiology Subject: Students' Research Work for the Prešern's Award or Recognition***	Samo Ribarič Zoran Grubič			30			150	180	6
6.	Research Elective – Maxillofacial Surgery 5,6	Nataša Ihan Hren					75	105	180	6
7.	Research Elective – Jaw and Teeth Orthopaedics	Maja Ovsenik					75	105	180	6
8.	Research Elective – Prosthetics	Milan Kuhar Igor Kopač					75	105	180	6
9.	Research Elective – ORL	Irena Hočevnar Boltežar	2			10	5	56	90	3
10.	Research Elective – Children and Preventive Dentistry 5	Alenka Pavlič					60	120	180	6
11.	Basics of Management in Health Care	Lijana Zaletel Kragelj Ivan Eržen	10		35			45	90	3
12.	Orthodontic – Surgical Treatment of Orthognathic Patients	Maja Ovsenik Nataša Ihan Hren					35	55	90	3

Elective subjects in 6 <sup>th</sup> year of study										
Seq. No.	Subject	Lecturer	Contact hours					SIW	Total hours	ECTS credits
			L	S	PPC	CPC	OFS			
13.	Combined Prosthetic Care of Patients	Igor Kopač Milan Kuhar	5	40				45	90	3
14.	Hyperbaric Physiology and Medicine	Žarko Finderle	5	20	5			60	90	3
15.	Neurophysiology	Martin Štrucl	5	20				65	90	3
16.	Physiology – Electrocardiography (ECG)	Živa Melik	5	20	5			60	90	3
17.	Physiology of Sports	Helena Lenasi	5	20				65	90	3
18.	Physiology – Microcirculation	Ksenija Cankar	5	20				65	90	3
19.	Disaster medicine***	Radko Komadina	30	30				30	90	3
20.	Steroid Biochemistry	Tea Lanišnik Rižner	6	16			8	60	90	3
21.	Research in Pathology	Nina Zidar		10	30	40		100	180	6
22.	Gene Technology Applications in Dental Medicine	Nataša Debeljak Petra Hudler	10	15			20	45	90	3
23.	Functional Genomics in Medicine	Damjana Rozman	10	10	10			60	90	3
24.	Contemporary Informatics in Biomedicine 2*	Janez Stare	6	32	12			40	90	3
25.	Research in Dental Medicine***			20				160	180	6
26.	Basics of Genetic Technology and Molecular Medicine	Damjana Rozman	15	5			5	65	90	3
27.	Gynaecology and Obstetrics	Ksenija Geršak		18		16		56	90	3
28.	Experimental Methods in Pharmacogenetics	Vita Dolžan	5	25	60			90	180	6
29.	Practical Bioinformatic Approaches in Medicine	Petra Hudler	10	15				65	90	3
30.	Research in Biochemistry	Ana Plemenitaš		20				160	180	6
31.	Pharmacogenetics in Medicine	Vita Dolžan	10	20	15			45	90	3
32.	Molecular Biology of Mind-Body Association	Metka Ravnik Glavač	4	26				60	90	3
33.	Clinical Nutrition 1	Nada Rotovnik Kozjek	10	10		5	20	45	90	3
34.	Clinical Nutrition 2	Nada Rotovnik Kozjek	10	10		5	20	45	90	3
TOTAL			174	422	222	76	612	2617	4140	138

## 11. Presentation of individual subjects

### Anatomy 1 (14 ECTS)

#### Aims

Anatomy is a basic medical subject. Due to international conventions the student has to learn Latin terminology and use it in theory and practice. The content and terminology of the subject are thematically divided into 4 parts (2 in each semester of the 1<sup>st</sup> year of study), which are attached to each other.

#### Contents

At this subject, Latin terminology will be used (in accordance with international conventions), beside that the student will have to learn existing Slovene terms. 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.

### Biophysics (7 ECTS)

#### Aims

The student will get acquainted with the physical picture of the world in detail. The emphasis is on those physical principles that are important in the formation of biological structures and 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 diagnosis, and the physical phenomena which some methods of treatment are based on. He will get to know the basics of certain devices used in dental practice. The student will get used to quantitative treatment of physical and other phenomena. He will get acquainted with a scientific, analytically-synthetic method of thinking.

#### Contents

Mechanics. Using the laws of mechanics at analysing the locomotor system of a human. Pressure, buoyancy, compressibility, barometric equations, surface tension and capillary phenomena. Bernoulli's equation, the working heart. The flow of viscous fluid through a thin tube. Elastic properties of solid bodies and tissues.

Oscillations.

Heat and thermodynamics. Equilibrium and non-equilibrium thermodynamics. The first and second laws of thermodynamics. Entropy. Bioenergetics. Thermodynamic potentials. Chemical potential. Solubility. Humidity. Osmotic pressure. Donnan's equilibrium. Transport of matter and energy. Permeability of membranes.

Electricity and Magnetism. Electrical and magnetic properties of matter. Bioelectric potentials. Electric current. Conduction of an electrical charge along a cable and nerve.

The structure of matter. Atoms, molecules, crystals. Intermolecular forces, the structure of water, hydration. Hydrophobic force. The structure of biological macromolecules and membranes.

Fluctuation and sound. The ear. Ultrasound. Electromagnetic fluctuation and optics. Measurement devices for light, the eye. Absorption of light. Light scattering and fluorescence. X-rays.

The atomic nucleus and nuclear energy. Isotopes. Radioactivity. Fission and fusion of nuclei. Sources of high-energy ionizing radiation. High energy particle crossing through matter and dosimetry.

Regulation in biological systems.

## Cell Biology (9 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, and will understand the principles and role of cell death, which is required knowledge for understanding cellular basics of disease processes. He will get familiar with cell – chromosomal basics of hereditary disease transmission in classic Mendel genetics.

### Contents

Biological membranes, membrane transport principles – connection of different transport systems, intercellular junctions, cell polarity, intercellular communication and transmission of information.

Cytoskeleton and cell motion; microtubules, actin and intermediate filaments. Abnormal cytoskeleton structure and function underlie a variety of pathologic states.

Biosynthetic secretory pathways and endomembrane systems; endoplasmic reticulum, Golgi apparatus, vesicles and transport, lysosomes and degradation of macromolecules, exocytosis and exocytotic pathways.

Endocytotic pathways; endosomes and different pathways of macromolecules in the cell. Normal and abnormal course of exocytosis and endocytosis. Energy-converting organelles; the mitochondria as a semi-autonomous organelles.

The nucleus as a carrier of the genome, interphase nucleus, nucleolus, chromatin and levels of chromatin condensation, chromosomes, chromosomal and genomic mutations.

Cell division; mitosis, meiosis and genetic recombination.

Cell cycle; phases and control points, mechanisms of regulation.

Balance between cell proliferation and cell death; apoptosis and necrosis.

Cellular basics of Mendelian genetics and different types of inheritance: autosomal inheritance – dominant and recessive, sex-linked inheritance – X-linked (dominant and recessive) and Y-linked inheritance. Mitochondrial, polygenic and multi-factor inheritance. Genetic polymorphism and essentials of immunogenetics.

Primordial germ cells, spermatogenesis and oogenesis. Cellular and molecular basics of fertilization, sex determination. Early stages of embryonic development; blastulation and gastrulation. The genetic basis of establishment of body axes.

## Communication (4 ECTS)

### Aims

To teach the student the basics of medical psychology, to teach him basic rules of communication with a healthy human being and a patient, to get him to know how to communicate in a group, to understand the importance of mutual relations between a patient and a doctor.

### Contents

The subject consists of lectures on the theoretical foundations of communication and of practical course in the class-room, where students will gain basic practical guidance for fieldwork and will train to communicate with role-playing exercises. Practical fieldwork which will be held in health and social care institutions (e.g. retirement homes, institutes for rehabilitation of persons with disabilities). During and after the practical work the students will share their experiences with other students and supervisors at seminars or at individual consultations. The following areas of communication will be discussed in lectures: an interview with the patient; how to communicate better; leading the conversation; open/closed questions; silent communication; communication and the relationship between patient and doctor; communication with a child and with an adolescent; communication in a team; communicating with a family; communication between the team and family members; the relationship between a doctor, patient and relatives; role playing with recording and analysis of the recordings. In small groups the students will practice communication skills with each other on the basis of prepared examples. Students will act as a patient, doctor and observer. After the role-play, there will be a discussion which will be followed by an analysis of communication. The students will perform

fieldwork in pairs, so that one student will lead the conversation with a patient or resident of the retirement home, while the other will observe their communication. It is planned that students will, after the first part of fieldwork, practice fieldwork again, and repeat the exercises after discussion, which will be moderated by a supervisor.

## Introduction to Medicine (5 ECTS)

### Aims

The student will get to know basic ethical principles in medicine, including modern deontological guidelines, 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 into the doctor'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 doctors 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 doctors abroad, of some foreign doctors 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.

## Concepts in Biochemistry (12 ECTS)

### Aims

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

### Contents

Introduction: Biochemistry, the molecular basis of life; the structure of atoms, chemical bonds, intermolecular forces.

Water: Structure, properties, H-bonds, hydrophobic interactions, water as a solvent, water as a reagent.

Solutions: Gas solutions (Henry's law), colligative properties of solutions (Raoult's law, freezing point

depression, boiling point elevation, osmotic pressure), osmotic events in a cell (tonicity, Donnan's equilibrium, passive transport, Fick's law).

pH: Ionization of water,  $K_w$ , pH, weak and strong electrolytes, acids and basic substances (titration curves,  $K_a$ ,  $K_b$ ,  $pK_a$ ,  $pK_b$ ), buffers (Henderson-Hasselbalch's equation), buffer systems in human organisms, biological significance of pH.

Thermodynamics: Laws of thermodynamics, thermodynamic functions, the standard state, chemical potential, spontaneous and nonspontaneous processes.

Chemical equilibrium: Chemical, kinetic and thermodynamic aspects of chemical equilibrium, the influence of concentration, pH and temperature on chemical equilibrium; solubility product; coupled reactions, the role of TP in coupled processes, active transport.

