CURRICULUM AND STUDY GUIDE

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UNIVERSITY OF NOVI SAD
FACULTY OF MEDICINE NOVI SAD

CURRICULUM AND STUDY GUIDE

INTEGRATED ACADEMIC STUDIES
IN MEDICINE
Accredited 2021

NOVI SAD, 2022.


ГЕОДЕЗИЈСКИ ФАКУЛТЕТ

FACULTY OF MEDICINE NOVI SAD

The Faculty of Medicine, as a part of the University of Novi Sad, is a public, autonomous educational and scientific institution, specialized in the field of higher medical education. It offers both undergraduate and postgraduate studies as well as various forms of training in the field of medical science. Since its foundation, on May 18th, 1960, the Faculty of Medicine Novi Sad has been educating students of Medicine, from 1976 also students of Dentistry, since 1999 students of Pharmacy, and after 2000 students of Nursing, Special Education and Rehabilitation, Medical Rehabilitation and Radiological Technology. Study programes of Integrated Academic Studies in Medicine, Integrated Academic Studies in Dental Medicine and Integrated Academic Studies in Pharmacy are organized in Serbian and English. Bilingual program is available since 1993.

So far, about 10,000 medical doctors, dentists and pharmacists have graduated from our School. Today, former students of our University are proud ambassadors of our school in Greece, Cyprus, Switzerland, Sweden, France, United Kingdom, Germany, Hungary, United States, Canada, India, Iran, Kuwait, Malaysia and China to name a few, and countries in the Middle East, Africa, Asia, Eastern Europe and around the world.

Experience gained during that period has been enough to qualify our Faculty as an autonomous center of excellence for health education and scientific progress. Following dynamic changes, innovations and the idea of common European area of education and science, implementation of Bologna Declaration in our curricula, lead to the fact that Faculty nowadays offers accredited study programs through first, second and third level of education, specialized studies and several other forms of knowledge innovation and education, such as continuous medical education, lifelong learning programs, etc.

Studies are based on approved or accredited programs of higher education in the field of medical science in accordance to the ECTS system and the accumulation of credit points. Closely relying on European standards and programs, our study programs are continuously restructured to focus more on practical forms of learning (practical work, demonstrations, seminars) and adapted to international study programs. At the same time, this educational system encourages medical students and grants them a chance in seeking their own perspectives and inspires them to become well trained and competent physicians and researchers in the field of medical science.

Faculty of Medicine in Novi Sad has a space that is required for the implementation of programs of study (undergraduate, second and third degree programs), information and library space segment as well as the space needed to perform the administrative tasks. Undergraduate and Master Study Secretariat has Department for Studies in English with non-teaching staff qualified for providing service in English. For the relization of practical classes in clinical subjects, which are a majority of study programs in medical sciences, the Faculty of Medicine also uses the available space in its teaching bases (clinics, institutes, departments, healthcare centers, pharmacies, spas, preschool institutions, schools, social institutions) with which the Faculty has a special agreement on teaching process.

To all employees and students, School of Medicine provides ready access to different types of information in electronic form and information technologies, so they can use this information for scientific and educational purposes. The library is equipped with a sufficient number of textbooks required for specific programs of study. In addition to basic literature, library has additional literature (books, monographs, scientific journals, other periodicals). Faculty of Medicine provides enough library units in English language. Students are offered e-books published by Faculty of Medicine, as well. Each Department has coordinator for English studies who is responsable for distribution of teaching material.

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STUDY PROGRAMS

Program	Duration (semesters)	ECTS
Undergraduate Applied Studies – studies of the first level (in Serbian)		
Undergraduate Applied Studies in Radiological Technology	6	180
Undergraduate Academic Studies – studies of the first level (in Serbian)		
Undergraduate Academic Studies in Nursing	8	240
Undergraduate Academic Studies in Medical Rehabilitation	8	240
Undergraduate Academic Studies in Special Education and Rehabilitation (modules: Inclusive Education, Logopedics, Multiple Disabilities)	8	240
Integrated Academic Studies (in Serbian and English)		
Integrated Academic Studies in Medicine	12	360
Integrated Academic Studies in Dental Medicine	12	360
Integrated Academic Studies in Pharmacy	10	300
Master Academic Studies – studies of the second level (in Serbian)		
Master Academic Studies in Nursing	2	60
Master Academic Studies in Special Education and Rehabilitation	2	60
Master Academic Studies in Medical Rehabilitation	2	60
Specialist Academic Studies – studies of the second level (in Serbian)		
Specialist academic studies – Early Childhood Intervention	2	60
Doctoral Academic Studies (in Serbian and English)		
Doctoral Academic Studies in Biomedical Sciences	6	180

ORGANIZATION

Organizational Units:

- Departments
- Institutes
- Laboratories
- Research, Innovation and Educational Centres
- Dean's Office
- Teaching Bases

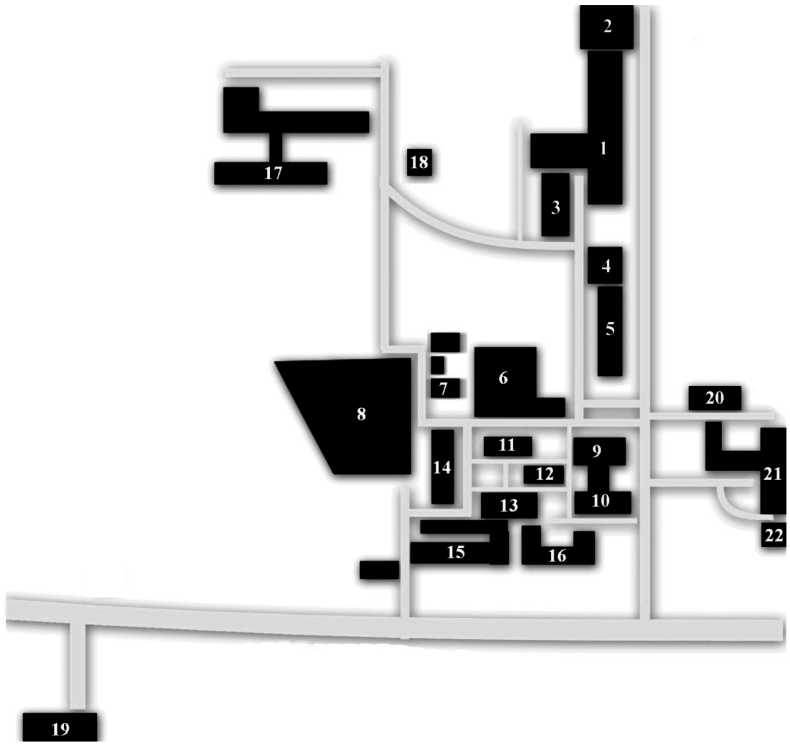
Departments

- Department of Anatomy
- Department of Anesthesiology and Perioperative Medicine
- Department of Biochemistry
- Department of Dental Medicine
- Department of Dermatovenereology
- Department of Emergency Medicine
- Department of Epidemiology
- Department of Forensic Medicine
- Department of General Education Subjects
- Department of General Medicine
- Department of Geriatrics
- Department of Gynecology and Obstetrics
- Department of Histology and Embryology
- Department of Hygiene
- Department of Infectious Diseases
- Department of Internal Medicine
- Department of Medical Rehabilitation
- Department of Microbiology with Parasitology and Immunology
- Department of Neurology
- Department of Nursing
- Department of Occupational Medicine
- Department of Oncology
- Department of Ophthalmology
- Department of Otorhinolaryngology
- Department of Pathology
- Department of Pathophysiology and Laboratory Medicine
- Department of Pediatrics
- Department of Pharmacology and Toxicology
- Department of Pharmacy
- Department of Physical Medicine and Rehabilitation

- Department of Physiology
- Department of Psychiatry and Psychological Medicine
- Department of Psychology
- Department of Radiology
- Department of Social Medicine and Health Statistics with Informatics
- Department of Special Education and Rehabilitation
- Department of Sports Medicine
- Department of Stomatology with Maxillofacial Surgery
- Department of Surgery

Teaching Bases

- University Clinical Center of Vojvodina
- Institute for Health Protection of Children and Youth of Vojvodina
- Institute of Public Health of Vojvodina
- Oncology Institute of Vojvodina
- Institute of Cardiovascular Diseases of Vojvodina
- Institute for Pulmonary Diseases of Vojvodina
- Dentistry Clinic of Vojvodina
- Special Hospital for Rheumatic Diseases Novi Sad
- Institute of Occupational Health Novi Sad
- National Reference Laboratory for Rabies – Pasteur Institute Novi Sad
- Health Centre Novi Sad
- Institute for Emergency Medical Service, Novi Sad
- Institute of Transfusion Medicine
- Institute for Student Health Care Novi Sad
- Health Centre Kula
- Medical School "7th April" Novi Sad
- "Benu" Pharmacies Novi Sad
- Home for Children with Disabilities Veternik
- Special Education School "Milan Petrovic" Novi Sad
- Center for Social Work Novi Sad
- Gerontology Center Novi Sad
- General Hospital "Đorđe Joanovic" Zrenjanin
- Special Hospital for Rheumatic Diseases "Banja Kanjiža"
- Special Hospital for Rehabilitation "Rusanda", Melenci
- Special Hospital for Rehabilitation "Termal", Vrdnik
- Primary School "Kosta Trifković" Novi Sad
- Primary School "Jovan Popović" Novi Sad
- Preschool Institution "Radosno detinjstvo" Novi Sad
- SOS Children's Village "Dr. Milorad Pavlović" Sremska Kamenica
- General Hospital Subotica
- General Hospital Vrbas
- Primary School "Dušan Radović" Novi Sad



1. Faculty of Medicine
2. Institute of Transfusion Medicine
3. Department of Pharmacy
4. Center of Forensic Medicine, Toxicology & Molecular Genetics
5. Center of Radiology
6. Outpatient Clinic
7. Clinic for Infectious Diseases
8. Center of Emergency Medicine
9. Clinic for Eye Diseases and ENT
10. Clinic for Maxillofacial and Oral Surgery, Clinic for Plastic and Reconstructive Surgery, Clinic for Urology
11. Clinic for Orthopedic Surgery and Trauma
12. Clinic for Dermatovenereological Diseases
13. Clinic for Neurosurgery, Clinic for Vascular and Transplant Surgery, Clinic for Anesthesiology and Intensive Therapy
14. Clinic for Nephrology and Clinical Immunology, Clinic for Endocrinology, Diabetes and Metabolic Diseases, Clinic for Gastroenterology & Hepatology, Clinic for Hematology, Center for Intensive Therapy & Toxicology
15. Clinic for Medical Rehabilitation
16. Clinic for Emergency Surgery, Clinic for Abdominal, Endocrine & Transplant Surgery
17. Clinic for Psychiatry, Clinic for Neurology
18. Center of Pathology and Histology
19. Institute of Public Health Vojvodina
20. Dentistry Clinic of Vojvodina
21. Institute for Health Protection of Children and Youth of Vojvodina (Children's Hospital)
22. Clinic for Pediatric Rehabilitation

INTEGRATED ACADEMIC STUDIES IN MEDICINE

LEVEL
Integrated Academic Studies

LENGTH OF STUDIES
6 years (12 semesters)

TOTAL ECTS CREDITS EARNED
360

ACQUIRED TITLE
Doctor of Medicine (M.D.)

LANGUAGE OF INSTRUCTION
English

ENTRY REQUIREMENTS
Previous education

Admission of students to the studies in English at the Faculty of Medicine in Novi Sad, is open to those who completed four-year secondary education (gymnasium or medical school). The applicants need to present a high school diploma/official transcript of grades from secondary school. Foreign citizens and applicants who completed secondary education abroad, need to present relevant secondary school documents validated and recognized by Serbian legal authority (National Agency for Qualification Recognition) confirming their eligibility for higher education studies.

Entrance exam

Applicants for admission into the first year undergraduate studies in English at the Faculty of Medicine Novi Sad must pass the following entrance exams:

- Biology
- Chemistry

The order of candidates for admission into the studies is established according to the results of the entrance examination and general results achieved at high school. The right for admission into the first year of studies is reserved for candidates according to their order in the frame of number determined for enrolment.

Enrolment contest into the first year of studies is carried out by the admission board appointed by the Educational Board of the Faculty of Medicine, whereas details about the procedure itself and entrance examination are arranged by a special record made by the Faculty Council.

Language requirements

Admission of students to the undergraduate studies in English is open to students if they are fluent in English (i.e. the language of study), which is supported with relevant certificate on language skills or tested by a relevant board appointed by the Dean of the Faculty of Medicine.

AIMS

The main goal of this study program is to train students to apply scientific and professional knowledge in prevention, diagnosis and treatment of patients, including promotion of healthy life style, legal and ethical conduct, and further professional education, all in accordance with the principles of good clinical practice.

Special goals of the Study Program include:

- acquiring knowledge of normal structure and biological functions of human body (including measuring and assessment methods), understanding health and ways of its promotion;
- acquiring knowledge of natural or accidental disturbance of the composition and/or function of particular organs, organ systems or entire human body and etiology of the disorders;
- acquiring knowledge and skills in respective clinical disciplines that provide competencies in the field of mental and physical diseases, their diagnosing and treatment (disease history taking, physical and psychological examination, interpretation of clinical and laboratory findings, becoming competent in basic clinical skills as well as performing a certain number of basic diagnostic and therapeutic procedures);
- acquiring knowledge of procedures and methods in the field of prevention, diagnosis and treatment of patients, as well as human reproduction;
- acquiring knowledge of living conditions of human being and it's environment, environment protection and social status of individuals;
- acquiring knowledge of deontology, ethics and legal responsibility of the physician/medical practitioner;
- acquiring clinical experience in the health centers and institutions under professional supervision;
- developing abilities and orientation towards continuous adaptation to modern requirements of medical science and practice within the European academic area;
- acquiring knowledge of research-scientific methodologies and the application of biomedical measurement, assessment of scientific facts and data analysis.

Graduate students of the Integrated Academic Studies in Medicine acquire and develop a variety of skills and clinical competence. In regard to numerous aspects of the study program, medical doctors also master principles of professional conduct, develop their research activities and abilities to systematically present topics in writing, orally or in electronic format, as well as efficiently use time and resources and take part in team work. The goals of the Medical Curriculum are to provide knowledge, understanding and attitudes which are necessary for a six-month internship followed by independent individual clinical work. The acquired knowledge will allow them to become engaged in the process of permanent medical education and further professional and scientific improvement.

The objectives of the study are in accordance with the training outcomes and are available to the public.

COMPETENCIES OF GRADUATE STUDENTS

After completing the study programs of Integrated Academic Studies in Medicine, students develop competencies and use their theoretical knowledge, clinical skills and professional communication standards during their professional and research activities.

Learning outcomes provided by the structure of the Curriculum, enabling the acquisition of knowledge, skill and attitude/behavior in the following categories of competencies (outcomes): integration of basic sciences in medicine, integration of clinical knowledge and skills in the care of patients, interpersonal and communication skills, professionalism, organization and systematic approach to medicine and continuing education and personal development.

All program outcomes are covered under the compulsory subjects defined by the program of study.

Integration of basic sciences in medicine

- Knowledge of the normal structure of the human body (cell tissues and organs)
- Knowledge of the normal function of the human body (cell tissues and organs)
- Knowledge of the nature of the agents and mechanisms that lead to changes in the structure and functioning of the organism
- Knowledge of the nature and pace of change in the function produced by etiological agents and mechanisms (Pathophysiology) of the body
- Knowledge of the nature and pace of change in the structure produced by the etiological agents and mechanisms (Pathological Anatomy) of the body
- Knowledge of the appropriate use of laboratory techniques to identify diseases or health problems
- Knowledge of the effects, metabolism and toxic effects of drugs
- Knowledge of the therapeutic use of drugs
- Knowledge of the normal growth and development
- Knowledge of the principles of health promotion and disease prevention
- Knowledge of the reaction / response of patients to disease
- Knowledge of the principles and concepts that are the basis of normal behavior and mental illness
- Knowledge of the aging process
- Knowledge of the principle of reproduction including fertility and conception, pregnancy and birth

Integration of clinical knowledge and skills in patient care

- Ability to perform satisfactory physical examination
- Ability to take satisfactory history
- Ability to use data from the history, the physical examination and the laboratory tests to identify health problems
- Ability to formulate an appropriate differential diagnosis
- Ability to formulate an effective plan of care (diagnostic, therapeutic and prevention strategies) for diseases and other health problems
- Ability to monitor the progress of the disease and appropriate revision of the plan of care
- Ability to perform routine technical procedures specific to a particular field of medicine
- Ability to document clinical examination of the patient
- Ability to apply the principles and concepts that are the basis of normal behavior and mental illness
- Ability to diagnose and participate in the management of mental illnesses
- Ability to use drugs therapeutically in the treatment of patients
- Ability to recognize normal growth and development
- Ability to recognize the relationship between health and disease, the patient and his environment
- Ability to apply psychosocial principles and concepts in the provision of health care services

- Ability to apply the principles and techniques of prevention and maintenance of health in the provision of health care services
- Ability to make appropriate use of laboratory methods to identify diseases or health problems
- Ability to identify patients with life-threatening conditions
- Knowledge of methods of relieving pain and suffering of patients
- Ability to apply the principles of evidence-based medicine in clinical decision making
- Ability to interpret the findings from history, clinical and laboratory examination of a specific area of clinical medicine
- Ability to adopt therapeutic protocols based on the principles of modern medicine (primarily for internal, surgical and psychiatric acute and chronic diseases)

Interpersonal and communication skills

- Ability to demonstrate the majority of effective patient-physician interactions
- Ability to use appropriate communication skills in history taking, diagnosis and implementation of an effective treatment plan
- Ability to communicate effectively with colleagues, patients, and their families, without prejudice to the language, culture, gender, race and lifestyle
- Ability to respect the patient's right to refuse treatment or participation in educational or research activities
- Ability to be in accordance with the professional code of ethics and keep patients' information confidential, and to reveal it in exceptional circumstances i.e. if the patient or others are at risk
- Ability to collect and arrange information, including the use of information technology
- Possession of communication competence, covering written and oral communication in one of the leading European languages

Professionalism

- Ability to apply humanistic values in health care
- Ability to collaborate with other health professionals in the provision of health care services
- Ability to respect the dignity, privacy and professional secrecy in the provision of health care services
- Ability of effective interactions with patients, colleagues and other health care workers from culturally diverse backgrounds

Organization and systemic approach to medicine

- Ability to apply concepts and principles of primary care and family medicine in the provision of health care services
- Ability to apply the principles of health promotion and disease prevention
- Ability to apply the principles and techniques of limiting the cost of providing healthcare services
- Knowledge of different health care systems, including social, economic and political dimensions
- Understanding of needs and values of consultation and reference of patients to different specialists in the provision of healthcare services
- Knowledge of ethical and legal issues relevant to the practice of medicine

Continuing education and personal training

- Recognizing the need for continuous education throughout the professional career in order to follow the latest relevant scientific achievements
- Ability to identify one's own needs concerning education and to use appropriate educational resources
- Ability to critically evaluate medical / scientific literature
- Ability to conceive, design, implement and develop research

ASSESSMENT AND ADVANCEMENT OF STUDENTS

By passing exam student accomplished ECTS credits according to the study program. Number of ECTS credits is expressed in terms of student's workload.

Assessment of students is done by continuous monitoring of students during the study and on the basis of points gained by performing pre-exam requirements and passing the exam. The way and procedure, and other questions on the student assessment are defined by the Rulebook on the assessment of students of the Faculty of Medicine, University of Novi Sad. The method of examination and grading in each course is defined by the course curriculum (practical, written or oral final part). Students are informed in advance about grading, quantification of pre-exam commitments and final exam. During regular classes teachers are testing the students in different ways (practical, written, oral exam, or in combination with one another).

Depending on the individual course, points are scored by attending lectures and exercises, grading tests that are taken during school hours, as well as by writing seminar papers, if they are included. During the school the continuous monitoring of students' work is required. By fulfilling pre-exam commitments and taking exams a student can earn up to 100 points. The proportion of points gained in pre-exam activities and by taking the exam is determined by the study program. The number of points allocated to teaching activities cannot be less than 30 nor more than 70 points.

The final grade (5-10) for each particular course is a reflection of accomplished points:

- <50.99 points – grade 5
- 51-60.99 points – grade 6
- 61-70.99 points – grade 7
- 71-80.99 points – grade 8
- 81-90.99 points – grade 9
- 91-100 points – grade 10

CURRICULUM

The program comprises 60 subjects, including 10 elective blocks. The total number of classes in the curriculum of the study program is 6.300, and the number of active classes 5.475, out of which 2.595 classes are devoted to theoretical teaching, 2.565 classes to practices, and 15 classes to other types of active teaching. Summer internships and clinical practical work include 735 classes, while graduate work includes 300 classes of scientific research and 90 classes for final diploma thesis preparation.

After the 3rd, 4th and 5th years of study, students are required to participate in practice at teaching hospitals from clinical courses (Internal Medicine, Infectious Diseases, Neurology, Dermatovenereology, Surgery, Pediatrics, Gynecology and Obstetrics, Physical Medicine and Rehabilitation, Emergency Medicine, Oncology, and Pediatrics). During the 6th year they participate also summer practice that takes 300 classes.

When a student has finished all the courses and passed all the exams that are prescribed, he/she starts working on graduation thesis and studies for the oral examination. The number of ECTS credits earned in the students' graduation thesis (20 ECTS) is included in the total number of credits required for completion of the study.

SCHEDULE OF SUBJECTS BY YEAR OF STUDY AND SEMESTER

I year of study												
No.	Course	No. of classes/week						No. of classes/year				ECTS
		Winter semester			Summer semester							
		L	P	OFT	L	P	OFT	L	P	Total	Other classes	
1.	Anatomy	4	3		4	5		120	120	240		24
2.	English Language 1	2			2			60		60		4
3.	Biophysics	2	1					30	15	45		6
4.	Biology with Human Genetics	3	2					45	30	75		8
5.	Medical Ethics	2						30		30		3
6.	First Aid		2						30	30		3
7.	Chemistry in Medicine				3	2		45	30	75		8
8.	Medical Statistics and Informatics				2	2		30	30	60		4
Total:		No. of classes of active teaching:						360	255	615		
	Professional practice:											60
	Total no. of classes in a year:							615				

L – theoretical teaching (Lectures); **P** – practical teaching (Practice); **OFT** – other forms of teaching

II year of study												
No.	Course	No. of classes/week						No. of classes/year				ECTS
		Winter semester			Summer semester							
		L	P	OFT	L	P	OFT	L	P	Total	Other classes	
9.	Histology and Embryology	3	3		3	3		90	90	180		10
10.	Medical Biochemistry	3	3		3	3		90	90	180		13
11.	Physiology	5	4		5	4		150	120	270		24
12.	English Language 2	2			2			60		60		2
13.	Neuroanatomy	1	2					15	30	45		3
14.	Communication Skills	2	1					30	15	45		2
15.	Introduction to Clinical Practice				1	4		15	60	75		2
16.	**Elective course 1** 1. Medical Sociology 2. General and Special Medical Cytology 3. Teaching and Learning 4. Classical Languages in Medical Terminology 5. Introduction to Scientific Research Work 6. History of Medicine and Dentistry 7. Variations in Anatomy				2	1		30	15	45		2
17.	**Elective course 2** 1. Medical Sociology 2. General and Special Medical Cytology 3. Teaching and Learning 4. Classic Languages in Medical Terminology 5. Introduction to Scientific Research Work 6. History of Medicine and Dentistry 7. Variations in Anatomy				2	1		30	15	45		2
Total:		No. of classes of active teaching:						510	435	945		
	Professional practice:											60
	Total no. of classes in a year:							945				

L – theoretical teaching (Lectures); **P** – practical teaching (Practice); **OFT** – other forms of teaching

III year of study												
No.	Course	No. of classes/week						No. of classes/year				ECTS
		Winter semester			Summer semester							
		L	P	OFT	L	P	OFT	L	P	Total	Other classes	
18.	Pathology	5	5		3	3		120	120	240		15
19.	Pathophysiology	3	4		3	4		90	120	210		14
20.	Microbiology and Immunology	3	2		3	2		90	60	150		8
21.	Psychological Medicine	2	1					30	15	45		3
22.	Clinical Propedeutics	2	6					30	90	120	30	7
23.	**Elective course 3** 1. Clinical Surface Anatomy 2. Introduction to Experimental Neuroscience 3. Microscopic Laboratory Techniques in Medicine 4. Clinical Genetics 5. Approaches to Working with People with Disabilities	2	1					30	15	45		3
24.	Pharmacology and Toxicology 1				5	3		75	45	120		7
25.	**Elective course 4** 1. Physiology of Sport 2. Clinically Oriented Embryology 3. Healthcare Management 4. Sign Language 5. Dissection Techniques in Anatomy				2	1		30	15	45		3
Total:		No. of classes of active teaching:						495	480	975		
	Professional practice:										30	60
	Total no. of classes in a year:							1005				

L – theoretical teaching (Lectures); **P** – practical teaching (Practice); **OFT** – other forms of teaching

IV year of study												
No.	Course	No. of classes/week						No. of classes/year				ECTS
		Winter semester			Summer semester							
		L	P	OFT	L	P	OFT	L	P	Total	Other classes	
26.	Pharmacology and Toxicology 2	3	2					45	30	75		4
27.	Internal Medicine	6	6		7	6		195	180	375	120	24
28.	Radiology	1	2		2	2		45	60	105		6
29.	Infectious Diseases	1	2		2	2		45	60	105	45	6
30.	Neurology	2	4					30	60	90	15	5
31.	**Elective course 5** 1. Health Psychology 2. Clinical Biochemistry 3. Safety of Supplements Consumption in Sports 4. Biochemistry and Genetics of Inherited Metabolic Diseases 5. Anthropometry	2	1					30	15	45		3
32.	**Elective course 6** 1. Health Psychology 2. Clinical Biochemistry 3. Safety of Supplements Consumption in Sports 4. Biochemistry and Genetics of Inherited Metabolic Diseases 5. Anthropometry	2	1					30	15	45		3
33.	Dermatovenereology				2	2		30	30	60	15	4
34.	Psychiatry				2	4		30	60	90	15	5
Total:		No. of classes of active teaching:						480	510	990		
	Professional practice:										210	60
	Total no. of classes in a year:							1200				

L – theoretical teaching (Lectures); **P** – practical teaching (Practice); **OFT** – other forms of teaching

V year of study												
No.	Course	No. of classes/week						No. of classes/year				ECTS
		Winter semester			Summer semester							
		L	P	OFT	L	P	OFT	L	P	Total	Other classes	
35.	Surgery	2	3		4	6		90	135	225	30	14
36.	Pediatrics	3	3		3	4		90	105	195	30	12
37.	Gynecology and Obstetrics	2	3		3	4		75	105	180	30	12
38.	Anesthesia and Perioperative Medicine	2	2					30	30	60		3
39.	Hygiene	2	3					30	45	75		4
40.	Epidemiology	2	2					30	30	60		3
41.	Transfusion Medicine	1	1					15	15	30		2
42.	**Elective course 7** 1. Rational Pharmacotherapy 1 2. Clinical Immunology 3. Rational Phytotherapy 4. Pharmacoeconomics 5. Experimental Animals and Experimental Design in Medical Research 6. Integrative Medicine 7. Interventional Radiology 8. Diagnostic and Molecular Imaging 9. Emergency Conditions in Internal Medicine 10. Interprofessional Education 11. Basics of Psychotherapy 12. Clinical Sexology 13. Bloodborne Diseases and Professional Prophylaxis 14. Professionally Orientated Education of Health Workers in Pharmaceutical Industry	1	2					15	30	45		3
43.	Maxillofacial Surgery with Fundamentals of Dental Medicine				1	1		15	15	30		2
44.	Nuclear Medicine				1	1		15	15	30		2
45.	**Elective course 8** 1. Rational Pharmacotherapy 2 2. Rational Drug Use in Pregnancy and Lactation 3. Special Epidemiology of Communicable Diseases 4. Special Epidemiology of Non-Communicable Diseases 5. Special Epidemiology of Hospital Acquired Infection (HAI) and Infection Control 6. Tropical Infectious Diseases 7. Intensive Care 8. Laboratory Medicine 9. Professionalism in Healthcare				1	2		15	30	45		3
Total:		No. of classes of active teaching:						420	555	975		
	Professional practice:										90	60
	Total no. of classes in a year:							1065				

L – theoretical teaching (Lectures); **P** – practical teaching (Practice); **OFT** – other forms of teaching

VI year of study												
No.	Course	No. of classes/week						No. of classes/year				ECTS
		Winter semester			Summer semester							
		L	P	OFT	L	P	OFT	L	P	Total	Other classes	
46.	Ophthalmology	2	2					30	30	60		3
47.	Otorhinolaryngology	2	2					30	30	60		3
48.	Clinical Pharmacology	2	2					30	30	60		2
49.	Occupational Medicine	2	1					30	15	45		2
50.	Medical Rehabilitation	2	1					30	15	45	15	2
51.	Emergency Medicine	1	2					15	30	45	30	2
52.	Oncology	2	1					30	15	45	15	2
53.	Forensic Medicine	2	3					30	45	75		4
54.	Geriatrics	1	1					15	15	30	15	2
55.	Social Medicine	2	1					30	15	45		2
56.	Family Medicine and Primary Health Care	2	2	1				30	45	75		2
57.	**Elective course 9** 1. Immunogenetic Testing 2. Immunohaematological Testing 3. Tissue and Organ Transplantation 4. Experimental Surgery 5. Pain Medicine 6. Clinical Toxicology 7. Palliative Medicine 8. Sports Medicine 9. Intensive Care and Therapy in Pediatrics 10. Early Childhood Development 11. Health of School-Age Children and Adolescent 12. Ethics in Pediatrics 13. Health Promotion 14. Personalized Medicine 15. Nutrition of Healthy and Unhealthy Child 16. Balneoclimatology	1	2					15	30	45		3
58.	**Elective course 10** 1. Immunogenetic Testing 2. Immunohaematological Testing 3. Tissue and Organ Transplantation 4. Experimental Surgery 5. Pain Medicine 6. Clinical Toxicology 7. Palliative Medicine 8. Sports Medicine 9. Intensive Care and Therapy in Pediatrics 10. Early Childhood Development 11. Health of School-Age Children and Adolescent 12. Ethics in Pediatrics 13. Health Promotion 14. Personalized Medicine 15. Nutrition of Healthy and Unhealthy Child 16. Balneoclimatology	1	2					15	30	45		3
59.	Clinical Practical Training										330	8
60.	Graduation Paper									300*	90	20
Total:		No. of classes of active teaching:						330	345	975		
	Professional practice:										495	60
	Total no. of classes in a year:							1470				

L – theoretical teaching (Lectures); **P** – practical teaching (Practice); **OFT** – other forms of teaching; ***SRW** – Study-research work

Course title: Anatomy

Course status: compulsory

ECTS Credits: 24

Condition: –

Course aim

Acquiring knowledge about the anatomy of human body, which will be the basis for further study of histological structure and function, and application of acquired knowledge in all branches of medicine, biomedicine, pharmaceutical-therapeutic and technological fields.

Expected outcome of the course:

Students will get acquainted with the morphology and structure of particular body parts. They will learn about the systematic and topographical anatomy applicable in practical part of the course. This knowledge is the basis of all clinical disciplines, such as pathological anatomy and histopathology, forensic medicine, pathophysiology, radiology and radiotherapy (nuclear medicine), as well as all surgical branches.
Acquiring practical knowledge in anatomy: identification of mutual relations of particular anatomical structures of organ systems, including vessel-nerve structures, as well as morphological and functional features of individual systemic and topographic parts. Learning about anatomical structures using cadaveric preparations, as well as the X-ray, MRI and CT techniques as the basis for post mortem examination and surgical techniques, radiological treatments and radiotherapy, as well as understanding biomedical and borderline disciplines.

Course description

Theoretical education

1. General anatomy: general osteology, general arthrology, general myology, general angiology, general neurology. 2. Bones, joints, muscles, blood vessels, lymphatics, nerves and regional anatomy of the upper limb. 3. Bones, joints, muscles, blood vessels, lymphatics, nerves and regional anatomy of the lower limb. 4. Back. 5. Thoracic walls. 6. Division of thoracic cavity. 7. Thoracic viscera (lungs and pleura, heart and pericardium, esophagus, blood vessels, lymphatic system and nerves). 8. Abdominal walls; 9. Division of abdominal cavity. 10. Abdominal viscera (organs, blood vessels, lymphatic system and nerves). 11. Pelvic walls. 12. Division of pelvic cavity. 13. Pelvic viscera (organs, blood vessels, lymphatic system and nerves). 14. Skull and facial bones, craniofacial cavities. 15. Joints, muscles, blood vessels, lymphatic system and nerves of the head and neck. 16. Head and neck organs. 17. Regional anatomy of the head and neck. 18. Sense organs – skin, eye, ear, sense of taste and sense of smell.

Practical education

1. General anatomy: general osteology, general arthrology, general myology, general angiology, general neurology. 2. Bones, joints, muscles, blood vessels, lymphatics, nerves and regional anatomy of the upper limb. 3. Bones, joints, muscles, blood vessels, lymphatics, nerves and regional anatomy of the lower limb. 4. Back. 5. Thoracic walls. 6. Division of thoracic cavity. 7. Thoracic viscera (lungs and pleura, heart and pericardium, esophagus, blood vessels, lymphatic system and nerves). 8. Abdominal walls; 9. Division of abdominal cavity. 10. Abdominal viscera (organs, blood vessels, lymphatic system and nerves). 11. Pelvic walls. 12. Division of pelvic cavity. 13. Pelvic viscera (organs, blood vessels, lymphatic system and nerves). 14. Skull and facial bones, craniofacial cavities. 15. Joints, muscles, blood vessels, lymphatic system and nerves of the head and neck. 16. Head and neck organs. 17. Regional anatomy of the head and neck. 18. Sense organs – skin, eye, ear, sense of taste and sense of smell.

Literature

Compulsory

1. Drake R, Vogl W, Mitchell A. Gray's anatomy for students. 3rd ed**.** London: Elsevier; 2014.
2. Netter FH. Atlas of human anatomy. 6th ed. London: Elsevier Health Sciences; 2014.

Additional

1. Outlines of lectures
2. Standring S, editor-in-chief. Grey's Anatomy – The Anatomical Basis of Clinical practice. 41st ed. London: Elsevier Churchill Livingstone; 2016.
3. Waschke J, Böckers TM, Paulsen F. Sobotta Anatomy Textbook. 1st ed. Munich, Germany: Elsevier GmbH; 2019.
4. Snell RS. Clinical anatomy by regions. 9th ed. Baltimore: Lippincott Williams & Wilkins; 2012.
5. Moore KL, Dalley AF (eds). Clinically oriented anatomy. 5th ed. Baltimore: Lippincot Williams; 2006.
6. Hudak R, Kachlik D, Volny O. Memorix anatomy. 1st ed. Prague: Triton; 2015.

Number of active classes	**Theoretical classes:** 120	**Practical classes:** 120

Teaching methods:

Lectures and practical classes

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures		Test	20
Practices		Practical exam	50
Colloquium	30		
Essay			

Course title: English Language 1

Course status: compulsory

ECTS Credits: 4

Condition: –

Course aim

Acquisition of the basic language skills which help students to use language actively and make progress in both general and medical English. To make students aware of how important it is to learn and use English as an international language of science.

Expected outcome of the course

Learning terminology in both general and medical English. Learning grammar, but concentrating more on language in context. Helping students to understand the basic differences between ESL and ESP and acquire new knowledge in both areas. Improving reading, listening, writing and speaking skills. Active communication and usage of sources in the subject area.

Course description

Theoretical education

Introduction: the importance of using English in everyday life as well as in the professional area; the human body seen from a layman's and a doctor's angle. Chemical elements and Compounds: structure of the atom, ions, isotopes, chemical bonds, basic elements that make up human body. The Cell: different living organisms (single-celled, multi-celled), the cell – structure and functions, different types of cells and their functions in the human body. The Skeletal System: types of bones; bone formation and structure – functions; the names of the major bones (their location in the skeleton); articulations. The Muscular System: types of muscles (their functions and structure); tendons and ligaments. The Digestive System: the main parts and other organs which take part in the process of digestion; general and specific functions. The Nervous System: nerve cell (structure and functions); generation and conduction of electrical impulses; the central nervous system; the peripheral nervous system (structure and functions). The Circulatory System: Lymphatic System (parts), Cardiovascular System (structure and functions), the heart, arteries and veins, blood pressure. The Respiratory System: respiration (external and internal); transport of gases; different parts of the system and their functions. The Excretory System: body systems and organs which remove waste products (skin, digestive and respiratory system); the urinary system – main organs and their functions. The Endocrine System: basic characteristics and functions, endocrine glands, different hormones and their roles. The Reproductive System: male and female reproductive systems (anatomy); gonads, fertilization, gestation, parturition. Senses: sense organs – their structure and functions (eye, ear, nose, tongue, skin). Body movements: words used for various body movements in everyday life. Physical appearance: description of appearance (hair, face, constitution, skin, general appearance). Character: description of various human characteristics (intelligence, attitudes, behavior, ambitions, righteousness and so on). Clothes: vocabulary on clothes and usage, materials, colors, general appearance, style. Interpersonal and Family Relationships: friendship, acquaintance, fellowship, kinship, love. Travel: means of transport, reasons for travel (business, adventure, touristic), planning, destinations, orientation. Food: various kinds of foods and their effects on health, national cuisines, food preparation, dining-out. Young People and Society: childhood, growing up, adolescence, man's role in the society, individuals as factors of change, students. Humor: humor as a reflection of intelligence and positive way of thinking, humor as a factor of health, cultural phenomenon, sense of humor. Fear: types of fear, causes of fear, overcoming fear, the role of fear in manipulating people. Memory: reliability of memories, training memory, motivation and memory, attention, learning. Loneliness: as a subjective phenomenon, circumstances leading to loneliness, solitude and loneliness.

Practical education

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Literature

Compulsory

1. Marošan Z. English for medical students. Novi Sad: Ortomedics; 2008.
2. Momčinović V, Tanau V, Žurić Havelka S. Medical English. Zagreb: University of Zagreb School of Medicine; 1988.
3. Raymond M. English grammar in use. Cambridge: Cambridge University Press; 1988.

Additional

4. Mcarthy M, O'Dell F. English vocabulary in use. Cambridge: Cambridge University Press; 1996.
5. Hornby AS. Oxford advanced learner's dictionary of current English. Oxford: Oxford University Press; 1968.
6. MacLean J. English in basic medical science. Oxford: Oxford University Press; 1980.