Oxidoreduction: Definitions, quantitative characterization of redox reactions (Nernst equation); redox potential and reaction free enthalpy; photosynthesis and respiration as a model of a redox system in a cell.

Velocity of chemical reactions: Definitions, order and molecularity of reactions; theories about the velocity of chemical reactions (Arrhenius theory, collision theory, theory of activated complexes); the velocity of chemical reactions and the equilibrium (the energy profile of reactions); the impact of concentration, pH, ionic power and temperature on reaction speed; catalysis.

Molecular basis of life: Biologically important elements, ions and biomolecules.

Carbon atom: Electronic configuration, resonance, steric properties. Chemical bonds between carbon atoms and between carbon and other elements.

Organic biomolecules: Isomerism; the mutual influence of functional groups (inductive and resonant effects); a brief overview of organic compounds by functional groups and biochemical importance.

Carbohydrates: Chemistry of sugars; monosaccharides, disaccharides, polysaccharides – homoglycans and heteroglycans; enzymatic degradation of glycosidic bonds; detoxification of organic compounds in an organism; simple and complex polysaccharides; glycoproteins; bacterial cell walls; cell surface – membrane characteristics; blood groups.

Lipids: Simple and complex; fatty acids, triacylglycerols, sphingolipids, lipoproteins, liposomes; biological membranes – structure and function; prostaglandins and terpenes.

Steroids: General characteristics, classification, chemistry of steroids, steroids isomerism; sterols, bile acids; steroid hormones – classification, structure and properties; the basis of functioning of hormones at the molecular level.

Nucleotides: Purine and pyrimidine bases, nucleosides and nucleotides – structure and nomenclature; nucleotides and their role in the transfer of energy; cyclic nucleotides as second messengers, nucleotides as building blocks of nucleic acids.

Nucleic acids: Nucleic acid types, structure and biological role; the definition and structural properties of the gene; basics of replication, transcription and translation; mutations; the structure of the human genome, the human genome project, genomics, proteomics, understanding the causes and consequences of genetic diseases/defects at the molecular level.

Vitamins: Classification of vitamins; water soluble vitamins (vitamins thiamine, riboflavin, nicotinic acid, folic acid, vitamin C, cobalamin – the structure and biological role), coenzymes and prosthetic groups; lipid-soluble vitamins (vitamins A, D, E, K – the structure and biological role).

Amino acids: Structure, properties, and nomenclature; isoelectric and isoionic points; the analysis of amino acids. Peptides: biologically active peptides; biogenic amines, the structural basis of peptide hormones and biogenic amines functioning.

Proteins: General structure and properties; division by function (enzymes, transport, storage, contractile, structural, defensive and regulatory proteins); division by structure (fibrillar and globular proteins). The structure of proteins: primary structure – sequence; secondary structure ( $\alpha$ -helix,  $\beta$ -structure); tertiary and quaternary structure; self-assembly of proteins; conformation and conformational change. Fibrillar proteins:  $\alpha$ -keratin, collagen and elastin – the structure and function. Monomeric and oligomeric structure of proteins: myoglobin and hemoglobin. Contractile proteins: muscle contractile proteins (myosin, actin, troponin and tropomyosin); contraction of striated and smooth muscles; non-muscular contractile proteins (kinesin and dynein). Membrane proteins: erythrocyte membrane proteins (glycophorin, spectrin, anion transport protein);  $K^+$ /  $Na^+$ -ATPase; G-proteins (the structure and role in the functioning of hormones); insulin receptors; rhodopsin (sight cycle).



Enzymes: General characteristics; enzyme kinetics (Michaelis-Menten's kinetics, multi-substrate kinetics, cooperativeness, inhibition and activation); mechanisms of enzymatic reactions; regulation of enzyme activity (allosteric modulation, covalent modification (glycogen phosphorylase), regulation by proteolytic enzymes (trypsin)); classification and nomenclature of enzymes. Other proteins: apoproteins of plasma lipoproteins; immunoglobulins (the structure and molecular basics of the immune response).  
Conclusion: Functional links – from biomolecules to complex cellular structures.

## Emergency Medical Care 1 (3 ECTS)

### Aims

The student will learn basic cardiopulmonary resuscitation (CPR) approaches and first aid in all situations which endanger life or impair health. He will get to know first aid tools.

### Contents

Medical first aid (legal and ethical aspects, mechanisms of injuring), loss of consciousness, approach to the injured or suddenly sick person, restoring breathing, restoring blood circulation (use of automated external defibrillation – AED), video records (emergency medical care), rescue methods – sequence of operations, bleeding, methods of transportation, immobilization, first aid in acute poisonings.

## Anatomy 2 (5 ECTS)

### Aims

At this subject, Latin terminology will be used (in accordance with international conventions), beside that the student will have to learn existing Slovene terms.

Anatomy will be approached from a functional perspective, with particular emphasis on the clinical anatomy of the adult. Clinically important aspects of child and adolescent anatomy will also be discussed. The student will become familiar with the structures of the head and neck, which are relevant for his later clinical part of study, the establishment of clinical diagnosis and treatment. He will get acquainted with the structure of head cavities, especially those related to the previous study of the digestive and respiratory system. In the field of neuroanatomy, the student will acquire basic knowledge of the structure and elementary functions of the central and peripheral nervous system, of meninges, pertinent blood vessels and sense organs.

### Contents

Head and neck: The skull. Topographical divisions of head and neck. Lateral triangle of the neck. Submandibular triangle and the floor of mouth. Carotid triangle. Retromandibular fossa. Infratemporal fossa. The nasal cavity. The oral cavity. Pharynx. Larynx. Vasculature and lymph nodes of head and neck.

Central nervous system (CNS): Brain stem and brain nerves. Autonomic nervous system and parasympathetic ganglia in the head. Principles of the CNS organization. The spinal cord and spinal nerves. Sympathetic nervous system. Cerebrum. Cerebellum. Pathways of general somatic sensibility. Brain stem motor pathways. Basal ganglia. Cerebrospinal fluid spaces. The meninges and blood vessels in the cranial cavity and in the spinal channel. Auditory system. Visual system.

Elective courses: Selected chapters of radiological anatomy, selected chapters of neuroanatomy, dissections of the thorax and the abdomen.

## Medical Biochemistry and Molecular Genetics (9 ECTS)

### Aims

The student will get to know the basics of life processes and their regulation on the molecular level. The subject's goal is to provide students with knowledge of basic biochemical processes that allow living organisms to function normally, maintaining optimal concentration of cell compounds and of body fluids, and with knowledge of the processes involved in growth and reproduction.

## Contents

General introduction: General importance of biochemistry for diagnosis and treatment of diseases, general information on the intermediary metabolism, general information about the regulation of metabolic pathways, oxidative processes in a cell in conjunction with acquiring energy.

Carbohydrates: Digestion of carbohydrates, degradation and biosynthesis of carbohydrates, regulation of carbohydrate metabolism, diseases associated with dysfunctional carbohydrate metabolism.

Lipids: Digestion of lipids, cellular degradation and biosynthesis of simple and complex lipids, metabolism of cholesterol and bile acids, lipoprotein metabolism, metabolism of eicosanoids, regulation of lipid metabolism, diseases associated with dysfunctional lipid metabolism.

Amino acids: Digestion of proteins, intracellular protein degradation, degradation of amino acids, biosynthesis of unsaturated amino acids, regulation of amino acid turnover, amino acids as starting compounds in the biosynthetic processes, diseases associated with dysfunctional metabolism of amino acids.

Nucleotides: Biosynthesis and degradation of nucleotides, regulation of nucleotide metabolism, diseases associated with dysfunctional metabolism of nucleotides.

Nucleic acids: The structure and properties of DNA, replication and DNA repair, biosynthesis of RNA, co- and post-transcriptional modifications, regulation of biosynthesis of RNA, degradation of nucleic acids, genetic code, genetic diseases.

Proteins: Protein biosynthesis, post-translational modifications, regulation of velocity of protein biosynthesis, biosynthesis of some selected proteins.

Basics of genetic engineering: Recombinant DNA technology, DNA sequencing, using recombinant DNA technology in dental medicine.

Hormones: Biosynthesis of hormones, release of hormones, degradation of hormones, mechanisms of hormone functioning, cell signaling, the role of hormones in the regulation of metabolic processes, the role of hormones in homeostasis.

Biochemistry of the oral cavity: The structure, properties and role of saliva. The composition of hard dental tissues. The process of biomineralization. Molecular biology of hard dental tissues. Origin and significance of pellicle. Metabolic activities of oral bacteria. Biochemical aspects of caries. Prevention of caries. The composition and properties of dental tissues. Biochemical processes in parodontal tissues.

## Physiology (15 ECTS)

### Aims

The student will learn about the function of a normal organism. He will master fundamental concepts in physiology. He will get to know the principles of physiology phenomena measurements and will be, in accordance with concepts, getting used to interpreting the results of measurements. Lessons in physiology will be based on the knowledge gained from the lessons of biophysics, biochemistry, biology and normal morphology. The ability to independently solve problems and critical thinking will be developed. The habit of self-education will be encouraged.

### Contents

Physiological principles: Physiology as science, homeostasis. Transport phenomena in the body and across the cell membranes. System analysis and regulation in biological systems. Membrane potential. Electrical communication (localized and propagating potentials). Skeletal muscle. Smooth muscle.

Blood circulation and the heart: General description, division, cardiac cycle. Electrical activity of the heart. Heart muscle cell, heart energetics. Monitoring of the cardiac function. Hemodynamics. Arteries and veins. Microcirculation (capillary exchange, regulation). Regulation of cardiac output. Regulation of arterial pressure.

Respiration: Structure – function relationship of the respiratory system. Ventilation. Mechanics of breathing. Diffusion in lungs. Pulmonary blood flow. Blood transport of gases. Ventilation, diffusion, perfusion matching. Regulation of breathing.