Number of active classes	**Theoretical classes:** 60	**Practical classes:** –

Teaching methods: Oral Approach and Situational Language Teaching; Audiolingual Method; Audio-visual method (video presentations, Internet); Lexical Approach; Communicative Approach; Task-Based Language Teaching.

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	30	Written	70
Practices		Oral	
Colloquium			
Essay			

Course title: Biophysics

Course status: compulsory

ECTS Credits: 6

Condition: –

Course aim:
The aim of this program is to provide students with the opportunity to develop knowledge of physics needed to understand the function of the major systems of the human body, linking physics to physiology and healthcare. The aim is also to obtain a fundamental understanding of physical phenomena and processes that may be applied in new technologies for healthcare.

Expected outcome of the course:
Upon successful completion of this course, students will demonstrate knowledge of basic physical principles and their applications to the understanding of human body and diagnostic systems used in many aspects of health sciences.

Course description

Theoretical education
1. Static Forces
2. Friction
3. Translational Motion
4. Angular motion
5. Elasticity and Strength of Materials
6. Fluids
7. The Motion of Fluids
8. Heat and Kinetic Theory
9. Thermodynamics
10. Transport Through Neutral Membranes
11. Waves, sound and ultrasound
12. Electricity
13. Impulses in Nerve and Muscle Cells
14. Electrocardiogram
15. Biomagnetism
16. Optics
17. Atomic Physics
18. Nuclear Physics and Nuclear Medicine

Practical education
1. Fluid Viscosity
2. Flow through a pipe
3. Microscope
4. Ultrasound
5. Magnetic resonance
6. Electrocardiogram
7. Optical Bench
8. Audiometry
9. Absorbed Radiation Dose
10. Radioactivity Measurement in Nuclear Medicine

Literature

Compulsory

1. Paul Davidovits. Physics in Biology and Medicine 5th Edition. Academic Press 2018. ISBN: 9780128137161
2. George Hademenos. Schaum's Outline of Physics for Pre-Med, Biology, and Allied Health Students. McGraw-Hill Education 1998. ISBN-13: 978-0070254749
3. Biophysics DeMystiFied 1st Edition McGraw-Hill Professional; 2010. ISBN-13: 978-0071633642

Additional

1. Russell K. Hobbie, Bradley J. Roth. Intermediate Physics for Medicine and Biology 4th Editon. Springer Science+Business Media 2007, LLC. ISBN-10:0-387-30942-X
2. Suzanne Amador Kane. Boris A Gelman. Introduction to Physics in Modern medicine Third Edition. CRC Press; 3 edition 2020. ISBN-13: 978-1138036031

Number of active classes	**Theoretical classes:** 30	**Practical classes:** 15

Teaching methods: Lectures, students practical work, teacher demonstrations, discussions, virtual science labs, projects, multimedia approach (ppt, video clips, animations)

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	20	Written	60
Practices	20	Oral	
Colloquium			
Essay			

Course title: Biology and Human Genetics

Course status: compulsory

ECTS Credits: 8

Condition: –

The aim of the course is to acquaint students with the organization and structure of the cell and cell organelles, the organization of the human genome and the expression of the human genome, as well as with the genetic mechanisms of hereditary diseases. Throughout the course, the student will use numerous sources of information through various forms of teaching activities and gain new knowledge of the fundamental concept and technological advances in human genome research, and will also gain insight into the human microbiome. The aim of the course is to understand and adopt the processes and mechanisms of transferring of the structure and expression of genetic information at the levels of molecules, chromosomes, organisms and populations**.**

Expected outcome of the course:

After completing the course, the student will understand theories about the evolution of life, learn the structure of the cell and cell organelles, and distinguish between prokaryotic and eukaryotic cells as well as plant and animal cells. They will be able to recognize the importance of certain organelles in the transmission and regulation of gene expression. The student will understand basic genetic concepts and recognize the importance of genetics in modern science. They will learn about chromatin structure, morphological and functional organization of chromosomes. They will clearly distinguish between the stages of meiosis and understand the importance of cell division in transmission genetics. Through examples, they will apply Mendel's laws, understand the intra and inter locus interactions of genes. Students will anticipate possible mechanisms of inheritance and accurately construct pedigree based on given data. They will understand the mechanisms of mutations, and the mechanisms of DNA repair. They will understand and differentiate basic molecular genetics techniques in prenatal diagnosis, population genetics and forensics and understand the principles of gene therapy. After successfully completing the pre-exam and exam obligations, the student will be able to distinguish between levels of structural and functional organization of the human genome; identify mechanisms of regulation of gene expression; understand the processes of genetic experiments that explain causes of hereditary diseases of varying complexity and etiology; explain the methodology of basic molecular genetics techniques in prenatal diagnosis, population genetics and forensics; use internet sources and professional literature with understanding.

Course description

Theoretical education

Evolution of life and the formation of cells and nucleic acids. Cell structure, cell organelles, transport trough the cell membrane. Human microbiome. Nucleic acid structure, DNA replication and types of RNA molecules. Gene expression and control of gene expression. Molecular organization of chromosomes, organization of the human genome. Cell cycle and cell division, gametogenesis, causes of chromosome non-disjunction. Basic principles of inheritance, Mendel's laws, classification of genetic diseases, formation of pedigree. Extension of Mendel's laws: incomplete dominance, codominance, multiple alleles, mitochondrial inheritance. Extension of Mendel's laws: expressivity and penetrance, pleiotropy, phenocopies, genocopies, lethal alleles, linked genes, gene interactions. Autosomal dominant diseases, autosomal recessive diseases. Polygenic, multifactorial and complex diseases. Sex chromosomes and sex-related traits, traits influenced by sex. Sex determination in humans and disorders of gender differentiation. Chromosome aberrations: structural and numerical and analysis of selected syndromes caused by aberrations. Uniparental disomy and gene imprinting. Gene mutations, recombinations, DNA repair mechanisms and diseases associated with malfunctioning of DNA repair mechanisms. Molecular methods in human genetics. Prenatal and preimplantation diagnosis of genetic diseases; Genetic counseling. Possibilities of gene therapy.

Practical education

Nucleic acids and gene expression; Structural and molecular organization of chromosomes; Cell division; Basic laws of inheritance; Pedigree analysis; Gene interactions. Multiple alleles and blood groups; Gene interactions. Partial dominance. Codominance. Epistasis; Sex determination. Sex-related traits; Chromosomal numeric aberrations; Chromosomal structural aberrations; Multifactorial inheritance; Molecular markers in human genetics.

Literature

Compulsory

1. Turnpenny P, Ellard S. Emery's elements of medical genetics. Elsevier; 2009.

Additional

1. Lewis R. Human Genetics, 12th edition Mc Graw-Hill Education, New York, 2018.
2. Alberts B, Johnson A, Lewis J, Morgan D, Raff M, Roberts K, Walter P. Molecular Biology of the Cell, Sixth Edition. Garland Science, Taylor & Francis Group, New York, US, 2015.

Number of active classes	**Theoretical classes:** 45	**Practical classes:** 30

Методе извођења наставе

Student activity assessment (maximally 100 points)			
Pre-exam activities	**points**	**Final exam**	**points**
Lectures		Written	65
Practices	5	Oral	
Colloquium	30		
Essay			

Course title: Medical Ethics

Course status: compulsory

ECTS Credits: 3

Condition: –

Course aim

To encourage students to develop and adopt ethical schemes for the future profession. Making the students familiar with the recent trends in medical ethics.

Expected outcome of the course

To achieve familiarity with some basic ethical frameworks and understand how these ethical frameworks promote thinking through contemporary questions in medical ethics. To think clearly and carefully through the own positions about important issues in contemporary medical ethics and the compatibility of these positions with broader philosophical commitments (i.e. personality, human and personal rights, human flourishing, etc.).

Course description

Theoretical education

Ethical Theories. Doctor-Patient Relationship. Confidentiality. Truth Telling. Autonomy and Informed Consent. The Definition of Death and the Persistent Vegetative State. Decisional Capacity and the Right to Refuse Treatment. Abortion. Reproductive Control. Religious Ethical Considerations. Seriously Ill and Impaired Infants. Euthanasia and Physician-Assisted Suicide. Human and Animal Research. Biotechnology and Reproductive Technology. Embryonic Stem-Cell Research. Plastic Surgery.

Practical education

Seminar paper on selected topics to show the understanding of and analytical engagement in the subject matter.

Literature

Compulsory

1. Bjelica A. An outline of medical ethics. Novi Sad: Faculty of Medicine; 2015.

Number of active classes	**Theoretical classes:** 30	**Practical classes:** –

Teaching methods

Lectures

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	10	Written	50
Practices		Oral	
Colloquium	20		
Essay	20		

Course title: First Aid

Course status: compulsory

ECTS Credits: 3

Condition: –

Course aim

Basic goals of education are introducing students to principles of initial help to suddenly injured or diseased patients. Application of theoretical knowledge in practice. Learning skills for immediate management of the injured, protecting their life as well as the life of a helper and the environment.

Expected outcome of the course

Teaching: Teaching students about forms of sudden disease and getting hurt and ways of management.
Skills: Skills of examining and recognizing signs and symptoms that require prompt and immediate reaction.

Course description

Theoretical education

1. ERC (European resuscitation council) e- platform 2016.

Practical education

Practical teaching is done on models and with situation simulations:

1. Assessment of vital functions and conscience. Maintenance of breathing and securing airways. Bolus obstruction – partial, total. Procedure algorithms in children and adults. Artificial respiration.
2. Appropriate position for injured or suddenly diseased patients (side-relaxing, semi-side position, supine, prone, sitting up…).
3. Sudden heart arrest and basic resuscitation methods in adults and children. Application of automatic external defibrillators. Procedure algorithms for resuscitation in adults and children. Special injuries, diseases and conditions and care.

Literature

Compulsory

1. Piazza G. First aid manual. American College of emergency physicians. New York. 2015.

Additional

2. ERC (European Resuscitation Council) e- platform 2016. BLS manual 2016 (PDF).
3. ERC (European Resuscitation Council) ALS manual 2016 (PDF). Pediatric ALS 2016 (PDF).

Number of active classes	**Theoretical classes:** –	**Practical classes:** 30

Teaching methods

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures		Written	60
Practices	40	Oral	
Colloquium			
Essay			

Course title: Chemistry in Medicine

Course status: compulsory

ECTS Credits: 8

Condition: –

Course aim

- to provide wide and balanced theoretical knowledge of chemistry and the chemical structure of molecules applied in modern medicine;
- to enable students to understand chemical reactions and processes in the human body.

Expected outcome of the course:

After successfully completing the course the student is able to:

- demonstrates acquired knowledge of chemical principles and reactions necessary for the functioning of the human body;
- lists biologically important elements, ions and biomolecules included in processes in human cells;
- correctly interprets the connection between the structure and activity of simple and complex molecules widely applied in medicine;
- independently analyzes and applies chemical trends in medicine.

Course description

Theoretical education

Atomic theories, chemical bonds, intermolecular forces. Radioisotopes. Water structure, hydrogen bonds, and hydrophobic interactions. Solutions, solubility, diffusion, dialysis, osmosis, osmodiuretics. Acids and bases. pH and buffer systems in the human body. Redox reactions in a living organism. Rate of chemical reactions and chemical equilibria in a living organism. Influence of concentration, pH, ionic strength and temperature on the rate of a chemical reaction. Molecular basis of life – biologically important elements, ions and biomolecules. Organic compounds in medicine. Isomerism, functional groups and reactivity of organic molecules. Heterocyclic compounds in medicine. Relationship between structure and activity of major organic molecules and pharmaceuticals. Chemistry of carbohydrates, lipids and steroids. Amino acids and proteins. Nucleotides and nucleic acids. Vitamins. Amphiphilic biologically active molecules. Fundamentals of thermodynamics of the human organism. Molecular modeling of medically important molecules and pharmaceuticals. Correlation between physicochemical properties and biological activity of molecules. Toxicity of inorganic and organic compounds.

Practical education

Theoretical exercises: Quantitative expression of solution composition. Colligative properties of the solution. Acid-base equilibria: calculation of pH in aqueous solutions of acids, bases and buffers. Salt hydrolysis. Chemical reaction rate. Molecular modeling.

Laboratory exercises: Measurement of mass and volume. Preparation of a solution of a certain concentration. Demonstration of diffusion and osmosis processes. pH measurement. Preparation of buffer solution. Reactions of functional groups of organic compounds. Reactions of biomolecules.

Literature

Compulsory

1. Weekly teaching load provided by lecturers
1. Fundamentals of Medicinal Chemistry, Gareth Thomas, University of Portsmouth, UK, 2003, John Wiley & Sons Ltd.
2. Medicinal Chemistry – A Molecular and Biochemical Approach, 3rd Edition, Thomas Nogrady and Donald F. Weaver, 2005, Oxford University Press, Inc.
3. Principles of Organic Medicinal Chemistry, R.R. Nadendla, India, 2005, New Age International (P) Ltd.

Number of active classes	**Theoretical classes:** 45	**Practical classes:** 30

Teaching methods: theoretical classes, practical classes, seminars, consultations

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	10	Written	60*
Practices	60	Oral	30

*Passed tests replace the written part of the exam.

Course title: Medical Statistics and Informatics

Course status: compulsory

ECTS Credits: 4

Condition: –

Course aim:
To enable students to use basic statistical-analytical procedures, to design simple surveys, to read professional and scientific literature critically and to apply informational technologies in the field of medical sciences.

Expected outcome:
Students will be able to distinguish the statistical aspects of professional and scientific papers in the field of medical sciences, to use different statistical methods, to process and interpret the data collected in the study and to use computers to solve problems by using pre-built software solutions.

Content
Theoretical education
Basic concepts in statistics. Statistical population, units and symbols. Stages of statistical processing and interpretation of results. Relative numbers. Measures of central tendency. Measures of variability. Homogeneity assessment. The types of samples. Trend. Correlation analysis. Parametric and non-parametric tests for testing statistical hypotheses. Method of population health status analysis. Basics of hardware and software architecture of the computer. System and application software. Basics of computer networks and the Internet. Text editing and calculation in tables. The use of computers in medicine (data processing, medical information systems, medical diagnostics, standards in medical informatics, telemedicine and e-health).

Practical education
Sampling. Selection and use of statistical methods based on problem and variables types. Presenting data in tables and charts. Interpretation of the results and making conclusions. Indicators for population health status analysis. Basic functions of operational system. Working with files. Text editing. Cross-table calculations.

Literature
Compulsory
1. Stewart A. Basics statistics and epidemiology. A practical guide. Abingdon, UK: Radcliffe Medical Press Ltd; 2002.
2. Harris M, Taylor G, editors. Medical statistics made easy, third edition. Banbury, UK: Scion Publishing; 2014.
3. Moore DS, editor. The basic practice of statistics, third edition. New York: W.H. Freeman and Company; 2004.
Additional
1. Peacock JL, Peacock PJ, editors. Oxford Handbook of Medical Statistics. Oxford: Oxford University Press; 2011.
2. Riffenburgh R. Statistics in Medicine. San Diego: Academic Press; 2005.
3. Coolidge LF, editor. Statistics: A Gentle Introduction. Third Edition. University of Colorado, Colorado Springs: SAGE publications; 2013.

Number of active classes	**Theoretical classes:** 30	**Practical classes:** 30

Teaching methods: Lecture; Practice; Work on computer

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	10	Written	70
Practices	20	Oral	
Colloquium			
Essay			

Course title: Histology and Embryology

Course status: compulsory

ECTS Credits: 10

Condition: –

Course aim:
Acquiring knowledge and skills necessary to: 1. recognize and distinguish specific tissues and organs including their ultrastructural characteristics, and recognize structures deviating from normal morphological characteristics of tissues and organs; 2. distinguish specific phases in human embryonic and fetal development, describe basic disorders of particular organs and organ systems.

Expected outcome of the course:
Knowledge: Student needs to be able to specify: 1. ultrastructural cell characteristics, morphological characteristics of organelles as well as their functions, ultrastructural characteristics of specific cell types with regard to their function; 2. types of tissues, their morphological characteristics, location and function; 3. morphological characteristics of all organ systems, in particular organs with their basic functions; 4. morphological features of pre-embryonic, embryonic and fetal human development; 5. histological elements associated with particular developing organs relevant to assessment of fetal age; 6. morphological basis of disorders in development of specific organs and organ systems.
Skills: Student will become capable to: 1. recognize all cell organelles in electron microscope photographs and register changes inconsistent with normal cells; 2. distinguish 4 basic types and all subtypes of tissues and register changes inconsistent with normal tissues under light microscope; 3. distinguish all organs presented in practical classes, point to their elements relevant for structure and for differentiating them from other organs and to recognize changes inconsistent with normal structure; 4. describe and recognize in graphic representations and photographs specific phases of intrauterine fetal development; 5. make an assessment of approximate fetal age based on histological structure of developing organs as seen under light microscope; 6. recognize basic disorders in development of particular organs and organ systems when seen in graphic representations, drawings and photographs.

Course description
Theoretical education
1. Ultrastructural characteristics of the cell: cell membrane, cytoplasm, nucleus, cytoskeleton, membranous and non-membranous organelles, cytoplasmic inclusions, cell cycle, cell division and cell renewal, mechanisms of cell death.
2. Histological characteristics of epithelial, connective, muscle and nervous tissue, subtypes, structure, function and localization in the body.
3. Histological structure of organs of the circulatory and immune system, digestive system and glands of digestive system, respiratory system, urinary system, male and female reproductive system, endocrine and nervous system, sense organs, integumentary system, bone and joints.
4. Fertilization, umbilical cord and placenta, pre-embryonic development, germ layers – ectoderm, mesoderm and endoderm and their further differentiation, embryonic and fetal development of tissues, folding of the embryo and formation of the primitive gut, formation of the head and neck, development of the digestive, respiratory, circulatory system, lymph organs, development of nervous, sensory and endocrine system, reproductive system, urinary system and skeleton. Malformations in the process of development, macroscopical and microscopical characteristics and importance for the survival.

Practical education
1. The cell and cellular organelles at the level of electron microscope – microphotographs.
2. Epithelial tissue, covering, glandular and sensory epithelium, simple, stratified and pseudostratified epithelium, connective tissues with fluid, viscous and hard matrix.
3. Histological structure of the: heart, arteries, veins, capillaries; thymus, lymph nodes, spleen, tonsils; organs of the oral cavity, pharynx, esophagus, stomach, small intestine, large intestine, salivary glands, pancreas, liver, gallbladder; respiratory and olfactory region of the nasal cavity, larynx, trachea, bronchial tree, lungs, pleura; kidneys and excretory passages of the urinary system; ovaries, oviducts, uterus, vagina, mammary glands, testes, extratesticular ducts, accessory male genital glands; pineal body, pituitary, thyroid, parathyroid and suprarenal gland; organs of the central and peripheral nervous system, organs of the sensory system-eye, ear, taste buds; the skin and derivatives of the skin, bone and joints.
4. Histological structure of embryonic and fetal tissues and organs: umbilical cord, placenta, development of epithelial, connective, muscle and nervous tissue, development of skeleton, ossification, development of lips and teeth, fetal liver, pancreas, lungs, kidneys, ovaries, testes.

Literature
Compulsory
1. Ross M, Kaye G, Pawlina W. Histology: A Text and Atlas. 8th ed. Wolters Kluwer Health; 2019. 928p.
2. Sadler TW. Langman's Medical Embryology. 14th ed. LWW Lippincott Williams and Wilkins; 2018. 456p.
Additional
1. Junqueira LC, Carneiro J (edited by Mescher AL). Junqueiras Basic Histology: Text and Atlas. 15th ed. The McGraw Hill Companies; 2018. 480p.
(For the purposes of learning histology, older editions of the aforementioned literature are also appropriate.)

Number of active classes	**Theoretical classes:** 90		**Practical classes:** 90
Teaching methods: Lectures and Practice			
Student activity assessment (maximally 100 points)			
Pre-exam activities	**points**	**Final exam**	**points**
Lectures	10	Practical	10
Practices	20	Written	
Colloquium	5	Oral	**50**
Essay	**5**		

Course title: Medical Biochemistry

Course status: compulsory

ECTS Credits: 13

Condition: Biology and Human Genetics; Chemistry in Medicine

Course aim:

To gain knowledge about the structure and function of basic biomolecules, the metabolic pathways, the specificities of the metabolism of organs and tissues, as well as mechanisms of the regulation of metabolism. Acquiring the necessary knowledge for better understanding of biochemical-physiological and pathological processes in the organism. In addition, to provide an overview of the basic biochemical methods used in clinical biochemistry as diagnostic tools and thus to prepare future physicians to properly use and interpret these methods and the results obtained.

Expected outcome of the course:

Knowledge of basic constituents of the body. Knowledge of common biochemical pathways, bioenergetics, regulatory mechanisms and its importance for the normal metabolism. Knowledge of biological processes on the molecular level and understanding the basics of the diseases. Knowledge of the specific biochemical processes in various tissue-types and organs. Proper sampling of biologic material for biochemical tests. Evaluation of the reliability of biochemical methods and their use in the diagnostic procedure Use of results of biochemical analyses in diagnostic procedure. Functional examination of metabolisms based on the analysis of the biological specimens.

Course description

Theoretical education

1. Introduction. Bioelements and biomolecules. Energy. Chemical reactions within cells. 2. Water as biological solvent and biomolecule. 3. Amino acids. Peptides. 4. Proteins – structure, physical and chemical properties, classification. 5. Fibrillary proteins – keratin and collagen, structure and function. 6. Hemoproteins – structure and function of hemoglobin and myoglobin, cytochromes, non-porphyrin metalloproteins. 7. Nucleic acids – general structure. Structure and properties of DNA. Structures, types and functions of RNA. 8. Carbohydrates – mono-, di- and oligosaccharides, polysaccharides, glycosaminoglycans. 9. Lipids – fatty acids, alcohols, simple and complex lipids, properties. Phospho-, glycero-, and sphingolipids; biological membranes. 10. Glyco-, lipo-, and phosphoproteins. 11. Enzymes – structure, properties, mechanism of catalysis, classification. Enzymatic reaction kinetics. Factors influencing enzymatic kinetics, activation and inhibition. Isoenzymes, diagnostic importance of enzymes in practical medicine. Coenzymes and vitamins. 12. Bioenergetics – thermodynamics, exergonic and endergonic reactions. Energy rich chemical bonds. Biological oxidation. Electron transport system of mitochondria, ATP synthesis. 13. Biochemistry of oxidative stress. Antioxidative mechanisms. 14. Metabolic pathways. Catabolism, anabolism. Regulation of metabolism. 15. Digestion and absorption of carbohydrates. Catabolism of carbohydrates – glycogen catabolism, glycogenolysis. Glycolysis: process, energy balance, regulation. Oxidative decarboxylation of pyruvate. The Krebs cycle of citric acid: process, energy balance, regulation. Pentose phosphate pathway – process and importance. Catabolism of other hexoses. Anabolism of carbohydrates – gluconeogenesis: process, energy balance, regulation. 16. Digestion and absorption of lipids. Lipoprotein metabolism. Catabolism of lipids – beta-oxidation of fatty acids, regulation. Catabolism of triglycerides, phospho-, and sphingolipids, cholesterol. Ketogenesis. Anabolism of lipids – biosynthesis of fatty acids: process and regulation. Biosynthesis of triglycerides, phospho-, and sphingolipids. Biosynthesis of cholesterol. 17. Digestion of proteins and absorption of amino acids. Metabolism of amino acids. Deamination, transamination. Ureagenesis. 18. Biosynthesis of nucleotides. Breakdown of nucleic acids. Biosynthesis of heme. 19. Molecular basis of heredity – DNA. Synthesis of DNA – replication. Synthesis of RNA – transcription. Synthesis of proteins – translation and processing. 20. Restrictive endonucleases. Vectors and cloning. Identification and isolation of genes (Blot). cDNA library. Polymerase chain reaction – PCR. 21. Cell cycle, oncogenes, growth factors, carcinogenesis. 22. Signaling molecules, mechanism of signal transduction. 23. Biochemistry of the eye. Biochemistry of nervous tissue – general metabolism, transduction of nerve impulses. 24. Water and electrolytes – distribution and metabolism of water, transport of electrolytes via the cell membrane, acid-base balance, and mineral metabolism. 25. Biochemistry of the blood – blood plasma, blood clotting, biochemistry of red blood cell. 26. Biochemistry of connective tissue. 27. Biochemistry of bones. 28. Central position of the liver, metabolism of glycogen, gluconeogenesis, ureagenesis. Metabolism of bilirubin, mechanisms of detoxification. 29. Hormones – classification, mechanism of action. Hormones of thyroid gland. Parathyroid hormone and D-hormone. Hormones of the adrenal medulla: adrenalin, noradrenalin, dopamine. Hormones of the pancreas. Hormones of the adrenal cortex: gluco-, and mineralocorticoids. Hormones of adeno- and neurohypophysis. Hormones of the gonads: oestrogens, progesterone, testosterone. Hormones of gastro-intestinal system. Hormones of the fatty tissue. 30. Prostaglandins, thromboxane and leukotrienes. 31. Biochemical basis of the immunological defense. 32. Molecular mechanisms of muscular contraction. 33. Biochemistry of the kidneys.

Practical education

1. Measurements in medical biochemistry – review. Calculation of the reference values, precision and accuracy of measurement. 2. Photometry – principles of the Lambert-Beer law. Absorbance (extinction) and molar extinction coefficient. Blank and the standard solution. Colorimeter and spectrophotometer. The absorption spectrum. Application of photometry. Colorimetric determination concentration via molar extinction coefficient, standard solution and calibration curve. Determination of the proportionality factor. 3. Quantitative determination of blood plasma protein concentration – methodology review. Quantitative determination of total blood plasma protein concentration. Determination of serum albumin concentration. 4. Serum protein fractions. Albumin/Globulin index. Plasma fibrinogen isolation. 5. SEMINAR: Enzymology. Qualitative assessment of enzymatic activity of α-amylase from saliva. 6. Principles of quantitative determination of enzymatic activity. Determination of the initial velocity of the enzymatic reaction. Determination of the Michaelis constant 7. Determination of the molar extinction coefficient of NADH coenzyme. UV test. Measurement of the enzymatic activity in serum. 8. Isoenzymes – definition, characteristics, diagnostic importance of isoenzyme profile. 9. SEMINAR: Vitamins and coenzymes. Quantitative determination of vitamin C in urine. 10. Metabolism of carbohydrates. Metabolism of glucose. Quantitative determination of blood glucose concentration – methodology review. Quantitative determination of serum glucose concentration. 11. Polarimetry – the principle of Biot law. The specific rotation. Determination of specific rotation of glucose. Quantitative determination of glucose in urine by polarimetry. 12. Metabolism of lipoproteins. Quantitative determination of serum cholesterol and triglyceride concentration. 13. Metabolism of proteins. Amino acid metabolism. Ureogenesis. Quantitative determination of serum urea concentration. 14. Metabolism of nucleic acid. The metabolism of purine and pyrimidine nucleotides. Quantitative determination of uric acid in serum. 15. Quantitative determination of DNA and RNA. 16. SEMINAR: Molecular biology. Recombinant DNA technology. 17. Metabolism of minerals. Metabolism of calcium. Quantitative determination of total calcium in blood plasma. 18. Metabolism of magnesium and inorganic phosphate. Quantitative determination of magnesium and inorganic phosphate in plasma. 19. Metabolism of minerals. Metabolism of iron. Quantitative determination of iron and iron binding capacity in serum. Quantitative determination of hemoglobin. 20. Biochemistry of liver. Metabolism of bilirubin. Qualitative determination of direct and indirect bilirubin in serum. Quantitative determination of serum bilirubin concentration. Qualitative analysis of bilirubin, urobilinogen and urobilin in urine. 21. Biochemistry of kidneys. Quantitative determination of creatinine. 22. Ion-exchange chromatography of amino acids.

Literature

Compulsory

1. Lieberman M, Marx A. Marks' Basic Medical Biochemistry – A Clinical Approach, 4th Edition. Wolters Kluwer Health, 2013.
2. Harvey R, Ferrier D. Lippincott's Illustrated Reviews: Biochemistry, 5th Edition. Wolters Kluwer Health, 2011.
3. Rodwell A, et al. Harper's Illustrated Biochemistry, 30th Edition. The McGraw-Hill Education, 2015.
4. Kovačević Z, Milošević Tošić M. Practical Biochemistry and Molecular Biology, Novi Sad, 2001.

Number of active classes	**Theoretical classes:** 90	**Practical classes:** 90

Teaching methods Oral presentations for small group of students using multi-medial didactic tools. Control of knowledge by the use of tests with multiple choice questions. Practical work in independent execution of biochemical tests and interpretation of the obtained results.

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	8	Written	
Practices	12	Practical	15
Colloquium	25	Oral	40
Essay			

Course title: Physiology

Course status: compulsory

ECTS Credits: 24

Condition: Anatomy

Course aim:

The aim of the physiology study is that the students gain knowledge about the functioning, the mutual integration and interactions of cells, tissues, organs, organic systems and human organism as a single unit, as well as the forms of their organization, regulation and mechanisms for maintaining homeostasis in the changing external and internal conditions.

Expected outcome of the course:

The acquired knowledge in physiology should provide students with a logical understanding of the fundamental mechanisms of physiological processes in the body, ways of maintaining homeostasis at the level of the cell membrane, cell, organ and organic system and maintaining health in the complex, but integrative human body. Students should understand the nervous and humoral regulatory mechanisms and the principles of functioning of the organism and organ systems in different states and under the influence of external and internal changes. Such knowledge should provide them a successful understanding of pathophysiological processes and prepare to work with different clinical subjects. Students should acquire basic knowledge of laboratory equipment and work in laboratory conditions, general principles and rules of the attitude towards the respondent or patient and to learn how to properly conduct basic examinations that give insight into the physiological state of the organism, which will enable them to participate safely in practical learning within professional within professional subjects and clinical practice.

Course description

Theoretical education

Introduction in physiology: Functional organization of human body and control of homeostasis. Cells as basic living units of human body, their functional parts and their function. Special importance and role of the cell membrane and their structures. Transport through biological membranes. Basics of the homeostatic mechanisms. **Respiration:** Respiratory pathways. Respiratory surface. Ventilation. Phonation and speech. Lung volumes and capacities. Physiological characteristics of pulmonary circulations. Transport of gases to the cells. Main and accessory respiratory musculature. Interpleural pressure. Regulation of respiration. Kinds and types of respiration. Respiration in the conditions of decreased and increased atmospheric pressure. **Blood:** General functions of blood. Blood plasma. Red blood cells. White blood cells. Immunity and immune bodies. Platelets. Coagulation and hemostasis. Blood types. Transfusion and transplantation. **Heart, circulation and lymph**: Functional characteristics of circulation. Morphofunctional characteristics of the heart muscle. Pericardium. Specialized excitable and conductive system of the heart. Specific bioelectrical events in the working and specialized heart muscle. Heart cycle. Heart sounds. Heart hemodynamics. Registration and analysis of ECG. Regulation of the heart. Policardiography. Basic characteristics of the circulation. Blood vessels. Arteries. Capillaries and exchange of substances. Veins. Lymph system. Regulation of local blood flow. Regulation of blood pressure. Neurohumoral mechanisms of blood vessels diameter regulation. **Digestion** Basic functions of the digestive system. Basic movements in the digestive tract. Digestion in the mouth. Saliva, regulation of salivation. Vomiting. Digestion in the stomach. Digestion in the small intestine. Roles of the pancreas in digestion. Bile. Digestion in the large intestine. Resorption in different parts of digestive tract. Regulation of digestive juices excretion. Liver. Defecation. **Metabolism**: Role of nutrients. Minerals and vitamins. Methods of investigation of the metabolism. Respiratory quotient. Basal metabolism. Metabolism in physical activity. Design of the daily menu. **Thermoregulation**: Mechanisms of maintenance of the temperature balance of the body core. Physical and chemical thermoregulation. Physiological basis of hypo- and hyperthermia. **Excretion:** Physiological roles of the kidneys. Ultrastructure of the nephrons. Glomerular filtration, filtration membrane, pressures and autoregulation. Mechanism, level and changes of the tubular reabsorption and secretion. Tubulo-glomerular feedback. Role of kidneys in the homeostasis of the osmolality, volemia, ionia, blood pressure. Renal concentration power. Regulation of kidney function. Quantity and quality of the urine. Miction. **Excitable tissue:** Resting potential. Action potential. Laws of excitation. Local answer. Refractoriness. Action potential propagation. Accomodation. **Senses:** General features, division and basic function Senses. Receptors. Vision. Light refraction part of eye. Light receiving part of eye. Lences and ophthalmoscopy. Hearing. Equilibrium. Muscle-joint perception. Tactile and thermal perception. Visceroreception. Smell and taste. Pain and analgesic system. **Muscles:** Division of muscles in body. Morpho-functional characteristics of skeletal muscles. Neuro – muscular synapses. Connection between excitation and contraction. Skeletal muscle contraction. Different muscle contractions. Types of muscle fibers. Motor unit. Muscle tone. Energetics of muscle contraction. Work, power and muscle fatigue. Morpho-physiological characteristics of smooth muscle. **Autonomous nervous system:** Sympathetic and parasympathetic nervous system: structure, classification, of the vegetative ganglia and their function, specific mediators. Division of vegetative reflexes and the significance of dual organ innervation. Effects of the autonomous nervous system in the inner organs functioning. **Endocrinology:** Basic characteristics of hormones and endocrine glands. Thyroid gland. Parathyroid gland. Pancreas. Suprarenal gland. Male and female gonads. Pituitary gland: hormones, function, and regulation of secretion. Hypothalamo-pituitary complex. Regulation of glucose homeostasis. Regulation of calcium homeostasis. Other organs with endocrine role: thymus, epiphyseal gland, spleen, heart and kidney. Tissue hormones. **Physiology of central nervous system:** Neuron. Neuron types and classifications. Synapses in CNS. Neuromediators, neuromodulators and neurotrophic factors. Neuroglia. Nervous center. Organization of nervous system. Inhibition in CNS. Spinal cord. Medulla oblongata and pons. Reflex function. Functional significance of conductive pathways in medulla oblongata. Mid brain. Reticular formation of brainstem. Thalamus Hypothalamus. Limbic structures of the brain. Cortex. Specific organization of cortex cerebri. Functions of left and right hemisphere of the brain and their connection. Basal ganglia. Cerebellum. Alertness and sleeping. Cognitive functions. Memory and learning. Brain circulation and metabolism.

Practical education

Excitable tissue (registration and analysis of single muscle contraction; registration and analysis of complex muscle contraction – tetanus; summation, influence of intensity of stimuli on the size of muscle contraction, maximal muscle contraction with different loads; ergography; dynamometrics; influence of temperature and fatigue on muscle contraction). **Breathing** (CO_2 content in inhaled end exhaled air; model of the ribs; pulse oximetry; spirometry; spirography; forced spirometry,). **Blood** (plasma buffers, sedimentation, hematocrit, concentration of hemoglobin according to Sahli method, hemolysis, red blood and white blood cell count; white blood cell formula; time of coagulation and bleeding). **Digestion** (digestion in the mouth; rodanindes in the saliva; qualitative and quantitative examination of the stomach acid). Metabolism (VO_2 max, Astrand test; OGT test; anthropometry; BMI; bioelectric impedance). **Heart and the circulation** (ECG; extrasystole; pulse; measurement of the blood pressure; auscultation; policardiography, capillaries). **Excretion** (general characteristics of the urine, chlorides in the urine; urine sediment; glucose, ketone bodies and proteins in urine). **Senses** (examination of the eyes, ears and hearing, balance, surface and deep sensibility). **Nervous system** (spinal reflexes of the decapitated frog; spinal shock; testing of the reflex arc; examination of the reflexes of clinical significance; EEG; EMNG, reaction time).

Literature

Compulsory

1. Guyton AC. Textbook of medical Physiology. Esevier, 2016.

Additional

1. Despopulos A, Silbernagl S. Color Atlas of Physiology. Thieme, 2009.
2. Bruce KM. Berne & Levy Physiology. Mosby Elsevier, 2010.
3. Costanzo LS. Physiology. Elsevier, 2014.

Number of active classes	**Theoretical classes:** 150	**Practical classes:** 120

Teaching methods:
Lectures; laboratory work.

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	15	Written	70
Practices	15	Oral	
Colloquium			
Essay			

Course title: English Language 2

Course status: compulsory

ECTS Credits: 2

Condition: –

Course aim

The basic aims of the English Language Course are for the students to attain a higher level of general language competence, to improve their communication skills in the target language, to build their general and medical English vocabulary, to provide them with the basic of academic writing and enable them to study textbooks and medical journals in English, to promote their creative thinking and expression. The third semester includes discussions on acquired knowledge and exercises for apprehensive use of vocabulary and grammar structures in a text.

Expected outcome of the course

Learning general and medical terminology; Learning and comprehensive grammar exercises in a text; Pointing to the differences between the common day and professional and academic English language; Furthering their knowledge in the four basic language skills – reading, writing, speaking and listening; General language skills – reading, writing, listening and speaking, academic writing, English for medical purposes; Active communication, research using English language sources.

Course description

Theoretical education

Preliminaries: Introduction to the course and methodology: Medical articles: The Challenge of Prevention – text analysis, lexical and grammar exercises, argumentation, discussion. Methods of Prevention – text analysis, lexical and grammar exercises, argumentation, discussion. Healthy Eating – text analysis, lexical and grammar exercises, argumentation, discussion. Stress – text analysis, lexical and grammar exercises, argumentation, discussion. Relaxation – text analysis, lexical and grammar exercises, argumentation, discussion. Dangers of Smoking – text analysis, lexical and grammar exercises, argumentation, discussion. Lung Cancer – text analysis, lexical and grammar exercises, argumentation, discussion. Investigating Hear Attack – text analysis, lexical and grammar exercises, argumentation, discussion. Cholesterol – text analysis, lexical and grammar exercises, argumentation, discussion. Heart Transplantation – text analysis, lexical and grammar exercises, argumentation, discussion. Diabetes – text analysis, lexical and grammar exercises, argumentation, discussion. Measles – text analysis, lexical and grammar exercises, argumentation, discussion. Grammar Review: Past Tenses – formation, usage, time vs. tense. Basic Present Tenses – formation, usage, time vs. tense. Basic Future Tenses – formation, usage, time vs. tense. The Passive Voice – theoretical framework, usage. Indirect Speech – theoretical framework, usage. Conditional Sentences – formation and usage, three types of conditional clauses. Discussion Topics: Student Life – personal experiences, exchanging experiences, expectations and plans, future. Experiences with Diseases/Treatment – exchanging experiences, doctor-patient relations, both standpoints. Future – personal and general – general and professional standpoints. Professional Plans – specialization, advancement opportunities, professional training. Medicine Today, Medicine Tomorrow – perception of medicine, consideration of scientific issues.