Kidneys and the traffic of electrolytes in the body: Structure – function relationship. Glomerular filtration and renal blood flow. Renal function tests, renal clearance. Transtubular transport of matter. Countercurrent multiplier system. Transport of water in the body, osmolality control. Transport of sodium and water in the body.

Transport of potassium in the body. Acid-base physiology – buffers and Davenport's diagram. Physiology of acid-base balance – kidneys and the regulation of pH in the body.

Digestion: Gastric and intestinal wall structure and its impact on the digestive functions, neural and hormonal control of the digestive tract, characteristic motor activity of the digestive tract, secretion of saliva, gastric secretion, exocrine pancreas, secretion and the role of bile, absorption of nutrients in the gastrointestinal tract.

Endocrine system: Principles of endocrine functions, control of hormone secretion, major classes of hormones and their actions, nervous system – endocrine system interactions, hormones of adeno- and neurohypophysis, thyroid and adrenal glands, homeostasis of calcium and phosphate, sex hormones, pregnancy and childbirth.

Metabolism: Transformations of matter and energy in the body, the metabolism in different physiological states of the organism, regulation of blood glucose concentration, basal metabolism, regulation of body temperature.

Nervous system: General properties and functions of the nervous system, organization of the nervous system, homeostasis of the nervous functions, synaptic transmission, general properties of the sensory systems, somatosensory system, the physiology of pain, optics of vision, photoreception, neurophysiology of vision, psychophysics of vision, conduction of sound to the inner ear and sound transduction, psychophysics of hearing, vestibular apparatus, smell and taste, the general scheme of the motor system, motor role of the spinal cord, motor role of the brain stem, cortical control of movement, motor functions of the cerebellum and basal ganglia, control of eye movements, the role of the vegetative nervous system, integrative functions of the brain stem, nerve control of instinctive behaviors, speech control.

## Histology and Embryology (8 ECTS)

### Aims

The student will be acquainted with basic (pre-clinical) and clinical characteristics of histology and embryology. Histology and embryology will be discussed from a functional perspective, with particular emphasis on normal histology, normal development and anomalies in development. In seminar class-rooms and at electives the student will deepen his knowledge in important areas of functional histology, human evolution and teratology. At practical course he will get familiar with microscopy, the histological structure of tissues and organs and the histological peculiarities of embryonic development in early stages. At this subject, Latin terminology will be used (in accordance with international conventions), beside that the student will have to learn existing Slovene terms.

### Contents

Histology: Connective tissue. Cells of the connective tissue. Ground substance and fibres. Embryonic connective tissue (mesenchyma), jelly-like ground substance, loose and dense connective tissue. Cartilage. Adipose tissue. White and brown adipose tissue. Osseous tissue. Types of ossification. Muscle tissue. Histophysiology of muscle contraction. The peripheral and central nervous system. Neurons, neuroglia. Peripheral nerves, ganglia. Spinal cord. Cerebellum. Brain stem. Cerebrum. Synapses. Nerve endings. Epithelia. Classification of epithelia. Glandular epithelium. Skin – structure and functional histology. Hair, nails, skin glands. Mammary gland. Endocrine glands and functional histology of several glands. Thyroid. Parathyroids. Adrenal glands. The pituitary gland. The pineal gland. The diffuse endocrine system. Paraganglia. Blood and functional histology of blood cells. Hematopoiesis and stages of hematopoiesis. The lymphatic system. Lymph nodes. The spleen. Thymus. Tonsils. Circulatory system. Arteries. Veins. Lymphatic vessels. The heart. The digestive system. The digestive tube. The liver. The pancreas. The respiratory system and the respiratory pathway. The lungs. Urinary system. The kidney. Ureter, urinary bladder, urethra. Male genitals. Testicles. Seminal accessory glands and excretory ducts. The penis. Female genitals. Ovaries. Fallopian tubes. The uterus. The vagina. The organs of senses. The eye. The ear.

Embryology: The embryo. The fetus. Development of the cardiovascular system. Development of the urogenital system. Development of the nervous system. Development of branchial organs. Development of the digestive tract. Development of the eye. The placenta. Teratology. Teratogenic substances.

## Oral Biology (8 ECTS)

### Aims

The principal aims of the study of oral biology are the knowledge and understanding of the biological basics of normal and pathological processes in oral cavity. The student will get acquainted with oral biology as scientific support for quality improvements in patient care.

I. The student will get to know the anatomy and histological structure of permanent and deciduous teeth and the fundamentals of occlusion, to know and understand concepts and terminology of anatomy and histology of teeth, to know basic facts and concepts about anatomy and histology of the dental organ and to know how to use them in clinical subjects.

II. The student will get to know the basics of facial development, development of the palate and of teeth, development of the parts of dental organ in detail. He will get qualified to use the knowledge in clinical subjects. He will get familiar with the mechanism of teeth growing and replacement of deciduous teeth with permanent teeth.

III. The student will get to know biological and biochemical events in the oral cavity on the molecular level.

### Contents

Anatomy of permanent and deciduous teeth. Fundamentals of occlusion, articulation and chewing. Histology of tooth organ (enamel, dentine, dental pulp, cement, periodontium, bone, gingiva). Development of the oral cavity and of the dental organ (early tooth development, the development of dentin, enamel, root, dental cement, periodontium, alveolar process, parodontal ligament, gingiva, tooth pulp). Tooth eruption, regeneration and reparation of dental hard tissues. Biology and biochemistry of saliva, dental hard tissues, parodontal tissues. Particular aspects of molecular biology in dental medicine.

## Health and the Environment (5 ECTS)

### Aims

Two most important aims are to understand the concept of the health determinant and to recognize the effect of health determinants on human health. The student will become acquainted with the importance of a healthy natural and social environment for the health of an individual and of the population, he will recognize the importance of a rational and ethical health care system for individual and population health. The student will learn about the organization of work in general dental clinic, in specialized dental clinic and in dental laboratory.

### Contents

Health and the environment. Interactions between humans and the environment (historical and contemporary perspectives), basic requirements for a healthy environment, obstacles and opportunities for solving environmental problems, the connection between common and work environments.

Risk factors in the natural environment. Biological, physical, chemical and biomechanical factors and their impact on human health. Basic conditions for a healthy environment: air, water, nutrition.

Health and social environment. Socio-economic factors. Education and literacy, employment and income, social status. Social values and beliefs. Cultural characteristics, religion, gender as a social factor, contemporary social values. Social networking and social exclusion.

Health inequalities. Behaviors, risky for health. Stress. Health care.

## Basics of Biostatistics (4 ECTS)

### Aims

To know the purpose and types of statistical methods; to understand the basics of statistical reasoning; to be able to properly reflect the massive data and results of statistical analyses; to be able to properly interpret the results of statistical analyses; to be able to adequately plan the collection of empirical data and choose appropriate methods of statistical analyses for them, to be able to understand and critically evaluate the statistical analyses described in professional and scientific literature.

### Contents

Basic statistical concepts. Fundamentals of probability: normal and binominal distribution, the principles and methods of data presentation, basics of parameter evaluation and statistical hypothesis testing, confidence intervals, univariate analysis of numerical variables, univariate analysis of descriptive variables, linear regression and correlation, non-parametric statistical methods, experiment design and introduction to the analysis of variance, basics of survival analysis.

## General Pharmacology and Toxicology (3 ECTS)

### Aims

The student 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.

### Contents

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 student will get acquainted with the action and the effects of xenobiotics on the organism.

The acquired knowledge will represent an upgrade of the knowledge of physiological and pathological processes on which therapeutic drugs have an effect.

## Special Pharmacology and Toxicology (3 ECTS)

### Aims

Special pharmacology: Review of classes of drugs according to their pharmacodynamic profile.

### Contents

The student will get to know and to understand the mechanisms of action, the effects and pharmacokinetic properties of drugs of different pharmacodynamics groups. The student will acquire knowledge about indication fields and contraindications

while taking certain medications. He will gain the ability to predict unwanted effects of medications and will get familiar with measures in poisoning with drugs. He will also get to know rational drug combinations.

## Microbiology, Immunology and Oral Microbiology (7 ECTS)

### Aims

The student will become familiar with the basic characteristics of micro-organisms that cause the most common infections in humans. He will acquire knowledge about basic immunology. In seminar class-rooms he will deepen his knowledge in individual areas which are particularly important for work in dental medicine. At practical course he will get familiar with basic microbiological techniques and methods, with the importance and the duration of the most common microbiological examinations.

The student deals with materials that are especially important for the clinical work in dental medicine and are related to microbiology and immunology. At autonomous work in small groups and preparations of materials the student learns to find connections to practical work, to explain and to evaluate laboratory reports and research achievements, connected to clinical picture of individual cases.

### Contents

Structure of a bacterial cell. Bacterial metabolism, growth and reproduction. Bacterial genetics. Classification and nomenclature of bacteria. The normal bacterial flora. Pathogenesis of bacterial infections. Diagnosis of bacterial infections.

Sterilization and disinfection, with an emphasis on specialties in dental medicine. Mechanisms of action of antibiotics and chemotherapeutics. Mechanisms of bacterial resistance against antibiotics. The problem of bacterial resistance spreading.

Characteristics of pathogenic fungi. Fungi that cause infections of the skin and subcutaneous tissue. Opportunistic fungi. Fungi that cause systemic infections.

General characteristics of viruses. Reproduction of viruses. Viral genetics and the origin of viruses. Direct and indirect detection of viruses. Pathogenesis of viral infections. Viral oncogenesis. Natural antiviral resistance and antiviral immune response. Prions.