Practical education

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Literature

Compulsory

1. Arneri Georgijev J. English for doctors and medical students. Beograd: Naučna knjiga; 1990.
2. Arneri Georgijev J. More medical words you need. Beograd: Savremena administracija; 2004.
3. Marošan Z. English for medical students. Novi Sad: Ortomedics; 2008.

Additional

1. Raymond M. English grammar in use. Cambridge: Cambridge University Press; 1988.
2. Mcarthy M, O'Dell F. English vocabulary in use. Cambridge: Cambridge University Press; 1996.
3. Hornby AS. Oxford advanced learner's dictionary of current English. Oxford: Oxford University Press; 1968.
4. MacLean J. English in basic medical science. Oxford: Oxford University Press; 1980.
5. Momčinović V, Tanau V, Žurić Havelka S. Medical English. Zagreb: University of Zagreb School of Medicine; 1988.

Number of active classes	**Theoretical classes:** 60	**Practical classes:** –

Teaching methods

Oral and situational language learning; Audio-lingual method; Audio-visual methods (presentations, the Internet); Lexical and communicative approach; Frontal, individual and group work on selected topics.

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	30	Written	20
Practices		Oral	50
Colloquium			
Essay			

Course title: Neuroanatomy

Course status: compulsory

ECTS Credits: 3

Condition: Anatomy

Course aim

Acquiring knowledge about the anatomy of human body, which will be the basis for further study of histological structure and function, and application of acquired knowledge in all branches of medicine, biomedicine, pharmaceutical-therapeutic and technological fields.

Expected outcome of the course:

Students will get acquainted with the morphology and structure of particular body parts. They will learn about the systematic and topographical anatomy applicable in practical part of the course. This knowledge is the basis of all clinical disciplines, such as pathological anatomy and histopathology, forensic medicine, pathophysiology, radiology and radiotherapy (nuclear medicine), as well as all surgical branches.
Acquiring practical knowledge in anatomy: identification of mutual relations of particular anatomical structures of organ systems, including vessel-nerve structures, as well as morphological and functional features of individual systemic and topographic parts. Learning about anatomical structures using cadaveric preparations, as well as the X-ray, MRI and CT techniques as the basis for post mortem examination and surgical techniques, radiological treatments and radiotherapy, as well as understanding biomedical and borderline disciplines.

Course description

Theoretical education

1. External morphology of central nervous system (CNS).
2. Built of central nervous system.
3. Brain pathways.
4. Meninges and ventricular system.
5. Blood vessels of CNS.

Practical education

1. External morphology of central nervous system (CNS).
2. Built of central nervous system.
3. Brain pathways.
4. Meninges and ventricular system.
5. Blood vessels of CNS.

Literature

Compulsory

1. Drake R, Vogl W, Mitchell A. Gray's anatomy for students. 3rd ed. London: Elsevier; 2014.
2. Netter FH. Atlas of human anatomy. 6th ed. London: Elsevier Health Sciences; 2014.
3. Mtui E, Gruener G, Dockery P. Fitzgerald's Clinical Neuroanatomy and Neuroscience. 7th ed. London: Elsevier; 2015.

Additional

4. Outlines of lectures
5. Standring S. Grey's Anatomy-The Anatomical Basis of Clinical practice. 41st ed. London: Elsevier Churchill Livingstone; 2016.
6. Logan BM, Reynolds PA, Rice S. McMinn's color atlas of head and neck anatomy. 5th ed. London: Elsevier Inc; 2017.
7. Rubin M, Safdieh JE. Netter's Concise Neuroanatomy. Philadelphia, PA: Elsevier; 2017.
8. Vanderah TW. Nolte's The Human Brain in Photographs and Diagrams. 5th ed. Philadelphia, PA: Elsevier; 2020.
9. Waschke J, Böckers TM, Paulsen F. Sobotta Anatomy Textbook. 1st ed. Munich, Germany: Elsevier GmbH; 2019.
10. Snell RS. Clinical anatomy by regions. 9th ed. Baltimore: Lippincott Williams & Wilkins; 2012.
11. Moore KL, Dalley AF (eds). Clinically oriented anatomy. 5th ed. Baltimore: Lippincot Williams; 2006.
12. Hudak R, Kachlik D, Volny O. Memorix anatomy. 1st ed. Prague: Triton; 2015.

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 30

Teaching methods: Lectures and practical classes

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures		Test	20
Practices		Practical exam	50
Colloquium	30		
Essay			

Subject name: Communication Skills

Course status: compulsory

ECTS Credits: 2

Preconditions: –

Course goals:

– Introducing students to the nature and structure of communication (verbal and nonverbal communication);
– Introducing students to the characteristics of healthcare communication (diagnostic and therapeutic);
– Introducing students to the principles of complex communication skills (empathy, assertiveness, active listening);
– Enabling students to establish quality contact with various medical service users;
– Mastering communication skills through simulation of situations in the healthcare context.

Subject outcomes:

It is expected that after attending this course students will know and understand the structure, role and importance of applying communication skills between healthcare practitioners and different groups of healthcare users.
It is expected that after attending this course the student will be able to:

– Assertively communicate with different partners in the healthcare context (medical and non-medical staff, patients, patient's family...);
– Apply active listening and empathy skills;
– Independently conduct an interview with patients and family members; participate in patient's psychological preparation for various medical interventions;
– Demonstrate skills in conveying bad news in different situations (communication with the mournful, with parents of sick children etc.)
– Show skill in establishing communication with users of medical services from different age groups (children, adults);
– Demonstrate skill in establishing communication with healthcare users with different types of limited communication capabilities;
– Demonstrate assertive communication skills in negotiating and solving conflict situations.

Course content:

Theoretical education

Basic elements of communication. Verbal and nonverbal communication. Nature and goals of healthcare communication. What is good communication in healthcare? Preconditions for successful healthcare communication. Basics of diagnostic and therapeutic communication. Applying interviewing technique and taking anamnesis. Motivating patients to cooperate with medical staff. Basic communication skills. Complex communication skills: empathy, active listening, assertiveness. Relationship between assertive and aggressive behavior. Communication with „difficult" interlocutor. Communication with healthcare services users of different age groups. Communication with health care services users with different types of limited communication capabilities. Communication within a team. Conflict resolution.

Practical education

Practical exercises – Training elements of the communication process; Relationship between verbal and nonverbal communication; Conducting interviews and taking anamnesis; Exercises for assertive, empathetic behavior and active listening; Examples of resolving conflict situations within a team; Exercises aimed at communication with individuals of different ages and with individuals with limited communication capabilities; Ways of communicating bad news in a context of healthcare.

Literature

Mandatory

1. Lloyd M, Bor R, Noble L. Clinical Communication Skills for Medicine, 4th edition. Elsevier, 2018. (selected chapters)
2. McCorry LK, Mason J. Communication skills for the healthcare professional, 1st edition.Lippincot Williams & Wilkins, 2011. (selected chapters)
3. Kurtz S, Draper J, Silverman J. Teaching and Learning Communication Skills in Medicine, 2nd edition (selected chapters). London: CRC Press, 2004.(selected chapters)

Additional

1. Tate P, Frame F. The doctor's communication handbook, 8th edition. Boca Raton: CRC Press, 2019.

Number of active classes	**Theoretical classes:** 30	**Practical classes:** 15

Teaching methods:

Lectures, interactive teaching, reviewing and analyzing case studies, seminar papers, consultations

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	10	Written	60
Practices	10	Oral	
Colloquium	20		
Essay			

Course title: Introduction to Clinical Practice

Course status: compulsory

ECTS Credits: 2

Condition: –

Course aim

- acquisition of practical – professional knowledge medical in the field of clinical practice
- students will get acquainted with the organization of clinical work; responsibilities of medical staff, especially medical doctors, and application of acquired knowledge in clinical and research scientific work.
- developing critical thinking important in diagnosis and treatment
- students will get basic skills for a daily clinical practice
- developing abilities for teamwork.

Expected outcome of the course:

- acquisition of basic theoretical knowledge required for working with patients.
- acquisition of knowledge in clinical work in the field of internal medicine and surgery
- students will be able to recognize and identify the disease, its severity and to perform initial treatment of critically ill patients
- acquisition of basic skills required by admission of the patient to the health care institution and all aspects of the treatment and care
- students will be able to work individually and in a team to apply different diagnostic and therapy procedures.

Course description

Theoretical education

1. Relation of health practitioners and medical students towards patients
2. Admission of patients to the hospital
3. Identification of basic disorders on admission
4. Evaluation of the patient on admission and during hospitalization
5. Basic measurements
6. Vital functions
7. Mobile patients – basic care
8. Immobile patients – basic care
9. Hygiene of the patients
10. Nourishment of patients and types of diet
11. Infusions
12. Obtaining body fluids and blood for analysis
13. Patient transport
14. Hygiene for bedridden patients
15. Means and modes for heating and cooling the body

Practical education

1. Getting familiar with the Institute/Clinic and organization of work
2. Admission and history taking
3. Attending morning rounds – the role of doctors and nurses during rounds.
4. Evaluation of patient's consciousness
5. Anthropometric measurements: patients' body height and weight, measuring waist circumference and limbs
6. Evaluation of vital functions (body temperature, pulse, arterial blood pressure, quality of breathing, respiration, skin appearance – identifying remarkable changes in color and appearance of the skin)
7. Mobility of patients and general condition
8. Care and hygiene of recumbent patient (changing clothes of mobile and immobile patients, moving of patients, prevention of decubitus, hygiene of oral, axillary and groin region;
9. Feeding the patient; basic types of diet
10. Recording of fluid intake.
11. Procedures for obtaining blood and body fluids for diagnostic purposes
12. Moving patients from bed to the wheelchair
13. Means and modes for heating and cooling the body
14. Preparation of patients for certain diagnostic procedures; preparation of instruments for sterilization.
15. Assisting by preparing drugs for oral use, parenteral use, the use of disposable syringes and needles, preparation of infusion solutions
16. Assist by distribution of drugs: oral route, parenteral route, intradermal injection, subcutaneous injection, intramuscular injection, intravenous application. Monitoring infusion rate. Applying prescribed therapy (under supervision).
17. Urinary and other catheterization

Literature
Compulsory
1. Dejanović J. Introduction in clinical practice. Medical faculty Novi Sad.
2. Outlines of lectures

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 60

Teaching methods

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	10	Written	
Practices	60	Oral	30
Colloquium			
Essay			

Course title: Medical Sociology

Course status: elective

ECTS Credits: 2

Condition: –

Course aim
Introducing students to the basic topics, problems and achievements of sociology and medical sociology. The aim is to get students acquainted with the understanding of social relations and contemporary social processes as well as the importance of social problems and challenges of the contemporary medical practice.

Expected outcome of the course
Students acquired knowledge about society and the most important contemporary social processes. Through theoretical, systematic and critical reflection and analysis of the most important issues and subjects of the Medical Sociology, students have knowledge about the connection between contemporary social processes and medical practice and the ability to apply that knowledge in future professional practice.

Course description
Theoretical education
The course covers sociological content that should enable students to think rationally and critically about social interactions, processes, and problems. The course covers the following thematic areas: 1. Sociology and Medical Sociology: subject, origin, development; 2. Sociology of Body; 3. Sociological aspects of health 4. Sociological aspects of disease; 5. Social interaction and communication in Medicine: doctor-patient relationship; 6. Professions and the professionalization in Medicine; 7. Social inequalities, health and public health; 8. Medicine and media; 9. Medicine and Risk society.

Practical education
Study research work Lectures, discussions, dialogue, presentation of literature, tutorial giving instructions for independent study of individual content units.

Literature
Compulsory
1. Giddens, Anthony (2003). *Sociology. 6th Edition*. Cambridge: Polity Press.

Number of active classes	**Theoretical classes:** 30	**Practical classes:** 15

Teaching methods

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	30	Written	50
Practices	20	Oral	
Colloquium			
Essay			

Course title: General and Special Medical Cytology

Course status: elective

ECTS Credits: 2

Condition: Biology and Human Genetics

Course aim: Acquiring knowledge and skills necessary for a thorough understanding of cell biology and interpretation of clinical cytological analyses.

Expected outcome of the course:
Knowledge: The student should know the basic common cytological features as well as the characteristics of epithelial and connective tissue cells with special reference to their microscopic identification.
Skills: The student should be able to recognize the normal structure of blood cells at the level of light microscopy, to identify normal Pap smear, as well as the cellular composition of different types of cytological specimens.

Course description
Theoretical education
1. General cytology, history of cellular theory
2. Eukaryotic cell, principles of their structure, cell membrane
3. Membrane and non-membrane organelles, inclusions
4. Cellular signaling
5. Mitosis and meiosis, ultrastructure of nucleus and cell cycle, nuclear-cytoplasmic ratio
6. Cell movement and migration, cytoskeleton, flagella
7. Cell cultures and tissues
8. Epithelial cells, microscopic structure
9. Papanicolaou test and Practical Clinical Cytology
10. Connective tissue cells, cytology of blood and hematopoiesis
11. Cytopathology
12. Recapitulation and preparation for the exam

Practical education
Microscopic exercises, cell culture, swabs and smears, interpretation of stained slides.

Literature
Compulsory
1. Anđelković Z, Somer Lj, Matavulj M, Lačković V, Lalošević D, Nikolić I, Milosavljević Z, Danilović V. Ćelija i tkiva. Niš: Bonafides; 2002.
2. Grozdanović-Radovanović J. Citologija. Beograd: Zavod za udžbenike; 2000. 397 p.
3. Andrić S, Kostić T. Mehanizmi ćelijske komunikacije. Skripta za studente. Novi Sad: WUS Austria; 2007.
Additional
1. Krstić VR. Ultrastructure of the mammalian cell: an atlas. London: Springer; 1979. 376 p.
2. Papanicolaou G. Atlas of exfoliative cytology. Cambridge: Harvard University Press; 1963.

Number of active classes	**Theoretical classes:** 30	**Practical classes:** 15

Teaching methods:
Lectures and Practice

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	10	Written	70
Practices		Oral	
Colloquium	20		
Essay			

Course title: Teaching and Learning

Course status: elective

ECTS Credits: 2

Condition: –

Course aim

Introducing to fundamental principles and psychological rules of effective teaching and strengthening of students for their practical use in education; Students learn: to master theoretical knowledge durably, develop critical thinking and their creative attitude towards the didactic-methodological foundation of teaching, process of learning and educational practice.

Expected outcome of the course

Upon completion of the course, students are expected: to demonstrate an understanding of basic theoretical pedagogical – educational process, master the basic problems of modern teaching, develop a critical attitude and creative approach to the pedagogical-psychological theory and practice, to be able to evaluate and self-evaluate educational activities and master elementary procedures in teaching appraisal.

Course description

Theoretical education

Familiarize students with pedagogics and didactic-methodological competencies for active application, and participatory interactive teaching and learning methods; Encouraging the development of sensitivity to the position of students and different learning needs in the educational process; Psychological aspects of active and creative learning; Learn how to learn; Solidify the principles of learning; Considering contemporary beliefs in education and emphasizing the role of motivation for learning; Acquainting students with work practices, methods and techniques which provide efficient coaching and the development of divergent thinking in the learning process during classes; The concept of interactive teaching; The most commonly used techniques and methods in interactive teaching; Criteria for selecting methods and learning techniques; Learning techniques; Expanding and strengthening knowledge about cooperative learning; Workshop form; The application, design, development, implementation and effects of games in teaching; Evaluating teaching and self-evaluation; Procedural application of the analysis and evaluation of the teaching process.

Practical education

Development of competencies for the application of various modern teaching forms, methods and techniques; Gaining skills in the planning, implementation and evaluation of interactive teaching; Training for the use of specific techniques of cooperative learning; Workshop work; Technique in active and creative learning; Implementation of games in teaching; Practical examples; Preparation of drafts, class preparation and realization of classes; Teaching research work; Realization of the research process in the classroom; Mastering the skills of creating a positive environment in the department; Training students for the evaluation of teaching and self-evaluation.

Literature

Compulsory

1. Babic-Kekez, S., Peric-Prkosovački, B. (2014): Fundamentals of Pedagogy-Value Teaching, Faculty of Medicine Novi Sad, University of Novi Sad; 2. Roeders, P. (2003) Interactive teaching: the dynamics of effective learning and teaching, Belgrade: Institute for Pedagogy and Andragogy of the Faculty of Philosophy in Belgrade.

Additional

1. Jensen, E. (2003). Super Set. Zagreb: Eduka.

Number of active classes	**Theoretical classes:** 30	**Practical classes:** 15

Teaching methods

Lectures, interactive sessions, independent work of students.

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	10	Written	60
Practices	10	Oral	
Colloquium		Other	**5**
Essay	15		

Course title: Classical Languages in Medical Terminology

Course status: elective

ECTS Credits: 2

Condition: –

Course aim

Acquiring knowledge and skills in the field of morphology and syntax of classical languages (Latin and Ancient Greek) that will provide further understanding, writing and translation of medical terms and understanding of terms that are used in the diagnostic and therapy. Reception of classical languages in medical terminology – etymological interpretation. Practical work on the ancient medical literature sources. Understanding of heritological importance of classical languages in the medical science in the western world.

Expected outcome of the course:

Student has theoretical and practical knowledge in the field of classical languages; resolving main abbreviations and terms in medical terminology. Student uses relevant ancient terms and reads relevant literature. He understands the significance of preserving classical languages in modern professional and scientific communication.

Course description

Theoretical education

Latin and Greek script; morphology and syntax in medical science; short history and myth about ancient therapy; ancient cult of body and soul: examples from the ancient literature.

Practical education

1. Reading, translation and interpretation of relevant texts in the field of medical terminology.

Literature

Compulsory

1. Černy K. Guide to Basic Medical Terminology. Karolinum Press 2015.

Additional

1. Moerkerke, C. & Ceusters, W. The Myth of Preferred Terms In Medical Sublanguage And Its Impact on Natural Language Understanding Applications: An Empirical Study. In: De Moor, G. & De Clercq, E. (Eds.). Proceedings of the 18th MIC Conference, 2000. pp.55-62.
2. Srdić Galić B, Babović SS, Vukadinović S, Štrkalj G. Clinical relevance of official anatomical terminology: The significance of using synonyms. Int J Morphol 2018;36(4):1168-1174
3. Panourias, I. G.; Stranjalis, G.; Stavrinou, L. & Sakas, D. E. The ancient Hellenic and Hippocratic origins of head and brain terminology. Clin. Anat., 25(5):548-58, 2012. Panourias, I. G.; Stranjalis, G.; Stavrinou, L. C. & Sakas, D. E. The Hellenic and Hippocratic origins of the spinal terminology. J. Hist. Neurosci., 20:177-87, 2011.
4. Polackova, G. Synonymy of medical terminology from the point of view of comparative linguistics. Bratisl. Lek. Listy, 102(3):174-7, 2001.

Number of active classes	**Theoretical classes:** 30	**Practical classes:** 15

Teaching methods

Problem approach to the content; monologic and dialogic method with using modern audio-visual media; reading handouts; critical discourse.

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	15	Written	70
Practices	15	Oral	
Colloquium			
Essay			

Course title: Introduction to Scientific Research Work

Course status: elective

ECTS Credits: 2

Condition: –

Course aim

The aim of this course is to point out the importance of research and provide students with knowledge about basic principles of research-scientific work in the field of biomedicine.

Expected outcome of the course

Differentiate science from pseudoscience; know conditions for authorship, and know what authorship is not; know ethical aspects of research, and about dishonesty in science; know about necessary conditions for scientific research; understand and define scientific problems; understand and test hypothesis; differ scientific publications and their characteristics; know about electronic search services, databases and electronic journals; know basic characteristics of the descriptive method, cross-sectional studies, anamnestic studies, cohort studies, as well as experiments in the community and field experiments, their application, advantages and disadvantages, sample selection, result generalization, establishing and testing hypotheses; know the different measurement errors and understand their impact on the results of scientific research; understand importance of various statistical methods of research, as well as interpretation of scientific significance; understand basic principles of clinical trials, sample selection, and specificities of clinical drug investigations; know about scientific projects, their preparation, components, review and evaluation; know about modes of data collection and processing data; know the structure of a scientific work; understand citation, and rules in reference citation; know about evaluation criteria regarding scientific papers.

Course description

Theoretical education

Science and pseudoscience. Research problem. Hypothesis. Categories of scientific publications. Biomedical scientific information. Descriptive studies. Cross-sectional studies. Anamnestic studies. Cohort studies. Clinical trials. Clinical drug trials. Ethical principles in research. Bias and affiliation. Data collection. Sampling. Analysis of statistical results in research. Science projects. Authorship. Intellectual dishonesty. Mentorship. Evaluation of scientific work. Research structure. Reference citation. Research presentation. Evidence-based medicine.

Practical education

Science and pseudoscience. Identification of a research problem. Setting a hypothesis. Research structure. Authorship. Electronic databases. Reference citation. Descriptive studies. Cross-sectional studies. Anamnestic studies. Cohort studies. Clinical trials. Clinical drug trials. Bias and affiliation. Research presentation. Analysis of statistical results. Sampling. Data collection and questionnaires. Science projects.

Literature

Compulsory

1. Rašković A, et al. Authorized handouts for Introduction to scientific research work.

Number of active classes	**Theoretical classes:** 30	**Practical classes:** 15

Teaching methods

Lectures, practice.

Student activity assessment (maximally 100 points)			
Pre-exam activities	**points**	**Final exam**	**points**
Lectures	5	Written	50
Practices	15	Oral	
Colloquium	30		
Essay			

Course title: History of Medicine and Dentistry			
Course status: elective			
ECTS Credits: 3			
Condition: –			
Course aim Student should adopt the attitude towards modern medicine as a dynamic development of medical thoughts, and not as an uppermost and constant scientific and practical achievement.			
Expected outcome of the course: Provide students with basic knowledge and initiate critical attitude towards the most important periods of historical development of medicine and dentistry.			
Course description *Theoretical education* An overview of history of medicine and dentistry from prehistoric times to the 21st century. Outstanding individuals throughout the history of medicine, founders of theoretical directions, diagnostic and therapeutic procedures. *Practical education* Debates on certain important historical dates in medicine.			
Literature *Compulsory* 1. Companion Encyclopedia of the History of Medicine, Volume 1&2 Edited by William F. Bynum, Roy Porter. Routledge Taylor & Francis group, London and New York, First published 1993. Reprinted 1994. First published in paperback 1997. 2. Dušica Rakić. The history of medicine and dentistry, lecture notes, Faculty of Medicine, 2016.			
Number of active classes	**Theoretical classes:** 30	**Practical classes:** 15	
Teaching methods Lectures, video presentation.			
Student activity assessment (maximally 100 points)			
Pre-exam activities	**points**	**Final exam**	**points**
Lectures	15	Written	70
Practices		Oral	
Colloquium			
Essay	**15**		

Course title: Variations in Anatomy

Course status: elective

ECTS Credits: 2

Condition: Anatomy; Neuroanatomy

Course aim

The aim of introducing this course is to provide students' knowledge about the most common variations in human anatomy important for clinical practice.

Expected outcome of the course:

In the frame of the course of Anatomy, first year medical students had the opportunity to meet with the shape, appearance, position and relations of the basic anatomical structures of the body that are common to most people. However, anatomical features are subject to numerous variations that may occur in greater or lesser degree, depending on the population. Unlike congenital anomalies, anatomical variations are considered normal findings, which usually do not disturb physiological processes of the body. Some variations may be physical structures that influence or increase the predisposition to the development of certain diseases, as well as to change certain symptomatology of painful conditions or diseases. Many medical journals have some chapters or even issues devoted to anatomic variations, but recently there was a need for a magazine that deals exclusively with variations such as the International Journal of Anatomical Variations (IJava). Given the existence of a large number of variations, knowledge about them is essential for physicians in practice, which justifies the introduction of this course to basic medical studies. These findings will particularly benefit future surgeons, radiologists, physiatrists and dentists.

Through lectures and practical work students will be trained to recognize and analyze the anatomical variations of certain areas of the human body as well as their impact on the painful symptoms of conditions or diseases in order to properly lead a clinical trial of patients with anatomical variations.

Course description

Theoretical education

1. Anatomical variations of the head. 2. Anatomical variations of the neck. 3. Anatomical variations of the chest and mediastinum. 4. Anatomical variations of the abdomen. 5. Anatomical variations of the urogenital tract. 6. Anatomical variations of the locomotor system. 7. Anatomic variations of the central nervous system. 8. Anatomical variations of sense organs

Practical education

1. Morphological characteristics of cranial variations. 2. The clinical significance of maxillofacial variations. 3. Anatomical basis of anesthesia in head and neck variations. 4. Subclavian and carotid arteries: variations and clinical significance. 5. Anatomical variation of the nasal cavity and paranasal sinuses. 6. Anatomical variations of the oral cavity. 7. Anatomical and functional variations of the organs of head. 8. Variations of deep interfacial neck spaces. 9. Anatomical variations of the chest wall, mediastinum and the lungs and heart. 10. Anatomical variations of the walls of the abdomen and certain organs. 11. Anatomical variations of the digestive tract. 12. Anatomical variations of the urogenital tract. 13. Anatomic variations of the upper and lower extremities: the understanding of clinical cases and the interpretation of certain clinical pictures. 14. Variations in the shape and structure of the central nervous system. 15. Variations in the shape and function of the sense organs. 16. Forensic significance of morphological and topographical variation of organs and blood vessels

Literature

Compulsory

1. Tubbs RS, Shoja MM, Loukas M. Bergman's Comprehensive Encyclopedia of Human Anatomic Variation. New Jersey: John Wiley & Sons; 2016.
2. Faiz O, Blackburn S, Moffat D. Anatomy at a Glance. 3rd edition. New Jersey: John Wiley & Sons; 2011.
3. Schuenke M, Faller A. The human body. Stuttgart-New York: Thieme; 2004.
4. Drake R, Vogl W, Mitchell A. Gray's anatomy for students. 3rd ed. London: Elsevier; 2014.
5. Moeller BT, Reif E. Pocket atlas of Radiographic Anatomy. 2nd ed. Stuttgart-New York: Thieme; 2000.
6. Netter FH. Atlas of human anatomy. 6th ed. London: Elsevier Health Sciences; 2014.
7. International Journal of Anatomical Variation. Available http://www.ijav.org/

Additional

1. Students will be informed about necessary literature for each unit.

Number of active classes	**Theoretical classes:** 30	**Practical classes:** 15

Teaching methods: Lectures and practical classes

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	25	Written	40
Practices	25	Oral	
Colloquium			
Essay	10		

Course title: Pathology

Course status: compulsory

ECTS Credits: 15

Condition: Physiology

Course aim

The aim of the course is to inform the student about the mechanisms of cell damage, damage of tissues and organs and about morphological changes underlying the disease. Our goal is to train students to identify morphological changes in cells, tissues and organs through lectures and seminars. Students will obtain necessary skills through individual practical work, performing microscopy and histological analysis, macroscopic diagnostics using biopsy-, surgical or autopsy specimens or museum prosections.

Expected outcome of the course:

Practical sessions are adapted to the basic aims of the subject and deal with developed educational entities in order to form general practitioner

Course description

Theoretical education

Within the scope of general pathology students will learn about the etiology and macroscopic and microscopic structural changes of basic pathological processes, such as reversible and irreversible cell damage, impairment of water-, fat- and protein metabolism, blood and lymph circulation changes, inflammation, neoplasms. Through special pathology all those topics are described in the light of specific organ system.

Practical education

Getting acquainted with interpretation of histopathological preparation will enable student to:

1. Identify changes that diverge normal cell and tissues, i.e. to distinguish normal tissues and organs from that manifesting pathological processes and states using light microscopy
2. describe normal tissue and organ composition
3. describe morphological substrates of the disease
4. to diagnose the disease and to note it in Latin
5. to suggest the differential diagnosis.

Student will be able to macroscopically describe the organs and pathological changes in the body by identifying and describing the organ and the change, establishing diagnosis or differential diagnosis.

Literature

Compulsory

1. Kumar V, Abbas AK, Aster JC. Robbins & Cotran Pathologic Basis of Disease, 9th Edition. Elsevier 2015.
1. Eri Ž. Histological exercises on CD. Faculty of Medicine Novi Sad, 2012.
2. Panjković M. A practical handbook of macroscopic examination in pathology, 2017.

Number of active classes	**Theoretical classes:** 120	**Practical classes:** 120

Teaching methods:

Lectures, interactive lectures, microscopic and macroscopic examinations and autopsies

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	2	Written	
Practices	5	Oral	70
Colloquium	20		
Essay	3		

Course title: Pathophysiology

Course status: compulsory

ECTS Credits: 14

Condition: Anatomy, Histology and Embryology (entrance); Chemistry in Medicine, Medical Biochemistry, Physiology (exam)

Course aim

Studying of the properties of particular etiological factors, their interactions with particular structures of the organism and how they lead to the initiation of the pathological process. Understanding the general principles of organ and organ system disorders. Studying the pathogenesis of the processes at the level of molecules, subcellular structures and cells; the onset of humoral and tissue functional disorders, as well as functional disorders of different organs and organ systems, with the aim of successful transition from preclinical to clinical disciplines. Introduction to the basic principles of functional tests used in the diagnostic procedure for determining changes in the function of a diseased organ or the whole organism.

Expected outcome of the course:

Knowledge: Training students to identify the causative agents of the disease, understanding the mechanisms of the onset of impaired function in the diseased organ and organ system, how to respond and adapt the diseased organism and pathophysiological disorders leading to appropriate clinical manifestations of the disease**.**

Skills: Training students in order to understand the basic principles of performing individual laboratory and functional tests (chemical, hematologic, cytological, immunometric, physical and nuclear medical tests) used in modern laboratory diagnostics, procedures for obtaining different biological material as well as methods of patient preparation. Training to use the most important parameters of functional tests and the movement of their values in various pathophysiological disorders, diseases and pathological conditions. Training to interpret the findings of individual functional tests.

Course description

Theoretical education

- Introduction to pathophysiology. Health and disease as dynamic processes. Stages of disease development. Etiological factors in diseases. Etiology and pathogenesis of the disease. Inflammation. Fever. Disorders of barriers and phagocyte functions.
- Immune response disorders as an etiological factor of the disease. Immunodeficiencies. Autoimmunity and autoimmune diseases. Hypersensitivity reactions. Mechanism of emergence and reaction patterns in early and late type hypersensitivity. Transplantation immunology.
- Heritage as an etiological factor of disease.
- Lifetime as an etiological factor of disease.
- Chemical etiological factors.
- Malignant neoplasia as an etiological factor of the disease.
- Eating disorders as an etiological factor of the disease. Energy balance disorders. Vitamin metabolism disorders. The role of enzymes in the etiopathogenesis of the disease and clinical diagnosis.
- Protein metabolism disorders. Serum protein metabolism disorders. Disorders of other proteins. Disorders of heteroprotein metabolism.
- Disorders of carbohydrate metabolism. Etiology, pathogenesis, and stages of diabetes mellitus development. Hypoglycemic conditions and their consequences. Glycogenoses and renal glycosuria.
- Disorders of lipid metabolism. Hyperlipoproteinemia. Hypolipoproteinemia. Dyslipoproteinemia. Pathogenesis of atherosclerosis.
- Disorders of body fluid metabolism. Isoionia disorders. Disorders of acid-base balance.
- Physical etiological factors. General and local effects of cold. General and local effect of heat. Mechanical factors. The effect of changes in atmospheric pressure. The effect of acceleration and deceleration. The effect of radiation. The effect of electric current and electromagnetic waves. The effect of vibration, sound and ultrasound.
- Pathophysiology of the cardiovascular system. Etiology and pathogenesis of heart failure. Heart defects. Heart rhythm disorders. Myocardial diseases. Pulmonary blood disorders. Systemic blood flow disorders. Disorders of regional and peripheral circulation.
- Pathophysiology of the respiratory system. Signs and symptoms of the disease. Pulmonary ventilation disorders. Diffusion disorders. Perfusion disorders. Respiratory failure. Pathophysiology of tissue hypoxia and reserve adaptive mechanisms.
- Pathophysiology of the digestive tract. General motor and passage disorders in the digestive tract. Secretory function disorders. Absorption disorders. Common pathophysiological mechanisms in the gastrointestinal system.
- Liver pathophysiology. Etiopathogenesis of liver failure. Pathophysiological consequences of liver failure. Pathophysiology of gallbladder and biliary tract dysfunction.
- Pathophysiology of the kidney. Urinary syndrome. Acute kidney failure. Chronic kidney failure. Glomerular kidney disease. Tubulointerstitial kidney disease. Renal hypertension. Nephrolithiasis.
- Pathophysiology of the neuroendocrine system. Disorders of nervous and humoral regulation. Hypothalamus and pituitary disorders. Thyroid disorders. Calcium homeostasis, calcitropic mediators and bone metabolism. Adrenal disorders. Glandular function disorders.
- Pathophysiology of the blood. Pathophysiology of the red blood cells. Pathophysiology of white blood cells. Pathophysiology of the hemostatic system.
- Pathophysiology of the locomotor system. Pathophysiology of muscles and joints. Degenerative diseases. Pathophysiology of connective tissue.
- Pathophysiology of the nervous system. Disorders of motor and sensory functions. Somatosensory system disorders. Pathophysiology of pain. Disorders of the cerebral circulation. Epilepsy. Disorders of consciousness.

Practical education
– Functional testing in medicine.
– Functional testing of inflammation.
– Functional testing of protein metabolism.
– Functional testing of carbohydrate metabolism.
– Functional testing of lipid metabolism.
– Functional testing of metabolism of body fluids, electrolytes and acid-base balance.
– Functional testing of the immune system.
– Functional examination of the pituitary gland.
– Functional testing of the thyroid gland.
– Functional examination of the adrenal glands.
– Functional testing of the gonad glands.
– Functional examination of parathyroid glands, calcium metabolism and bone metabolism.
– Functional testing of the red blood cells.
– Functional testing of white blood cells.
– Functional testing of the hemostatic system.
– Functional testing of the respiratory system.
– Functional testing of the cardiovascular system.
– Functional testing of the digestive tract.
– Functional examination of the liver and biliary tract.
– Functional testing of the nervous system.
– Laboratory diagnostics of malignant neoplasms.
– Functional examination of the kidney.

Knowledge assessment is required through a test at the end of each semester.

Literature

Compulsory

1. McCance KL, Huether SE. Pathophysiology: The Biologic Basis for Disease in Adults and Children, 8th Edition. Edinburg: Elsevier; 2018.
2. Hammer GH, Mc Phee JS. Pathophysiology of disease. An Introduction to Clinical Medicine, 7th ed. New York: McGraw-Hill Education; 2014.
3. Đerić M, ed. Practical Handbook of Pathophysiology. [CD-ROM] Novi Sad: Faculty of Medicine; 2019.

Additional

1. Silbernagl S, Lang F. Color Atlas of Pathophysiology. Stuttgart: Thieme; 2016.
2. Huether SE, Mc Cance KL. Understanding Pathophysiology. 6th edition. St. Louis, Missouri: Elsevier; 2016.
3. Norris TL, Lalchandani R. Porth's Pathophysiology: Concepts of Altered Health States. Tenth Edition. Philadelphia: Wolters Kluwer; 2019.

Number of active classes	**Theoretical classes:** 90	**Practical classes:** 120

Teaching methods: interactive theoretical and practical education; consultation; seminars; pre test consultation.

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	10	Written	15
Practices	10	Oral	45
Colloquium	10		
Essay	10		

Course title: Microbiology and Immunology

Course status: compulsory

ECTS Credits: 8

Condition: Biology with Human Genetics (exam)

Course aim

To integrate knowledge from fields of microbiology and immunology in order to use them in theory and practice.

Expected outcome of the course:

Theoretical preparation for establishing diagnosis and differential diagnosis.
Preparation for practical work, choosing appropriate methods and their interpretation.

Course description

Theoretical education

1. Aims and objectives of studying microbiology. Bacterial Classification. 2. Morphology and Structure of bacteria. 3. Metabolism of bacteria. 4. Replication of bacteria. 5. Bacterial genetics. 6. Sterilization and disinfection. 7. Antibacterial agents (antibiotics and chemotherapeutic drugs; 8. Bacterial resistance to antibacterial agents; 9. Association between microorganisms and higher life forms; 10. Development of immunology and immunologic system; 11. Defense mechanisms in living organisms (nonspecific and specific); 12. Aggressive effects of microorganisms, infection; 13. Defense mechanisms against bacteria, viruses, parasites, fungi; 14. Structure and functional organization of the immune system, regulation of immune response; 15. Antigens and haptens, immunogenicity; 16. Specificities in immunology, recognition of foreign (and own), immunologic memory; 17. Cellular basis of immunological reactivity, cellular cooperation in immune response; 18. Antibody dependent cellular cytotoxicity; 19. Antibodies (immunoglobulins), biologic characteristics of antibodies and their role, modes of identification; 20. Early hypersensitivity (mechanisms and manifestations); 21. Late hypersensitivity (mechanisms and manifestations); 22. Transplantation immunology (graft rejection, GVH reaction); 23. HLA complex in humans and its role; 24. Immunosuppression, immunologic tolerance, facilitation, immune deficiency (types and significance), immunomodulation in treatment; 25. Tumor immunology, mechanisms of immune surveillance (tumor antigens, immune tolerance); 26. Complement (complement dependent reactions); 27. Antibodies against antigenes on erythrocytes (role, incompatibility); 28. Types and mechanisms of autoimmune diseases; 29. Active and passive immunity (natural and artificial), special characteristics of immunity in viral infections; 30. Vaccines, immunization (problems); 31. Antigen-antibody reactions in diagnosis; 32. Immunological tests and interpretation; 33. Staphylococcus; 34. Streptococcus; 35. Neisseria; 36. Bacillus; 37. Clostridiae; 38. Corynebacterium, Listeria; 39. Mycobacterium; Actinomyces; Nocardia; 40. Familia Enterobacteriaceae; 41. Escherichia; 42. Salmonella; 43. Shigella; 44. Other enterobacteriaceae; 45. Pseudomonas; 46. Haemophilus, Llegionella, Bordetella; 47. Brucella, anaerobic gram-negative bacilli; 48. Vibrio, Aeromonas, Plesiomonas; 49. Ampylobacter, Helicobacter; 50. Yersinia; 51. Treponema; 52. Borrelia, Leptospira; 53. Mycoplasma, Ureaplasma; 54. Rickettsia. 55. Sanitary bacteriology; 56. Development of virology, differences between viruses and microorganisms, significance in medicine; 57. Viral particle – virion, shape and size of viruses. Electron microscope, preparation techniques in virology. Ultracentrifuge, ultrafilters; 58. Chemical compounds of viruses (proteins, nucleic acids, antigens), hemagglutinins and viral hemagglutination; 59. Biosynthesis of viral compounds, virus replication stages; 60. Selective tropism of viruses, virus genetics, defective viruses, prions, virus variability; 61. Types of virus infections, pathogenesis of virus diseases, syndrome manifestations of virus diseases; 62. Virus associations (coinfections, interfence and exaltation), interferon (role and application); 63. Virus vaccines; 64. Effects of physical, chemical and chemotherapy agents on viruses (antiviral drugs), principles of rational antiviral therapy; 65. Virus replication in laboratory settings (cell cultures, embryonated eggs and laboratory animals); 66. Etiological diagnosis of virus diseases, serologic techniques (for antigens and antibodies). Fast diagnostic methods, hybridization tests and PCR; 67. Virus classification, DNA and RNA virus families; 68. Picornaviridae; 69. Orthomyxoviridae; 70. Paramyxoviridae; 71. Rhabdoviridae; 72. Togaviridae; 73. Arbo viruses; 74. Arenoviridae, Filoviridae; 75. Viruses as etiologic factors of gastroenteritis; 76. HIV; 77. Adenoviridae; 78. Parvoviridae, 79. Papillomaviridae and polymaviridae, Herpesviridae; 80. Poxviridae; 81. Human hepatitis viruses; 82. Chlamydia, 83. Introduction into parasitology, classification; 84. Classis sarcomastigophora; 85. Plasmodium, Pneumocystis; Cryptosporidium; Toxoplasma; 87. General features of helminths; 88. Cestodes; 89. Nematodes; 90. Medical mycology.

Practical education

1. Basic rules of behavior in microbial laboratory, microscope and use of microscope; 2. Microscopic examination of unstained microorganisms; Microscopic examination of stained microorganisms; 3. Culture media; Bacteria variation; 4. Biochemical, physiological and serological testing; 5. Antimicrobial sensibility testing; 6. Basic data about antigens, antibodies and formation of antigen-antibody complex (in vitro). Application of antigen-antibody reaction in diagnosis (qualitative, semiqualitative and quantitative reactions); 7. Agglutination (various techniques), precipitations (various techniques in liquid and gel medium); 8. Complement (bacteriolysis and hemolysis). Reading results of immunologic diagnostic tests and serologic reactions. Determination of immunoglobulin and complement quantities, Efficacy of immunoprophylaxis; 9. Staphylococcus; Streptococcus; 10. Neisseria, Moraxella, 11. Mycobacterium; 12. Corynebacterium; 13. Enterobacteriaceae family; 14. Escherichia coli, Klebsiella; 15. Salmonella, Shigella; 16. Proteus, Morganella, Providencia; 17. Pseudomonas, Campylobacter; 18. Bacillus, Clostridium; 19. Serologic diagnosis of bacterial infections; 20. Sanitary bacteriology; 21. Selection, collection and transport of samples for viral analysis. Reading results of viral examination; 22. Isolation of viruses in culture cells, electronic and immunoelectronic microscopy, virus isolation on embryonated hicken eggs; 23. Virus isolation in laboratory animals. Virus selectivity and tropism, inclusion; 24. Preparation techniques in virology; 25. Virus hemagglutination; 26. Serologic reactions of etiologic and random specificity; 27. Protozoa; 28. Plasmodium, toxoplasma; 29. Helminths, 30. Medical mycology

Literature
1. Murray PR, Rosenth KS, Pfaller MA. Medical Microbiology, 7th Edition, Elsevier, 2017
2. Carol KC, Morse SA, Mietzner T, Miller S. Jawetz, Melnick & Adelbergs Medical Microbiology, 27th Edition, Mc Graw Hill Education, 2015

Number of active classes	**Theoretical classes:** 90	**Practical classes:** 60

Teaching methods
Lectures, practice

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	10	Written	55
Practices	10	Oral	
Colloquium	25		
Essay			

Course title: Psychological Medicine

Course status: compulsory

ECTS Credits: 3

Condition: Medical Ethics; Medical Sociology (exam)

Course aim
Students will learn about the unique biopsychosocial being of humans, different reactions of diseased person to disease, as well as different interactions of physicians / health professionals and patients.

Expected outcome of the course:
Students will learn about biopsychosocial uniqueness of humans; personality development and structure; mental and defense mechanisms; reaction of the sick to the disease; psychological aspects of treatment of various diseases; the role of physician / health professionals; desirable relation of physician / health professionals with patients and their nearest relatives and environment.
Through active participation of students in workshops and practical classes, students will be able to communicate with different patient categories (regarding age, disease condition, etc.); manage various psychological situations during their professional career and cope with them.

Course description
Theoretical education
1. Introduction to the concept of psychological medicine. 2. Psychological functions. 3. Biological basis of mental functions. 4. Stress and psychological trauma. 5. The impact of psychological factors on the occurrence of diseases. 6. Psychosomatic Medicine. 7. The doctor patient relationship. 8. Reaction of patients to disease. 9. Reaction of the child to illness. 10. Aging and reaction to illness. 11. The process of grieving. 12. Stigma, prejudice and discrimination. 13. Personality and defense mechanisms.

Practical education
1. Communication of physicians/ health professionals with patients – workshop
2. Health and disease – workshop
3. Communication, empathy, professional attitude – workshop
4. Approach to anxious and aggressive patients
5. Informing patients and their families on diseases
6. Communication of the family physicians with members of the family
7. Preparation of patients for diagnostic and therapeutic procedures
8. Relationships and communication within the team –workshop

Literature
Compulsory
1. Friedman H.S. The Oxford Handbook of Health Psychology. Oxford, UK: Oxford University Press; 2011.

Number of active classes	**Theoretical classes:** 30	**Practical classes:** 15

Teaching methods
Lectures, practical work

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	10	Written	70
Practices	20	Oral	
Colloquium			
Essay			

Course title: Clinical Propedeutics

Course status: compulsory

ECTS Credits: 7

Condition: Introduction to Clinical Practice; Anatomy; Physiology (exam)

Course aim

The main objective of education in Clinical propedeutics in integrated studies of medicine is mastering the techniques of taking a history and conducting a physical examination and application of acquired knowledge in the professional, clinical work and scientific research. The goal is to master the approach to patients, mastering the techniques of clinical examination, development of critical thinking skills and teamwork.

Expected outcome of the course:

Students will gain knowledge about the techniques of taking history and physical examination. They will learn to recognize the normal and the finding of a variety of disorders of the morphology and function of organs and organ systems, ie to vary within normal limits of the underlying pathology.

Students will master the techniques of history taking and physical examination methods, patients learn to perform them on the basis of anamnestic conclusion or set up a working diagnosis.

Course description

Theoretical education

1. Introduction to propedevtics. Causes, symptoms and signs of disease. Access to the patient. Testing of pain. 2. A history. 3. Physical examination. 4. Vital signs. 5. General inspection. 6.Skin examination. 7. History and physical examination of the head and neck. 8. History of respiratory diseases. 9. Examination of the chest-thorax topography, inspection and palpation. 10. Percussion of the chest (normal and abnormal findings). 11. Auscultation of the chest (normal and abnormal findings). 12. Special diagnosis of respiratory disease. 13. History of the cardiovascular system. 14. Physical examination of the heart and blood vessels: precordial inspection, palpation of the pulse. 15. Physical examination of the heart and blood vessels: auscultation of heart sounds and cardiac rhythm. 16. Physical examination of the heart: cardiac mirmurs auscultation. 17. Interpretation of ECG recordings – normal results. 18. Overview of the arteries and veins of the lower extremities. 19. A history of gastrointestinal system. 20. Physical examination of the abdomen: topography, inspection (normal and abnormal findings). 21. Physical examination of the abdomen: superficial and deep palpation, digital rectal examination (normal and abnormal findings). 22. Physical examination of the abdomen: percussion and auscultation (normal and abnormal findings). 23. Physical examination of the abdomen: a review of the liver (normal and abnormal findings). 24. Physical examination of the kidneys and urinary system: history, inspection, palpation, succussion (normal and abnormal findings). 25. Examination of the spleen (normal and abnormal findings). 26 Overview of the lymphatic system (normal and abnormal findings). 27. Examination of the limbs and musculoskeletal system. 28 Propedeutics genital tract: secondary sexual characteristics, review of the genitals (normal and abnormal findings). 29. Review of the breast. 30. The general neurological examination: medical history, test reflexes, examination of the cranial nerves (normal and abnormal findings).

Practical education

1. History taking. 2. Vital signs examination (temperature and pulse taking, blood pressure, respiration, pain assessment). 3. General examination. 4. Examination of the head and neck (normal and pathological finding). 5. Examination of the thorax and lungs – anamnesis, topography, palpation, percussion and auscultation (normal and pathological finding). 6. Examination of heart and blood vessels – anamnesis, auscultation, pulse palpation, ECG (normal and pathological finding). 7. Examination of the abdomen and abdominal organs – anamnesis, palpation, percussion, liver examination, digitorectal examination (normal and pathological finding). 8. Examination of kidneys and urinary tract – anamnesis, palpation, sucussion (normal and pathological finding). 9. Examination of the spleen and lymph nodes – anamnesis, palpation, percussion (normal and pathological finding). 10. Examination of genitalia and breasts – anamnesis and physical examination. 11. Examination of extremities – anamnesis and physical examination

Literature

Compulsory

1. Clinical Examination: A Systematic Guide to Physical Diagnosis, 7th Edition, 2013
2. Lecture handouts and notes

Number of active classes	**Theoretical classes:** 30	**Practical classes:** 90 **Other classes:** 30

Teaching methods: lectures, clinical practical work

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	10	Written	20
Practices	20	Oral	50
Colloquium			
Essay			

Course title: Clinical Surface Anatomy

Course status: elective

ECTS Credits: 3

Condition: Anatomy; Neuroanatomy

Course aim:
Gaining knowledge about the structure of the human body, the surface morphology of the body and the projections of the internal organs and structures of the body surface, which will form the basis for clinical propedeutics and radiology as well as the possibility of applying the acquired knowledge of the observed objects in all morphological branches of medicine, biomedicine, pharmacy, therapeutic and technological branches.

Expected outcome of the course:
Introducing surface anatomy of individual body parts and projections related organs and structures. Gaining knowledge will be useful in the practical teaching of this subject, and then as the basis of all clinical disciplines, some of which are internal medicine, radiology and radiotherapy (nuclear medicine), all branches of surgery and forensics.
Gaining practical knowledge of topographical anatomy as a basis of surface anatomy: recognition and identification of relationships of individual anatomical structures of all organ systems, including vessel and neural structures, as well as morphological and functional support of each systematic and topographical part. Knowledge of the anatomical structures of X-ray, MRI and CT images as well as their projections on the surface of the body is the basis of autopsy and surgical techniques, radiology and radiation treatments, as well as understanding of biomedical and borderline disciplines.

Course description
Theoretical education
1.Essentials of general anatomy. 2. Topographic and surface anatomy and projections of the upper extremity. 3. Topographic and surface anatomy and projections of the lower extremity. 4. Topographic, surface anatomy and projections of the spine and back. 5. Topographic and surface anatomy of the thorax. 6. Projections of the thoracic cavity (lungs, heart, esophagus, blood vessels, lymphatics, nerves). 7. Topographic, surface anatomy and projections of the walls of the abdominal cavity. 8. Topographic anatomy and projections of the abdominal cavity (peritoneal cavity and retroperitoneal organs). 9. Topographic, surface anatomy and projections of the pelvic walls. 10. Topographic anatomy and projections of the pelvic cavity. 11. Topographic, surface anatomy and projections of the skull and facial bones. 12. Topographic, surface anatomy and projections of the head and neck. 13. Topographic, surface anatomy and projections of sense organs. 14. Topographic, surface anatomy and projections of the nervous system (central and peripheral nervous systems, somatic and vegetative) and the central nervous system cavity (chambers and cerebrospinal fluid)

Practical education
1. Topographic and surface anatomy and projections of the upper extremity. 2. Topographic and surface anatomy and projections of the lower extremity. 3. Topographic, surface anatomy and projections of the spine and back. 4. Topographic and surface anatomy of the thorax. 5. Projections of the thoracic cavity (lungs, heart, esophagus, blood vessels, lymphatics, nerves). 6. Topographic, surface anatomy and projections of the walls of the abdominal cavity. 7. Topographic anatomy and projections of the abdominal cavity (peritoneal cavity and retroperitoneal organs). 8. Topographic, surface anatomy and projections of the pelvic walls. 9. Topographic anatomy and projections of the pelvic cavity. 10. Topographic, surface anatomy and projections of the skull and facial bones. 11. Topographic, surface anatomy and projections of the head and neck. 12. Topographic, surface anatomy and projections of sense organs. 13. Topographic, surface anatomy and projections of the nervous system (central and peripheral nervous systems, somatic and vegetative) and the central nervous system cavity (chambers and cerebrospinal fluid)

Literature
Compulsory
1. Drake R, Vogl W, Mitchell A. Gray's anatomy for students. 3rd ed**.** London: Elsevier; 2014.
2. Netter FH. Atlas of human anatomy. 6th ed. London: Elsevier Health Sciences; 2014.
Additional
1. Outlines of lectures

Number of active classes	**Theoretical classes:** 30	**Practical classes:** 15

Teaching methods:
Lectures and practical classes

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	20	Written	60
Practices	20	Oral	
Colloquium			
Essay			

Course title: Introduction to Experimental Neuroscience

Course status: elective

ECTS Credits: 3

Condition: –

Course aim: Acquiring knowledge and skills in the field of experimental neuroscience fundamentals.

Expected outcome of the course:
Knowledge: Students should acquire the basics of histochemical and immunohistochemical characteristics of brain tissue of both human and animal origin. Also, the students should know the basics of experimental models such as neuroembryonic development and disorders, neuroinfection, Parkinson's disease, neuro-oncology and neurointoxication.

Skills: The student should be able to recognize the characteristics of immunohistochemical staining of brain tissue of human and animal origin at the level of light microscopy, as well as the basic characteristics of theoretically presented experimental models.

Course description
Theoretical education
Development and evolution of experimental neuroscience; Using of microscope in analysis and evaluation of brain tissue; Histological specificy and diferences of human and animal brain tissue; Immunohistochemical analysis and cell classification in brain tissue; Experimental neuroembryology; Experimental model of Parkinson's disease, neuroinfections, neurotoxicology, neurooncology, neuroembryology and developmentay desorders. Application of fractal brain analysis; Consultation hours for preparation of exam.

Practical education
Base of gross analysis and dissection of adult and fetal brian; Analysis of histochemically and immunohistochemically stained material of human and animal nerve tissue; Stereotaxic atlases and stereotaxic experimental neurosurgery; Histological plaque analysis of the experimental model of Parkinson's disease, neuroinfection, neurodevelopmental disorders, neuro-oncology, as well as neurotoxicological conditions; Fractal analysis and interpretation of branching neurons; Use of computer software in the analysis and processing of microscopic photographs; Recapitulation and preparation for the exam.

Literature
Compulsory
1. Abstract book / 2nd Neuro-MIG Treaning School „Pathology of brain malformation". Novi Sad: Faculty of Medicine, University of Novi Sad; 2018.
2. Snyder JM, Hagen CE, Bolon B, Keen CD. Nervous system. In: Treuting PM, Dintzis SM, Montine KS. Comparative Anatomy and Histology A Mouse, Rat, and Human Atlas 2nd ed. San Diego: Elsevier; 2017.
3. Ferry B, Gervasoni D, Vogt C. Stereotaxic Neurosurgery in Laboratory Rodent-Handbook on Best Practices. New York: Springer Verlag; 2014.
4. Paxinos G, Watson C. The rat brain in stereotaxic coordinates. 6th ed. San Diego: Elsevier; 2007.
Additional
Students will be informed about necessary literature for each unit.

Number of active classes	**Theoretical classes:** 30	**Practical classes:** 15

Teaching methods:
Lecture and Practice

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	20	Written	50
Practices	10	Oral	
Colloquium			
Essay	20		

Course title: Microscopic Laboratory Techniques in Medicine

Course status: elective

ECTS Credits: 3

Condition: Histology and embryology

Course aim:
Students will get acquainted with techniques of making histological preparations for microscopic examination

Expected outcome of the course:
Knowledge: Main postulates of laboratory work, selection of microscopic fixative when working with biological materials, methods of processing biological materials intended for microscopic examination, including specific features of particular simple and complex staining methods, tissue cultures in laboratory medicine, pathology of laboratory animals, norms and disease prevention when working with laboratory animals
Skills: Laboratory work with biological materials with special emphasis on accident prevention, preparation of laboratory solutions, preparation of native and vital microscopic specimens, fixation and further processing of the different tissue samples (rinsing, dehydration, inclusion, moulding), the use of microtome, staining of microscopic preparations, working with laboratory animals, preparation and maintenance of tissue cultures, techniques of post mortem examination on laboratory animals

Course description
Theoretical education
1. Microscopes, history, types
2. Classification of toxins according to WHO and prevention of poisoning and other accidents in the histology laboratory
3. Methods of tissue fixation, selection of fixative for light and electron microscopy
4. Blood and tissue smears and impressions, cytological features of particular samples, basophilia and eosinophilia as representatives of cytological structure
5. Microtomes and their application and usage (history since Purkinjea, manual, rotary, sliding, cryotome)
6. Classification of histological staining methods, simple staining
7. Complex staining
8. Selective staining, major cytochemical reactions
9. Methods of bacterial staining, simple and complex
10. Preparation of microscopic specimens: helminths and arthropods
11. Tissue cultures
12. Biology and working conditions with laboratory animals
13. Pathology of laboratory animals and prevention of anthropozoonoses
14. Consultation hours for preparation of exam

Practical education
1. Native and vital microscopic preparations
2. Measuring procedure using a scale; pipetting and solution preparation, first aid in poisoning
3. Preparation of fixative, obtaining tissue sections, rinsing after fixation, dehydr.ation
4. Staining blood smear by the method of Giemsa
5. Paraffin embedding, cutting the sections using microtome
6. Hematoxylin-eosing staining
7. Masson trichrome and PAS staining
8. Principles of immunohistochemistry
9. Explantation, primary and continuous culture
10. Experimental animal disease models
11. Methods of post-mortem diagnostics in laboratory animals
12. Writing an essay;
13. Pre-exam practical work

Literature
Compulsory
1. Bancroft J.D, Stevens A. Theory and practice of histological techniques. Churchill Livingstone, Edinburgh, 2005.

Number of active classes	**Theoretical classes:** 30	**Practical classes:** 15

Teaching methods: Lecture and Practice

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	20	Written	40
Practices	10	Oral	
Colloquium	15		
Essay	15		

Course title: Clinical Genetics

Course status: elective

ECTS Credits: 3

Condition: –

Course aim

The primary aim of the elective course of Clinical Genetics is to inform medical students about the possibilities of applying clinical genetics in primary, secondary and tertiary health care; acquiring knowledge about the possibilities of applying new molecular genetics technologies in clinical genetics and clinical practice; introduction to the importance of clinical recognition, diagnosis and treatment of hereditary diseases, including rare hereditary diseases. Aquiring knowledge on the importance of prenatal diagnosis including preimplantation genetic testing. Aquiring knowledge on the importance of newborn screening.

Expected outcome of the course

Taking the elective Clinical Genetics course, students will get knowledge on approuch to patients who suffer from inherited diseases. Students will be informed on the importance of etiology, pathogenetic mechanisms, clinical presentation and treatment options for hereditary diseases, including diseases with low incidence (rare diseases). Students will become informed about the importance of dysmorphological examination. Particular attention is paid to modern approaches to the detection and treatment of hereditary diseases, as well as the proper differential diagnosis and additional diagnosis of hereditary diseases, including rare congenital diseases of metabolism. Students will be informed with the importance of prevention of hereditary diseases, including the possibilities of preimplantation genetic testing. Students will be introduced to newborn screening.

Course description

Theoretical education

– Inherited diseases
– Basic principles of hereditary diseases
– Inherited diseases with non-traditional pattern of inheritance
– Chromosomal abberations
– Monogenic diseases
– Multifactorial diseases
– Mitochondrial pattern of inheritance
– Expansion of repetitive trinucleotides
– Genetic imprinting and uniparental dysomia
– Epigenetics
– Dysmorphology
– Congenital anomalies
– Mutations
– Genetic counseling
– Prenatal diagnosis
– Non-invasive prenatal diagnosis
– Invasive prenatal diagnosis
– Preimplantation genetic testing
– Genetic aspect of infertility
– Ethical problems in clinical genetics
– New technologies in molecular genetics including next-generation sequencing
– Modern therapeutic approach for persons affected with hereditary diseases
– Neonatology and genetics
– Inherited metabolic diseases that are available for treatment
– Inherited metabolic diseases not available for treatment
– Personalized medicine
– A multidisciplinary approach in clinical genetics

Practical education

– A family medical history in clinical genetics
– Standard pedigree symbols, pedigree analysis
– Physical examination including dysmorphological examination of the patient, introduction to the terminology of clinical dysmorphology
– Case reports of numerical chromosomal anomalies
– Case reports of structural chromosomal anomalies
– Case reports of monogenic diseases
– Case reports of mitochondrial diseases
– Case reports of uniparental dysomia
– Case reports of neurological hereditary diseases
– Case reports of congenital anomalies

– Case reports of congenital metabolic disorders
– Introduction to non-invasive prenatal diagnostic methods
– Introduction to invasive methods of prenatal diagnosis
– Introduction to preimplantation genetic testing
– Isolation of DNA from a blood sample, amnion, fetal blood and skin
– Introduction to MLPA technology
– Karyotype analysis by standard techniques and other techniques
– Introduction to the detection of chromosomal microdeletions
– Introduction to the detection of mutations of genes responsible for cystic fibrosis
– Introduction to microarray technology
– Introduction of enzyme replacement therapy
– Introduction to the use of substrat inhibitory treatment and enzyme cofactor treatment
– Introduction to prenatal diagnosis
– Introduction to newborn screening
– Introduction of personalized medicine's possibilities

Literature

Required

1. Firth H, Hurst J. Oxford Desk Reference Clinical Genetic and Genomics, 2nd Ed. Oxford University Press 2017.
2. Nussbaum RL, McInnes RR, Willard HF. Thompson and Thompson Genetics in Medicine, 8th Ed. Elsevier Science Health Science 2015.

Number of active classes	**Theoretical classes:** 30	**Practical classes:** 15

Teaching methods

Lectures, practice Medical history, physical, dysmorphological examination of persons affected by hereditary diseases, differential diagnostic and therapeutic aspects in clinical genetics with case reports; Presentation of the Cytogenetic Laboratory; Molecular Genetic Laboratory; Medicogenetic Service for Family Planning and for Medical Genetics – Service for Medical Genetics.

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	20	Written	20
Practices	30	Oral	30
Colloquium			
Essay			

Course title: Approaches to Working with People with Disabilities

Course status: elective

ECTS Credits: 3

Condition: –

Course aim

Acquiring knowledge about etiological factors, characteristics of development and functioning of children with developmental disabilities and adults with disabilities. Adopt an inclusive approach to models of support.

Expected outcome of the course:

After completing the course, the student will be able to understand the concept of disability, to analyze needs for support in different situations and environments, to create support programs. Students will be able to use the acquired knowledge while working with people with disabilities as well as during teamwork.

Course description

Theoretical education

– The International Classification of Functioning, Disability and Health (ICF)
– Characteristics and development of persons with intellectual disabilities
– Characteristics and development of persons with pervasive developmental disorders
– Characteristics and development of hearing impaired persons
– Characteristics and development of people with speech disorders
– Characteristics and development of visually impaired (blind and partially sighted) persons
– Characteristics and development of persons with physical disabilities
– Primary and secondary consequences of disability
– Preparation for examinations, procedures and provision of health care for persons with disabilities
– Providing support and methods of communicating with persons with disabilities during examinations, challenging in the provision of health care to people with disabilities.
– Specificity of the environment and equipment for persons with disabilities

Practical education
– Practical teaching follows the contents of the theoretical part
– Familiarity with certain types of disabilities
– Analysis of support needed
– Development of a support plan
– Participation in practical work with persons with disabilities

Literature
1. Breitenbach RW. Radiologists and Disability Access Requirements. Journal of the American College of Radiology, 2013;10(12):892 – 894
2. Story MF. Luce A. Omiatek EM. Lemke MR. Rempel DM. Accessibility of radiology equipment for patients with mobility disabilities. Hum Factors, 2008;50(5):801-10.
3. Gates B. Barr O. Oxford handbook of learning & intellectual disability nursing. Oxford; New York: Oxford University Press, 2009:pp.333-399.

Number of active classes	**Theoretical classes:** 30	**Practical classes:** 15

Teaching methods: Lectures and practical classes

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	15	Written	70
Practices	15	Oral	
Colloquium			
Essay			

Course title: Pharmacology and Toxicology 1

Course status: compulsory

ECTS Credits: 7

Condition: Medical Biochemistry; Physiology (exam)

Course aim
Medical students are acquainted with basic biologic mechanisms of drugs and their effects on organ systems

Expected outcome of the course
Student should know why, how and when to apply particular drugs, general information on drug metabolism in the body, site and mechanism of their actions, interactions and side effects of drugs. Student must be able to describe effects, therapeutic indications and application of drugs used in the treatment of microbial diseases. Practical classes deal with practical pharmacotherapeutical problems. Student must know how:to properly fill a prescription (magistral drugs, officinal drugs, ready-made drugs) and to explain it; to use drugs registry books; to fill out forms to report side effects of drugs.

Course description
Theoretical education
History of pharmacology. Classification. Drugs and poisons. Mode of application. Dosage. Therapeutic index and therapeutic scope of drugs. Movement of drugs in the body. Biomembrane penetration. Reabsorption and distribution of drugs. Excretion of drugs. Drug metabolism. Induction and enzyme inhibition. Factors affecting the metabolism of drugs.Pharmacokinetic models. Pharmacokinetic parameters. Drug action. Sites of action. Mechanisms of action. Receptors. G-protein.Drug interactions. Synergism and antagonism. Applying drugs used in particular circumstances (children, elderly, pathological condition, pregnancy, breastfeeding). Pharmacogenetics. Adverse effects of Drugs. Addiction. Autonomic nervous system. Respiratory, gastrointestinal and cardiovascular system diseases. Toxicology. Poisons. Drug poisoning. Disinfection and antisepsis. Antimicrobial agents. Antimycotic, antiviral and antiparasitic drugs.

Practical education
Drug classification. Putting drugs on the market. Names of drugs.Pharmacopeia. Drug prescription forms. Magistral and generic formulas. Ready-made drugs. Solid drugs. Liquid drugs. Semi-solid drugs. Inhalation. Bandages. Antimicrobial drug prescription.

Literature
Compulsory
1. Brenner GM, Stevens C. Pharmacology (5th edition). Elsevier, 2017.
2. Rang HP, Dale MM, Ritter JM, Moore PK. Pharmacology (9th edition). Elsevier, 2019;
3. Brown MJ, Sharma P, Bennet PN, Mir FA: Clinical Pharmacology (12th edition). London: Churchill Livingstone, 2018.

Number of active classes	**Theoretical classes:** 75	**Practical classes:** 45

Teaching methods: Theoretical and practical

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	5	Written	40
Practices	15	Oral	
Colloquium*	40		

* if the students does not pass both colloquiums, he/she should take the exam in written form

Course title: Physiology of Sport

Course status: elective

ECTS Credits: 3

Condition: –

Course aim

The basic aims of the course in Sports Medicine are to acquaint students with basics of sports physiology, that is, physiological processes in the body that are specific for engaging in physical activity, and especially in efforts during professional sports.

Expected outcome of the course:

Understanding the basic mechanisms of functioning of different organ systems and aspects of the organization of regulatory mechanisms of complex homeostatic parameters into functional systems of higher order, induced by continuous physical activity of different forms and types. These informations should provide students with a dynamic insight into the functioning of the body and homeostasis during increased efforts and in extreme changes in the body that are induced by sport.

The student should master the general principles and rules of conduct in the sports laboratory, to master the skill of performance and interpretation of laboratory procedures of functional testing. Regular examinations and physical fitness assessment of persons engaged in physical activity is a significant aspect of protecting the health of actors in physical activity and developing the health culture of the general population of a developed society.

Course description

Theoretical education

Muscles: Neuro–muscular synapses. Types of muscles. Morpho-physiological characteristics of skeletal muscles. Contraction of skeletal muscles. Types of contractions. Motor unit. Types of muscle fibers and sports. Work, power and muscle fatigue. The physical aspects of human work (force, power, work). Smooth muscles. **Bioenergetics:** Energy and the role of nutrients, energy sources in the human body. Anabolism and catabolism. Minerals and vitamins. Methods for measuring energy flow and energy deposition. Respiratory coefficient. Glycogen supercompensation. Lactic acid. Basal metabolism. Energy transfer under workloads. Daily diet composition. Special diet of athletes depending on the age and type of physical activity. **Homeostasis:** Regulation of acid – base balance. Chemical and physiological buffers. Glycemic regulation. Regulation of body calcium levels. Regulation of protein metabolism (impact of physical activity on anabolic processes in the body). **Ergometry:** Energetic capacities and their measurement. "Steady State". Sports training and types of training. Dynamic stereotype. Reaction time. **Stress:** The theory of stress, stages of stress, stressor. The role of sport and recreation according to the modern theory of functional systems in the perception and adaptation to harmful effects of stress. Overtraining and its implications on functional abilities of athletes. Injuries and their prevention. Chronobiology and its importance in sports. Circadian rhythm.

Practical education

1. **Assessment of functional abilities** (functional test selection, selection of workload type). 2. **Determination of aerobic capacity** (determining maximal oxygen uptake, "vita maxima" and "all – out" tests, Astrand test, indirect tests). 3. **Determination of anaerobic capacity** (Wingate anaerobic test, maximum power, the average power, explosive power, fatigue index; determining oxygen debt and oxygen deficit). 4. **Determination of steady states** (test selection, heart rate monitoring, monitoring of respiratory parameters, oxygen consumption monitoring). 5. **Determination of heart rate** (palpation, auscultation, heart rate monitoring by ECG). 6. **Measurement of arterial blood pressure**. 7. **Dynamometry** (dynamometry equipment, basic parameters of dynamometric testing of muscular strength, arm flexor strength testing, arm extensor strength testing, leg extensor strength testing). 8. **Analysis of body composition – basic anthropometrics measurements** (basic instruments – scales, pelvimeter, slide calipers, calipers, centimeter tape; determining of BMI; somatotype determination, calculation of physical constitution by Heath – Carter, determining body fat mass utilizing bioelectrical impedance).

Literature

Compulsory

1. Costill D, Wilmore J. Physiology of Sport and Exercise, Human Kinetics 2015.
2. William D, Katch IF, Katch VL. Exercise Physiology. Wolters Cluver,2014.

Number of active classes	**Theoretical classes:** 30	**Practical classes:** 15

Teaching methods

Lecture. Practical work.

Student activity assessment (maximally 100 points)			
Pre-exam activities	**points**	**Final exam**	**points**
Lectures	20	Written	60
Practices	20	Oral	
Colloquium			
Essay			

Course title: Clinically Oriented Embryology

Course status: elective

ECTS Credits: 3

Condition: –

Course aim

Explanation of purpose and application of embryology in clinical practice with a detailed understanding of gametogenesis, *in vivo* fertilization along with retrospection and correlation with *in vitro* fertilization, embryo formation and fetal development with histological analysis of embryonic and fetal structures.

Getting familiar with the application of clinically oriented embryology in gynecology, pediatrics, pathology and other areas of medicine. Parallel to the theoretical knowledge about proper development and training of practical knowledge of normal embryology, the purpose of the subject is to explain the development of congenital malformations (teratology), to give a detailed explanation of their origin and mechanism of their appearance, as well as the importance of their recognition and practical issues (consequences, the possibility of medical care).

Expected outcome of the course:

Upon completion of this course, students will be trained to know in detail the structure and needs of the conceptus. Their knowledge of the normal and abnormal development in humans will be expanded greatly, which will be an important basis for understanding other familiar branches of medicine (gynecology, pediatrics, pediatric surgery).

Course description

Theoretical education

1. Introduction and history of reproductive biology – embryology as a science and basics of teratology
2. Oogenesis
3. Spermatogenesis
4. Phases of fertilization *in vivo* and correlation with *in vitro* fertilization
5. Blastomerization, implantation, gastrulation, formation of germ layers and neuralation
6. Branchial system and development of the head and neck region of the embryo with possible malformations
7. Development of cardiovascular system with possible malformations
8. Development of digestive system with possible malformations
9. Development of respiratory system with possible malformations
10. Development of urinary system with possible malformations
11. Development of reproductive system with possible malformations
12. Development of endocrine system
13. Development of nervous system and senses with possible malformations
14. Development of musculoskeletal system and abdominal wall with possible malformations
15. Development of placenta and its functions

Practical education

Microscopic analysis of human and animal material. Analysis of histological specimens of embryonal and fetal structures. Macroscopic analysis. Essay. Pre-exam review classes. Student's scientific papers.

Literature

Compulsory

1. Sadler T. Langman's medical embryology, 14th ed. Baltimore: Lippincott, Williams & Wilkins; 2018. 456 p.
2. Moore KL, Persaud TVN. The Developing human. Clinically oriented embriology. 10th ed. Philadelphia: Saunders; 2015. 560 p.

Additional

1. Singh V. Textbook of clinical embriology. Elsevere India; 2013. 352 p.
2. Schoenwolf GC, Bleyl SB, Brauer PR, Francis-West PH. Larsen's human embriology, 5th ed. New York, Edinburgh: Churchil Linvingstone; 2014. 576 p.
3. Gilbert SF. Developmental biology. 8th ed. Sunderland: Sinauer Associates; 2006. 785 p.
4. Keeling JW, Khong TY. Fetal and neonatal pathologhy, 5th ed. London: Springer; 2015. 882 p.
5. Trounson A, Gosden R, Eichenlaub-Ritter U. Bilogy and pathologa oh the oocyte. Role in fertility, medicine and nuclear reprograming, 2nd ed. Cambrige: University press; 2013. 466 p.
6. Ten Donkelaar HJ, Lammens M, Hori A. Clicinal neuroembriology. Development and divelopmental disordes of human central nervous system. 2nd ed. Berlin Heidelberg: Springer; 2006. 659 p.

Number of active classes	**Theoretical classes:** 30	**Practical classes:** 15

Teaching methods: oral presentations and interactive lectures using multi-medial didactic tools and virtual microscopy. Practical work (individual or in small groups) trough microscopic analysis of histologic specimens, and macroscopic analysis of relevant cases.

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	30	Written	
Practices	10	Oral	60
Colloquium			
Essay			

Course title: Healthcare Management

Course status: elective

ECTS Credits: 3

Condition: –

Course aim

Introduction with the healthcare management principles, as well as with leadership skills aimed at healthcare work efficiency improvement.

Expected outcome of the course

Abilities and skills in understanding individual segments of the organisation and organisation as a whole, team work skills, knowledge of leadership skills.

Course description

Theoretical education

- Human resources in healthcare
- Importance of different healthcare systems
- Importance of planning in healthcare
- Organisational behaviour and management
- Management in healthcare system
- Importance of economics and financial management in healthcare system
- Assessment of health needs in healthcare
- Importance of cost analysis in healthcare
- Ethics and Law in healthcare system management
- Health policy and decision-making
- Healthcare marketing,
- Healthcare leadership
- Strategic management and changes

Practical education

- Written assignments, group and individual activities
- Needs plan, cost analysis, strategic planning, human resources

Literature

Compulsory

1. Basics of Healthcare Management. Published by the Ministry of Health of RS. Authors: Bjegović Mikanović Vesna et al., April 2011, Belgrade (Osnove menadžmenta u zdravstvu. Izdavač Ministarstvo zdravlja RS. Autori: Bjeković Mikanović Vesna i saradnici, April 2011, Beograd).

Additional

1. Psychology in Management. Abraham Maslow. Published by Adižes Novi Sad, 2004. (Psihologija u menadžmentu. Abraham Maslov. Izdavač: Adižes Novi Sad, 20014).

Number of active classes	**Theoretical classes:** 30	**Practical classes:** 15

Teaching methods

Lectures, exercises, interactive teaching, seminars.

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	10	Written examination (final written assignment)	50
Practices	10	Oral	
Colloquium			
Essay	30		

Course title: Sign Language			
Course status: elective			
ECTS Credits: 3			
Condition: –			
Course aim The main objective of this course is to enable students for inital, basic communicatin with people with hearing impairments and to apply the acquired knowledge in their work.			
Expected outcome of the course: It is expected that after completing this course the student will be able to understand and use the initial level of sign language and to communicate with people with hearing impairment in their primary language.			
Course description *Theoretical education* Deafness and hard of hearing, hearing impairment – terminology, Socio-cultural and medical approach to people with hearing impairment; Bilingualism and biculturalism; Communication of people with hearing impairment; The concept and importance of sign language in the communication of people with hearing impairment; The historical perspective of sign language; Origin and development of sign language; Classification and characteristics of sign language; Basic sign language settings and rules; Specificities in sign language training; The influence of sign language on the psychosocial development of a child with hearing impairment; Sign language and socialn environment; Use of sign language in people with multiple disabilities; Vocabulary and Sign Language; Grammar, syntax and sign language; Dactylology; Sign language and translation. *Practical education* Practical exercise includes mastering the signs, movements and rules of communication in sign language through the fields of: people, family, daily life, food, education, work, time, culture, sport, communication, medicine (with special emphasis on communication of medical staff with patients, during medical examinations, hospitalizacion, intensive care, etc.), personality, world. Mastering of sign language is conducting through learning words and phrases, and using them in simple and simple sentences. One-handed and two-handed finger alphabet.			
Literature *Compulsory* Outlines of lectures			
Number of active classes	**Theoretical classes:** 30	**Practical classes:** 15	
Teaching methods Lectures, PPT presentations, video presentations, workshops; Active and interactive teaching.			
Student activity assessment (maximally 100 points)			
Pre-exam activities	**points**	**Final exam**	**points**
Lectures		Written	70
Practices	5	Oral	
Colloquium	25		
Essay			

Course title: Dissection Techniques in Anatomy
Course status: elective
ECTS Credits: 3
Condition: Anatomy; Neuroanatomy
Course aim Understanding normal anatomical relationships and morphology of the human body using dissection techniques in anatomy.
Expected outcome of the course: Acquiring knowledge about the anatomy of human body through individual dissection of cadavers. Beside gaining the basic skills of dissection and how to prepare for practicing in dissection hall, the acquired theoretical and practical knowledge will make it easier for students to understand and follow further courses in medicine (pathological anatomy, surgery, maxillofacial surgery, otolaryngology, ophthalmology and forensic medicine).