The most common causative agents of respiratory infections and the basics of their laboratory diagnosis. The most common causative agents of bacteremia and sepsis and the basics of their laboratory diagnosis. The most common causative agents of the central nervous system infections and the basics of their laboratory diagnosis. The most common causative agents of gastrointestinal tract infection and the basics of their laboratory diagnosis. The most common causative agents of urinary tract infection and the basics of their laboratory diagnosis. The most common causative agents of sexually transmitted infections and the basics of their laboratory diagnosis. The most common causative agents of infections of skin, subcutaneous tissue, muscle, joint and bone and the basics of their laboratory diagnosis. The most important causative agents of zoonoses and basics of their laboratory diagnostics. The most common causative agents of infections in immunocompromised patients and the basics of their laboratory diagnosis.

Natural resistance. The immune system. Antigens. Antibodies. Hypersensitivity. Autoimmunity. T-cell receptor and MHC molecules. Activation of lymphocytes, tolerance. Regulation of the immune response. The immune response in microbial infections. Infections due to reduced resistance. Immunosuppression. Vaccines and routine vaccination programs.

Immune response and inflammation of the oral mucosa. Normal oral flora. Microbes in parodontal tissues. Microbiology and immunology of parodontal diseases. Biofilm and caries. Causative agents of dental pulp and periapical tissue infection. Causative agents of acute odontogenic inflammation. Causative agents of peri-implantitis. Causative agents of osteomyelitis of odontogenic origin. Removal of microorganisms in the appliances and in the environment. Pathways of microbe transfer in dental clinic. Prevention of the spread of infectious agent from the patient to the therapist. Vaccination of dental staff. Oral cavity infections due to compromised immunity.

## Methods of Public Health (3 ECTS)

### Aims

To understand the importance of studying the health of the population as a whole: in general and as the basis for public health approaches and control of public health problems.

The student will learn basic methods for studying public health and will understand the importance of public health study. He will become acquainted with the epidemiological methods for study of public health, with specific methods for study of environmental health.

### Contents

1<sup>st</sup> part. Epidemiological methods: Measurement of phenomena in epidemiology, measurement and measures of frequency of epidemiological phenomena, prevalence measures, incidence measures, measures of connections between phenomena, measures of potential influence of phenomena on human health.

Epidemiological research: Ecological research, cross-sectional research, case studies with controls, cohort research, experimental research.

Interpretation of the results of epidemiological research: quality of data, bias, coincidence, causality. Courses of epidemiological research. Tools for epidemiological research. Ethical aspects of epidemiological research.

2<sup>nd</sup> part. Study methods of environmental health.

Monitoring indicators of environmental conditions: measurement of environmental quality (air, water, soil, food). Measurement of human exposure, determination of health consequences, monitoring of environmental health.

Definition of specific effects on health: health risk evaluation, harmful environmental factors, evaluation of the dose-response relationship, human exposure evaluation, risk description. Methods of displaying medical data in space: Geographic information system – GIS.

## **Pathology (9 ECTS)**

### **Aims**

General pathology: Learning about elementary pathological processes with help of microscopic analysis of tissues and organs. The student will get acquainted with etiology and pathogenesis of diseases, with functional and especially morphological changes in cells, tissues and organs which are typical for particular disease processes. He will get acquainted with general work and diagnostic methods in pathology, he will understand the role of pathology in the diagnostic process.

Special pathology: The student will become familiar with the specific pathology of individual organs and organ systems, with the etiology and pathogenesis of diseases and their possible complications, on macroscopic and microscopic level. He will get knowledge about etiologically targeted rational therapy and diagnostics (understanding of clinical symptoms and of rationales for laboratory diagnostics). He will also get qualified for the correlation of clinical and pathological findings and will become acquainted with the role of pathology in the patient treatment process.

Oral pathology: The students will be acquainted with oral pathology – etiology, pathogenesis, histological diagnostics, prognostics and complications of oral cavity disease (cysts in the oral region, odontogenic tumors, inflammation of teeth and parodontal tissue, bone diseases, epithelial changes, oral infections, immune-dependent diseases in the oral cavity, salivary gland diseases and lymphatic tissue diseases). He will acquire understanding of the role of pathology in the diagnostics of diseases in the oral cavity.

### **Contents**

General pathology: Cell injury and cell adaptation, regeneration and reparation, circulation disorders, immunopathology, neoplasia, infectious and environmental diseases. The most common pathologic processes will be presented with microscopic preparations.

Special pathology: Cardiovascular pathology, gastrointestinal pathology, respiratory pathology, urological and nephrological pathology, pathology of the liver, pancreas, gallbladder and bile ducts, head and neck pathology, pathology of the central and peripheral nervous system; gynecological pathology; pathology of the locomotory apparatus and hematopathology. The most common pathological entities will be presented with macroscopic preparations.

## **Pathophysiology (9 ECTS)**

### **Aims**

The student will acquire knowledge about the causes and mechanisms of diseases and pathological processes in a human on the basis of disturbed physiological and biochemical events in the body.

At practical course, seminars and problem-oriented lessons the student will learn how to use acquired knowledge for recognition of signs and symptoms of diseases, for understanding the course and the complications of the disease with special emphasis on dental medicine.

**Contents**

The subject deals with pathophysiology of the following diseases and processes:

Changes in body temperature. Starvation. Diabetes mellitus. Hypoglycemia. Thyroid diseases. Burns. Radiation sickness. Cell death and diseases.

Inflammation. Response to stress. Free radicals and disease. Carcinogenesis and cancer cell properties.

Changes in the composition of body fluids. Dehydration. Acidosis, alkalosis. Disorders of calcium and phosphorus metabolism. Renal failure and renal function tests.

Disorders in blood clotting. Thrombosis.

Disorders of external respiration. Hypoxias and cyanosis. Disorders due to changes in air pressure. Coughs.

Dyspnoe. Asthma and obstructive pulmonary diseases. Pneumothorax.

Bleeding and shock. Hypertension. Hypotension. Cardiac failure. Edemas. Atherosclerosis. Risks of transfusion.

Ischemic necrosis of skeletal muscles.

Liver diseases and liver tests. Biochemical disturbances in alcoholism. Peptic ulcer disease. Eating and digestion disorders.

Neuromuscular disorders. Organophosphate poisoning. Disorders of consciousness. Pathophysiology of locomotion and paralysis. Pathological pain. Headache. Increased intracranial pressure. Disorders of basal ganglia. Psychotic disorders. Psychosomatic disorders. Stroke.

**Pre-clinical Practicum (10 ECTS)****Aims**

Knowledge of biological and clinical principles and basic practical skills which are a prerequisite for basic parodontal, restorative and prosthodontic interventions on a patient.

**Contents**

Ergonomics and preparation of the therapist, working environment and patient. Procedures for preventing transmission of infections. Instruments, their use and maintenance. Instruments for removing soft and hardened dental plaques, dental scaling and polishing of tooth roots. Instruments for preparation of the tooth (turbine, dental drill, dental burs) and restoration of the tooth (matrices, pluggers, accessories for impressing, impression materials). Handling metals and know-how about dental soldering. Preparation of the tooth for different fixed prosthetic anchors and impressing. Laboratory procedures for making fixed prosthetic anchors (pouring work models, preparation of individual work models, modulation until final shape is formed and finishing of full metal coatings, faceted coatings, composite coatings). Manufacture of fixed prosthetic pins with abutment. Getting to know the elements of total and partial prostheses, producing wire spoons, acrylic individual impression spoons, bite edges on a shellac base plate. Making temporary crowns by a direct method. Clinical and histological pictures of carious lesions, dental caries epidemiology, diagnosis, prevention and treatment, risk evaluation. Prevention of dental pulp defect. Relative/absolute drying of work area. Cavity preparations for amalgam and filling. Cavity preparations for composite materials and filling.

**Internal Propedeutics (3 ECTS)****Aims**

The student will learn the basics of a clinical examination, which consists of medical history (anamnesis) and physical examination. In both semesters the student will upgrade his knowledge about the technique of taking anamnesis and of its proper recording. In the first semester the student will learn the basic techniques of physical examination, in the second semester he will continue with learning directed anamnesis and directed physical examination and elaboration of a working diagnosis.

**Contents**

1<sup>st</sup> semester: Introduction to propedeutics (presentation of the subject; approach to the patient, the first contact with a patient). Anamnesis (demonstration of some tools that do not require any special



background knowledge: the ability to listen to a patient and raising reasonable questions; inductive and deductive anamnesis; recognition and description of the main symptom; family anamnesis; anamnesis about medications, about vegetative functions, bad habits and social anamnesis). Physical examination: General status. Head examination. Neck examination. Examination of the chest, breasts and lungs. Heart examination (inspection, palpation, pulse evaluation, blood pressure measurement). Auscultation: heart sounds and murmurs. Abdominal examination. Examination of kidneys and male genital organs. Blood vessel examination. Examination of joints, muscles and skeleton.

2<sup>nd</sup> semester: A patient with chest pain, a patient with acute abdominal pain, a patient with breathing difficulties, a patient with cyanosis, a patient with edema, a patient with heart failure, a patient with jaundice, a patient with ascites, a patient with difficulty urinating, a patient with fever, a patient with enlarged lymph nodes, a patient with disorder of consciousness, a patient with bleeding, a patient with limb pain.

## Emergency Medical Care 2 (3 ECTS)

### Aims

The student will renew basic resuscitation procedures and will upgrade his knowledge and skills with additional procedures of cardiopulmonary resuscitation (CPR).

At the end of course, the student will be theoretically familiar with emergency medical conditions and injuries, for which urgent action is required and he will have practical know how on implementing the appropriate procedures in such situations. He will know the tools, appliances and some drugs that are necessary for successfully helping accident victims and patients in urgent situations and he will also know how to properly use them.

### Contents

Renewal of basic CPR procedures, additional CPR procedures, use of the tools.