Course description

Theoretical education

– Introduction to the methods how to prepare the cadaver for dissection
– Introduction to the basic dissection techniques in anatomy
– Introduction to the techniques of preserving anatomical preparations
– Human skeletal preparation techniques and their anthropological analysis
– Dissection techniques of the thoracic wall and vertebra column
– Dissection techniques of the thoracic cavity organs
– Dissection techniques of the abdominal walls
– Dissection techniques of the abdominal organs
– Dissection techniques of the pelvic walls and organs
– Dissection techniques of the upper extremity
– Dissection techniques of the lower extremity
– Dissection techniques of the head and neck
– Dissection techniques of the senses organs and temporal bone
– Dissection techniques of the central nervous system
– Repetition of the acquired knowledge

Practical education

– Introduction to the methods how to prepare the cadaver for dissection
– Introduction to the basic dissection techniques in anatomy
– Introduction to the techniques of preserving anatomical preparations
– Human skeletal preparation techniques and their anthropological analysis
– Dissection techniques of the thoracic wall and vertebra column
– Dissection techniques of the thoracic cavity organs
– Dissection techniques of the abdominal walls
– Dissection techniques of the abdominal organs
– Dissection techniques of the pelvic walls and organs
– Dissection techniques of the upper extremity
– Dissection techniques of the lower extremity
– Dissection techniques of the head and neck
– Dissection techniques of the senses organs and temporal bone
– Dissection techniques of the central nervous system
– Repetition of the acquired knowledge

Literature

Compulsory:

1. Standring S, editor-in-chief. Grey's Anatomy – The Anatomical Basis of Clinical practice. 41st ed. London: Elsevier Churchill Livingstone; 2016.
2. Hansen JT. Essential Anatomy Dissector – following Grant's method. 2nd ed. Philadelphia, Baltimor: Lippincot Williams & Wilkins; 2002.
3. Tubbs RS, Shoja MM, Loukas M. Bergman's Comprehensive Encyclopedia of Human Anatomic Variation. New Jersey: John Wiley & Sons; 2016.
4. Rohen J., Yokochi C., Lutjen-Drecoll E. Anatomy – A Photographic Atlas.
5. Drake R, Vogl W, Mitchell A. Gray's anatomy for students. 3rd ed. London: Elsevier; 2014.

Additional:

1. Outlines of lectures

Number of active classes	**Theoretical classes:** 30	**Practical classes:** 15

Teaching methods: Lectures and practical classes

Student activity assessment (maximally 100 points)			
Pre-exam activities	**points**	**Final exam**	**points**
Lectures	20	Written	40
Practices	40	Oral	
Colloquium			
Essay			

Course title: Pharmacology and Toxicology 2

Course status: compulsory

ECTS Credits: 4

Condition: Pharmacology and Toxicology 1

Course aim

Medical students are acquainted with basic biologic mechanisms of drugs and their effects on organ systems

Expected outcome of the course

Student should know why, how and when to apply particular drugs, general information on drugs, metabolism in the body, site and mechanism of action, interactions and side effects of drugs. Student must be able to describe the effects, therapeutic indications and application of drugs used in the treatment of microbial diseases. Practical classes deal with practical pharmacotherapeutical problems. Student should know to: properly fill a prescription (magistral drugs, officinal drugs, ready-made drugs) and to explain it; use the drug registry; fill the registration form /report onadverse effects of drugs.

Course description

Theoretical education

Drugs in the treatment of endocrine system disorders and diseases. Transmitters and receptors in the nervous system. Total and local anesthesia. Strong analgesics. Nonsteroidal antiinflammatory drugs. Treatment of epilepsy. Treatment of degenerative diseases of CNS (Alzheimer's and Parkinson's disease). Sedatives and hypnotics. Anxiolytics. Neuroleptics. Antidepressants and therapy of mania.

Practical education

Drug prescription according to pharmacotherapeutic classes, interactive lectures and seminar papers.

Literature

Compulsory

1. Brenner GM, Stevens C. Pharmacology (5th edition). Elsevier, 2017.
2. Rang HP, Dale MM, Ritter JM, Moore PK. Pharmacology (9th edition). Elsevier, 2019;
3. Brown MJ, Sharma P, Bennet PN, Mir FA: Clinical Pharmacology (12th edition). London: Churchill Livingstone, 2018.

Number of active classes	**Theoretical classes:** 45	**Practical classes:** 30

Teaching methods Theoretical and practice

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	5	Written	(60)
Practices	5	Oral	30
Colloquium*	2x30		

* if the students does not pass both colloquiums, he/she should take the exam in written form

Course title: Internal Medicine

Course status: compulsory

ECTS Credits: 24

Condition: Pathology; Pathophysiology (entrance); Clinical Propedeutics; Radiology, Pharmacology and Toxicology 1; Pharmacology and Toxicology 2 (for the test and exam)

Course aim

The main objective of education in the subject Internal Medicine in integrated medicine studies the adoption of the current theoretical and practical expertise in internal medicine, as well as training to apply their knowledge in a professional and in scientific research. Significant development of critical thinking, as well as the ability to take on the basis of the knowledge and skills of diagnosis of disease, the appropriate plan further diagnosis and prescribe treatment.

Expected outcome of the course:

Students will gain knowledge in all areas of Internal Medicine: nephrology and clinical immunology, endocrinology, gastroenterology and hepatology, hematology, pulmonology, cardiology and medical oncology, as well as the ability to recognize these diseases, the implementation of a rational diagnosis and treatment of these diseases in terms of general practitioners as well as urgent care for serious and critically ill patients. They will acquire the ability to use these skills define the diagnosis, plan diagnostic procedures and administer appropriate therapy.
Students will be trained for individual and team work in identifying cardiac, pulmonary, nephrologic, endocrine, gastrointestinal, hematological and oncological diseases, as well as the application of diagnostic and therapeutic algorithms..

Course description

Theoretical education

1. PULMONOLOGY: Clinical symptoms and signs of lung disease. Physical findings in pulmonary diseases. Pathophysiology of respiration. Diagnostic algorithm in lung diseases and diagnostic methods. Chronic obstructive pulmonary disease. Pulmonary failure, hypertension and chronic pulmonary heart. Lung tumors (etiopathogenesis, clinical, TNM classification, therapy). Diseases of the mediastinum. Pulmonary thromboembolism. Smoking, a risk factor in the development of lung disease. Bronchial asthma. Sleep apnea syndrome. Toxic lung injury and acute respiratory distress syndrome. Lung transplantation. Collagenosis and vasculitis. Side effects of drugs to the lungs. Idiopathic, immune and granulomatous lung disease. Sarcoidosis of the lungs. Tuberculosis (etiology, pathogenesis, clinical picture, diagnosis, therapy). Diseases of the pleura. Malignant pleural mesothelium. Pneumonia. Respiratory disease in immunocompromised patients, AIDS and non-AIDS diseases. Lung abscess, bronchiectasis and cystic fibrosis. Diaphragm (disease and its role in breathing). The rehabilitation of pulmonary patients. Interventional pulmonology. Occupational lung disease.
2. GASTROENTEROLOGY AND HEPATOLOGY: Diseases of the esophagus and hiatus hernia. Dyspepsia, acute and chronic gastritis. Atony and ptosis of the stomach. Ulcer disease of the stomach and duodenum. Bleeding from the gastrointestinal tract. Diagnosis of bowel disease, syndrome of constipation and diarrhea syndrome. Functional disorders of the gastrointestinal tract. Malabsorption syndrome. Gluten enteropathy. Ulcerative colitis. Crohn's disease and intestinal tuberculosis. Acute pancreatitis and diagnosis of pancreatic diseases. Chronic pancreatitis. Cirrhosis of the liver (Causes, division, symptoms, diagnosis, treatment). Chronic hepatitis. Diagnosis of diseases of the gall bladder and bile ducts. Cholelithiasis. Cholecystitis. Diferential diagnosis of jaundice. Postholecystectomic syndrome. Acute intermittent hepatic porphyria. Acute poisoning with chemical substances. Diverticules of the gastrointestinal tract. Tumors of gastrointestinal organs (esophagus, stomach, duodenum, small intestine and colon, GIST, pancreas, and liver). Liver echinococcosis.
3. CARDIOLOGY. Heart defects (congenital and acquired). Coronary heart disease and acute myocardial infarction. Pathophysiology of cardiogenic schock. Ultrasound diagnostics in cardiology. Acute and chronic pulmonary heart. Syncopal sheet in cardiology. Endocarditis. Heart rhythm disorders. Treatment of cardiac arrhythmias. Cardiopulmonary resuscitation. Electrophysiological diagnostics and electrotherapy of the heart. Pericarditis. Emergencies in Cardiology. Invasive diagnostics in cardiology. Emergency treatment methods in cardiology. Arterial hypertension. The rehabilitation of cardiovascular patients. Acute and chronic heart failure and its treatment. Rheumatic fever. Imaging techniques in cardiology. Prevention of cardiovascular disease. Diseases of the arteries and veins. Primary and secondary cardiomyopathy. Thrombolytic treatment in cardiology. Tumors of the heart. Aortic disease.
4. ENDOCRYNOLOGY. Disorders of hypothalamic-pituitary axis (hipofunkciona and hiperfunkciona sheet). Disorders neurohypophysis. Thyroid disease (hyperthyroidism, hypothyroidism, thyroiditis, thyroid carcinoma). Diseases of the parathyroid glands (hyperparathyroidism, hypoparathyroidism). Diseases of the adrenal glands (Cushing's syndrome, hyperaldosteronism, DLV, pheochromocytoma, MEN hipokorticizam). Primary ovarian insufficiency. Menopause. Polycystic ovarian syndrome. Diseases of male gonads. Primary and secondary osteoporosis. Paget's disease of bone. Diabetes mellitus (etiopathogenesis, classification, clinical features, diagnostic, treatment, acute and chronic complications). Disorders of fat metabolism (etiology, clinical presentation, diagnosis, treatment). Obesity and cardiometabolic syndrome. Importance of genetics and molecular biology, in the diagnosis and treatment of endocrine diseases. Diabetes and pregnancy. Endocrinological diseases and pregnancy.
5. NEPHROLOGY AND CLINICAL IMMUNOLOGY Clinical syndromes in nephrology. Diagnosis of renal disease and functional testing. Glomerulonephritis-etiopathogenesis, classification and clinical picture. Acute, rapidprogressive, persistent and chronic glomerulonephritis – diagnosis and treatment. Acute pyelonephritis. Chronical pyelonephritis and other interstitial nephropathy. Vasculitis. Acute and chronic renal failure. Nephrolithiasis and vascular nephropathy. Kidney transplant. Emergencies in nephrology. Water and electrolytes abnormalities. Clinical aspects of the functioning of the immune and disorders of the appliance. Hypersensitivity reactions – pathophysiological and clinical aspects. Atopy. Pharmacological and nutritional allergies. Systemic anaphylactic reactions. Autoimmunity. Autoimmune diseases, connective tissue diseases. Systemic lupus erythematosus. Rheumatoid arthritis. Sjogren's syndrome. Systemic sclerosis. Polymyositis. Mixed connective tissue disease. Seronegative arthritis. Differential diagnosis of arthropathy. Immunodeficient conditions. Diagnostic methods in immunology. Transplantation immunology and clinical aspects to transplantation. Therapeutic methods in clinical immunology.

6. HEMATOLOGY Anemic syndrome. The division of anemia. Iron deficiency anemia and conditions. Aplastic anemia and paroksizmna nocturnal haemoglobinuria. Megaloblastic anemia. Hemolytic anemia (hereditary corpuscular, ekstracorpucular, microangiopathy). Anemia of complex genesis and anemia in the elderly. Leukocytosis, leukopenia, and agranulocytosis. Eosinophilia, basophilia, monocytosis. Malignant hematological diseases – etiology, classification and therapeutic principles. Acute leukemia (lymphoblastic, nonlymphoblastic). Chronic myeloid leukemia. Erythrocytosis and polycythemia. Myelofibrosis and essential thrombocythemia. Chronic lymphocytic leukemia. Tricholeukemia. Lymphomas (Hodgkin's and non Hodgkin's lymphoma, B and T lymphocytes). Differential diagnosis of lymphoadenomegaly and splenomegaly. Plasmacytoid lineage disease (MGUS, multiple myeloma and other diseases plasmacytoid lineage). Hemorrhagic syndrome, vasculopathy, thrombocytopenia and thrombosthenias. Hemophilia A and B, Von Willebrand's disease (congenital and acquired). Hypoprothrombinaemia, pathologic fibrinolysis and disseminated intravascular coagulation (DIC). Arterial and venous thrombosis. Stem cell transplantation. Molecular diagnostics and treatment of hematological diseases.

Practical education

1. The history and physical examination of pulmonary patients, diagnostic and therapeutic algorithms in pulmonology. The role of general practitioners in the diagnosis and treatment of pulmonary diseases, solving emergencies in pulmonology. 2. The history and physical examination of patients with gastroenterology and hepatology diseases, diagnostic and therapeutic algorithms in gastroenterology and hepatology. The role of general practitioners in the diagnosis and treatment of gastrointestinal diseases and hepatological and solving emergencies in gastroenterology and hepatology. 3. The history and physical examination of patients with cardiological disases, diagnostic and therapeutic algorithms in cardiology. The role of general practitioners in the diagnosis and treatment of cardiovascular diseases, solving emergencies in cardiology. 4. History taking and physical examination of endocrine patients, patients with diabetes and other metabolic disorders, diagnostic and therapeutic algorithms in endocrinology, diabetes and other metabolic disorders. The role of the general practitioner in the diagnosis and treatment of endocrine disorders, diabetes mellitus and other metabolic diseases, solving emergencies in endocrinology, diabetes and metabolic disorders. 5. The history and physical examination of patients with immune and renal diseases, diagnostic and therapeutic algorithms in clinical immunology and nephrology. The role of general practitioners in the diagnosis and treatment of immune diseases and nephrology, as well as taking care of emergencies in clinical immunology and nephrology. 6. History taking and physical examination of patients with hematological diseases, diagnostic and therapeutic algorithms in hematology. The role of general practitioners in the diagnosis and treatment of hematological diseases.

Literature

Compulsory

1. Harrison's Principles of Internal Medicine, McGraw-Hill Professional 20th Edition 2018;
2. Lecture handouts and notes

Number of active classes	**Theoretical classes:** 195	**Practical classes:** 180 **Other classes:** 120

Teaching methods: Lectures and practical work

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	10	Written	10
Practices	20	Oral	60
Colloquium			
Essay			

Course title: Radiology

Course status: compulsory

ECTS Credits: 6

Condition: Anatomy; Neuroanatomy; Histology and Embryology; Physiology; Pathology; Patophysiology

Course aim:

Students are acquainted with radiology physics and radiographic anatomy. In practical classes students are instructed of diagnostic imaging modalities, radiography, ultrasound, computerized tomography and magnetic resonance imaging, as well as angiographic procedures. Students are acquainted with radiologic appearance of hereditary, vascular, inflammatory, oncologic diseases of the thorax, abdomen, pelvis, musculoskeletal, central nervous system and neck. In practical classes students are instructed in X-Ray, ultrasound, computerized tomography and magnetic resonance imaging interpretation. Teaching activities in Radiology are specific due to education in conventional radiology combined with novel diagnostic procedures.

Expected outcome of the course:

Student will be introduced to the spectrum of imaging methods, their basic principles and utilization. Particular attention is paid to accurate indications and becoming accustomed with the diagnostic options of particular categories of radiological examination. Student will accomplish necessary skills to perform X-ray, ultrasonography examination, to analyze radiography images, computed tomography and MR images and to demonstrate particular techniques of interventional radiology.

Detailed knowledge of the anatomical details in each diagnostic modality will be required. Student will be able to establish the diagnosis based on obtained diagnostic data and understand radiological findings. Particular attention is paid to accurate indications and becoming accustomed with the diagnostic options of particular categories of radiological examination.

Course description:

Theoretical education

1. Basics of medical application of ionizing radiation; physics of imaging methods (X-ray, ultrasound, computed tomography, magnetic resonance imaging); interventional radiology; 2. Application and indications for radiological examinations (X-ray, computed tomography, ultrasound, magnetic resonance imaging); 3. Basic principles and indications for invasive diagnostic and intervention-radiology methods; 4. Radiological appearance of "head to toe" pathological conditions (malformations, variations, trauma, inflammatory diseases, primary benign and malignant tumors, secondary tumors); 5. Radiological characteristics of common disorders of respiratory-, digestive- and urinary system, acute abdomen, reproductive system (breast, female pelvis and male reproductive organs: prostate and scrotum); musculoskeletal and nervous system, acute abdomen in adult patients; 6. Radiological characteristics of common disorders of circulation, respiratory, nervous, musculoskeletal and urinary system and acute abdomen in children.

Practical education

1. Demonstration of radiology-imaging equipment and instruments and their operations; 2. Analysis of radiology images and scans (X-ray, CT, MR); 3. Practical work with ultrasound; image analysis; 4. Practical work with magnetic resonance; image analysis; 5. Observing particular techniques in interventional radiology; 6. Detailed identification of the anatomical structures on each diagnostic modality;

Literature

Compulsory

1. Richard B. Gunderman. Essential Radiology: Clinical Presentation, Pathophysiology, Imaging. Thieme 2014.
2. William Herring.Learning Radiology: Recognizing the Basics, 3e. Elsevier Science 2015.
3. Lothar Wicke. Atlas of Radiologic Anatomy. Saunders 2004

Number of active classes	**Theoretical classes:** 45	**Practical classes:** 60

Teaching methods:

Lectures, practical work

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	15	Test	20
Practices	15	Practical	25
Colloquium		Oral	25
Essay			

Course title: Infectious Diseases

Course status: compulsory

ECTS Credits: 6

Condition: Microbiology and Immunology; Pathology; Pathophysiology; Clinical Propedeutics

Course aim

The aim of the course in Infectious diseases is to train students to identify and treat patients suffering from infectious diseases, obtain medical history, perform clinical examinations, identify acute and chronic infectious diseases.

Expected outcome of the course:

Students get acquainted with features of infectious diseases, etiology, epidemiology, pathogenesis, clinical manifestations, diagnostic and therapeutic approaches to infectious diseases.
Students are trained for appropriate history taking, with special emphasis on the clinical course of present disease by dates and by systems, and on the epidemiological questionnaire. Students will be able to perform physical examination including meningeal signs examination and neurologic examination.

Course description

Theoretical education

Acute tonsillopharyngitis and diphtheria; General features of streptococcal diseases, erysipelas, scarlet fever
Atypical pneumonia and pertussis; Zoonosis (anthrax, brucellosis, tularemia, plague); Q fever; Rickettsiosis, Typhus and Brill disease
Fever of unknown origin; Rational approach to antimicrobial treatment; Influenza i flu like syndrome; Viral exanthema; Chicken pox, smallpox, 5th and 6th disease; Measles, German measles; Herpesvirus infections; Infectious mononucleosis, Epidemic parotitis
Infectious diseases in pregnancy, toxoplasmosis; HIV infection; Sepsis; Tropical diseases; Malaria; Haemorrhagic fever; Lyme disease; Leptospirosis; Introduction to viral hepatitis; Differential diagnosis of icterus; Fulminant viral hepatitis; Hepatitis A, E, nonA-E; Hepatitis B, D, C; General features of meningitis and meningeal syndrome; Bacterial meningitis; Meningococcal disease; Meningitis with clear cerebrospinal fluid, TB meningitis; Encephalitis and CNS disease caused by prions; Tetanus; Polio and rabies
Botulism; General features of intestinal infections, enteroviral infections; Salmonellosis and typhoid fever; Food poisoning and cholera; Traveler's diarrhea, Clostridium difficile infection; Bacillary and amoebic dysentery, campylobacteriosis; Trichinellosis

Practical education

Introduction to infectious diseases; taking medical history in infectious diseases; Intestinal infections – medical history; respiratory infections – medical history; fever of unknown origin and rash – medical history; CNS infection – medical history; hepatology – medical history; medical history – conclusion; Complete physical examination – demonstration; complete physical examination of the abdomen – demonstration; complete physical examination – meningeal signs and neurologic examination – demonstration; complete physical examination of the upper respiratory tract – demonstration; ccomplete physical examination of the lower respiratory tract – demonstration; complete physical examination of the liver – demonstration; ddifferential diagnosis of icterus ; differential diagnosis of intestinal infections; differential diagnosis of CNS infections, especially neurologic and neurosurgical disease; differential diagnosis of unclear febrile states; differential diagnosis of respiratory infections; lumbar puncture – demonstration

Literature

Compulsory

1. Mandell GL, Douglas RG, Bennett JE: Principles and practice of Infectious Diseases, 7th ed, Churcill Livingostone, Philadelphia, New York, US, 2010.
2. Jong CE, Stevens DL: Netter's Infectious Diseases, 3rd ed.Elsevier, Philadelphia, US, 2012.

Number of active classes	**Theoretical classes:** 45	**Practical classes:** 60 **Other classes:** 45

Teaching methods

Lectures, practice

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	10	Written	10
Practices	30	Oral	40
Colloquium	10		
Essay			

Course title: Neurology

Course status: compulsory

ECTS Credits: 5

Condition: Clinical Propedeutics (exam); Pharmacology and Toxicology 1 (exam)

Course aim

The aim of this course is to provide medical students with knowledge on pathogenetic basis and clinical symptoms of common neurological disorders and their current neurological diagnostic procedures, treatment, and prognosis.

Expected outcome of the course:

The course provides students with a general understanding of symptoms and signs of disorders of different structures of the central nervous system, evaluation of the patient with neurological symptoms, how and when to suspect a neurological entity, perform an adequate diagnostic procedure and if necessary initiate a treatment.

After completing the course the student should:

– be able to carry out history-taking and a complete neurological examination of the patient and based on it
– formulate a working (probable) diagnosis and indicate basic laboratory investigations;
– be familiar with basic principles of the management of urgent neurological conditions;
– have an understanding of conditions that require referral to a neurology specialist (i.e. whether a condition requires in-patient investigation and treatment)

Course description

Theoretical education

1. Episodic disturbance of consciousness, coma, delirium. Sleep disorders
2. Epilepsy and epileptic syndromes
3. Headache, neuralgia, vertigo
4. Ischemic cerebrovascular disease
5. Hemorrhagic cerebrovascular disease and brain edema
6. Infectious disease of the CNS and neurological complications of systemic disorders
7. Dementias
8. Leucodystrophies and metabolic disorders
9. Neurological aspects of CNS trauma and CNS tumors
10. Demyelinating diseases
11. Movement disorders and cerebellar disorders
12. Developmental neurology
13. Motor neuron disorders and polyneuropathies
14. Brainstem and spinal cord disorders
15. Neuromuscular junction disorders and muscular disease

Practical education

1. Neurological history taking
2. Examination of cranial nerves I-VI
3. Examination of cranial nerves VII-XII
4. Examination of the neck, upper and lower limbs (nutrition, tonus, movement, muscular reflexes, strength, stretching tests)
5. Examination of sensibility
6. Extrapyramidal symptoms and signs
7. Examination of cerebellar functions
8. Examination of higher cerebral functions
9. Diagnostic procedures in neurology (EEG, video EEG, EMNG, EP, LP, CSF isoelectric focusing, ultrasonography, CT, MRI, PET, SPECT)
10. Examination of a comatose patient
11. Examination of a patient with myasthenia gravis
12. Neurological examination of a pediatric patient
13. Gait disorders (differential diagnosis)
14. Headaches
15. Complete neurological examination of different neurological diseases, differential diagnosis

Literature

Compulsory:

1. Mumenthaler M, Mattle H. Fundamentals of neurology. Thieme, 2006.
2. Gilman S. at al. Oxford american handbook of neurology. Oxford University Press, Inc. 2010.
3. Westover MB. Pocket neurology. Lippincott Williams and Wilkins, 2016

Additional:

1. Adams RD, Victor M, Ropper AH. Principles of neurology. Mc Graw-Hill New York 1997 (2005,2009,2014)

Number of active classes	**Theoretical classes:** 30	**Practical classes:** 60 **Other classes:** 15

Teaching methods: lectures, practice			
Student activity assessment (maximally 100 points)			
Pre-exam activities	**points**	**Final exam**	**points**
Lectures	15	Written	60
Practices	15	Oral	
Colloquium		Practical	10
Essay			

Subject name: Health Psychology

Course status: elective

ECTS Credits: 3

Condition: –

Course goals:
Students will gain knowledge of the significance in relationship between psychology and medicine, as well as about the role of psychological constructs in the health care settings. They will acquire knowledge about the influence of psychological factors and the importance of stress in the onset of psychosomatic diseases. They will also gain knowledge of posible ways in overcoming stress and pain management. They will also be acquainted with current tendencies in interdisciplinary approaches (e.g. psychoneuroimmunology, psychooncology). They will master the knowledge that will enable them to recognize the burnout syndrome at work, along with appropriate strategies of how to overcome it.

Subject outcomes:
After completing this course it is expected that students will be able to:
- Know and understand the definition of health psychology and the theoretical models on which it is based (biomedical; psychosomatic, biopsychosocial model).
- Understand the psychological aspects of illness and health
- Recognize different psychological reactions to symptom, illness, and importance of seeking professional help and social support
- Understand the role of stress in the onset of psychosomatic diseases and possible ways in overcoming stress
- Recognize the role of personological factors in experiencing and managing pain (acute and chronic pain states)
- Understand the psychological aspects of serious illnesses and terminal conditions (e.g. cancer, AIDS, etc.),
- Understand the health psychology concepts in different periods of life (childhood, adolescence, adulthood and older life)
- Understand the psychological aspects of hospitalization in patients of different ages
- Understand and recognizes the phenomenon of burnout syndrome at work

Course content:
Theoretical education
Defining health psychology (biomedical, psychosomatic and biopsychosocial model). Stressogenic life events. Stress management and social support. Psychosomatic diseases (asthma, obesity, addiction diseases, arthritis, diabetes, psychogenic headaches, heart disease and hypertension, irritable colon, etc.). Chronic fatigue syndrome. Experiences of pain and pain managament. Health psychology in different periods of life (childhood, adolescence, adulthood and older life). Psychoneuroimmunology. Psychosocial oncology. Placebo. Burnout syndrome at work.

Practical education
Health behavior and change, as well as coping mechanisms and coping with illness. Understanding the relationship between stress and disease. Psychological approach and interventions for patients with different chronic and acute diseases. Pain management (psychological treatment of pain). Understanding the relationship between patient and healthcare provider. Understanding the principles of establishing healthy habits at different ages. Factors that influence the development of healthy habits and healthy lifestyles. Relationship between social support and health. A review of models and strategies of health behavior change aimed at reducing health problems. Recognizing the symptoms of burnout syndrome and acquiring strategies to overcome it.

Literature
Compulsory
1. Albery I, Munafò M. Key concepts in health psychology. London: Sage, 2008. (selected chapters)
2. Baum A, Newman S, Weinman J, McManus C, West R. (Eds.). Cambridge handbook of psychology, health and medicine. New York: Cambridge University Pres, 1997. (selected chapters)

Number of active classes	**Theoretical classes:** 30	**Practical classes:** 15

Teaching methods: Lectures, interactive teaching, reviewing and analyzing case studies, seminar papers, consultations			
Student activity assessment (maximally 100 points)			
Pre-exam activities	**points**	**Final exam**	**points**
Activity during lectures	10	Written	60
Practices	10	Oral	
Colloquium	20		
Essay			

Course title: Clinical Biochemistry

Course status: elective

ECTS Credits: 3

Condition: Medical Biochemistry; Patophysiology

Course aim:

The aim of teaching clinical biochemistry is to enable medical students to integrate knowledge of General biochemistry, Physiology and Pathophysiology, to see the practical application and importance of determining both basic and important specialized biochemical parameters used in laboratory diagnostics. In an era of increasing number of analyzes, thanks to the rapid development of technical sciences and methods that we can use, a better and more in-depth understanding of clinical biochemistry will certainly influence the development of the ability to rationally select the laboratory parameters necessary to diagnose, monitor the course and outcome of the disease. Acquaintance with new methods that have not yet come to fruition in routine practice but are certainly the basis of personalized medicine that we all strive for.

Expected outcome of the course:

Knowledge of biological phenomena at the molecular level and understanding the essence of many diseases. Knowledge of specific biochemical processes of individual organs and tissues and their importance for the functioning of the whole organism. Biochemical basis of functional testing of individual organs.

Proper sampling of biological material for biochemical analysis. Method of use of certain analytical procedures and apparatuses in specialized biochemical laboratories. Using the results of biochemical analysis, normal and reference values, measurement units. Investigation of the metabolism of the most important ingredients of the body based on measurements of biological samples.

Contents of the course:

Teaching in clinical biochemistry is realized through 30 hours of theoretical and 15 hours of practical teaching (10 laboratories, 5 seminars). In addition to working in the laboratory on determining basic biochemical parameters and analyzing the results obtained, students will also be introduced in small groups to work in routine and specialized clinical-biochemical laboratories.

Theoretical education

1. Introduction to clinical biochemistry. Place of clinical / medical biochemist in the health care system of the Republic of Serbia.
2. Monitoring the quality of work in the laboratory. Determination of method reliability factors. Reference values. Causes of variability in laboratory analysis results.
3. Types of samples for biochemical analyzes, adequate selection, collection, transportation. Preanalytical phase errors.
4. Biochemical markers
5. Laboratory diagnostics of heart and blood vessel diseases (troponin, BNP, H-FABP, IMA…)
6. Laboratory diagnostics of liver disease. Importance of determining metabolites, enzymes, proteins.
7. Laboratory diagnostics of gastrointestinal tract diseases, H.Pylori infections, biochemical markers of malabsorption syndrome, gluten enteropathy and others.
8. New markers of laboratory diagnosis of kidney disease.
9. Laboratory diagnostics of neurological diseases.
10. Biochemical Aspects of Bone Diseases. Biochemical markers of bone remodeling.
11. Laboratory immunodiagnostics of autoimmune diseases (ANA, ANCA, ACPA...)
12. Biochemical Aspects of Pregnancy. Prenatal screening.
13. Chromosomopathy screening, determination of free circulating fetal DNA (cffDNA).
14. Methods of "omics", proteomics, lipidomics, genomics and others as an introduction to personalized medicine.
15. Liquid biopsies ", significance and opportunities.
16. POCT – patient bedside laboratory.

Practical education

1. Introduction. Statistical evaluation of the reliability of the results of clinical biochemical analyzes. Verification of precision, accuracy, Laboratory quality control. Clinical quality control and clinical correlation of biochemical analysis results.
2. Laboratory analysis-analytics and interpretation of findings of glucose concentration, protein, lipid parameters and others. Interpretations of certain pathological conditions by analysis of "paper patients". Rational interpretation of the results obtained.

Work in specialized clinical-biochemical laboratories at the Pediatric Clinic and at the Clinic for Gynecology and Obstetrics.

Literature

Compulsory

1. Rifai N, Horwath R A, Wittwer C. Tietz Textbook of Clinical chemistry and molecular diagnostics, Elsevier, St. Louis, Missouri, 2018.

Number of active classes	**Theoretical classes:** 30	**Practical classes:** 15

Teaching methods

Lectures for small groups with the use of multimedia didactic materials. Practical work: work in medical laboratories.

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	8	Written	15
Practices	12	Practical	
Colloquium	15	Oral	40
Essay	10		

Course title: Safety of Supplements Consumption in Sports

Course status: elective

ECTS Credits: 3

Condition: –

Course aim

The programme introduces students with sport supplementation and legal regulation, rational sports supplements, risks of abuse and unwanted effects for the care of athletes and recreational players.

Expected outcome of the course:

This programme will introduce students with action mechanisms of dietary supplements and its rational use, risks of the use of unauthorized substances by athletes and recreational players. Furthermore, the programme allows the students to understand better doping resources, taking biological materials for chemical and toxicological analysis due to its legal regulations and regulation the use of dietary supplements in sports.

Course description

Theoretical education

– Dietary supplements – definition, division, legal regulation
– Energy drinks
– Vitamins. Minerals and phytochemicals
– Natural substances containing plant components
– Proteins ("for the mass", whey proteins and plant proteins)
– Amino acids
– Enzymes
– NO reactors
– Creatine
– Fat burners and stimulants (L-carnitine, caffeine and clenbuterol)
– Carbohydrates: glucosamine, chondriotine sulphate, glycerol
– Natural hormone stimulants (tribulus terrestris)
– Hormones (anabolic steroids and GH)
– Doping control and list of prohibited doping drugs in sports
– Healthy safety of dietary supplements

Practical education

Independent drafting of nutrition for recreational and professional athletes regarding to the goals set in sports activities. Independent selection and prescription of dietary supplements depending on gender, age and eventual diseases in recreational sport activities.

Literature

Compulsory

1. Smolin LA, Grosvenor BM, editors. Nutrition for sports and exercise. 2nd ed. Hoboken, NJ: John Wiley&Sons; 2010.

Additional

1. Dorfman L. Nutrition in exercise and sports performance. In: Mahn K, Raymond LJ editors. Food&the nutrition care process. 14th ed. St. Louse (Mo): Elsevier INC; 2017. pp.426-55.
2. Position of the Academy of Nutrition and Dietetics, Dietitians of Canada, and the American College of Sports Medicine: nutrition and athletic performance. Can J Diet Pract Res. 2016;77(1):54.
3. Williams MH. Sports Nutrition. In: Ross CA, Caballero B, Cousins RJ, Tucker KL, Ziegler TR, editors. Modern nutrition in health and disease. 11th ed. Baltimore, US: Lippincott Williams & Wilkins; 2014. p. 1559-63.

Number of active classes	**Theoretical classes:** 30	**Practical classes:** 15

Teaching methods

Power point presentations – theory and case reports

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	20	Written	60
Practices	20	Oral	
Colloquium			
Essay			

Course title: Biochemistry and Genetics of Inherited Metabolic Diseases

Course status: elective

ECTS Credits: 3

Condition: Medical Biochemistry

Course aim

The main objective of the course is to enable the medical students to acquire the knowledge and skills about the biochemical and genetic basis of inherited metabolic diseases, as well as other inherited metabolic aberrations, with possibilities of diagnostics, prevention and therapy. This elective subject will enable students to learn about the functional and structural aberrations of chromosomes and genes mutations in inherited diseases, to learn about biochemical and molecular mechanisms of inherited diseases pathogenesis, models of inheritance and up-to-date methods of diagnostics, prevention and therapy of inherited diseases

Expected outcome of the course:

Medical students will acquire the comprehensive knowledge about the biochemical and genetic basis of inherited diseases. Skills that will be developed comprise the adequate approach to diagnostics in patients with inherited diseases, with case reports. The specificities of laboratory tests, up-to-date methods of molecular diagnostics of inherited diseases, and therapy possibilities with emphasis on prevention, including methods of pre-natal and post-natal diagnostics.

Course description

Theoretical education

1. Biochemical and genetic basis of inherited metabolic diseases
2. Classification of inherited metabolic diseases
3. Chromosomal basis of inheritance
4. Molecular basis of chromosomal aberrations and gene mutations in inherited diseases
5. Molecular basis of monogenic, polygenic and multifactorial inheritance
6. Biochemical mechanisms in inherited metabolic diseases pathogenesis
7. Molecular basis of diagnostics, prevention and therapy of inherited diseases.
8. Methods of prenatal and postnatal diagnosis of inherited diseases
9. Possibilities of inherited diseases therapy
10. Pharmacogenomics – genomic variation in response to therapy

Practical education

1. Methodology of inherited diseases diagnostics
2. Methods of biochemical laboratory diagnostics of inherited metabolic diseases
3. Numerical and structural chromosomal aberrations
4. Gene mutations detection
5. Polymerase chain reaction
6. Methods of laboratory diagnostics of gene mutations
7. Fluorescent in situ hybridization
8. Methods of prenatal diagnostics
9. Therapeutic possibilities of inherited metabolic diseases
10. Methods of pharmacogenetic analyses in drug metabolism

Literature

1. Robert L. Nussbaum, MD, Roderick R. McInnes. Thompson & Thompson's Genetics in Medicine. 7th Edition. ISBN: 978-1-4160-3080-5. 2007.
2. Strachan T, Read A. Human Molecular Genetics, 3rd ed. Garland Science/Taylor&Francis Group, 2003. ISBN:9780815341499.

Number of active classes	**Theoretical classes:** 30	**Practical classes:** 15

Teaching methods

Plenary lectures, problem sessions, independent presentations carried out by students.

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	8	Written	15
Practices	12	Oral	40
Colloquium			
Essay	25		

Course title: Anthropometry

Course status: elective

ECTS Credits: 3

Condition: Anatomy

Course aim

– to understand human physical variation.
– to desribe systematic measurement of the physical properties of the human body
– to evaluate different methods of body composition assessment with a focus on measurements used in the public health.

Expected outcome of the course:

After the course student will be able to locate measurement sites, to perform anthropometric measurement, to assess body composition and somatotype and to interprete the results.

Course description

Theoretical education

1. Overview of anthropometry
2. Human physical variation
3. Importance and practical use of anthropometry
4. Body compositon levels
5. Methods for body composition assessment
6. Quantifying measurement errors
7. Somatotyping
8. Craniometry
9. Relationship between anthropometric variables and physical and physiological health

Practical education

1. Basic anatomy – landmarking
2. Equipment and calibration
3. Measurement of body height and body weight
4. Assessment of nutritional status
5. Growth charts
6. Measurement of body circumferences
7. Measurement of skinfold thicknesses
8. Measurement of lengths and diameters of different body parts
9. Introduction to various instruments for assessing body composition
10. Craniometry
11. Calculation of somatotype

Literature

Compulsory

1. Eston R, Reilly T. Kinanthropometry and Exercise Physiology Laboratory Manual: Tests, Procedures and Data: Volume One: Anthropometry: 1. Human Kinetics 2008.
2. World Health Organization. Physical Status: the use and interpretation of anthropometry. Report of a WHO Expert Committee, Geneva 1995. (https://apps.who.int/iris/bitstream/handle/10665/37003/WHO_TRS_854.pdf?sequence=1)
3. National Health And Nutrition Examination Survey III Body Measurements (Anthropometry). Westat, Inc. 1650 Research Boulevard Rockville, MD 20850 (301) 251-1500. https://wwwn.cdc.gov/nchs/data/nhanes3/manuals/anthro.pdf
4. Technical Committee ISO/TC 159, Ergonomics, Subcommittee SC 3, Anthropometry and biomechanics.ISO 7250-1:2017(en). Basic human body measurements for technological design https://www.iso.org/obp/ui/#iso:std:iso:7250:-1:ed-2:v1:en

Number of active classes	**Theoretical classes:** 30	**Practical classes:** 15

Teaching methods:

Lectures and practical classes

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures		Test	
Practices	30	Practical exam	70
Colloquium			
Essay			

Course title: Dermatovenereology

Course status: compulsory

ECTS Credits: 4

Condition: Clinical propedeutics (exam); Pharmacology and toxicology 1 (exam)

Course aim
The aim of this course is to introduce students with all kinds of dermatoses, as well as diagnostic and therapeutic procedures of relevance in dermatovenereology.

Expected outcome of the course:
Clinical presentation, diagnostic procedures, therapy, course and prognosis in dermatovenereological diseases relevant for medical students. Students are provided with skills and diagnostic and therapeutic methods in dermatovenereology.

Course description
Theoretical education
1. Allergic skin diseases
2. Parasitic dermatoses
3. Pyodermas
4. Skin tuberculosis
5. Viral skin infections
6. Skin tumors
7. Erythematous dermatoses
8. Bullous dermatoses
9. Papular dermatoses
10. Pruritic dermatoses (Prurigo, pruritus, erythrodermia)
11. Keratinization disorders
12. Autoimmune skin diseases
13. Circulatory skin diseases (purpura, vasculitis)
14. Diseases of skin adnexa
15. Mucosal diseases
16. Sexually transmissive infections

Practical education
1. General propedeutics in dermatovenereology
2. Obtaining medical history in dermatology
3. Clinical examination
4. Efflorescences
5. Anatomy and histology of the skin
6. Physiology of the skin
7. Pathohistology of the skin
8. Additional diagnostic procedures
9. Laboratory diagnosis of syphilis
10. Sexually transmissive diseases – diagnostic procedures
11. Sexually transmissive diseases – therapy
12. Therapy in the dermatovenereology
13. Visiting specialized units at the clinic
14. Visiting specialized units at the outpatient clinic
15. Work with patients
16. Local surgical procedures

Literature
Compulsory
1. Lecture handouts.

Number of active classes	**Theoretical classes:** 30	**Practical classes:** 30 **Other classes:** 15

Teaching methods

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	10	Written	20
Practices	10	Oral	40
Colloquium	20		
Essay			

Course title: Psychiatry

Course status: compulsory

ECTS Credits: 5

Condition: Psychological Medicine; Clinical Propedeutics (exam); Pharmacology and Toxicology 1 (exam)

Course aim

The aim of this course is to train students, as future family physicians, to identify, diagnose and manage patients with mental disorders. Students also learn about scientific research.

Expected outcome of the course:

Students acquire knowledge on psychiatry as a medical field, characteristics of particular mental disorders according to WHO classification ICD-10, identification/diagnostics of mental disorders and their treatment.
Students learn about conducting psychiatric interviews, evaluation of psychical functions and behavior of individuals with different mental disorders. They study how to establish diagnosis (working and differential diagnosis), and manage patients. Students are included in the treatment of mental disorders as general practitioners.

Course description

Theoretical education

1. Definition of mental health and mental disorders. 2. Mental health and legislation. 3. Position and role of a psychiatrist. 4.Work with psychiatric patients. 5. Psychiatric interview and medical history. 6. Psychopathology. 7. Mood disorders. 8. Anxiety disorders. 9. Schizophrenia and other psychotic disorders. 10. Mental disorders due to use of psychoactive substances. 11. Eating disorders. 12. Organic mental disorders and old age psychiatry. 13. Mental disorders in childhood and adolescence. 14. Personality as a predisposing factor for the development of mental disorders. 15. Personality disorders. 16. Emergency psychiatry. 17. Treatment of mental disorders. 18. Psychopharmacotherapy. 19. Suicidology. 20. Forensic psychiatry.

Practical education

1. Mental disorders, psychiatric patients, specific patient-physician relationship; rights of psychiatric patients. 2. Psychiatric interview: psychiatric interview techniques. 3. Psychiatric Interview: important information for personal, family and medical history of the disease. 4. Psychic status: evaluation of psychological functions (consciousness, orientation, thinking, perception, emotion, memory, intelligence, volitive and instinctive dynamism, attention) and behaviour evaluation. 5. Organic mental disorders – history, mental status, diagnosis, care. 5. Diseases induced by misuse of psychoactive substances – drugs: medical history, mental status, diagnosis, care. 6. Diseases induced by misuse of psychoactive substances – alcohol: medical history, mental status, diagnosis, care. 7. Schizophrenia – medical history, mental status, diagnosis, care. 8. Schizotypal and shizoaffective disorders – medical history, mental status, diagnosis, care. 9. Psychotic Disorders – medical history, mental status, diagnosis, care. 10. Mood disorders – medical history, mental status, diagnosis, care. 11. Neurotic and stress-induced disorders – medical history, mental status, diagnosis, care. 12. Emergency states in psychiatry. 13. Mental disorders in children – medical history, mental status, diagnosis, care. 14. Mental disorders in adolescents – medical history, mental status, diagnosis, care. 15. Consultation psychiatry and psychosomatic medicine. Psychiatrist in a team. Physically ill patients, medical history, mental status, diagnosis and care in a view of consultation psychiatry and psychosomatic medicine. 16. Forensic psychiatry.

Literature:

Compulsory

1. Semple D, Smyth R (eds.). Oxford Handbook of Psychiatry. Oxford, UK: Oxford University Press; 2013.

Number of active classes	**Theoretical classes:** 30	**Practical classes:** 60 **Other classes:** 15

Teaching methods

Lectures and practical work

Student activity assessment (maximally 100 points)			
Pre-exam activities	**points**	**Final exam**	**points**
Lectures	10	Written	70
Practices	20	Oral	
Colloquium			
Essay			

Course title: Surgery

Course status: compulsory

ECTS Credits: 14

Condition: Internal Medicine (attend); Pharmacology and Toxicology 2 (exam); Radiology; Anesthesiology and Perioperative Medicine (exam)

Course aim

The aim of this course is to provide students with knowledge how to estimate health status of population and to recognize and implement measures of prevention and control of surgical diseases.

Expected outcome of the course:

Students acquire knowledge about surgery techniques which they need to implement in routine work with patients. They need to become familiar with legislation in the context of surveillance.

Students need to acquire skills to manage surgery patients, including reporting and CPR.

Course description

Theoretical education

1. Diagnostic surgical procedures; war surgery
2. Organization and management of the injured in peace time and wars
3. Asepsis in war surgery
4. Wounds, war wounds, surgery infections
5. Surgery terminology and classification of surgical interventions
6. Postoperative complications, alentheses in surgery
7. Surgical principles in oncology
8. Neck and breast surgery
9. Abdominal surgery
10. Specific characteristics of pediatric surgery; emergencies in neonatal surgery
11. Thoracic surgery: pleura, lungs, mediastinum, thoracic injuries
12. Cardiosurgery and vascular surgery
13. Surgical management of burns, basic principles of esthetic surgery, skin and soft tissue tumors, general principles and methods
14. in skin defect reconstruction, hand injuries and diseases
15. Neurosurgery
16. Urology
17. Orthopedic surgery

Practical education

1. Principles, methods, sterilization and disinfection in surgery, asepsis in surgery and in war surgery
2. Physical examination of surgical patients, diagnostic surgical procedures
3. Types of immobilization
4. Initial hospitalization and management of the injured
5. Surgical wound care
6. Surgical infection treatment
7. Initial treatment of patients with burns
8. Small surgical interventiona
9. Operating rooms
10. Postoperative care
11. Characteristics of thoracic surgery, cardiosurgery, oncologic surgery, pediatric surgery, plastic and reconstructive surgery, vascular surgery, neurosurgery, urology, abdominal surgery, orthopedic surgery, locomotor apparatus injury management

Literature

Compulsory

1. Towsend C, Beauchamp RD, Evers BM. Sabiston Textbook of Surgery, 19th edition. Elsevier Saunders, 2012.
2. Brunicardi FC. Schwartz's Principles of Surgery, 10th edition. McGraw Hill Education, 2015.

Additional

Outlines of lectures

Number of active classes	**Theoretical classes:** 90	**Practical classes:** 135 **Other classes:** 30

Teaching methods

Student activity assessment (maximally 100 points)			
Pre-exam activities	**points**	**Final exam**	**points**
Lectures	10	Written	10
Practices	20	Oral	50
Colloquium	10		
Essay			

Course title: Pediatrics

Course status: compulsory

ECTS Credits: 12

Condition: Internal Medicine; Infectious Diseases; Pharmacology and Toxicology 2; Neurology

Course aim

The aim of this course is to get medical students familiar with pediatric population (aged from 0 to 18 years) and to teach them the basic principles of growth, development and nutrition. The main goal is to teach medical students to recognize clinical manifestations of common diseases in children, to plan diagnostic procedures, to consider differential diagnosis and therapy. Final goal is to educate physicians to correct attitudes toward this vulnerable population in general practitioner's office.

Expected outcome of the course:

During lectures students get basic knowledge about pathogenesis, clinical manifestations and therapy of diseases in population aged 0 to 18 years. We strongly emphasize specific issues of this age group (growth, development and nutrition), as well as the importance of preventive measures and accurate diagnosis (careful differential diagnosis and additional diagnostic procedures in the most frequent diseases in this population). Correct attitude and skillful communication with patients aged 0 to 18 years and their families. Specific history taking, physical examination and treatment. Specific tasks of general physicians in the absence of pediatrician. Immunization schedule, prevention and counseling for children and adolescents.

Course description

Theoretical education

1. Opening lecture. 2. Growth and development: estimation of growth and development and pathology of growth and development, 3. Genetics: Chromosomes and genes; Patterns of inheritance and inherited disorders; Congenital malformations; Genetic counseling; Prenatal diagnostics; Neonatal screening of inherited diseases. 4. Neonatology: Adaptation of newborn to the extra-uterine conditions; Delivery trauma; Mature and premature newborn; Neonatal jaundice, hemorrhagic disease of the newborn; Infections of the newborn; Respiratory distress; Hypoxic-ischemic encephalopathy. 5. Nutrition: Breastfeeding; Cow's milk; Nutrition of the premature newborn; Formulas; Diets. 6. Metabolism of water and electrolytes. 7. Rickets. 8. Juvenile diabetes. 9. Thyroid dysfunction: Congenital hypothyroidism; Hashimoto thyreoiditis; Hyperthyroidism. 10. Obesity and hyperlipoproteinemias, 11. Congenital adrenal hyperplasia, Cushing's disease, Addison's disease, Pheochomocytoma, 12. Gastroenterology; diseases of upper and lower gastrointestinal tract, intestinal parasites, recurrent abdominal pain; Hepatology, non conjugated hyperbilirubinema (Syndrome Gilbert), conjugated hyperbilirubinaemia (neonatal hepatitis); Extrahepatic biliar atresia; Chronic hepatitis; 13. Pulmonology: Airways in children; Diseases of upper and lower respiratory tract. 15. Pulmonary tuberculosis: Primary TBC; Post primary TBC; Therapy, diagnosis, prevention, BCG immunization. 16. Cardiology: Fetal circulation; Congenital heart diseases (clinical picture, diagnosis, therapy); Rheumatic fever; Bacterial endocarditis; Myocardial diseases; Rhythm disturbances; Conduction disturbances. 17. Immunology: Immunological system; Immunodeficiency. 18. Allergology: Urticaria; Quincke edema; Atopic dermatitis; Prevention of allergic diseases; Rheumatology. 19. Bones and muscles. 20. Hematology and Oncology: Anemias; Disorders of hemostasis; Screening of hemostasis; Thrombocytopenia; Coagulopathy; Vasculopathy; Lymph node enlargement; Acute leukemia; Oncology; Lymphoma; Solid tumors. 21. Social Medicine. 22. Neuropediatrics: Normal psychomotor development; Denver developmental score; Paroxysmal non-epileptic disorder of childhood; Epilepsy and epileptic syndromes of childhood; Headache; Treatment of epilepsy and epileptic status. 22. Nephrology: Urinary tract infections; Vesicoureteral reflux; Reflux nephropathy and renoprotective therapy; Primary glomerular diseases; Acute and chronic renal failure. 23. Intoxication: General aspects; First aid; Treatment. 24. Pharmacotherapy: Pharmacokinetics and pharmacodynamics in children; Doses of the most common drugs used in children; Drugs and breastfeeding; History of medication. 25. Adolescence: Growth and development in adolescence; The most common problems of adolescents and their parents; Morbidity, mortality, risk behavior; Disorders on nutrition in adolescence, 26. Emergency and resuscitation in pediatrics: Cardiopulmonary-cerebral resuscitation in pediatrics; Resuscitation and treatment in some specific conditions in pediatrics (drowning, lightning/electrocution etc.)

Practical education

1. History taking and physical examination. Physician – patient relationship, co operability and general status of the patent. 2. Endocrine and metabolic diseases in pediatrics. Disorders of water and electrolytes and principals of correction of hydro-mineral disorder, Diabetes, hypothyroidism, hyperthyroidism, congenital adrenal hyperplasia, obesity and hyperlypoproteinemia. 3. Cardiovascular diseases in children. Inborn heart failure, rhythm disturbances, myocarditis and pericarditis, bacterial endocarditis. 4. Respiratory tract diseases in children. Acute and chromic inflammation of upper and lower respiratory tract in children, asthma cystic fibrosis. 5. Nutrition, breastfeeding and formulas, nutritional workshop, principles of nutrition of healthy and sick child. 6. Diseases of urogenital system, congenital malformations of urinary tract, the most common renal diseases, urinary tract infection, acute and chronic renal failure, parenteral and peritoneal dialysis. 7. Hematology and oncology – anemia, leukemia, malignant diseases of childhood, disorders of hemostasis. 8. Immunology, immunodeficiency, anaphylactic shock, allergic diseases, neurodermatitis, arthritis in children. 9. Neonatology, estimation of gestational age, hyperbilirubinaemia, Hypoxic-ischemic encephalopathy, hemorrhagic disease of the newborn, prematurity, nutrition of newborn and premature infant, Respiratory distress syndrome. 10. Neurological and psychiatric diseases in childhood, seizures, epilepsy, lumbar puncture, neurocutaneous diseases. 11. Diseases in adolescence. Anorexia, risky behavior, bulimia, prevention of risky behavior. 12. Diseases of gastrointestinal tract and liver: infective and chronic diseases of upper and lower gastrointestinal tract, liver diseases. 13. Healthcare of children and adolescents. 14. Healthcare and social pediatrics. 15. Intoxication in childhood and prevention. 16. Emergency and resuscitation in pediatrics

Literature
Compulsory
1. Lissauer T, Clayden G. (Eds). Illustrated Textbook of Paediatrics. 5th Edition, Elsevier 2017.

Number of active classes	**Theoretical classes:** 90	**Practical classes:** 105 **Other classes:** 30

Teaching methods
Lectures. Practical education: history, physical examination, differential diagnosis and therapy. Case reports, workshops.

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	15	Written	10
Practices	15	Oral	50
Colloquium	10		
Essay			

Course title: Gynecology and Obstetrics

Course status: compulsory

ECTS Credits: 12

Condition: Internal medicine; Dermatovenereology; Pharmacology and Toxicology 2

Course aim:
During the theoretical classes medical students will be familiar with the course of normal pregnancy and childbirth, delivery and modern management of obstetric operations. Special attention vill be paid to pathological conditions that complicate pregnancy and childbirth. Introduction to etiopathogenesis, clinical presentation, diagnostic procedures, the basic principles of therapeutic and prevention of diseases of female genital organs (inflammatory disease, benign and malignant tumors), as well as modern methods of family planning, contraception, diagnosis and treatment of marital sterility.
During the practical part of teaching (ie. student exercises) medical students acquire and obtain basic practical knowledge in the field of obstetrics and gynecology, obstetrics and gynecology ultrasound examination as well as the most frequently performed interventions.

Expected outcome of the course
After completion of the two-semester program, students should know how to diagnose a normal pregnancy, recognize pathological pregnancy, perform basic gynecological examination under a speculum, take cytological smear and perform bimanual gynecological examination. Alsow, after completion of the two-semester program, students should past exam in obstetrics and gynecology. Exam is consists of a written test, a practical and oral part of the exam.

Course description
Theoretical education
Obstetrics
– Prenatal and antenatal care of pregnant women
– Physiology of pregnancy and normal placentation
– Management of normal labour and delivery
– Mechanisms of labor in the vertex presentation and breech presentations and delivery
– Cesarean section and operative vaginal deliveries
– High risk pregnancies (Rh isoimmunization and ABO incompatibility, diabetes in pregnancy, intrauterine growth restriction, hipertensive syndrom in pregnancy, preterm delivery)
– Anemia in pregnancy
– Multiple gestations
– Post-term pregnancy and induction of labor
– Prenatal diagnostics and ultrasound in obstetrics
Gynecology
– Anomalies of female reproductive system
– Pelvic inflammatory diseases in gynecology
– Gynecological urology (stress and urge urinary incontinence, low urinary tract symptoms)
– Benign and malignant tumors of female genital organs
– Pathology of genital organs in juvenile and adolescent age
– Marital infertility
– Assist. reproductive techniques
– Family planning

Practical education
– Obstetric and gynaecologic history
– Examination of pregnant women (external and internal)
– Gynaecologic physical examination (general, speculum and bimanual examination)

Literature

Compulsory

1. Hacker NF, Moore JG. Essentials of obstetrics and gynecology 5th edition. W.B. Saunders company, 2009.
2. Evans AT, DeFranko E. Manual of obstetrics 8th edition. Wolters Kluwer, 2015.
3. Bienstock JL, Fox HE, Wallach EE. Johns Hopkins Manual of gynecology and obstetrics, 5th edition. Wolters Kluwer, 2015.

Additional

1. Cundiff GW, Azziz R, Bristow RE. Te Linde's atlas of gynaecologic surgery. Wolters Kluwer, Lippincott Williams &Wilkins, 2015.
2. Cunningham FG, Leveno KJ, Bloom SL, Spong CY, Dashe JS, Hoffman BL, Casey BM, Sheffield JS. Williams. Obstetrics 24th edition. McGraw-Hill Education, 2014.

Number of active classes	**Theoretical classes:** 75	**Practical classes:** 105 **Other classes:** 30

Teaching methods

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	10	Written	15
Practices	20	Oral	35
Colloquium	10		
Essay	10		

Course title: Anesthesia and Perioperative Medicine

Course status: compulsory

ECTS Credits: 3

Condition: Internal Medicine; Pharmacology and Toxicology 1 and 2

Course aim

The aim of this course is to train future general practitioners to prepare and assess surgical patients; inform them about techniques of general and regional anesthesia, general measures of intensive care, as well as about intensive care in special pathological conditions. Therapy of acute and chronic pain and cardiopulmonary resuscitation.

Expected outcome of the course:

Preoperative assessment and preparation of surgical patients. Specific features of general and regional anesthesia. Identification, diagnosis, monitoring and treatment of emergency patients with special review of pathological conditions (injuries, burns, sepsis, shock, pancreatitis etc.). Acute and chronic pain assessment.

Cardiopulmonary resuscitation in all age groups and clinical conditions. Intubation and venous catheterization. Other modes of drug application. Algorhythms of preoperative preparation. Monitoring of the critically ill. Infusion of electrolytes, blood and blood derivatives. Postoperative pain assessment and therapy.

Course description

Theoretical education

1. Preoperative patient preparation
2. General anesthesia – classification
3. General anesthesia – anesthetics and other medications used during general anesthesia
4. General anesthesia – complications and postoperative monitoring
5. Sedation and analgosedation
6. Acute pain therapy
7. Chronic pain therapy
8. Regional anesthesia (techniques, drugs, complications)
9. Critically ill patients
10. Shock (definition, classification, stages, therapy)
11. Sepsis (definition, classification, stages, therapy)
12. Intravenous sedation (classification, techniques, equipment and complications)
13. Acid-base status, intravenous infusions
14. Acute pulmonary conditions
15. Mechanical ventilation
16. Pancreatitis – intensive care and therapy
17. Acute kidney failure in critically ill
18. Nutrition of the critically ill (enteric and parenteral)
19. Trauma and polytrauma
20. Burns – intensive care and therapy

21. Basic and advanced resuscitation
22. Airway (intubation techniques, complications)
23. Preoperative blood and blood derivatives transfusion
24. Brain death, donors, cadaveric transplantation

Practical education
1. Phantom resuscitation takes place in outpatient facilities for preoperative preparation and in operating rooms, as well as emergency units.
2. Preoperative patient preparation algorithms.
3. Infusion (classification, techniques, equipment, complications).
4. Intramuscular drug application and other manners.
5. Regional anesthesia techniques
6. Assessment of patients'hydration and acid base status
7. Correction of electrolyte and acid-base disorders
8. Intubation – practice
9. Monitoring and therapy of the critically ill
10. Postoperative pain assessment and therapy
11. CPRC – Cardiopulmonary cerebral resuscitation in adults
12. CPRC – Cardiopulmonary cerebral resuscitation in children

Literature
Compulsory
1. Biljana Drašković Anaesthesia and perioperativ medicine 2019. (electronic version)
Additional
2. Marino, ICU book, 4th edition, 2014.

Number of active classes	**Theoretical classes:** 30	**Practical classes:** 30

Teaching methods

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	15	Written	
Practices	25	Oral	40
Colloquium		Practical	20
Essay			

Course title: Hygiene

Course status: compulsory

ECTS Credits: 4

Condition: Infectious diseases (exam), Epidemiology (exam)

Course aim

To train general physicians (family physicians) for preventive and prophylactic work.

Expected outcome of the course:

Knowledge – Preventive work in the field of environmental protection. Promotion of healthy diet. Food safety. Prevention of non-communicable diseasess.

Skills – Design and application of prevention programs in the field of environment protection and human health.

Course description

Theoretical education

1. Hygiene – science on health. Health in 2020. Health and health maintenance. 2. Atmosphere, climate, micro-climate – health impacts. Air pollution: sources, properties and prevention. Health effects of air pollution. 3. Noise in an urban environment. Noise health effects and prevention. Non-ionizing and ionizing radiation. Impacts on health, prevention of adverse effects. 4. Types of water origin and characteristics. Objects of water supply. Safety and importance of water. Purification and treatment of drinking water. 5. Health aspects of waste management. Risk management in communities. 6. Community hygiene. House hygiene. Hygiene in public facilities. Proceedings of primary health care in emergencies. 7. Hygiene of the school environment. School environment and health. 8. Planning and construction of health facilities. Risk management in health care facilities. 9. Personal hygiene. Personal hygiene of health care workers. 10. Nutrition and health. Energy needs. Physiological and daily needs and sources of nutrients. 11. Physiological and daily requirements and sources of vitamins. Physiological and daily requirements of minerals. 12. Food hygiene – of animal and plant origin. Genetically modified food. Nutraceuticals. Allergy and food intolerance. 13. Food safety. Foodborne diseases. Safety of items for general use. 14. Medical nutrition therapy and prevention of disease caused by overeating. Medical nutrition therapy and prevention of malnutrition and specific nutritional deficits. Medical nutritional prevention and therapy of noncomunicable diseases. 15. Improving the nutrition of the population. 16. Mental hygiene and mental health.

Practical education

1. Ecological interpretation of health and disease. 2. Influence of climate and microclimate on human health. 3. Air Quality – mutual influences of the WHO recommendations, the EU and national legislation. 4. Measurement of light: tasks. Ultraviolet radiation and health. Importance of UV Index in assessing health risks. Ionizing radiation in the environment. Health risk assessment. 5. Sampling drinking water. Disinfection of drinking water. 6. Recommendations on drinking water safety. 7. Ecological waste disposal – environmental risk control – preparation for writing an Essay. 8. Ecological waste disposal – Essay presentation. 9. Promotion of personal hygiene and hand hygiene – essay. 10. Good hygiene practices in health care facilities – preparation for writing an Essay. 11. Good hygiene practices in health care facilities – preparation for writing an Essay. 12. Environmental risk management – preparation for writing an Essay. 13. Environmental risk management – essay presentation. 14. Assessment of the nourishment status. Calculating energy requirements. 15. Calculation of daily nutrients. 16. Calculation of daily needs for hydrosoluble and liposoluble vitamins. 17. Calculation of daily needs for minerals: macroelements and microelements. Essay preparation. 18. Nutrition survey. Diet plan. Theoretical approach. 19. Designing a nutrition plan and a questionnaire. – Essay. 20. Seminar on nutrition. Seminar on nutrition planning. 21. Planning supplementary meals at school. 22. Food safety – Essay preparation. 23. Activity of general practitioners in cases of food-borne epidemics – student presentation. 24. Promotion of healthy nutrition policies. Students' suggestions – presentations. 25. Visit to the National Seed Laboratory. 26. Medical nutrition therapy in cases of undernutrition and obesity. 27. Basic principles of medical nutrition therapy. 28. Medical nutrition therapy of noncomunicable diseases.

Literature

Compulsory

1. WHO. PREVENTING DISEASE THROUGH HEALTHY ENVIRONMENTS: A GLOBAL ASSESSMENT OF THE BURDEN OF DISEASE FROM ENVIRONMENTAL RISKS. World Health Organization, Switzerland 2016
2. WHO. MONITORING AMBIENT AIR QUALITY FOR HEALTH IMPACT ASSESSMENT, WHO Regional Publications, European Series, No. 85, Copenhagen, 2003.
3. WHO. GUIDELINES FOR DRINKING – WATER QUALITY, World Health Organization, 3rd Edition, Geneva, 2011.
4. WHO. HEALTH-CARE WASTE. World Health Organization
5. WHO. BURDEN OF DISEASE FROM ENVIRONMENTAL NOISE. QUANTIFICATION OF HEALTHY LIFE YEARS LOST IN EUROPE. World Health Organization 2011
6. WHO. IONIZING RADIATION, HEALTH EFFECTS AND PROTECTIVE MEASURES. World Health Organization 2016
7. WHO. FOOD SAFETY. WHO. Basic Food Safety for Health Workers. Geneva, World Health Organization
8. DIET, PHYSICAL ACTIVITY AND HEALTH, ILSI, Europe
9. WHO. DIET, NUTRITION AND THE PREVENTION OF CHRONIC DISEASE**,** WHO Technical Report Series 916, Geneva, 2003.
10. WHO. Hand Hygiene. WHO guidelines on hand hygiene in health care, WHO, Geneva, 2009
11. WHO. PROMOTING MENTAL HEALTH. CONCEPTS, EMERGING EVIDENCE, PRACTICE. World Health Organization 2005.

Additional
1. http:/www.efsa.europa.eu
2. http:/www.codexalimentarius.net
3. http:/ec.europa.eu/food
4. http:/www.who.int
5. http:/www.eufic.gov
6. http:/www.cdc.gov

Number of active classes	**Theoretical classes:** 30	**Practical classes:** 45

Teaching methods: lectures; practice; essay

Student activity assessment (maximally 100 points)			
Pre-exam activities	**points**	**Final exam**	**points**
Lectures	5	Written	70
Practices	5	Oral	
Colloquium			
Essay	20		

Course title: Epidemiology

Course status: compulsory

ECTS Credits: 3

Condition: –

Course aim

The aim of this course is to provide students with knowledge to estimate the population health status and to recognize and implement measures of prevention and control of diseases by enduring understandings of: 1. The causes of disease are discoverable by systematically identifying their patterns in populations, formulating hypotheses, and testing those hypotheses using group and individual comparisons. These methods lie at the core of the science of epidemiology, the basic science of public health. 2. Health and disease are not distributed randomly. There are patterns to their occurrence. These patterns can be identified through public health surveillance, looking for patterns based on person, place, and time. Analysis of these patterns can help formulate hypotheses about the possible causes of health and disease. 3. Hypotheses can be tested by comparing the frequency of disease in selected groups of people with and without an exposure to determine if the exposure and the disease are associated. 4. One possible explanation for finding an association is that the exposure causes the outcome. Because studies are complicated by factors not controlled by the observer, other explanations also must be considered, including chance and bias. 5. When an exposure is hypothesized to have a beneficial effect, studies known as randomized clinical trials may at times be designed in which participants are randomly assigned to study and control groups. Those in the study group are then exposed to the hypothesized cause and their outcomes are compared to those in the control group. 6. When an exposure is hypothesized to have a detrimental effect, it is not ethical to intentionally expose a group of people. Randomized clinical trials and community trials may be used to provide evidence for efficacy of potential interventions to reduce the risk. 7. Judgments about whether an exposure causes a disease are developed by examining a body of epidemiologic evidence as well as evidence from other scientific disciplines. While a given exposure may be necessary to cause an outcome, the presence of a single factor is seldom sufficient. Most outcomes are caused by multiple factors including genetic make-up, behaviors, social, economic, and cultural factors, availability of healthcare and the physical environment. 8 Individual and societal health-related decisions about interventions to improve health and prevent disease are based on more than scientific evidence. Social, economic, ethical, environmental, cultural, and political factors may also be considered in implementation decisions. The effectiveness of a health-related strategy can be evaluated by comparing the frequency of the outcome in carefully selected groups of people who were and were not exposed to the strategy. Costs, trade-offs of harms and benefits, and alternative solutions must also be considered in evaluating the strategy. 9 Principles of testing and screening based on Bayes theorem lie at the core of disease diagnosis and screening for disease and have applications to a range of social decision-making in security, forensics, quality control efforts, etc. 10. An understanding of non-health related phenomena can be also be developed through epidemiologic thinking, by identifying their patterns in populations, formulating causal hypotheses, and testing those hypotheses by making group and individual comparisons.

Expected outcome of the course:

Basic Learning Outcomes: 1. Describe the historical roots of epidemiologic thinking and their contribution to the evolution of the scientific method. 2. Explain how ethical principles affect epidemiologic research. 3. Use rates and proportions to express numerically the amount and distribution of health- and non healthrelated outcomes. 4. Use the distribution of a health-related outcome in groups to generate hypotheses that might provide a causal explanation. 5. Explain basic statistical and epidemiologic concepts of estimation, inference, and adjustment to establish association. 6. Explain how to use evidence of an association to make a judgment about whether an association is causal using the principles of contributory cause. 7. Describe the basic epidemiologic study designs that are used to test hypotheses, identify associations, and establish causation. 8. Describe the concepts of measurement of test performance and be able to apply the concepts of testing and screening in different settings. 9. Apply the concepts of benefits, harms, and cost to a public health decision. 10. Describe the broad applicability of epidemiologic methods to clinical and basic science as well as public policy.

Advanced Learning Outcomes

1. Analyze the evidence for and against a recommendation for intervention.2. Analyze a public health problem (e.g., investigation of a disease outbreak). 3. Synthesize epidemiological methods to assess the strengths and weaknesses of assertions in the scientific literature and popular press. 4. Evaluate the design of an epidemiologic investigation, demonstrating the ability to reconcile scientific validity and ethical sensitivity.

Course description

Theoretical education

History, Philosophy, and Uses of Epidemiology: 1. Historical contributions and modern uses of epidemiology—Development of epidemiologic thinking and placement of epidemiology in historical and modern perspective. 2. Ethics and philosophy of epidemiology—Appreciation of the links between epidemiology and broader ethical and philosophic traditions and concerns.

Descriptive Epidemiology: 1. Condition, frequency, and severity—the basic tools of epidemiologic analysis, including case definitions and populations, incidence, prevalence, and case-fatality rates. 2. Using data to describe disease and injuries—Vital statistics, public health surveillance, and measures of health status, including methods for describing quantitatively the natural/clinical history, frequency, and changes in communicable diseases, non-communicable disease, and injuries (Epidemiological process). 3. Patterns of disease and injuries—Application of the basic tools of epidemiology to generate hypotheses based upon person, place, and time; changes and differences in rates; exposures; incubation periods; and disease spread; Epidemiological models (ecological trias, wheel model, network of causality and chain of infection)

Association and Causation: 1. Estimation—Measures of the strength of association, graphical display of data, and measures of risk, relative risk, attributable risk, and population impact. 2. Inference—Concepts of statistical significance and confidence intervals. 3. Bias, confounding, and adjustment—Identification of bias, confounding, and effect modification/interaction and methods to prevent and take into account their impact. 4. Causation—Principles of contributory cause based upon evidence of association, the "cause" precedes the "effect" and "altering the "cause" alters the "effect."

Analytic Epidemiology: 1. Basic epidemiologic study designs and their applications to population health including ecologic or population comparison, cross-sectional, case-control, and retrospective and prospective cohort. 2. Experimental studies—randomized clinical trials, community trials, and their applications to understanding disease or injury etiology and the benefits and harms of intervention.

Evidence-Based Public Health: 1. Harm, benefit, and cost analyses—Evidence-based recommendations regarding benefits, harms, and cost effectiveness of interventions. 2. Intervention effectiveness—Evidence-based evaluation of degree of success of interventions.

Applications to Policy and Basic and Clinical Sciences: 1. Outbreak investigation, testing, and screening—Application of epidemiologic methods to basic and clinical sciences. 2. Public health policy—Application of results from investigations and analyses to policymaking; Levels of prevention; Immunization. 3. Special epidemiologic applications—Molecular and genetic epidemiology, environmental health and safety, unintentional injury and violence prevention, and behavioral sciences.

Practical education

1. Data bases on population morbidity and mortality – importance, legislation, reports, types of reports, internet data gathering. 2. Basic indicators of epidemiology – morbidity, mortality, general, specific and standard rates. 3. Epidemiologic methods – descriptive method practical application. 4. Epidemiologic questionnaire – importance, parts, creation. 5. Measurement errors practical significance and examples. 6. Epidemiologic methods – anamnestic studies practical application. 7. Epidemiologic methods – cohort studies practical application. 8. Epidemiologic methods – experiment examples, practical application. 9. Outbreak investigation – data bases for detection, step-by-step examination of infectious epidemics, examples. 10. Evidence-based recommendations, prqctical application (nosocomial infections). 11. Public health policy – Immunization programs. 12. Public Health policy – Screening programs and diagnostic tests

Literature

Compulsory

1. Robert H. Friis. Epidemiology 101, 2nd Edition. Burlington: Massachusets, Jones & Bartlett Learning 2018

Additional

1. A Dictionary of Epidemiology, Sixth Edition, Edited by Miquel Porta, International Epidemiological Association, Oxford University Press, 2014
2. Antony Stewart. Basic Statistics and Epidemiology: A Practical Guide, Fourth Edition. CRC Press 2016
3. Bonita, Ruth. Basic epidemiology, 2nd edition. World Health Organization 2006

Number of active classes	**Theoretical classes:** 30	**Practical classes:** 30

Teaching methods

Ex-cathedra theoretical lectures, practical sessions with active aprticipation of previously prepared students, with apropriate literature anounced during previous practical session

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	20	Written	10
Practices	30	Oral	40
Colloquium			
Essay			

Course title: Transfusion Medicine

Course status: compulsory

ECTS Credits: 2

Condition: –

Course aim

Students will acquire the necessary knowledge about the basic principles of modern transfusion, blood donation principles of motivational and educational work in the field of blood donation, the selection of donors and blood collection, manufacturing, testing and storage of blood products and their clinical applications. Transfusion laboratory diagnostics and its importance in the quality control of blood products and the safety of their clinical application. The place and role in transfusion medicine in transplantation and its relationship with other branches of medicine.

Expected outcome of the course:

Students will gain knowledge in all fields of transfusion medicine: motivation work for blood donation, the selection of voluntary donors, review DDK and blood collection, special forms of voluntary blood donation; testing according to the law that must be carried out on samples of blood from volunteer donors in order to ensure safe transfusion (determination of the blood groups ABO and RhD antigen, determination of the presence of irregular antibodies, and the presence of markers of transfusion-transmitted diseases: hepatitis B and C, HIV and Syphilis); current techniques for separation of blood constituents from a blood unit and national principles of blood products clinical use, preservation and storage of blood products; introducing with pretransfusion testing that is necessary for the distribution of blood products; introducing with risks and side-reactions during and after the application of blood components; introducing to techniques of transfusion laboratory diagnostics and transfusion basics of transplantation, prenatal care of pregnant women, immunohematological monitoring of transfused patients.

Course description

Theoretical education

1. History of transfusion medicine. Basic concepts in transfusion and its tasks. Relationship with other branches of medicine. Organisation of the transfusion service. Ethical aspects of transfusion medicine. Legislation. 2. Blood donation: the principles of organisation in our country and in the world, the conditions for giving blood and contraindications. The selection of blood donors, laboratory and medical examination, blood collection and complications after blood donation. 3. Conservation of blood, packaging, anticoagulants and optimal additive solutions, changes in blood during storage. Particular forms of blood donations and complications in the procedure of blood donation: autolgous blood and apheresis procedures (plasmapheresis, cytapheresis). 4. Genetic and immunologic bases in transfusion: blood group polymorphism; red blood cell membrane; blood group antigens and antibodies; antigen-antibody reaction, agglutination, hemolysis, immune response in transfusion. The complement system and its importance in transfusion practice. 5. The ABO blood group system: antigens, antibodies, their role in transfusion, anthropology and forensic medicine. Rhesus blood group system: antigens, antibodies, and the importance and the role in transfusion and morbus hemolitic of the newborn (MNH). Other erythrocyte blood group systems: MNSs, P Kell, Kidd, Duffy, Lewis, Lutheran and their significance. 6. The HLA system: genetics, structure, antigens and antibodies and the importance and the role in blood transfusion, transplantation of tissues and organs, anthropology and relation to diseases. Human Platelet Antigens, anti-platelet antibodies, and their clinical significance. Leukocyte Antigens, antiplatelet antibodies and their clinical significance. 7. Place, role and importance of transfusion in transplantation medicine. Basic laboratory tests in transfusion (perinatal, immunohaematological). 8. The basic principles of the selective / directed transfusion of blood products and the production, storage, transport of blood, labeling and standardization of blood products. Selection of blood products and transfusion compatibility tests. 9. Erythrocyte transfusion products: conservation types, selection and application of transfusion. Transfusion of platelets: physiological basis, preparation and conservation, therapeutic applications. Fresh frozen plasma, and drugs from plasma: various forms of plasma, human blood clotting factors, albumin, immunoglobulins, their preparation, indications for therapeutic use. 10. Cryopreservation of blood cells; Substitutes of blood. 11. The risks in transfusion therapy. Adverse effects of chemotherapy and treatment of transfusion reactions. 12 Quality and safety in transfusion; Good Manufacturing and Good Laboratory Practice in transfusion. 13. Laboratory testing of markers that are transmitted by blood transfusion: posttransfusion hepatitis B and C, HIV, and syphilis. 14. Transfusion treatment in pediatric patients. Transfusion treatment in surgery. Transfusion treatment in obstetrics and gynecology. 15 Apheresis therapy procedures.