Defibrillation, the establishment of venous channels, respiratory path care, acute strokes, acute coronary syndromes, dysrhythmias, use of an automatic defibrillator, reanimation medicine, shock, respiratory distress. Introductory lecture, first aid and emergency medical help (legal and ethical aspects, mechanisms of injuring), loss of consciousness, approach to the injured or suddenly ill, establishment of respiration, establishment of blood circulation (automated external defibrillator use), use of video records (emergency medical care), sequence of operations, bleeding, polytrauma and traumatic shock, urgent situations in internal medicine 1 and 2, acute poisoning, pediatric emergencies, emergencies in neurology, head and brain injuries, emergencies in ophthalmology, facial and dental injuries, spine and spinal cord injuries, chest injuries, abdominal injuries, wounds, procedures with amputated body parts, comprehensive treatment of burn injuries, injuries due to cold, injuries of bones and joints 1 and 2, rescue in the mountains and in other hard to reach places, organ donation and transplantation activity, reporting bad news.

## Dental Material and Dental Materials Technology (4 ECTS)

### Aims

At lectures and seminars the student will get familiar with terminology, scientific and technological principles and basic technological processes, so that he will be qualified in the fourth year of study to use dental materials in clinical practice. The student will also get familiar with the principles of usage of different dental materials.

### Contents

The student acquires knowledge about the basic physical properties of materials: mechanical (strength, hardness, elasticity, plasticity, modulus of elasticity); electrical and electrochemical properties; thermal properties (expansion and heat conduction); biocompatibility. He learns about basic comparative properties of metals, ceramics and plastics and their impact on their practical use. He gets familiar with plasters: plaster types, hardening, volume changes and their impact on the precision of casting, hardening speed, hardening accelerators and inhibitors, usage. He gets to know hard and elastic casting materials: types,

structure, chemistry of hardening, properties and he knows how to use them. He gets familiar with alginates, polysulphides, polyethers and silicones. He distinguishes between addition and condensation silicones, knows the advantages and disadvantages and their clinical value of usability. He gets to know different types of dental cements: classical dental cements, composite cements and glass ionomer cements; he learns about their characteristics, comparative advantages and usage. He gets to know metals: the structure and properties of metals, what nucleation and crystal networks are. He acquires knowledge about ductility of metals, hardness, elastic and plastic deformation, hardening of metals. He gets to know dental alloys: composition, production of alloys, properties, selection for use. He knows what refining is, he is acquainted with mechanical engineering properties and their functional relationship. He learns about alloys for denture bases, requirements, selection, mechanical and technological properties. He gets to know alloys for porcelain techniques, requirements, selection, mechanical and technological properties. He gets to know about ceramics, he gets familiar with precision casting: general principles, melting and casting, production casting patterns, casting systems, porosity, heat treatment of castings, spreading rate of dental alloys. He gets to know about polymers and the polymerization process: initiation, growth and completion of the process of polymerization. He gets familiar with thermal, chemical and light polymerization of polymers, comparative advantages and usage. He gets familiar with acrylates: types, methods of polymerization and the effect on mechanical properties, the technology of acrylate processing, composition, handling, defectiveness (shrinkage, water absorption, porosity); he gets familiar with hot and cold polymers and their usage. He gets familiar with depository masses: types, composition and influence on solidification and dimensional changes, properties and usage. He gets familiar with the basics of soldering, classic and laser welding. He gets familiar with plastics in prosthodontics: definition and division, the chemistry of polymerization, addition and condensation polymerization; he learns about composite, porcelain and base materials. He gets to know about materials for temporary closure of preparations. He gets familiar with amalgams: composition, properties, and usage. He gets familiar with adhesives: adhesive generation, properties, methods of bonding to enamel and dentin, polymerization and usage. He learns about composites: structure, properties, polymerization, shrinkage and usage. He gets familiar with glass ionomer materials and dental compomers: composition, properties, polymerization, shrinkage and usage.

He learns about materials for filling root canals: composition, properties and usage. He gets to know materials for the irrigation of fissures and other specific materials for children's dentistry. He learns about materials used in orthodontics: metals, orthodontic wires and other metal elements, acrylates, mechanical requirements and their selection. He gets familiar with waxes – natural and artificial, composition, properties and usage. He leans about pumice-stone, polishing means and other materials, used in prosthodontics.

## Propedeutics of Dental Medicine (5 ECTS)

### Aims

The purpose of this subject is to teach the student the orderly steps of anamnesis acquisition, clinical examination, diagnosis establishment of diagnosis and treatment plan of dental patients. The student will get basic knowledge how to perform different types of dental clinical examinations, such as complete dental clinical examination, screening and control dental clinical examination and limited or emergency dental clinical examination. The student will be able to take anamnesis, to make clinical general and oral examination, to write clinical records, to establish the diagnosis and elaborate the treatment plan.

### Contents

Types of dental clinical examination. Symptoms and signs in the oral cavity. Questionnaires about health. Anamnesis. The importance of drugs in oral diagnostics. Principles of clinical examination. General clinical examination. Examination of the oral cavity. Examination of parodontal tissues. Examination of teeth. Bite and identification of orthodontic anomalies. Examination of toothless parts of the jaw. Oral radiological examination. Further examination of a dental patient. Study models. Recording findings of clinical examination. Dental treatment plans. Specialties of dental examination of children and adolescents. Writing clinical records, patient admission forms and dismissal letters for patients with malignant and benign diseases, injuries,

developmental abnormalities and congenital anomalies of the oral cavity, head and neck. Writing records for patients who require oral-surgical operations.

## General and Dental Radiology (3 ECTS)

### Aims

The student will get knowledge about the importance and the principles of radiological imaging and diagnostic technologies that are used in diagnostics of disease processes and injuries of the teeth and maxillofacial area. He will get to know about digital X-ray imaging, computerized tomography, interventional radiology, diagnostic ultrasound and magnetic resonance tomography.

Knowledge of clinical indications for each imaging technique. Knowledge of intraoral imaging (parallel imaging techniques and dental crown imaging).

Knowledge of general principles of analysis and interpretation of X-ray images and other radiological imaging of examinations.

### Contents

Normal radiological anatomy of teeth and parodontal tissues, of maxilla and mandible, of temporomandibular joint and other parts of the maxillofacial area, patoanatomic changes, relevant for understanding of radiological visible signs, radiological features of congenital abnormalities, injuries, inflammations, tumors and degenerative changes in the area of teeth and parodontal tissues, maxilla, mandible, temporomandibular joint and other parts of maxillofacial area, clinical indications for the use of certain radiological technologies, intraoral imaging technology and development of images.

## Infectious Diseases and Epidemiology (4 ECTS)

### Aims

The aim of study of infectious disease and epidemiology is understanding and knowledge of the theoretical basics of infections and diseases caused by microorganisms. The dental medicine student will understand clinical images of infectious diseases in daily practice. He will be able to establish diagnosis of diseases caused by microorganisms in the neck and head, using clinical examination or uncomplicated diagnostic examinations. He will be familiar with the differential diagnostics of these diseases, with treatment methods and with prevention and epidemiology of infectious diseases.

### Contents

Epidemiology and prevention of major infectious diseases, including passive and active prophylaxis. Chemoprophylaxis of common infectious diseases, endocarditis prophylaxis. Pathophysiology and diagnostics of infectious diseases (clinical and laboratory). Infectious diseases by organic systems, in particular oral infections and infections of the neck and head. Major exanthematous diseases, systemic infections (bacteriemia, sepsis). Head and neck infections in an immunocompromised and weakened patient. Approaches to a patient with fever and/or suspected infection. Artificial materials infection. Aids (HIV infection). Herpes virus infections (HSV, VZV, CMV, EBV, HHV-6, HHV-7, HHV-8). Nosocomial infections. Important zoonoses, which are reflected with symptoms in the head and neck area (anthrax, tularemia, cat scratch disease). Important parasitoses (toxoplasmosis, trichinosis). Systemic and local fungal infections in the head and neck area and their treatment. Major tropical diseases (malaria, travellers' diseases). Emerging infectious diseases. Infections with anaerobes (tetanus, botulism, infection with *Clostridium difficile* and *Clostridium perfringens*, local infections with anaerobes). Recognition and treatment of sexually transmitted diseases, that are reflected by symptoms in the head and neck area. Treatment of infections in the head and neck area (antibacterial, antifungal, antiviral medications and treatment of parasitoses).

## Internal Medicine (3 ECTS)

### Aims

The student will get knowledge about clinical picture, diagnostics and therapy of internal diseases which have impact on the dental medicine.

### Contents

Knowledge of etiopathogenesis, clinical course, diagnostics and principles of treatment of selected internal diseases.

Intensive medicine and cardiology: Heart failure, cardiac rhythm disorders, rheumatic and infectious endocarditis, acquired heart defects, ischemic heart disease, arterial hypertension, shock and reanimation.

Angiology: Atherosclerosis and vascular disability, venous thrombosis.

Pulmonology: Bronchitis, asthma, COPD, pneumonia, respiratory cancers, pulmonary tuberculosis.

Gastroenterology: Esophagitis and gastritis, esophageal tumors, peptic ulcers of the upper gastrointestinal tract, ulcerative colitis and Crohn's disease, hepatitides and liver cirrhosis, acute cholecystitis and gallstones, obstructive jaundice.

Nephrology: Acute and chronic renal failure, glomerulonephritis, nephrotic syndrome, bacterial infections in the urinary tract, urinary stones.

Hematology: Anemias, myelodysplastic syndromes, acute and chronic leukemias, thrombocytopenias and drug-induced thrombocyte dysfunction, hemophilias and von Willebrand disease, coagulation disorders due to liver disease and medications.

Rheumatology: Rheumatoid fever, rheumatoid arthritis, systemic lupus erythematosus, scleroderma, Sjögren's syndrome, ankylosing spondylitis.

Endocrinology: Thyroid disease, diabetes, pathophysiology and basic clinical data of other glands with inner secretions.

## Surgery (4 ECTS)

### Aims

The student of dental medicine will acquire knowledge about surgical propedeutics to the same extent as the student of medicine. He will learn how, on the basis of anamnestic data and clinical examination, to build a diagnosis of surgical diseases or injuries, related to dental medicine. He will learn how to autonomously provide emergency medical care for these diseases or injuries. He will get acquainted with the currently valid ways of treatment and with possible future development of therapeutic methods.

### Contents

Conditions for surgical work. Surgical instruments. Surgical materials. Basic operational techniques. Principles of diagnosis and treatment of surgical infections. General traumatology. General plastic surgery and facial plastic surgery. General neurosurgery and surgical treatment of trigeminal neuralgia. Differential diagnosis and assessment of halitosis.

## Medical Clinic 1 (4 ECTS)

### Aims

Module 1. The goal of the study of dermatovenereology is understanding and knowledge of the theoretical bases of skin and venereal diseases. After the end of the module, the student of dental medicine will be able to understand the clinical pictures in patients with skin and venereal diseases in every-day clinical practice. The student will be able to state the diagnosis of the skin and sexually transmitted diseases with manifestation in the head and neck region, with clinical examination and basic diagnostic procedures. He will be familiar with differential diagnosis, the methods of treatment and prevention, and the epidemiology of these diseases.

Module 2. The goals of neurology study is to get basic knowledge about most common neurological diseases which have an impact on orodental disease or demand modification of patients treatment. The student will become able to autonomously provide the emergency medical aid in neurological patients which may occur during orodental treatment. Holistic treatment of a patient without a narrow focus on a single disease will be emphasized.

Module 3. The study of psychiatry is directed towards the understanding of fundamental psychological and psychosocial characteristics of the population, which must be taken into consideration at practical work. The student will get to know and understand the common types of mental disorder which may interfere with the treatment and may in their own way modify the work in a dental clinic. The student will get acquainted with the easiest ways to establish a proper relationship with and cooperation of a mentally disordered patient.

### Contents

Module 1. Propaedeutic of dermatovenereology, treatment of skin diseases, bacterial skin infections, skin tuberculosis, viral diseases of skin and mucous membranes, dermatomycology, parasitic skin diseases, sexually transmitted diseases, non-sexually transmitted diseases of external genitalia, allergic and reactive skin diseases, autoimmune skin diseases, photodermatoses, erythematosquamous skin diseases, diseases of the sebaceous glands, genodermatoses, skin tumours, disorders of pigmentation, diseases of the nails, hairs and sweat glands, metabolic skin disorders, vasculitic skin manifestations, chronic venous insufficiency, tropical skin diseases, diseases of the oral cavity.

Module 2. Functional units of the central nervous system, symptoms and signs of neurological diseases, classification of neurological diseases, a way to a neurological diagnosis, selected emergency situations in neurology, chronic neurological and psychiatric diseases, neurological complications of diseases in other organ systems.

Module 3. The content of the lectures meaningfully connects the knowledge about etiology and the development of individual groups of mental disorders, their clinical picture and therapeutic treatment, with special emphasis on the needs of dental practitioner.

Contents that are specifically relevant for dentists are put in a way that give to the student the possibility to obtain complementary skills while working with experts (relaxation methods, psychotherapy, working with anxious people...).

## Dental Diseases 1, 2, 3 (23 ECTS)

### Aims

The student will upgrade his knowledge and understanding of pre-clinical subjects; from the stomatology subjects these are: "Oral Biology", "Pre-clinical Practicum", "Dental Materials" and "Dental Propedeutics". He will gain clinical knowledge and skills, he will get knowledge about developmental defects of the dental organ, developmental defects of teeth eruption, number, size and shape of teeth, dental defects of the functional period among adults, he will explain the etiopathogenetic mechanisms, he will make a diagnosis and will describe therapeutic interventions in developmental defects and defects of the functional period, he will be trained for independent clinical work on a patient while treating conservative and endodontic cases (in the sixth year of study he treats patients completely).

### Contents

Upgrading of the knowledge obtained at pre-clinical subjects at practical course, seminars and elective courses. At clinical practical course the emphasis is on endodontic and conservative treatment of the patient (in the sixth year of study with an integrated approach), on causal factors of developmental abnormalities of teeth, on abnormal number of teeth, on abnormal teeth eruption, on abnormal shape and size of teeth, on developmental abnormalities of dental hard tissues caused by external factors or genetic defects, on acute mechanical damage of teeth in the active period among adults, on creating a list of acute injures of teeth, on

dental hard tissue abrasion, on resorption of teeth, on tooth staining, on teeth whitening after endodontic treatment, on dentin and cement production in diseased tooth.

## Oral Diseases and Periodontology 1, 2, 3 (20 ECTS)

### Aims

The aim of studying oral diseases is having knowledge about epidemiology, etiopathogenesis and a clinical picture of the most common oral mucosal disorders. The student will get to know differential diagnostics and the basics of treating conditions and oral mucosal disorders.

The aim of studying parodontics is that student becomes acquainted with epidemiology, etiopathogenesis, diagnostics and parodontal tissue disease treatment. The student will be able to recognize different forms of parodontal tissue diseases and will understand their importance for oral and systemic health. He will perform the hygienic phase and maintenance phase of parodontal disease treatment. The student will also get familiar with basics of planning and of the surgical part of dental implant procedures.

### Contents

Contents of the subject include the following items:

8<sup>th</sup> semester. Introduction to parodontology, gum, dentogingival epithelium, epithelial differentiation, periodontium, cement, alveolar bone, vascular, lymphatic and nervous system of parodontium, classification of parodontal diseases, parodontal indices, epidemiology of parodontal diseases, dental plaques, dental tartar, microorganisms associated with parodontal disease, microorganisms associated with parodontal disease II, pathogenesis of parodontal disease.

9<sup>th</sup> semester. Modifying factors, susceptibility to parodontal disease, gum inflammation that was not caused by dental plaques, gum inflammation caused by dental plaques, parodontitis, aggressive parodontitis, necrotizing parodontal disease, parodontal disease as a risk factor for systemic diseases, parodontal abscesses, acute parodontal diseases, lesions of endodontic origin, peri-implant mucositis, peri-implantitis, examination of patients with parodontal disease, treatment planning of parodontal diseases, systemic phase of parodontal disease treatment.

10<sup>th</sup> semester. Developmental abnormalities, hereditary diseases, mechanical, chemical and thermal injuries, changes in the oral mucosa due to medication, tongue disorders, lip diseases, viral infections, changes in the oral cavity due to HIV infection, bacterial infections, fungal infections, autoimmune diseases, skin diseases accompanied with changes in the oral mucosa, changes in the mouth due to blood diseases, changes in the oral mucosa due to vitamin deficiency.

11<sup>th</sup> semester. Motivational interview, mechanical and chemical control of supragingival plaque, non-surgical treatment of parodontal disease, basics of parodontal surgery 1 and 2, anaesthesiology, accessories, lobe operations 1 and 2, root bifurcation treatment, endodontics and parodontics, regenerative parodontal treatment, mucogingival surgery, parodontal plastic surgery 2, parodontal plastic microsurgery.

12<sup>th</sup> semester. Antibiotics in parodontal treatment, toothless alveolar ridge, healing after tooth extraction, reconstruction of toothless ridge, traumatic occlusion, orthodontics and parodontics, principles of osseointegration, selection of patients and dental implant surgery 1 and 2, supportive parodontal treatment, halitosis, complex parodontal treatment – clinical cases.

## Paediatric and Preventive Dentistry 1, 2, 3 (14 ECTS)

### Aims

At the completion of graduate studies, the student has theoretical and practical clinical skills required for performing basic preventive and basic curative work in children's and youth dentistry.

## Contents

8<sup>th</sup> semester. At the lectures, the student will get acquainted with the following items: aspects of pediatric dentistry, mental development of children and the impact on oral cavity health, behavioural characteristics and problems of children and adolescents, growth, development and child's health, anamnesis and clinical examination in pediatric dentistry, radiological examination and diagnosis in pediatric dentistry, pain and pain prevention in pediatric dentistry, local anesthesia, sedation and general anesthesia in pediatric dentistry. At the seminar, the student will present a patient case in the form of a seminar paper (anamnesis, clinical examination, radiological examination, additional diagnostic tests, diagnosis, plan of treatment). The purpose will be to acquire skills of taking anamnesis and to learn the clinical procedure of dental examination of child or adolescent, with an emphasis on the systematics and recording of the findings. During clinical practical training the student will become acquainted with the basics of preventive and curative procedures for treating caries and dental pulp diseases of deciduous and permanent teeth.

9<sup>th</sup> semester. At the lectures, the student will get acquainted with the following items: special features and treatment of carious lesions in different age groups, filling materials in pediatric dentistry, traumatic injuries of primary and permanent teeth with immature root development (classification of traumatic injuries types, immediate care, clinical monitoring of patients after traumatic injuries of teeth, complications following teeth injuries and treatments in such cases).

At the preclinical tutorials the student will install the rubber dam on an arch model of primary and mixed dentitions; he will seal fissure of permanent tooth, make enameloplasty, class II restoration and preparation for the stainless steel crown (SSC), completion of a tooth with a strip crown and pulpotomy.

At clinical practical training the student will perform a dental examination of a child or adolescent, will make a diagnosis and a plan of treatment. Under supervision or with the participation of an assistant, the student will learn basic procedures for prevention or treatment of dental diseases on deciduous and permanent teeth.

10<sup>th</sup> semester. At the lectures, the student will get acquainted with the following items: developmental changes in number and shape of teeth and their treatment, innate and acquired developmental disorders of hard dental tissues, eruption and loss of deciduous teeth, development of occlusion, preventive and interceptive orthodontics, usage of local anaesthesia in paediatric dentistry, sedation and dental treatment under general anaesthesia.

At the preclinical tutorials the student will take care of "damaged teeth" on a model of traumatised teeth: he will take care for complicated trauma of tooth crown with an exposed dental pulp and will make reposition and immobilization after tooth avulsion.

Within clinical practical training the student will continue with work from 9th semester.