Practical education

Introduction to the principles of blood donation, medical history / request, control of hemoglobin, review of voluntary donors, venipuncture, taking care of collapse, the procedure of the plasma and cytapheresis; autologous transfusion. Immunology and serology of blood groups: the different techniques for determining the blood group ABO system. Determination of the Rh antigens, variants of Rh antigens (partial and D weak); the character of the antibody in Rh system, posttransfusion reactions and sensitisation in pregnancy, immunological features of MNH. Determination of other red blood cell-blood group antigen systems: MNSs, P, Kell, Duffy, Kidd, Lewis, Lutheran. HLA system: antigens, antibodies, methods of testing. Modern laboratory techniques in the field of transfusion. Preparation of blood products: red blood cells, platelets, leukocytes, fresh frozen plasma, cryoprecipitate; labeling, conservation; standardization; quality control. Transfusion investigation and selection of blood for transfusion. Genetic and immunologic bases in transfusion: direct and indirect Coombs' test, the cold agglutinins, antiplatelet and antileucocyte antibodies. Testing of markers of transfusion-transmitted diseases: hepatitis B and C, HIV, and syphilis: methodology and interpretation of results, the algorithm of testing.

Literature

1. Klein HG, Anstee DJ, Mollison's Blood Transfusion in Clinical Medicine, 12th Edition, Wiley-Blackwell, 2014.
2. Material from the lectures

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 15	
Teaching methods: lectures and practical work			
Student activity assessment (maximally 100 points)			
Pre-exam activities	**points**	**Final exam**	**points**
Lectures	10	Written	10
Practices	20	Oral	60
Colloquium			
Essay			

Course title: Rational Pharmacotherapy 1

Course status: elective

ECTS Credits: 3

Condition: –

Course aim

The aim of this course is to provide students with knowledge on principles and importance of rational use of medications and rational therapy.

Expected outcome of the course

Students learn about intensive research on the development of new drugs and development of pharmaceutical industry which have contributed to the introduction of different drugs. This requires appropriate choice based on individualization of therapy and implementation of rational therapy. Students are expected to have skills and knowledge on pharmacological properties of drugs, on the risk-benefit ratio, adverse effects of drugs and to follow evidence-based principles in treatment in order to implement rational pharmacotherapy**.**

Course description

Theoretical education

Over the counter (OTC) drugs. Drugs for unregistered indications. The importance of compliance in rational pharmacotherapy. Rational pharmacotherapy in geriatrics. Rational pharmacotherapy in pediatrics. Rational pharmacotherapy during pregnancy and breastfeeding. Republic Health Care Fund – the list of drugs (ways putting drugs on the list,list types, constraints). Summary of product characteristics (SPC) and Patient information leaflet (PIL). ALIMS – Agency for Medicines and Medical Devices Agency of Serbia – the importance and role. Hospital lists of drugs and their tender procurement. The importance of drug consumption monitoring. Information systems – the importance for pharmacotherapy. Student essays.

Practical education

Evidence-based medicine – the databases, registered phytotherapeutics and traditional medicines. Phytotherapeutics and clinical studies. Safety of OTC drugs. Guidelines for the treatment of emergency cases in medicine. Basic principles of drug use in specific population groups (pregnant women, nursing mothers, children, the elderly).

Literature

Compulsory

1. Bennet PN, Brown MJ. Clinical Pharmacology. 12th ed. London: Churchill Livingstone, 2018.

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 30	
Student activity assessment (maximally 100 points)			
Pre-exam activities	**points**	**Final exam**	**points**
Lectures	5	Written	
Practices	5	Oral	40
Colloquium			
Essay	50		

Course title: Clinical Immunology

Course status: elective

ECTS Credits: 3

Condition: Pathology; Pathophysiology; Pharmacology and Toxicology 2

Course aim

The aim of this course is to provide students with knowledge on principles of clinical immunology, development of immune diseases, diagnostic methods and theoretical and practical aspects of the therapy of immune diseases. The practical goal of education is to provide students with skills for practical work, and to prepare students for future research-scientific work.

Expected outcome of the course:

Students learn about the mechanisms and features of immune system disorders, as well as primary genetic factors underlying immune diseases, diagnostic and therapeutic approach to immune diseases and basic therapeutic methods. Complications of immunomodulatory and immunosuppressive therapies.

Students learn how to apply their knowledge in practice: consideration of immune mediated diseases, methods for diagnosis confirmation. Basic and clinical laboratory methods for detection of immune diseases. Basic methods of treatment.

Analytical and synthetic thinking in identifying immune diseases: probability of occurrence, clinical manifestations, therapy, treatment of possible complications.

Course description

Theoretical education

1. Introduction to clinical immunology. Immunological diagnosis.
2. Autoimmunity. Systemic lupus erythematosus
3. Vasculitis, Rheumatoid arthritis
4. Rheumatology in childhood
5. Glomerulonephritis
6. Immunodefficiency. Immune therapy.
7. Endocrine diseases associated with immune processes
8. Hematologic diseases associated with immune processes
9. Principles of personalized and transplantation medicine in demyalinized diseases in neurology
10. Allergic dermatoses
11. Transplantation medicine in practice
12. Asthma – immunologic and clinical aspects
13. Immunologic manifestations during nonspecific pulmonary infections
14. Immunologic characteristics of granulomatous diseases
15. Allergic diseases in the ORL region

Practical education

1. Immunological laboratory: protein electrophoresis, radial immunodiffusion, agglutination technique for detecting rheumatoid factor and C reactive protein
2. Immunological laboratory: indirect immunofluorescence (heterologous biological substrates, tissue culture, cell smear), diagnostic methods: immunofluorescent immune complexes deposit in tissues, ELISA techniques
3. Clinical examination of immunological and rheumatic patients.
4. Clinical examination and treatment of organ recipient patients
5. Hypersensitivity skin test, clinical examination of patients with skin manifestations of immune diseases; diagnosis and treatment.
6. Functional lung tests in respiratory atopic diseases; clinical examinations and treatment of pulmonary immune diseases
7. Diagnosing and treating systemic atopic reactions (seminar)

Literature

Compulsory

1. Zabriskie JB. Essential Clinical Immunology. Rockefeller University, New York, 2009
2. Burmester GR, Pezzutto A. Color Atlas of Immunology. Thieme 2003

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 30

Teaching methods: Lectures, practical work, clinical work, laboratory work

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	15	Written	70
Practices	15	Oral	
Colloquium			
Essay			

Course title: Rational Phytotherapy

Course status: elective

ECTS Credits: 3

Condition: Pharmacology and Toxicology 2

Course aim

The aim of this course is to provide to students of integrated studies of medicine basic information on modern phytotherapy as a way of complementary medicine and its importance in conventional medicine.

Expected outcome of the course:

Students will acquire knowledge on most important phytopreparations applied in Serbia and worldwide, their active components, therapeutical dosage, modes of action active components, as well as on potential interactions and adverse effects. Also, students will be able to make the difference between herbal remedies and dietary supplements, as well as the recommendations for their categorization.
Students should be skilled in rational selection of appropriate phytopreparations (registered as herbal medicine or dietary supplement) and their role in modern therapy approaches, to be trained in preparing and applying of different types of phytopreparations. The students will also learn about the methods for identification and determination of content of the active components in herbal remedies.

Course description

Theoretical education

1. Rational phytotherapy, definition and role in modern medicine
2. Standardization, registration; legislation and guidelines for use of phytopreparations
3. Biological, pharmacological and clinical testing of phytopreparations
4. Pharmacological characteristics of particular groups of phytopreparations
5. Phytopreparations in the therapy and prevention of diseases of major organ systems (CNS, gastrointestinal, respiratory, urogenitaly tract, metabolic and disorders of immune and reproductive system, liver and biliary tract disorders)
6. Specificities of dosage of phytopreparations
7. Advantages and precautions in usage of phytopreparations
8. Adverse effects and interactions of phytopreparations with particular drug categories
9. Phytonutrients
10. Adaptogens

Practical education (labs):

1. Pharmaceutical dosage forms of phytopreparations – preparation and application, storage and disposal
2. Registration of phytopreparations (herbal remedy or dietary supplement)
3. Analysis and control of the Guidelines for usage of phytopreparations
4. Data sources on phytopreparations
5. Identification and determination of the content of active component in phytopreparations
6. Compatibility with the Guidelines for usage of commercial herbal medicines
7. Selection of appropriate phytopreparation in the prevention and/or therapy of the disease

Literature

Compulsory

1. Capasso F, Gaginella TS, Grandolini G, Izzo AA. Phytotherapy A Quick Reference to Herbal Medicine. Springer, 2003.
2. Laboratory classes in Basics of Phytotherapy, script for internal use. Department of Pharmacy, Faculty of Medicine, Novi Sad.

Additional

1. Blumenthal R. The Complete German Commission E Monographs. American Botanical Council, Austin, 1999.
2. Schulz V, Haensel R, Tyler VE. Rational Phytotherapy. Springer-Verlag, Berlin, Heidelberg, 2001.
3. Heinrich M, Barnes J, Gibbons S, Williamson E. Fundamentals of Pharmacognosy and Phytotherapy. Churchill Livingstone, Edinburgh, London, 2004.
4. WHO Monographs, Vol. 1-4. World Health Organization, Geneva.

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 30

Teaching methods

1. Theoretical education (Lectures, Interactive Lectures)
2. Practical education (Practical Classes)

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	5	Written	20
Practices	5	Oral	30
Colloquium	10		
Essay	30		

Course title: Pharmacoeconomics

Course status: elective

ECTS Credits: 3

Condition: –

Course aim

To provide students with knowledge on basic principles and importance of pharmacoeconomics.

Expected outcome of the course

Students should acquire knowledge on basic principles of conducting pharmacoeconomy research, to be able to analyze data obtained in pharmacoeconomy research. Students should be able to perform pharmacoepidemiological analysis for particular geographic area or healthcare institution.

Course description

Theoretical education

Pharmacoeconomical principles in creating lists of drugs. Information systems for monitoring drug use at national level – importance and possibilities. Principles of pharmacoepidemiological drug monitoring. The importance and possibilities of analyzing pharmacoepidemiological data with special emphasis on pharmacoeconomical evaluations. The concept of ATC/DDD classification and drug labelling. Definition of adverse drug effects.Post-marketing drug monitoring. The impact of adverse effects on pharmacoeconomical analysis. Basic principles of pharmacoeconomics. Principles of pharmacoeconomical analysis – cost of treatmen, cost of iminimization, costs – effectiveness relationship, costs and benefits, costs and usability. Effects of pharmacological properties of drugs on therapy expenses. Effects of pharmaceutical formulations on the cost of treatment. QUALY-importance, calculation principles.

Practical education

Drug registration, licensing, procedures. Evidence based medicine. Principles of controlled clinical studies. Principles of meta-analysis. Implementation of results of clinical trials and meta-analysis into pharmacotherapeutic/pharmacoeconomic guidelines. Drug prices – international comparison. Specific characteristics of pharmacoepidemiology in outpatient and hospital practice. Specific characteristics of pharmacoeconomic calculations of particular pharmaceutical forms – combinations, drops, dermatological preparations, etc. Adverse effects risk assessment. Costs of adverse effects. Drug therapy risk assessment.Treatment cost assessment. Application of cost-minimization analysis. Application of cost-effectiveness analysis. Application of cost-benefit analysis. Application of cost-usability analysis. Assessing the impact of therapy on the quality of life.

Literature

Compulsory

1. Vogenberg F.R. Introduction to Applied Pharmacoeconomics. New York: Mc. Grow-Hill; 2001.;
2. Berger ML, Bingefors K, Hedblom EC, Pashos CL, Torrance GW. Health Care Cost, Quality, and Outcomes. Lawrenceville NJ: ISPOR Book of Terms; 2003.

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 30

Teaching methods

Theoretical and practical

Student activity assessment (maximally 100 points)			
Pre-exam activities	**points**	**Final exam**	**points**
Lectures	15	Written	70
Practices	15	Oral	
Colloquium			
Essay	(2x35)		

Course title: Experimental Animals and Experimental Design in Medical Research

Course status: elective (compulsory before writing a student/graduation paper using experimental animals)

ECTS Credits: 3

Condition: –

Course aim

To familiarize students with the means, opportunities and working conditions when working with experimental animals in biomedical research.

Expected outcome of the course:

The students will get acquainted with conditions and possibilities of working with experimental animals and particular experimental models of importance for *in vivo* biomedical research. The students will get informed on legal regulations pertaining to protection of welfare of experimental animals, animal models and species used in particular investigations, the housing and care of experimental animals, application of investigated substances, monitoring the effects of applied substances, euthanasia and safe disposal of residual/waist material. The students will be trained for experimental work with laboratory animals (handling, administration of substances, sampling of biomaterial, anesthesia, monitoring of stress and pain parameters...) as well as for creating relevant documentation aimed to obtain necessary approvals for experimental work with laboratory animals.

Course description

Theoretical education

Legislation and welfare of experimental animals in biomedical research. The principles of ethics of working with experimental animals. The rule of "3-R's" and "five freedoms" in working with experimental animals. Categories of invasiveness in animal experiments. Alternative methods for in vivo experiments. Laboratory (experimental) animals – classification and nomenclature, types. Maintenance of experimental animals – accommodation, food and drinking water, hygiene, monitoring health status (stress and pain). Animal models – the model definition, requirements, selection. Basic rules of handling experimental animals – keeping, labeling, application of experimental substances, sampling material for analysis. Experimental models in non-anesthetized animals. Experimental models in anesthetized animals. Euthanasia and risks when working with experimental animals.

Practical education

Requests to the Ethics Committees for permission to work with experimental animals, in accordance with law. Practical introduction to the way of maintenance of experimental animals. Practical mastering the skills of handling experimental animals – keeping, labeling, application of experimental substances, sampling material for analysis. Development of an experimental model in accordance with the request to the Ethics Committee (research plan that includes work on experimental animals). Practical mastering of handling animal products (samples, bodies of euthanized animals), substances and equipment used in the planned experiment.

Literature

Compulsory

1. Chow P, Ng R, Ogden B. Using animal models in biomedical research. World Scientific Publishing Co. Pte. Ltd., Singapore 2007.
2. Hau J, Van Hoosier GL. Handbook Of Laboratory Animal Science, Vol I &II, CRC Press, Boca Raton, Florida 33431, 2003.

Additional

1. Kaliste E. The Welfare of Laboratory Animals. Springer, Dordrecht, The Netherlands, 2007.
2. Wahlsten D. Mouse Behavioral Testing. Academic Press, Elsevier, London NW1 7BY, UK, 2011.

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 30

Teaching methods

Theoretical and practical

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	50	Written	50
Practices		Oral	
Colloquium			
Essay	5*		

* if a student does an essay, he/she can get 5 points if he/she misses, up to a maximum of 100

Course title: Integrative Medicine

Course status: elective

ECTS Credits: 3

Condition: –

Course aim

The aim of the course is to provide students basic information about integrative medicine and alternative treatment techniques that exist in Serbia and in the world, and their relevance to conventional medicine. Students should gain knowledge of the most important alternative methods of treatment and preparations that appear on the market, their active constituents, therapeutic doses, mechanisms of action of active constituents, as well as side effects.

Expected outcome of the course:

By attending this course, students should gain knowledge related to the existence of numerous alternative treatment techniques and develop a realistic view of their place in modern medicine. Students should acquire a critical attitude towards particular treatments and treatment techniques and explain the advantages and disadvantages of their application.

Students are expected to acquire the skill of reasoning objectively the use of various alternative techniques of treatment and their place in modern methods of medication, as well as to acquire the skill of preparing certain groups of preparations (homeopathic, aromatherapy, etc.).

Course description

Theoretical education

Integrative medicine. The term and place in modern medicine. Legislation. Phytotherapy. Homeopathy – general principles and examples from practice. Aromatherapy – general principles and examples from practice. Traditional Chinese Medicine. Acupuncture. Chiropractic. Ayurvedic Traditional Medicine. Bach's flower therapy. Iris diagnostics. Shinrin-joku. Balneotherapy and Thalassotherapy. Apitherapy.

Practical education (labs):

Herbal preparations, categorization, border products. General principles of homeopathic remedies. Proper dosage in aromatherapy. Selection of active constituents for Bach's flower therapy.

Literature

Compulsory

1. Blumenthal R. The Complete German Commission E Monographs. American Botanical Council, Austin, 1999.
2. Capasso F, Gaginella TS, Grandolini G, Izzo AA. Phytotherapy A Quick Reference to Herbal Medicine. Springer, 2003

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 30

Teaching methods

1. Theoretical education (Lectures, Interactive Lectures)
2. Practical education (Practical Classes)

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	15	Written	50
Practices	15	Oral	20
Colloquium			
Essay			

Course title: Interventional Radiology

Course status: elective

ECTS Credits: 3

Condition: Radiology

Course aim

Introducing students to utilization of contemporary interventional radiology methods of examinations and procedures in diagnosis and treatment of patients.

Expected outcome of the course:

Evaluation of indications for utilization of different interventional procedures, devices and materials used for these procedures, introduction to different interventional techniques, recognition of pathological changes, reporting, therapeutic procedures, i.e. performing vascular and non-vascular interventional procedures.

Course description

Theoretical education

Short history of interventional radiological methods, division to vascular and non-vascular interventions, imaging modalities in interventional radiology (angiography room, CT, US), basic physical principles, radiation protection of patients and interventional team, advantages and limitations of different modalities, patient preparation for the intervention (general and specific, medications used). Vascular interventional radiology: vascular diagnostics (clinical vascular examination, non-invasive vascular diagnostics, invasive vascular diagnostics), materials and instruments, contrast agents, access points in vascular interventions, Seldinger punction technique, percutaneous transluminal angioplasty, artery stenting, aortic stent graft, cava filter, embolization, intraarterial chemical and mechanical thrombolysis, intracranial vascular interventions, coronarography, percutaneous transluminal angioplasty of coronary arteries and stenting. Non-vascular interventional radiology: non-vascular diagnostics, materials and instruments, cyst punctions and sclerozation, CT and US guided biopsy, biliary drainage and stents, percutaneous nephrostomy and ureteral stents, vertebroplasty, osteoplasty, tumor ablation (RFA, microwave, cryoablation), ozone therapy.

Practical education

Practical classes are identical to methodic units of theoretical classes.

Literature

Compulsory

1. Richard B. Gunderman. Essential Radiology: Clinical Presentation, Pathophysiology, Imaging. Thieme 2014.

Additional

1. Mathew D. Tam, Weiping Wang. Radiology Case Review Series: Interventional Radiology. McGraw Hill 2014.

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 30

Teaching methods

Theory classes. Demonstration of materials used in interventional radiology. Demonstration of selected interventional radiology procedures.

Student activity assessment (maximally 100 points)			
Pre-exam activities	**points**	**Final exam**	**points**
Lectures	20	Written	30
Practices	20	Oral	30
Colloquium			
Essay			

Course title: Diagnostic and Molecular Imaging

Course status: elective

ECTS Credits: 3

Condition: –

Course aim

Training students for: 1. Systematic identification and differentiation between the normal anatomical from pathological anatomical structures and tissue/organ functions by using various diagnostic and multiparametric functional/structural/metabolic/molecular diagnostic imaging methods; 2. Recognition of indications for the different diagnostic procedures and understanding of decision-making process on the use of different methods within multiparametric diagnostic algorithms; 3. Mastering advanced diagnostic and functional/structural/metabolic/molecular imaging techniques (computerized tomography, magnetic resonance imaging, radionuclide imaging, positron emission tomography and hybrid imaging methods (PET/CT and PET/MRI), etc.), including dynamic, spectroscopic, diffusion, perfusion and functional imaging; 4. Application of interventional diagnostic and therapeutic methods and procedures.

Expected outcome of the course:

Lectures should provide students with basic and advanced knowledge of diagnostic and functional/structural/metabolic/molecular imaging methods, use of contrast, radionuclide agents and other biomarkers in diagnostic and medical imaging, and use of different imaging techniques in order to obtain optimal diagnostic morphoanatomical and/or functional/structural/metabolic/molecular information, as well as basic knowledge on diagnostic and therapeutic interventional procedures. Additionally, determination of indicator areas for using various imaging and functional/structural/metabolic/molecular methods and interventional procedures, learning different diagnostic and functional/molecular imaging techniques, recognition of pathology, describing and interpretation of findings should be provided.

Course description

Theoretical education

1. Fundamentals of diagnostic and molecular imaging; 2. Chest imaging; 3. Cardiovascular imaging; 4. Imaging of the abdomen; 5. Imaging the urinary tract; 6. Imaging of the pelvis; 7. Musculoskeletal imaging; 8. Breast imaging; 9. Neuroradiological imaging 1; 10. Neuroradiological imaging 2; 11. Magnetic resonance spectroscopy and functional MRI; 12. Fetal diagnostic imaging; 13. Interventional radiology procedures; 14. Radionuclide imaging; 15. Hybrid PET/CT and PET/MRI imaging.

Practical education

Practical training corresponds to aforementioned theoretical topics.

Literature

Compulsory

1. Suetens P. Fundamentals of Medical Imaging. 2nd ed. 2009, Cambridge University Press
2. Adam A, Dixon AK (eds.). Grainger & Allison's Diagnostic Radiology – A Textbook of Medical Imaging 5th ed. 2008, Elsevier Churchill Livingstone
3. Diagnostic and molecular imaging (textbook for students of medicine). Cathedra of Radiology, Medical Faculty Novi Sad (in preparation)

Additional

1. Lisle DA. Imaging for students. 2001, Arnold/Oxford University Press
2. Chen MYM, Pope TL, Ott DJ. (eds.) Basic Radiology, 2nd Ed. 2011, McGraw Hill Medical
3. Ribes R, Luna A, Ros PR. (eds.) Learning Diagnostic Imaging. 2008, Springer-Verlag, Berlin Heidelberg

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 30

Teaching methods

Lectures and practice.

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	20	Written	30
Practices	30	Oral	20
Colloquium			
Essay			

Course title: Emergency Conditions in Internal Medicine

Course status: elective

ECTS Credits: 3

Condition: Internal medicine

Aim of the course:
Acquainting students with the early identification and therapy of critically ill patients in internal medicine.

Outcome of the course:
Training students in identifying critically ill patients and providing them adequate treatment measures

Course content
Theoretical classes
1. Identifying critical ill patients (implementation of the score systems (early warning systems-EWS). 2. Schock patophysiology,oxygen transport and delivery. 3.Cardiogenic schock, systolic and dyastolic dysfunction of the left heart. 4.Acute myocardial infarction. 5. Arrhythmias, dissection of the aorta. 6. Hypertensive urgencies, acute cardiogenic edema. 7. Severe community aquired pneumonia. 8. Severe asthma. 9. Acute respiratory distress syndrome (ARDS). 10. Pulmonary embolism. 11. Severe sepsis, septic schock and multiple organ dysfunction (MODS). 12. Acute renal insufficiency. 13. Hypoglycemia, Diabetic ketoacydosis, Hyperosmolar comma. 14. Mixedematous comma – Thyrotoxicosis. 15. Hepatic insufficiency acute, chronic, Acute pancreatitis

Practical education
Bedside teaching
– Ventilation, gas exchange, pulmonary circulation
– Principles of mechanical ventilation
– Noninvasive ventilation
– Solving and regulation of acid-base disturbances, solving and regulation of electrolites disbalance
– Renal replacement therapy
– Gastrointestinal bleeding
– Acute bleeding and thrombosis-hemostatic disorders

Literature:
Compulsory:
1. Marino PL. The ICU book. Wolters Kluwer 2016

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 30

Teaching methods
Power point presentation theoretical classes, compulsory including case reports

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	20	Written	40
Practices	20	Oral	
Colloquium			
Seminar papers	20		

Course title: Interprofessional Education

Course status: elective

ECTS Credits: 3

Condition: –

Course aim

Interprofessional education involves educators and learners from two or more health professions and their foundational disciplines who jointly create and foster a collaborative learning environment. The aim of these efforts is to develop knowledge, skills and attitudes that result in interprofessional team behaviors and competence.

Expected outcome of the course:

Student neeeds to be able:

- To state the goals of interprofessional and collaborative practice
- To learn how to function in an interprofessional team and carry this knowledge, skill, and value into their future practice,
- To provide professional patient care as part of a collaborative team and focused on improving patient outcomes.
- To provide patient-centered care in a collaborative manner.
- To make joint team decision about patient treatment
- To communicate efectively with other team members, relatives and comunity members.
- To define priorities in patient treatment
- To manage conflict situations
- To demonstrate respect to other team members and patients
- To demonstrate insight in personal role and responsabilities in patient treatment

Course description

Theoretical education

General*:*

1. Definition and significance of interprofessional eduaction.
2. Worldwide experiencies in teaching interprofessional education
3. Collaborative practice
4. Team – work
5. Team – work competencies
6. Interprofessional and collaborative practice competencies

Special*:*

1. Acute coronary syndrom
2. Intitial treatment of the trauma patient
3. Initial treatment of the poisoning
4. Diabetes mellitus
5. Primary prevention in somatology
6. Gariatry – characteristics in the primary healt care and pharmacotherapy.
7. Geriatry functional chaanges in the old people
8. Small child in primary health care; pharmacotherapy in small child

Practical education

General

1. uniprofessional workshops
2. special interprofessional workshops

Interprofessional simulated education – IPSE

Literature

Compulsory

1. World Healt Organisation:Framework for Action on Interprofessional Education and Collaborative Practice. Allied Health 2010; 39(3 pt 2): 196–197.

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 30

Teaching methods

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	10	Written	60
Practices	30	Oral	
Colloquium			
Essay			

Subject name: Basics of Psychotherapy

Course status: elective

ECTS Credits: 3

Condition: –

Course goals:
The objective of the course is to acquire theoretical and practical knowledge about the basic principles of psychotherapy and to get students familiar with the main psychotherapy schools and models, as well as to introduce students with the psychological principle of behavior change.

Subject outcomes:
Students will be able to recognize and apply the basic principles of individual and group psychotherapy treatment, to recognize the similarities and differences of main psychotherapy schools and models, and to recognize and apply specific principles related to motivation for behavior change.

Course content:
Theoretical education
– Definition, development and basic principles and goals of psychotherapy
– The course of psychotherapy treatment, basic principles of individual, group and family therapy
– Psychoanalytic and psychodynamic psychotherapy
– Existential and client-centered psychotherapy
– Gestalt and experiential psychotherapy
– Transaction analysis
– Behavioral therapy
– Cognitive therapy and cognitive-behavioral psychotherapy
– Psychodrama, body psychotherapy and art therapy
– Systemic psychotherapies
– Constructivist and integrative psychotherapy
– Sociotherapy
– Transtheoretical model of change
– Motivational interviewing
– Research in psychotherapy

Practical education
The practical part of the course will be focused on: application of basic principles of group and individual psychotherapy, development of empathy and self-reflective potentials, application of basic and specific interventions within different psychotherapy schools, understanding the therapist-patient relation, application of basic postulates of Transtheoretical model of behavior change.

Literature
Obligatory
1. Prochaska J, Norcross J. Systems of Psychoterapy. Belmont: Thomson Books/Cole, 2007.
2. Prepared course materials

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 30

Teaching methods:
Lectures, interactive teaching, group work, demonstrations, consultations

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	10	Written	60
Practices	10	Oral	
Colloquium			
Essay	20		

Course title: Clinical Sexology

Course status: elective

ECTS Credits: 3

Condition: Internal medicine; Surgery; Psychiatry; Neurology; Gynecology and Obstetrics

Course aim

The aim of this course is to learn about basic sexual problems using up-to-date literature and International classification of diseases. According to World Health Organizytion physical, emotional, mental and social well-being is in relation to sexuality. The most important aim of Clinical sexology is to contribute to education of medical doctors in the field of sexual health of general population. This course is multidisciplinar involving cardiologists, psychiatrists, urologists, endocrinologists, pediatrician and neurologists.

Expected outcome of the course:

Getting theoretical framework about clinical sexology. Learning about normal sexual development (childhood, adulthood, ageing) and sexual dysfunctions, diagnostic methods and multidisciplinary approach.

Course description

Theoretical education

1. Sexual dysfunctions
2. Physiology and anatomy of female and male reproductive system; physiology of female sexual response
3. Normal male sexual function
4. Hypoactive sexual desire
5. Female sexual desire
6. Female orgasmic dyfunction
7. Genito-pelvic pain/penetration disorder
8. Erectile dysfunction
9. Male orgasmic dyfunction
10. Ejaculation disorders
11. Paraphilia
12. Dysphoria
13. Sexual aversion
14. Hormons and sexuality
15. Sexual activity and cardiovascular disesaes
16. Neurological basis of sexual function
17. Psychosexual development
18. Sexual behaviour
19. Unconsummated relationship and marriage
20. Drug-induced sexual dysfunctions
21. Principles of sexual therapy
22. Sexual pharmacotherapy
23. Psychotherapy of sexual dysfunction
24. Surgical interventions in the pelvis region and sexual dysfunction
25. Sexuality in later life
26. Sexually transmitted infections
27. Sexual aids – therapy and risks
28. Sexual psychology and psychopathology
29. Family planning
30. Love, falling in love, intimacy

Practical education

– Anamnesis and physical examination of patuent with sexual dysfunction.
– Diagnostic evaluation

(Practices will be held on the Clinic for Urology, Clinic for Psychiatry, Clinic for Gynecology and Obstetrics, Clinic for Neurology, Clinic for Cardiology, Clinic for Endocrinology, Diabetes and Metabolic Disorders)

Literature

Compulsory

1. Dohle GR et al. Guidelines on Male Hypogonadisam. European Association of Urology 2015
2. Female sexual heacth consensus clinical guidelines. JOGC 2012:34(8):S1-S56

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 30
Teaching methods *Power Pont* presentations, practices with patients under supervision		

Student activity assessment (maximally 100 points)			
Pre-exam activities	**points**	**Final exam**	**points**
Lectures	15	Written	50
Practices	15	Oral	
Colloquium			
Essay	20		

Course title: Bloodborne Diseases and Professional Prophylaxis
Course status: elective
ECTS Credits: 3
Condition: –
Course aim Information about bloodborne viruses and ways of postexposure prophylaxis for health professionals.
Expected outcome of the course: Getting additional knowledge about bloodborne diseases, treatment options and professional prophylaxis.
Course description *Theoretical education* 1. Hepatitis B – acute, chronic, complications, treatment, prevention, treatment after an exposure 2. Hepatitis C – acute, chronic, complications, treatment, prevention 3. Other potential bloodborne viruses 4. HIV infection – etyology, epidemiology, patogenesis, clinical presentation, treatment, prevention 5. Confronting stigma and discrimination 6. PEP 7. PrEP *Practical education* 1. Morning visits 2. Ambulant care of exposedcpatients 3. Life style correction 4. Procedure in the case of professional and non-professional exposure 5. Profession-related prevention.
Literature *Compulsory* 1. Mandell GL, Douglas RG, Bennett JE: Principles and practice of Infectious Diseases, 7th ed, Churcill Livingostone, Philadelphia, New York, US, 2016

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 30
Teaching methods		

Student activity assessment (maximally 100 points)			
Pre-exam activities	**points**	**Final exam**	**points**
Lectures	30	Written	50
Practices	15	Oral	
Colloquium	5		
Essay			

Course title: Professionally Orientated Education of Health Workers in Pharmaceutical Industry

Course status: elective

ECTS Credits: 3

Condition: –

Subject goal

Students will be introduced to different aspects of work in pharmaceutical industry. They will gain the knowledge required for understanding of basics of new pharmaceutical formulations development, as well as for their placement on the market. Also, they will be trained for individual implementation of quality control in pharmaceutical industry (regulatory framework, validation of analytical methods, the assessment of results, certification of processes), as well as for performing pharmacoeconomic analysis. They will gain the knowledge related to communication skills required for successful marketing and sales of pharmaceutical products.

Outcome of the subject

By enrollment in this course the students will gain the fundamental knowledge required for understanding business processes in pharmaceutical industry. Furthermore, the proposed mode of education will enable them to apply for large spectra of job positions available in pharmaceutical industry.

Subject content

Theoretical education

1. Development of new pharmaceutical formulations – from initial formulation and registration to placement on market
2. Quality control in production of drugs, medical devices, dietary supplements and cosmetics
3. Pharmaceutical legislative
4. Pharmacoeconomics
5. BSCI Code of Conduct
6. Quality assurance of production process (ISO, HCCP, GMP, GLP)
7. Health industry and environmental protection
8. Business communication – the approach to health workers, the approach to patient
9. Basic terms in pharmaceutical marketing

Practical education

1. Development and validation of analytical method for determination analyte of interest
2. Pharmacoeconomic analysis of data
3. Steps in career development (from job offer to skilled professional)
4. Practical in-company training

Literature

1. Amfori BSCI Code of Conduct v.2021
2. Vogenberg F.R. Introduction to Applied Pharmacoeconomics. New York: Mc. Grow-Hill; 2001.
3. Current regulations of Republic of Serbia related to the health sector and pharmacy
4. European Commission. Directive 2004/10/EC of the European Parliament and of the Council on the harmonization of laws, regulations and administrative provisions relating to the application of the principles of good laboratory practice and the verification of their applications for tests on chemical substances
5. European Commission. Commission Directive 2003/94/EC laying down the principles and guidelines of good manufacturing practice in respect of medicinal products for human use and investigational medicinal products for human use.
6. Mark Gibson, Pharmaceutical Pre-formulation and Formulation, 2nd Ed., Informa Healthcare, 2009.
7. ICH guidances www.ich.org
8. Scripts for internal use

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 30

Method of carrying out the teaching

1. Theoretical lectures
2. Practical trainings (laboratory training, seminars, in-company training)

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	5	Written	30
Practices	15	Oral	
Colloquium			
Essay	50		

Course title: Maxillofacial Surgery with Fundamentals of Dental Medicine

Course status: compulsory

ECTS Credits: 2

Condition: –

Course aim:
The aim of this course is to provide students with knowledge and skills for examination and diagnosis of the oral, and head and neck diseases.

Expected outcome of the course:
Identification of common diseases of the oral cavity, head and neck.

Course description
Theoretical education
- Introduction to dentistry (anatomy and development stomatognathic system, occlusion and malocclusion, diseases of soft and solid tissues in oral cavity, prophylaxis, emergency conditions, x-ray diagnostic)
- Injuries in the maxillofacial regions (soft tissue, frontoethmoidal, mandible, maxilla, zygomatic bone) – diagnosis, clinical features and treatment
- Cysts of bones and soft tissues of the oral cavity, head and neck and extensive processes of the jaws – diagnosis, clinical features and treatment
- Infections of bones and soft tissue of the jaws, head and neck – odontogenic and non-odontogenic – diagnosis, clinical features and treatment
- Temporomandibular joint diseases
- Trigeminal neuralgia and other painful conditions in the maxillofacial region
- Tumors (benign tumors of the oral cavity, head and neck; premalignant lesions and facial carcinomas, melanoma, malignant tumors of the oral region and lips, malignant tumors of maxillary synus, regional metastases and malignant tumor "staging") – diagnosis, clinical features and treatment
- Salivary gland diseases (acute and chronic inflammation, *sialolythiasis*, salivary fistula, benign proliferative processes, benign and malignant tumors) – diagnosis, clinical features and treatment
- Facial and jaw deformities (diagnosis, classification, mandibular deformities –progenia, microgenia, laterogenia); Deformities of the maxilla (prognathism, micrognathism) apertognathia, other deformities, pre-prosthetic surgery) – diagnosis, clinical features and treatment
- Basics of reconstructive and esthetic surgery

Practical education
- Examination of the oral cavity and dental apparatus
- Examination and first aid in patients with maxillofacial traumas
- Diagnosis of benign and malignant tumors
- Diagnosis and treatment of patients with head and neck infections
- Diagnosis and treatment of patients with salivary gland diseases
- Diagnosis and treatment of painful conditions in dentistry and maxillofacial surgery
- Postoperative treatment

Literature
Compulsory
1. Carrie Newlands, Cyrus Kerawala: Oral and Maxillofacial Surgery. Published by OUP Oxford 2014. ISBN 10: 0199688400 ISBN 13: 9780199688401
2. Peterson's principles of oral and maxillofacial surgery 2nd edition, 2004, BC Decker Inc

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 15

Teaching methods
Leactures and practical lectures with patients

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	10	Written	10
Practices	20	Oral	60
Colloquium			
Essay			

Course title: Nuclear Medicine

Course status: compulsory

ECTS Credits: 2

Condition: –

Course aim

To provide students with knowledge on basic rules for application of open sources of ionizing radiation and diagnostic and therapeutic options of radioactive isotopes.

Expected outcome of the course:

Obtained knowledge in the field of nuclear medicine provide medical doctor to:
A) learn, accept basic clinical indications for nuclear medicine diagnostic procedures for efficient diagnostic and assessment of treatment response.
B) to learn how to interpretate nuclear medical scans adequately, to learn about their diagnostic value and limitations
C) to apply the knowledge into a clinical practise and to refer patient to a treatment
D) to learn how to refer patient to specific nuclear medicine therapeutic procedures

Course description

Theoretical education

Include general and special part of nuclear medicine. General part includes: radioactive isotopes and radiation, physical principles of radiation detection and equipment (scintillation detector, gamma camera, well counters, PET), basic principles of radiobiology, radio-pharmacology and radiation protection.
Special part includes basic principles of clinical application of nuclear-medicine methods in different clinical conditions, as well as radionuclide therapy: application of radioisotopes in diagnostics of CNS, cardiovascular, respiratory, endocrine, gastrointestinal, hepatobiliar, urinary, musculosceletal, hematological, oncological, infection and inflammation. Positron emission tomography. Hybrid systems. Radionuclide therapy.

Practical education

It represents the introduction to the safety rules in nuclear medicine departments, the use of radioisotopes in nuclear-medicine laboratory: features and application, basic principles of radiopharmaceutical preparations, dosimetry, as well as the basic principles of interpretation of nuclear medicine findings, application of radionuclide therapy.

Literature

1. Ziessman HA, O'Malley JP, Thrall JH. Nuclear Medicine: The Requisites, 4th ed. Philadelphia, United States; 2013.
2. Mettler FA, Guiberteau MJ. Essentials of nuclear medicine imaging. Philadelphia, Saunders Elsevier,2006
3. Mihailovic J, Goldsmith SJ, Killeen R. FDG PET/CT in Clinical Oncology. Case Based Approach with Teaching Points. Berlin Heidelberg: Springer Verlag, 2012. ISBN: 978-3-642-29865-3.
4. Ahmadzadehfar H, Biersack HJ. Clinical applications of SPECT_CT. Springer, Berlin Heidelberg, 2014.
5. Delbeke D, Israel O. Hvbrid PET/CT and SPECT/CT imaging. Springer New York, 2010.
6. Aktolun C, Goldsmith SJ. Nuclear Medicine therapy. Principles and clonical applications. Springer New York, 2013.
7. Aktolun C, Goldsmith SJ. Nuclear oncology. Philadelphia, Wolter Kluwer Health, 2015.
8. Luster M, Duntas LH, Wartofsky L, eds. The thyroid and its disease. Springer International Publishing AG, Switzerland, 2019.