11<sup>th</sup> semester. At the lectures, the student will get acquainted with the following items: characteristics and parodontal tissue disease treatment among children and adolescents, oral mucosal lesions among children and adolescents, basic dental and oral surgery in pediatric dentistry, temporomandibular joint disorders, impacts on oral health and dental treatment of children with chronic diseases and children with special needs. The student will select and present in the form of a seminar paper one of the following items: dynamics of caries development; motivation of preschool, elementary or secondary school children for their own oral health; fluorides (presence in the environment, entry into the body and metabolism; physiochemical interactions between fluoride and enamel, application forms, fluoride action on bacteria, fluoride toxicity).

At the clinical practice the student will continue and upgrade his work of this course from the 10th semester.

At clinical practical course the student learns about and is partly involved in performing preventive programs within the framework for primary dental care of children and adolescents (in preschool educational institutions, elementary schools, institutions for children and adolescents with special needs). He will also get familiar with dispensary work in pediatric dentistry clinics at examinations with counseling for one-year, two-year and three-year-old children.

## Maxillofacial and Oral Surgery 1, 2, 3 (16 ECTS)

### Aims

The student will learn the theoretical basics of tooth extraction and all associated conditions. He will acquire knowledge about dentoalveolar illnesses and oral cavity conditions that require oromaxillofacial surgical treatment. He will become acquainted with the injuries and illnesses of the facial skeleton, facial soft tissue structures and neck. At clinical practical course he will learn directed oromaxillofacial examination, differential diagnostics and basic skills for tooth extraction and surgical treatment of intraoral inflammatory conditions. In addition, he will learn first medical aid and how to guide oromaxillofacial patients from dental toward specialist treatment.

### Contents

8<sup>th</sup> semester. Indications and contraindications for tooth extraction, basic and simple techniques for tooth extraction, endangered patient and antibiotic prophylaxis at oral surgery interventions. Local anesthesia. Complications during or after tooth extraction. Treatment of not fully erupted teeth, surgical and surgical-orthodontic treatment of not fully erupted teeth. Surgical extractions, hemisections and dental root amputation. The etiology and pathogenesis of odontogenic infections, diagnosis and treatment of odontogenic infections. Specifics of tooth extraction and odontogenic infections among children.

9<sup>th</sup> semester. Characteristics and treatment for osteomyelitis of the jaws. Surgical treatment of chronic periapical parodontitis. Odontogenic diseases of the maxillary sinus. Jaw cysts and their treatment. Pre-prosthetic surgery: fundamentals, interventions in local and general anesthesia. Basics of osteointegration and implantology care for toothless patients.

10<sup>th</sup> semester. Tumors of the facial skin. Melanoma and other pigment changes in the oral cavity. Odontogenic tumors and other similar odontogenic changes. Non-odontogenic tumors of the jaws. Pre-malignant changes in the oral cavity. Tumor diagnostics. Oral cavity carcinomas. Soft tissue neoplasms and lymphomas. Indurations in the neck. Salivary gland tumors. Tumors of the maxillary sinus. Surgical treatment of head and neck tumors and their multidisciplinary treatment. Congenital anomalies of the head and neck – syndromes. Cheilognathopaltoschises, their surgical and multidisciplinary treatment. Dysgnathias and their treatment. Arthropathy of temporomandibular joints. Atypical facial pain.

11<sup>th</sup> semester. Clinical practical course.

12<sup>th</sup> semester. Seminars in selected topics of oromaxillofacial surgery.

## Fixed Prosthodontics 1, 2, 3 (20 ECTS)

### Aims

The student will get acquainted with the biological, technological and clinical principles of the subject, he will gain manual dexterity, skills and theoretical knowledge, so that he will be qualified for diagnostics, planning and manual work in the fourth, fifth and sixth years of study. The student will be qualified for performing fixed prosthodontic treatment and combined fixed and removable prosthodontic treatment, for understanding implant prosthodontic care and for interdisciplinary cooperation with other dental professionals and for independent work on a patient.

### Contents

8<sup>th</sup> semester. Introduction and overview of modern methods for fixed prosthodontic care and rehabilitation. Overview of doctrinal viewpoints on fixed prosthetic care and rehabilitation: anchor and construction systems. Phases of work in clinical fixed prosthodontics. Fixed prosthodontic diagnostics and assessment of biological conditions. The needs index after prostodontic care. Fixed prosthodontic planning: biological aspects of planning dental bridges, analysis of gaps in the tooth row, static aspects of planning dental bridges,



decision-making algorithms in fixed prosthodontic planning. Sanitation and preparatory procedures before fixed prosthodontic care. Oral hygiene of prosthodontic patients and preventive aspects of prosthodontics. Preparations in fixed prosthodontics: in general and for individual restoration, drill selection, marginal preparation, cementing and preparation. Fixed prosthodontic upgrades of vital and endodontically fitted teeth. Impression: methods, materials, selection. Temporary fixed prosthodontic care: protection against dental lesion and temporary fixed prosthodontic care. Bite registration and concepts of new prosthetic occlusion.

9<sup>th</sup> semester. Communicating with a dental laboratory and the principles of alloy selection. Methods of color selection in fixed prosthodontics. Verification of fixed prosthodontic constructions. Cementing in fixed prosthodontics: types of cements and clinical selection, temporary and permanently cementing: classical and adhesive; dentin and enamel bonding. Clinic for individual restoration: full, partial, metal, composite, ceramic, combined. Fixed prosthodontic care of partial teeth loss: Static, firm, biological aspects of dental bridges, types of dental bridges and dental joints. Clinic for metal, composite, and ceramic techniques: selection, indications, comparisons. Aesthetics in fixed prosthodontics and the concept of an aesthetic stomatology or multidisciplinary approach in fixed prosthodontics.

10<sup>th</sup> semester. Combination of fixed and detachable prostheses: five levels. Prosthetic ligaments and conical constructions. Fixed prosthodontic care during childhood. Fixed prosthodontic care of elderly patients. Parodontal prosthetics. Local and systemic effects of fixed prosthodontic care, corrosion, galvanism, allergies to dental materials. Epidemiology of needs after prosthodontic care. Quality criteria of fixed prosthodontic care and the impact of prostheses on quality of life.

11<sup>th</sup> semester. The rules of good clinical practice in fixed prosthodontics and interdisciplinary cooperation. Course of execution of complete fixed prosthodontic care, diagnostic modulation in wax, temporary construction, permanent construction, malocclusion care, bite lift. Implant prosthodontic care. The revision of doctrinal viewpoints of fixed prosthodontic care and rehabilitation.

12<sup>th</sup> semester. Integration of theoretical knowledge and clinical practice.

## Removable Prosthodontics 1, 2, 3 (18 ECTS)

### Aims

The student will acquire clinical and laboratory knowledge and skills that are required for clinical rehabilitation of partly or completely toothless patients with removable dental prostheses.

At the lectures he will acquire knowledge about biological features and modern theoretical principles for making a full dental prosthesis, immediate prosthesis, parodontally supported full prosthesis, acrylic partial prosthesis, partial prosthesis with a molded base, obturator prosthesis, dental facade prosthesis and removable diagnostic appliances. At seminary lessons he will use his knowledge acquired at lectures for autonomous planning of removable prosthodontic care. At clinical practical course he will be trained for self-reliant decision making about the treatment of partially or completely toothless patients (clinical examination, recognizing different states, planning, writing records, providing different removable prosthetic appliances, work evaluation, communicating with a patient or with a wider team of various experts). At laboratory practical course he will become acquainted with work in a dental laboratory.

### Contents

8<sup>th</sup> semester. Full dental prosthesis: biological basics for a full prosthesis, retention and stabilization principles and methods of installing removable prosthetic teeth, making a full prosthesis in a dental clinic and laboratory, prosthesis polymerization methods, reocclusion of the prosthesis in the articulator, relining and repairing of full prostheses, production of a full immediate prosthesis. Partial prosthesis I: biological basics for partial prosthesis, modern principles of partial prosthesis in terms of transferring chewing forces onto supporting teeth, denture base of the acrylic partial prosthesis and partial prosthesis with a molded base, types of partial

prostheses, elements of a partial prosthesis with a molded base, parallelometer in terms of molded bases and its use.

9<sup>th</sup> semester. Partial prosthesis II: planning using analysis of forces for treatment with partial prosthesis with a molded base, creation of a partial prosthesis with a molded base in the dental clinic and in the laboratory, programs of removable prosthodontic care, transformation of supporting and anchoring teeth and protective procedures following the transformation, theoretical basics of intentional crowns, shafts and modern elements of anchoring, dental attachments and working with them, theoretical basics of milling, telescopic and conical crowns and work with them, repairing and relining of partial prostheses.

10<sup>th</sup> semester. Parodontally supported full prosthesis: theoretical basics and work with modern anchoring elements. Special prostheses – theoretical basics: prostheses on congenital and acquired defects of jaw bones, dental facade prosthesis, removable molded metal splint, Dahl's splint.

11<sup>th</sup> and 12<sup>th</sup> semester. An integral treatment of patients with an emphasis on removable prosthodontic rehabilitation.

## Clinical Physiology of the Stomatognathic System (5 ECTS)

### Aims

Student will acquire understanding and will get familiar with the complexity of jaw relations and with functioning of the stomatognathic system (SGS). He will acquire knowledge about practical use of basic techniques of gnathology: selection and the use of articulators with the facebow system, bite registration, preparation of a model and plastering in the articulator, selection of the concept of building a new occlusion. He will be acquainted with occlusion pathology, SGS and their impact on the human organism. He will learn to implement gnathology into the treatment and care in all dental disciplines.

### Contents

The student will get to know the complexity of the functioning of the stomatognathic system in physiological and pathological conditions, treatment modalities and links of the stomatognathic system and the quality of life. The student will be trained to get skilled in gnathological techniques at clinical work. The student will be capable of critical thinking and integration of the acquired skills. The student will acquire biological, technical and clinical knowledge for assessing the patient's dental occlusion, which is the basis for clinical prosthetic dentistry, and the theoretical knowledge for multidisciplinary treatment approach composed of various medical and dental specialties.

## Orthodontics and Dentofacial Orthopedics 1, 2, 3 (9 ECTS)

### Aims

The student will learn about diagnostic procedures. He will become familiar with irregularities of individual teeth, groups of teeth, irregularities of the dental arches and the skeletal abnormalities of the orofacial system. At clinical practical course he will learn to perform the basic dental and gnathic orthopedic examination.

The student will get familiar with the development of the craniofacial system, with its physiological functioning and pathological deviations. He will acquire knowledge about critical periods for the formation of developmental abnormalities. The student will become familiar with the benefits of orthodontic treatment based on the developmental periods, with simple interceptive interventions and will recognize abnormalities that necessitate orthodontic treatment. At clinical practical course he will perform preventive and basic interceptive interventions on patients that are in different periods of development.

The student will get familiar with measures for creating conditions for normal development of the craniofacial system and for preventing the occurrence of developmental abnormalities. He will get acquainted with interceptive treatment – orthodontic-parodontal, orthodontic-surgical, orthodontic-prosthetic treatment and

cooperation with specialists of other dental and medical sciences. At clinical practical course he will become acquainted with planning singular stages of orthodontic treatment with removable and non-removable orthodontic appliances.

### Contents

The epidemiology of developmental abnormalities, classification of orofacial system irregularities, diagnostic procedures in jaw and dental orthopedics – basic gnatho-orthopedic examination with function analysis (lip posture, ways of breathing, swallowing, chewing, speaking, temporomandibular joint function, habits), analysis of study models, X-ray image analysis (local and panoramic X-ray images).

Growth and development of the craniofacial system. Planning of orthodontic treatment according to different kinds of irregularities of the orofacial region in class I, class II and class III.

Biological and physical processes following orthodontic teeth movement. Planning, monitoring and evaluation of orthodontic treatment. Benefits of orthodontic treatment according to developmental periods. Basic preventive and interceptive interventions.

Active orthodontic appliances (removable and non-removable appliances). Myofunctional therapy. Dental extractions in jaw and dental orthopedics. Orthodontic treatment of certain types of anomalies. Combined orthodontic treatment.

## Medical Clinic 2 (5 ECTS)

### Aims

Module 1.

Oncology: the student will acquire knowledge about most common types of cancer with emphasis on tumors in the head and neck area.

Module 2.

Otorhinolaryngology: the student will become familiar with ear diseases, nose and paranasal sinuses diseases, pharyngeal and laryngeal diseases, with diseased changes on the neck and with causes for hearing and equilibrium disorders. He will be instructed how to autonomously provide medical aid in certain otorhinolaryngologic emergency situations. At clinical practical course he will learn otorhinolaryngologic (ORL) examination techniques, treating an otorhinolaryngologic patient and will test his skill in contact with patients.

Module 3.

Ophthalmology: the student will acquire basic knowledge about common eye diseases, especially those that are in connection with diseases of the orbit, diseases of paranasal sinuses or orodental diseases. He will be instructed how to autonomously provide medical aid in certain ophthalmologic emergency situations in which may occur during the work in dental clinic. Holistic treatment of a patient without a narrow focus on a single disease will be emphasized.

### Contents

The student will get acquainted with the epidemiology and biology of tumors, general principles of oncology, etiology, course of diseases, clinical signs and symptoms of the most common cancer types with emphasis on head and neck tumors. He will get acquainted with the possibilities of early detection and with diagnostic procedures. He will get acquainted with the basic methods of multidisciplinary treatment (surgery, radiotherapy, systemic therapy) and with ensuring the quality of life (analgesia).

The student will learn about the frequency, causes, course of disease, clinical signs and symptoms of the disease of the ear, nose, paranasal sinuses, pharynx, larynx and the neck area. He will learn about congenital abnormalities, trauma, inflammation and tumors in these areas. He will learn about diagnostic procedures and about methods of treatment including first medical aid. He will acquire understanding about connections between dental medicine and other specialties of adjacent areas.

The students will get familiar with the functional eye system (vision and ocular movement), symptoms and

signs of eye diseases, classification of eye diseases. He will get familiar with the path to ophthalmological diagnosis, with selected emergency states in ophthalmology, chronic eye diseases, complications of diseases of other systems on the eyes.

## **Pediatrics with Clinical Genetics (3 ECTS)**

### **Aims**

The student acquires knowledge about the basics of pediatric propedeutics and the comprehensive approach to the treatment of a child, adolescent and a young adult. He becomes familiar with the frequency, clinical pictures and differential diagnostics of the most common diseases and states in pediatrics. He will acquire knowledge of contemporary diagnostic procedures and their adjustments for the pediatric population. He will get familiar with the contemporary approaches to comprehensive treatment and therapy. He will get to know the basics of preventive pediatrics, dispensary work and social pediatrics. The student will gain knowledge of clinical genetics in general, contemporary genetic diagnostic methods, cytogenetic and molecular diagnostics, genetic syndromes with involvement of orofacial area, genetics of periodontal diseases, genetics of tooth development, genetics of developmental defects of enamel and genetics of cancer of the oral cavity.

### **Contents**

Presentation of selected contents from pediatric propedeutics, general pediatrics, social pediatrics, preventive and dispensary treatment of children, adolescents and young adults, normal growth and development, neonatology, pediatric cardiology, pediatric hematology and oncology, pediatric neurology, pediatric pulmonology, pediatric infectology, pediatric immunology and rheumatology, pediatric gastroenterology, pediatric endocrinology, diabetology and metabolic diseases, pediatric nutrition.

Introduction of clinical genetics in general; cytogenetic and molecular diagnostics, treatment of genetic syndromes with involvement of orofacial area, genetics of periodontal diseases, genetics of tooth development, genetics of developmental defects of enamel and genetics of cancer of the oral cavity.

## **Forensic Medicine and Dentistry (3 ECTS)**

### **Aims**

The student will acquire knowledge about basics of forensic medicine, he will get familiar with injury mechanisms, especially of the head, facial part and teeth in connection with forensic expertise. He will become acquainted with the rights, duties and responsibilities that are related to his profession. Knowledge of all pre-clinical and the majority of clinical subjects is required to attend the lectures.

### **Contents**

The student will be acquainted with basics of classical forensic medicine from the mechanisms of natural and violent deaths to the signs of death. He will acquire knowledge about following items: general and special identification with the emphasis on the role of dental medicine in mass accidents, basics of forensic toxicology (alcohol, drugs, medication, traffic safety), autopsy (required and permissible in the light of legislation) and exhumation, determination of death, blunt force injuries, injuries with a sharp and pointed object, forensically significant maxillofacial injuries, the basics of forensic traumatology, craniocerebral trauma, shooting injuries, iatrogenic injuries in dentistry. The student will get familiar with legislation – both health and criminal, with the basics of expert work and with emphasis on assessing injuries of the maxillofacial area, especially dental injuries. He will get acquainted with the rights, duties and responsibilities that are related to his profession. He will get familiar with interdisciplinary cooperation.

## Dental Implantology (3 ECTS)

### Aims

The students get familiar with basic fundamentals of implantology and indications for implant prosthodontic care on different levels of partially and completely toothless patients. They learn about preparatory and diagnostic procedures, the surgical and prosthodontic care and monitoring of implantology patients.

### Contents

The basics of osseointegration and conditions for it, technological properties of dental implants, the relationship between the implant and the mucosa, general indications and contraindications for implantology treatment, diagnostics of an implantology patient, planning the implantologic-prosthodontic care, implant insertion protocols and loads, surgical preparation for a dental implant, procedures for completion of the jaw bone, dental implants in the visual area – surgical and prosthodontic treatment, characteristics of the dental crown on the implant, dental implants on a partially toothless patient – surgical and prosthodontic treatment, performance and characteristics of fixed prosthetic constructions on implants, temporary care, dental implants on completely toothless patients – surgical and prosthodontic treatment, characteristics of implantology-supported removable prosthetic constructions, orthodontic implants and orthodontic therapy in the treatment of an implantology patient, implantology-supported epithesis, complications of implantology treatment, mucositis and peri-implantitis, monitoring of an implantology patient and maintenance of dental implants and surrounding tissues.

## Geriatric Dentistry (3 ECTS)

### Aims

The student will get acquainted with specific dental problems of the elderly. He will get familiar with preventive measures and treatment specialties of oral cavity diseases, dental rehabilitation of the elderly and modifications of dental treatment and rehabilitation due to the presence of systemic diseases.

The student will renew basic cardiopulmonary resuscitation procedures (CPR) and will learn how to perform them properly. Special emphasis will be on providing first medical aid in a dental clinic. Relieving pain will also be discussed.

### Contents

#### Module 1.

Physiology of aging: The most common systemic diseases of the elderly. Consequences of systemic diseases and taking medicine on the oral health of the elderly. Age changes in the oral cavity (teeth, parodontal tissues, oral mucosa, salivary gland, maxilla, motor and sensory functions). Characteristics, prevention and treatment of caries (root caries, secondary caries) and parodontal tissue diseases among the elderly. The most common oral mucosa diseases among the elderly, basics of treatment. Elderly people with prosthetic applications: morphological – physiological specialties. Diagnostics and planning of dental treatment and rehabilitation among the elderly. Customization of the dental prosthodontic rehabilitation to different psychophysical states of the patient (the concept of shortened dental arches, functional or aesthetic care, restoration of old or development of new dental substitutes). Specialties of selection and methods of work with filling materials among the elderly. Special features of endodontic diagnostics and treatment among the elderly. Oral surgery among the elderly. Pre-prosthetic surgery due to jaw atrophy. Implantology care of an elder person. Renewal procedure among people that have already been provided with a prosthesis, elements adapted to the elderly and procedures in rehabilitation with various removable prosthodontic applications.

#### Module 2.

Causes of clinical death: Assessment of the level of consciousness. Assessment and establishment of breathing. Assessment and establishment of blood circulation. Medical first aid for acute coronary syndrome.

Medical first aid for stroke. Peculiarities of CPR in the dental clinic. Basic principles of pain relief in the dental clinic.