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 15

Teaching methods: Theoretical lectures, Practices; Essays

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	10	Written	20
Practices		Oral	50
Colloquium	20		
Essay			

Course title: Rational Pharmacotherapy 2

Course status: elective

ECTS Credits: 3

Condition: –

Course aim

The aim of this course is to inform students about basic principles and importance of pharmacotherapy.

Expected outcome of the course

Students will learn about intensive research on the development of new drugs and development of pharmaceutical industry which have contributed to the introduction of different drugs. This requires appropriate drug choice based on individualization of therapy and implementation of rational therapy. Students are expected to have skills and knowledge on pharmacological properties of drugs, on the risk-benefit ratio, adverse effects of drugs and to follow evidence-based principles in treatment in order to implement rational pharmacotherapy.

Course description

Theoretical education

Treatment of migraine. Pharmacotherapy of pain. Pharmacotherapy of diabetes and complications. Pharmacotherapy of ophthalmologic diseases. Ppharmacotherapy of depression. Pharmacotherapy of coronary and cardiac insufficiency. Rational drug therapy – the importance of phytotherapy. Rational drug therapy – the importance of phytotherapy. Rational pharmacotherapy in emergency medicine – treatment of acute pulmonary edema. Rational pharmacotherapy in emergency medicine – treatment of excessive and prolonged attacks of bronchial asthma (status asthmaticus). Rational pharmacotherapy in emergency medicine – treatment of excessive and prolonged seizures (status epilepticus). Student essays. Clinical significance of prebiotics and probiotics. Antibiotics and general practitioners. Benzodiazepines: Pros and Cons. Gastrointestinal disorders. Urogenital infections in pregnancy. Pharmacotherapy in neonatology. Pharmacotherapy in pediatrics. Antiviral agents in treatment of influenza. Medications and sports.

Practical education

Evidence-based pharmacy – databases; ATC / DDD classification, application of antihypertensive agents; application of antibiotics in patients with impaired renal and liver function; use of antibiotics in the treatment of asthma and COPD, application of drugs in athletes, use of antibiotics in infants and children; application of hormonal contraceptives; guidelines in the application of drugs in osteoporosis; guidelines for antimicrobial agents; relevant laboratory parameters in pharmacotherapy. AMMD, RFHI, databases.

Literature

Compulsory

1. Bennet PN, Brown MJ. Clinical Pharmacology. 12th ed. London: Churchill Livingstone, 2018.

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 30

Teaching methods

Theoretical and practical

Student activity assessment (maximally 100 points)			
Pre-exam activities	**points**	**Final exam**	**points**
Lectures	5	Written	
Practices	5	Oral	40
Colloquium			
Essay	50		

Course title: Rational Drug Use in Pregnancy and Lactation

Course status: elective

ECTS Credits: 3

Condition: –

Course aim

The aim of this course is to provide students with knowledge on basic principles of pharmacotherapy during pregnancy and lactation.

Expected outcome of the course

Students learn about basic characteristics of drugs used in pregnancy and lactation, with particular reference to the safety of pharmacotherapy; students learn about drugs which proved reasonable for use during pregnancy and breastfeeding based on the principles of evidence based medicine. At the end of the course students are expected to master basic skills and principles of rational pharmacotherapy in pregnant women and nursing mothers.

Course description

Theoretical education

Selection of drugs in relation to the sex of patient. Physiological characteristics of a pregnant woman and fetus affecting pharmacokinetic and pharmacodynamic properties of drugs. Physiological characteristics of nursing mothers and newborns/infants affecting properties of drugs during lactation . Criteria used to assess the risks and safety of drugs during pregnancy and breastfeeding . Classification of drugs in regard to their safety during pregnancy and breastfeeding. Impact of drugs on organogenesis, fetus and course of pregnancy. Impact of gestational age of the fetus on characteristics of drugs. Biological markers that indicate the exposure to drugs during pregnancy. Clinical studies in pregnant women. Safety of antihypertensive drugs in pregnancy and lactation. Safety of antiemetics in pregnancy and breastfeeding. Safety of antimicrobial agents during pregnancy and lactation. Safety of drugs used in the treatment of neuropsychiatric disorders (anxiolytics, antidepressants, antipsychotics and antiepileptics) during pregnancy and lactation. Prophylactic use of drugs in pregnancy. Rational pharmacotherapy of pain in pregnancy. Rational use of tocolytics and uterotonics. Impact of tobacco smoke, alcohol and drug abuse on the fetus and pregnancy.

Practical education

Data sources on the safety of medications used in pregnancy and lactation. Analysis of preclinical study results relevant for drug safety assessment during pregnancy and breastfeeding. Analysis of clinical study results important for drug safety assessment during pregnancy and breastfeeding. Case reports – on application of medications during pregnancy and breastfeeding. Students' essays.

Literature

Compulsory

1. Rang HP, Dale MM, Ritter JM, Moore PK. Pharmacology. New York: Churchill Livingstone; 2003.
2. Bennet PN, Brown MJ. Clinical Pharmacology (11th ed). London: Churchill Livingstone; 2012.

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 30

Teaching methods

Theoretical and practical

Student activity assessment (maximally 100 points)			
Pre-exam activities	**points**	**Final exam**	**points**
Lectures	5	Written	
Practices	5	Oral	50
Colloquium			
Essay	40		

Course title: Special Epidemiology of Communicable Diseases

Course status: elective

ECTS Credits: 3

Condition: –

Course aim

The aim of this course is to provide students with contemporary knowledge about the epidemiology of communicable diseases, to recognize and implement measures of prevention and control of communicable diseases and to be able to apply in practice the knowledge and skills acquired.

Expected outcome of the course:

Students gain theoretical knowledge (Epidemiology of diseases transmitted by food, water, droplets, air, vectors, epidemiology of vaccine preventable diseases and sexually transmitted infections) and practical skills (Application of epidemiological methods in communicable disease epidemiology research and outbreak investigation, analyses of epidemiological surveillance, evaluation of efficacy of prevention and control measures) necessary for further work in medicine in the area of routine work of the physician encompassing epidemiology of communicable diseases.

Course description

Theoretical education – Distance learning

1. Epidemiological process (natural history of disease, gradient of infection, iceberg phenomenon, characteristics according place and time).
2. Chain of infection (reservoir and source of infection, place of entry, routes of transmission, dose and virulence of agents, disposition).
3. Application of epidemiological methods in communicable disease epidemiology research and outbreak investigation..
4. Epidemiology of infectious respiratory diseases (epidemiological indices, risk factors, prevention and control, characteristics).
5. Epidemiology of intestinal infectious diseases (epidemiological indices, risk factors, prevention and control, characteristics).
6. Epidemiology of sexually transmitted diseases (epidemiological indices, risk factors, prevention and control, characteristics).
7. Natural foci, zoonotic diseases and vector diseases (epidemiological indices, risk factors, prevention and control, characteristics).
8. Epidemiological surveillance (definitions, significance, goals, classification, elements, evaluation, surveillance in our country).
9. International aspects of communicable diseases

Practical education – Distance learning

1. Investigation of epidemiology (preparations for field work, epidemics, confirmation of diagnosis, identification of the sick, descriptive-epidemiological analysis, setting and testing a hypothesis, additional testing, fighting epidemics, public announcement – data bases for detection, step-by-step examination of infectious epidemics, examples.
2. Respiratory epidemics – characteristics, respiratory diseases, examples, research.
3. Contact epidemics – characteristics, contact borne diseases, examples, research.
4. Water borne epidemics – characteristics, diseases, examples, research.
5. Food-borne epidemics – characteristics, diseases, examples, research.
6. Immunization – types of vaccines and their use, contraindications, organization of vaccination, documentation, reports of unwanted reactions.
7. Immunization – systemic immunization, epidemiologic and clinical indications, vaccination of international travellers, vaccination schedule, examples.

Literature

Compulsory

1. Nelson KE, Williams CM, Graham NMH. Infectious disease epidemiology. Gaithersburg:Aspen publishers; 2001.
2. Chin J. Control of communicable disease manual. 17th edition, Washington:American Public Association, 2000.
3. Heymann DL. Control of Communicable Diseases Manual, 20th Edition. APHA Press. 2014.

Additional

1. Benenson AS. Control of Communicable Diseases Manual, 16th Edition. American Public Health Association. 1995.

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 30

Teaching methods

Students will choose the way on how to attend the classes immediately upon th selection of this subject for their personal curriculum. They will choose between ex-cathedra teching (with overall number of 30 classes for theoretical lectures and 15 for practical sesions or distance learning through electronic system installed and accessed on web site of Medical Faculty (total 45 classes)

Registration for distance learning will be required through web/site of Medical Faculty of Novi Sad. Each student will use his/her name and surname in the form *name.surname* as a *username* and *password* will be student's index number. After the registration student will be able to access the system and start the education followed by exam through testing (quiz).

Students will have the possibility to access especially prepared presentations through the web site of the Medical Faculty. They will be able to look into presentations and learn from them as long as they need to and minimum time needed to adopt the knowledge will be 45 hours. Each of the communicable diseases will have special presentation(s) that will encompass its epidemiology. We will create at least one question from each of the slides in the presentation, with two or more answers offered where only one will be correct. That is how we will form a bank of questions. Quiz with minimum 20 questions will be randomly created for each of the topics covered, and one question could appear only once within the quiz.

System will inform the student whether the answer given was correct. It will take 60% of correct answers to pass each quiz. Uppon quiz passed student will receive certificate through his e-mail adress that he has to report at the begining, during registration process.
Educational materials will be accessible during the semester.
All quizez passed through distance learning or signatures from lectures and sessions collected during ex cathedra lectures will be preconditions for final exam.

Student activity assessment (maximally 100 points)			
Pre-exam activities	**points**	**Final exam**	**points**
Lectures	(30)	Written	55
Practices	(15)	Oral	
Colloquium	45		
Essay			

Course title: Special Epidemiology of Non-Communicable Diseases

Course status: elective

ECTS Credits: 3

Condition: –

Course aim

The aim of this course is to provide students with contemporary knowledge about the epidemiology of non-communicable diseases, to recognize and implement measures of prevention and control of communicable diseases and to be able to apply in practice the knowledge and skills acquired.

Expected outcome of the course:

Students need to be able to analyse and interpreted data that received from epidemiological surveillance of non-communicable diseases, evaluate the leading risk factors of non-communicable diseases, and conduct epidemiological investigation and preventive and control measures in this field.
Students get acquainted with epidemiological methods and their implementation in routine work with patients, they become familiar with the epidemiology of non-communicable diseases in population in order to recognize them and take measures of prevention and control.

Course description

Theoretical education

1. Definition, aim and objectives of epidemiology
2. Epidemiological surveillance of noncommunicable diseases
3. Application of epidemiological methods in non-communicable disease epidemiology research
4. Levels of prevention of noncommunicable diseases(primordial, primary, secondary and tertiary).
5. Epidemiology of gastrointestinal, endocrine and metabolic diseases (epidemiological indices, risk factors, prevention and control, characteristics)
6. Epidemiology of mental and neural diseases (epidemiological indices, risk factors, prevention and control, characteristics)
7. Epidemiology of chronic respiratory diseases (epidemiological indices, risk factors, prevention and control, characteristics)
8. Epidemiology of cardiovascular and cerebrovascular diseases (epidemiological indices, risk factors, prevention and control, characteristics)
9. Epidemiology of malignant diseases (epidemiological indices, risk factors, prevention and control, characteristics).
10. Epidemiology of injuries (epidemiological indices, risk factors, prevention and control, characteristics).

Practical education

1. Epidemiological methods – interpretation of results of epidemiological studies
2. Diagnostic tests – interpretation
3. Epidemiology of gastrointestinal, endocrine and metabolic diseases
4. Epidemiology of mental and neural diseases
5. Epidemiology of chronic respiratory diseases
6. Epidemiology of cardiovascular and cerebrovascular diseases
7. Epidemiology of malignant diseases
8. Epidemiology of injuries

Literature

Compulsory

1. Gordis L. Epidemiology, 5th edition. Saunders; 2013
2. WHO. Global status report on noncommunicable diseases 2014. World Health Organization,Geneva; 2015
3. Porta M. Dictionary of Epidemiology. 6th edition. Oxford University Press; 2016

Additional

1. Bonita R, Beaglehole R, Kjellstrm T. Basic Epidemiology, 2nd edition. WHO; 2006
2. Rothman K. Epidemiology: An Introduction, 2nd edition. Oxford University Press; 2012

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 30

Teaching methods

Ex-cathedra theoretical lectures, practical sessions with active aprticipation of previously prepared students, with apropriate literature anounced during previous practical session

Student activity assessment (maximally 100 points)			
Pre-exam activities	**points**	**Final exam**	**points**
Lectures	20	Written	50
Practices	30	Oral	
Colloquium			
Essay			

Course title: Special Epidemiology of Hospital Acquired Infection (HAI) and Infection Control

Course status: elective

ECTS Credits: 3

Condition: –

Course aim

The aim of this course is to provide students with knowledge and application of epidemiological methods, appropriate measures for the prevention and control of hospital acquired infections occurring during the process of health-care and treatment.

Expected outcome of the course:

Knowledge

Student should become familiar with epidemiological methods, epidemiological characteristics of different types of HAI's (by anatomical localization) in the hospital and community and in population of patients with different epidemiological characteristics in order to apply preventive and control measures. They also need to become familiar with application of epidemiological surveillance of hospital acquired infections.

Skills

The student should adopt the skills of epidemiological surveillance of hospital acquired infections and adopt the procedures that carry the risk of hospital infections. Also, students should be able to apply epidemiological questionnaire and records of HAI and risk factors; implementation of preventive measures, levels of disinfection, immunoprophylaxis and chemoprophylaxis; Detection of hospital outbreaks, interpretation of microbiological laboratory results and data collection of epidemiologically important microbiological pathogens.

Course description

Theoretical education

1. Subject, definitions and tasks of the epidemiology of hospital infections, epidemiological methods. Indicators of prevalence of hospital acquired infections.
2. Unit of epidemiological investigation – definition, significance, characteristics of acute health-care institutions and institutions for long-term care (outpatient), examples.
3. Epidemiological surveillance of hospital infections: continuous / intermittent; comprehensive / targeted.
4. Epidemiological models. Agent, host and environment. Modes of transmission of nosocomial infections. Epidemiological characteristics of hospital infection outbreaks.
5. Epidemiology of catheter – associated bloodstream infections.
6. Epidemiology of ventilator associated pneumonia.
7. Epidemiology of surgical site infections.
8. Catheter associated urinary tract infections.
9. Epidemiology of HAI among ICU patients.
10. Epidemiology of infections in outpatient services.
11. Epidemiology of blood-borne infections.
12. Measures of HAI control and prevention – Immune prophylaxis, Sera prophylaxis and chemoprophylaxis of patients and medical staff. Protection of healthcare workers. Procedure for sharp injures (accidental) injures. Medical waste менагment as preventive meassure of HAI.

Practical education

1. Sources of hospital infections data – importance, legal provision, case definition, reporting techniques, types of application forms, the use of data, use the Internet for date collection.
2. Basic indicators of HAI's incidence – indicators of morbidity, mortality, general, specific and standardized rates.
3. Application of epidemiological methods in research and investigation of hospital acquired infections – cohort studies, principles, significance, practical application, incidence study of specific anatomic localization (bloodstream infections, pneumonia, surgical site infection); incidence study of HAI conected to specific medical procedures (surgery, endoscopy, childbirth, hemodialysis) principles, significance, the practical application; case-control study, practical application; cross-sectional (prevalence) study (occasional and repeated), principles, significance, practical application.
4. Epidemiological surveillance: by implementation time, by HAI type, incidence study of HAI in high-risk units; Bloodstream infection – definition, criteria, significance, surveillance.
5. Epidemiological questionnaire for HAI's – importance of the questionnaire, components, questionnaire design.
6. Outbreak investigation – sources of date for detection of outbreak, steps in outbreak investigation of HAI, examples of hospital outbreaks. Application of molecular biology in outbreak investigation.
7. Contact transmitted outbreaks – characteristics, examples of infections transmitted by contact, steps in outbreak investigation; examples of contact transmitted outbreaks associated with medical procedures.
8. Respiratory infection outbreaks – characteristics of respiratory outbreaks in hospital environment, examples of respiratory infection outbreaks, investigations.
9. Foodborne and waterborne outbreaks in hospital environment, examples.
10. Surgical site infections – preventive measures, bundle approach.
11. Ventilator associated pneumonia – prevention, bundle approach
12. Urinary tract infections – prevention, precautions, bundles.
13. Infections caused by multidrug-resistant bacteria-*Staphylococcus aureus, Clostridium difficile, Enterococcus faecalis et faecium,* ESBL and others –preventive measures, protocols for prevention and control.
14. Measures of HAI control and prevention – Immunization of healthcare staff. Isolation measures.
15. Sanitary and hygiene measures to prevent hospital acquired infections – hand hygiene, disinfection and cleaning protocol for hospital environment; sterlization, principles, records, surveillance

Literature

Compulsory

1. Damani N. Manual of Infection Prevention and Control. Fourth edition. Oxford University Press, 2019.
(Damani N. Manual of Infection Control Procedures. Second edition. Cambridge University Press, 2003)

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 30

Teaching methods

Ex-cathedra theoretical lectures, practical sessions with active aprticipation of previously prepared students, with apropriate literature anounced during previous practical session

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	20	Written	50
Practices	30	Oral	
Colloquium			
Essay			

Course title: Tropical Infectious Diseases

Course status: elective

ECTS Credits: 3

Condition: Infectious Diseases

Course aim

The aim of this course is to provide knowledge for recognition, diagnosis and treatment of various tropical diseases. Through theoretical and practical training students will learn to recognize patients with infectious diseases, sample materials for diagnostic purposes and treat tropical diseases from the standpoint of general practitioners.

Expected outcome of the course:

Students should acquire basic knowledge of the etiology, epidemiology, pathogenesis, clinical features and treatment of patients with tropical infectious diseases.

Students should, after completing this course, master skills for early detection, diagnosis, differential diagnosis, treatment and prevention of various infectious and tropical diseases using previous knowledge in infectious diseases, microbiology and pharmacology, as well as following the latest scientific achievements in these areas.

Course description

Theoretical education

1. Introductory lecture – historical overview and importance of tropical diseases, etiologic classification, geographical distribution and mechanisms of transmission, clinical syndromes, diagnostic tests and therapeutic protocols 2. The significance and taxonomy of vectors of infectious tropical disease pathogens 3. Malaria 4. Leishmaniasis 5. Taeniasis and cysticercosis 6. Echinococcosis 7. Nematode infections (ascariasis, enterobiasis, trichuriasis, ancylostomiasis, strongyloidiasis,filariasis) 8. Strongyloidiasis, schistosomiasis 9. Ehrlichiosis, anaplasmosis, Bartonellosis 10. Trypanosomiasis 11. Protozoal gastrointestinal infections 12. HIV infection 13. Traveller's diarrhea and cholera 14. Viral hemorrhagic fever 5. Rickettsioses 16. Sexually transmitted diseases (other than HIV) 17. Fungal infections (hystoplasmosis, blastomycosis, coccidioidomycosis) 18. Zoonosis 19. Rabies 20. Toxocariasis 21. Respiratory tropical diseases 22. Vector borne encephalitis

Practical education

1. Echinococcosis – clinical review, diagnostic methods (serological, radiological) and therapy 2. Malaria – clinical examination of patients, complications, microscopic blood examination, interpretation of results of other diagnostic methods, treatment 3.Toxoplasmosis – examination, clinical forms, diagnostic tests, interpretation of laboratory and parasitological tests, therapeutic protocols 4. Leishmaniasis – clinical forms, bone marrow puncture, interpretation of results, therapy. 5. Taeniasis and cysticercosis – clinical presentation and complications, diagnostic protocols (X-ray, CT and MR images, lab tests), therapy 6. Trichinosis – diagnostic procedures, interpretation of diagnostic tests and therapy 7. Helminthiasis – diagnostic procedures, interpretation of results and therapeutic protocols8. Amoebiasis and lambliasis – clinical presentation and complications, diagnostic procedures, interpretation of results and therapeutic protocols 9. Pneumocystis jiroveci infection – a case report, diagnosis, treatment 10. Traveler's diarrhea – diagnosis and therapy 11. Vector encephalitis – diagnosis and therapy 12. Fungal infections – diagnosis and therapy 13. Sexually transmitted diseases – diagnosis and therapy14. Rickettsioses – diagnosis and therapy 15. Systemic bacterial disease – diagnosis and therapy

Literature

Compulsory

1. Guerrant RL,Walker DH, Weller PF. Tropical infectious diseases. Principles, Pathogenes and Practice (Third edition). Churchill Livingstone, Elsevier, Philadelphia, 2011.
2. Cook GC, Zumla AL. Mansons Tropical diseases, Saunders, 2003.
3. Mandell GL, Douglas GR, Bennett JE. Principles and Practice of Infectious Diseases, seventh edition, Churchill – Livingstone, New York, Edinbourgh, London, Melbourne, Tokyo, 2010.

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 30

Teaching methods

Lectures, practice

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	30	Written	50
Practices	10	Oral	
Colloquium			
Essay	10		

Course title: Intensive Care

Course status: elective

ECTS Credits: 3

Condition: –

Course aim:
To obtain basic knowlege about assessment, diagnostic procedures and therapy of critically ill patients.
Developing basic competencies and skills necessary for treatment of the critaically ill.

Expected outcome of the course:
– Demonstrate appropriate, evidence based, knowledge about patients with critical illness and injury, including life threatening trauma and multi-system organ failure.
– Developing an understanding of the organ systems approach to critical care, and obtaining, organizing, and presenting data
– Demonstrate appropriate, evidence based, knowledge about care to post-operative patients.

Course description
Theoretical education
General:
1. General approach to critically ill patient.
2. Diagnostic procedures in ICU
3. Monitoring in ICU
4. Intrahospital infections and antibiotic therapy in intensive care units
5. Sepsis, definition and treatment.
6. Nutrition and Nutritional status assessment in critically ill patient
7. Early rehabilitation in critically ill patient
8. Multidisciplinary approach and teamwork in ICU

Special
1. Diagnostic and initial treatment in trauma patient
2. Critically ill paediatric patient
3. Critically ill geriatric patient
4. Critically ill oncology patient
5. Critically ill pulmology patient
6. Critically ill cardiology patient
7. Critically ill surgical patient

Practical education
Students will attend everyday working activities in specialised ICUs (surgical and trauma) in Clinical Centre of Vojvodina, surgical paediatric ICU in Institute for Child and Youth Healthcare of Vojvodina and in Institute for Pulmonary Diseases of Vojvodina.

Literature
1. Marino PL. ICU book, 3rd Edition. Lippincott Williams & Wilkins 2007.
2. Rhodes A. et al.Surviving Sepsis Campaign: International Guidelines for Management of Sepsis and Septic Shock: 2016.Intensive Care Med 2017;43(3):304-377.

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 30

Teaching methods:
1. Lectures
2. Active learning
3. Teaching by simulation

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	10	Written	20
Practices	20	Oral	50
Colloquium			
Essay			

Course title: Laboratory Medicine

Course status: elective

ECTS Credits: 3

Condition: Medical Biochemistry; Pathophysiology (exam)

Course aim

Acquiring of the general principles of correct interpretation of laboratory results within the different diagnostic algorithms, and in accordance with its specificity, sensitivity and predictive clinical value. Rationalization in the choice of laboratory diagnostic algorithms and algorithms of treatment progress and outcome monitoring.

Expected outcome of the course

Knowledge: Training for the analysis and evaluation of the diagnostic cases within a multi-disciplinary context in the field of laboratory biomedicine, and then the assessment of the clinical significance of the biochemical and molecular biological indicators, the discovery of the source of errors in the testing process, knowledge of the variability of the results of laboratory tests, as well as for their interpretation from the clinical point of view.

Skills: Introduction to general principles of various laboratory techniques and the preparation of patients for laboratory testing. Acquiring of the skills of teamwork with physicians and experts of various specialties. Acquiring skills of critical evaluation and selection of appropriate laboratory procedures for the diagnosis, monitoring disease progression and therapy outcome.

Course description

Theoretical education

- Introduction to laboratory medicine.
- Preparing a patient for sampling biological material.
- Preanalytical variables that affect laboratory test results. Collection, analysis and identification of biological samples. The selection of proper anticoagulants. Techniques of serum and plasma separations. Proper transport and sample storage. Sources of errors and quality control. Impact of drugs on laboratory tests.
- Analytical phase of laboratory testing. Sources of errors and quality control. Factors of analytical interference. Methodological evaluation of analytical methods. Analytical specificity, sensitivity, accuracy and precision.
- Postanalytic phase of laboratory testing. Sources of errors. Validation of laboratory results. Biological variability and reference values. Impact of drugs on laboratory results. Interpretative comments.
- Presentation and interpretation of laboratory results (unit selection and content). Identification of diagnostic questions: the role of laboratory testing in improving patient health outcomes. The indications for laboratory testing. Laboratory medicine specialist as part of the diagnostic team.
- Clinical quality control of laboratory tests. Interpretation of the results of laboratory tests in accordance with the diagnosis and acquired therapy. Identifying specific clusters of laboratory results, characteristic for a particular disease. Long-term assessment of the course of the disease and treatment outcome. Critical values.
- Laboratory testing efficiency strategy. Diagnostic sensitivity and test specificity. Predictive value.
- Various laboratory techniqes. Photometry testing. Protein analysis techniqes. Electrochemical methods: ion-selective electrodes (ISE). An enzymatic assays.
- Immunoassays. Radioimmunoassays.
- Molecular testing. Techniques for nucleic acid analysis: amplification, mutation testing and gene expression; principles and methods of DNA and RNA isolation; PCR. Molecular genetics methods. Basic principles of flow cytometry.
- Hematologic-cytological methods. General morphology of blood cells in peripheral blood, cell counting. Automation in Hematology. Specialized laboratory tests in hematology with the basics of immunohematology.
- Laboratory testing of hemostasis and thrombosis. Screening tests of hemostasis. Specialized laboratory tests in hemostasis.
- Point-of-care testing (POCT). Introducing patients to the ways of laboratory self-control.
- Prenatal laboratory testing.

Practical education

- Laboratory evaluation of blood plasma proteins, body fluids and tumor markers. Interpretation of the laboratory results and case-based diagnostic problem solving.
- Laboratory evaluation of carbohydrate metabolism. Dynamic function tests. Interpretation of the laboratory results and case-based diagnostic problem solving.
- Laboratory evaluation of lipid metabolism. Interpretation of the laboratory results and case-based diagnostic problem solving.
- Laboratory evaluation of biomarkers of inflammation and sepsis. Interpretation of the laboratory results and case-based diagnostic problem solving.
- Laboratory evaluation of body fluids, electrolytes and acid-base balance. Blood gas analysis. Interpretation of the laboratory results and case-based diagnostic problem solving.
- Laboratory evaluation of kidney function and urinalysis. Interpretation of the laboratory results and case-based diagnostic problem solving.
- Laboratory evaluation of humoral and cell immunity. Interpretation of the laboratory results and case-based diagnostic problem solving.

– Laboratory evaluation of endocrine system. Dynamic function tests in endocrinology. Interpretation of the laboratory results and case-based diagnostic problem solving.
– Laboratory evaluation in hematology. Interpretation of the laboratory results and case-based diagnostic problem solving.
– Laboratory evaluation of digestive system, liver and biliary duct. Interpretation of the laboratory results and case-based diagnostic problem solving.
– Laboratory evaluation of cardiovascular system. Interpretation of the laboratory results and case-based diagnostic problem solving.
– Laboratory evaluation of nervous system and cerebrospinal fluid (CSF). Interpretation of the laboratory results and case-based diagnostic problem solving.
– Prenatal laboratory evaluation. Interpretation of the laboratory results and case-based diagnostic problem solving.
– Definition of sensitivity and specificity of laboratory tests. The identification of appropriate value for the diagnostic threshold. Definition of predicitive value of a positive and negative test. Interpretation of the laboratory results and case-based diagnostic problem solving.
– Evaluation of errors in clinical laboratory. Diagnostic sensitivity and test specificity. Predictive value. Solving set tasks.

Literature

Compulsory

1. Đerić M, ed. Practical Handbook of Pathophysiology [CD-ROM]. Novi Sad: Faculty of medicine; 2019.
2. Laposata M. Laposata's Laboratory Medicine. Diagnosis of Disease in the Clinical Laboratory. Third Edition. New York: McGraw-Hill Education; 2019.
3. Bruyere HJ, ed. 100 Case Studies in Pathophysiology. Philadelphia: Wolters Kluwer/Lippincot Williams&Wilkins; 2009.

Additional

1. Rifai N, Horvath AR, Wittwer CT, eds. Tietz textbook of clinical chemistry and molecular diagnostics. Sixth edition. St Louis, Missouri: Elsevier; 2018.

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 30

Teaching methods: Interactive lectures and practices; Consultations; Essays

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	10	Written	
Practices	20	Oral	60
Colloquium			
Essay	10		

Course title: Professionalism in Healthcare

Course status: elective

ECTS Credits: 3

Condition: –

Course aim

Introduction with importance of professionalism in work, personal role management, contact with patient and patient's family, importance of empathy and authority for the purposes of increased efficiency of outcomes in primary tasks of physicians and other healthcare professionals.

Expected outcome of the course

Abilities and skills in organisational role analysis, abilities in maintaining professionalism and empathy in performance of primary tasks of physicians and other healthcare professionals.

Course description

Theoretical education

– Professionalism in healthcare organisations
– Human resources and professionalism
– Challenges of medical profession today (social and political context)
– Organisational role analysis
– Organisational culture and primary task
– Authority, power and competence in professional role
– Welfare and professionalism

Practical education

– Practical exercise and group work – Organisational role analysis
– Organisational norms and primary task – exercise
– Authority and power in professional role – group work
– Written assignments on chosen topics

Literature

Compulsory

1. ON BEING A DOCTOR, Redefining medical professionalism for better patient care, Rebecca Rosen and Steve Dewar, ISBN 1857174755, www.kingsfund.org.uk/publications

Additional

2. Group Processes. Rupert Brown. Published by Naklada Slap. Zagreb, 2006. (Grupni procesi. Rupert Brown. Izdavač Naklada Slap. Zagreb, 2006).
3. Mirko Štifanić, Iva Rinčić Ethics and Professionalism Now (Etičnost i profesionalizam smjesta), JAHR, Vol. 3, No. 5, 2012. UDK 17:614.252.

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 30

Teaching methods

Lectures, exercises, interactive teaching, seminars.

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	10	Written	50
Practices	10	Oral	
Colloquium			
Essay	30		

Course title: Ophthalmology

Course status: compulsory

ECTS Credits: 3

Condition: Pharmacology and Toxicology 1; Pharmacology and Toxicology 2; Neurology; Internal medicine; Pediatrics

Course aim

The aim of this course is to provide medical knowledge of anatomy, vision function and eye diseases; identify most important ophthalmology problems important for vision protection and blindness prevention.

Expected outcome of the course:

Theoretical knowledge on the function of vision, optics and eye refraction, oculomotor balance and its disorders, diseases and injuries of the outer eye (eyelids, lacrymal apparatus, cornea), the inner eye (anterior eye chamber, uvea, retina, papilla, visual nerve), orbital and intracranial pupilomotor fibers and centres, diagnostics, prognosis and medication and surgical treatment of eye diseases and anomalies. Ability to identify the most important eye defects, diseases and injuries that endanger the eye function and vision; to be able to provide appropriate treatment and to refer the patient to the ophthalmologist or surgeon.

Course description

Theoretical education

1. Epidemiology of blindness and visual impairment and the importance and role of vision. Association between eye and general diseases. 2. Eyelids: structure, physiology, skin disorders, vascular disorders, bacterial and viral infections, inflammations and gland disorders, shape, position, mobility, and tumors of the eyelids. Treatment principles. 3. Lacrimal apparatus – anatomy, physiology of tear secretion. Dry and wet eye, inflammation, tumors, diagnosis and treatment. 4. Conjunctiva – anatomy, physiology, types hyperemia, eye inflammations (bacterial, viral, allergic). The differential diagnosis of the red eye. Degenerative diseases and tumors of the conjunctiva. Treatment. 5. Cornea – anatomy and physiology, disorders of the size and curvature. Defects of the cornea, inflammations – bacterial, viral, fungal. Disorders of transparency, edema, scars and degeneration. Corneal surgery. 6. Sclera – function and disorders, inflammations – bacterial, immunologic, degenerativeand their prevention and treatment. 7. Front uvea and ciliary body, anatomy, physiology. Anterior and posterior ocular chambers. Front diffuse uveitis. Purulent inflammation of uvea – endophthalmitis and panophthalmitis – diagnosis and treatment. 8. Physiology of intraocular pressure. Aqueous humor secretion and swelling. Primary, secondary, and congenital glaucoma. Closed-angle glaucoma – acute glaucoma. Primary open-angle glaucoma. Diagnosis and treatment. 9. Crystalline lens – embryology, physiology and pathology. Congenital and acquired cataract. Diagnostic surgical treatment and rehabilitation of vision, intraocular artificial lens. 10. Ocular fundus – chorioretinal complex, physiology and function of the retina and choroid. Semiology of changes of the ocular fundus. Diseases of the uvea and rear-choroiditis, chorioretinitis, uvea and retinal tumors, diagnosis and treatment. 11. Retinal diseases – vascular, inflammatory, degenerative. 12. The vitreous body and its disorders. Hemophthalmos. 13. Orbit, vascular, endocrine diseases, purulent inflammations and tumors. Diagnosis and treatment. 14. Optic nerve, visual pathway, diseases of the optic nerve and visual field disorders. Iris and pupilomotor reaction. 15. Refraction of the eye – refractive errors, nearsightedness, farsightedness, astigmatism. Eyeglasses, contact lenses, refractive surgery. 16. Eye motility, oculomotor functions, binocular vision. Disorders of the ocular balance, strabismus, amblyopia, paralytic strabismus. 17. Mechanical, physical and chemical eye and orbital injuries, emergency conditions and principles of diagnosis and treatment. 18. Current therapeutic modalities and surgery in ophthalmology – video presentation.

Practical education

1. Eyeball – anatomy.
2. History taking in ophthalomologic patients. Principal problems, external examination, inspection.
3. Vision acuity measurement, near and distance measurement in each eye.
4. Eyelids – anatomy, fissures, inspection, palpation, (upper eyelid ectropion) .
5. Lacrimal apparatus – lacrimal glands, drainage pathways (fluorescein test, Schirmer test, palpation – massage).
6. Examination of the conjunctiva, anatomy, types of hyperemia, conjunctival, ciliary.
7. Local therapy – drops, ointment, removal of foreign body from the conjunctiva, eye washing.
8. Examination of the cornea and sclera, focal illumination, fluorescein test sensitivity.
9. Anterior eye chamber (depth and content) . Iris – color, structure. Iridocyclitis, ciliary hyperemia. Pupil dilating, reactions to light, direct – indirect.
10. Biomicroscopy of the anterior eye chamber – demonstration and analysis of physiological properties of tissues, pathological changes, erosion, edema, corneal scars.
11. Digital measurement of the intraocular pressure (IOP), aplanatic tonometry, gonioscopy, visual field. Acute angle-closure glaucoma – a case report.
12. Orbit, cranial nerve palpation. Protrusion – exophtalmos – exophtalmometriy MR, CT.
13. White pupils – leukocoria, cataract – iris shadow, pupil illumination and parallax, aphakia, pseudophakia.
14. Ocular fundus – anatomy, semiology of the retina. Direct ophthalmoscopy, indirect ophthalmoscopy, biomicroscopy of the ocular fundus.
15. Iris dilation, direct ophthalmoscopy, red reflex, parallaxis.
16. Fluorescein angiography. Eye diseases – ultrasound diagnotics.
17. Functional and diagnostic tests: color vision, vision field – computerized perimetry, adaptation to darkness. Electrophysiological methods (ERG, EMG, EOG).

18. Subjective and objective determination of refraction, vision, various glasses.
19. Eye mobility, the primary position, the visual axis. Detection of strabismus and amblyopia, Hirsberg test, cover test, test for diplopia methods of penalizing (amblyopia).
20. Eye injuries (chemical, mechanical, physical): first aid.
21. Watching eye surgeries on the monitor.

Literature

Compulsory

1. Kanski JJ. Clinical Ophthalmology. Oxford. Butterworth-Heinemann Ltd, 1994.
2. Khaw PT, Shah P, Elkington AR. ABC of Eyes, Fourth Edition. London. BMJ books, 2004.
3. American Academy of Ophthalmology: Set of books of Ophthalmology:2017.

Number of active classes	**Theoretical classes:** 30	**Practical classes:** 30

Teaching methods: Lecture, practical work, multimedial presentations.

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	10	Written	20
Practices	20	Oral	30
Colloquium	10		
Essay	10		

Course title: Otorhinolaryngology

Course status: compulsory

ECTS Credits: 3

Condition: –

Course aim

Making students understand etiopathogenesis, clinical features, introducing them into diagnostic procedures and therapies in otorhinolaryngological ailments and the ailments of the head and neck.

Expected outcome of the course:

Unsupervised performance of otorhinolaryngological clinical examination, diagnosing and doing the procedure in ENT. Making diagnoses on the basis of radiological and functional findings by themselves. Consulting, advising and controlling ENT patients. Training on medical manikins: injuries, stopping nose bleeding, ear rinsing, conicotomy, endotracheal intubation, nasogastric sonde placing. Casuistics.

Course description

Theoretical education

1. Anatomy and physiology of the ear. Diagnostics of otological diseases. 2. Injuries of the ear. Foreign bodies of the external hearing canal and cerumen. 3. Acute inflammation of the outer and middle ear. 4. Chronic inflammation of the middle ear. 5. Otogenic complications. 6. Inner ear disease. Benign and malignant tumors of the outer, middle and inner ear. 7. Audiology. Vestibulology. 8. Anatomy and physiology of the nose and paranasal cavities. Congenital and acquired malformations of the nose. 9. Foreign body in the nose. Injuries of the nose. Bleeding from the nose. Inflammation of the skin of the nose. 10. Facial injuries. 11. Acute and chronic inflammation of nasal mucosa. Allergic rhinitis. Nasal polyps. 12. Acute and chronic inflammation of the paranasal cavities. Complications associated with paranasal cavity inflammations. 13. Rare diseases of the nose and paranasal cavities. Tumors of the nose and paranasal cavities. 14. Anatomy and Physiology of oral cavity and pharynx. Reticulo-endothelial function of muscle. Hypertrophy of the lymphatic ring. Tonsillar problem. Taste disorders. 15. Congenital anomalies of the oral cavity and pharynx. Injuries of oral cavity and pharynx. Inflammatory diseases of the oral cavity. Autoimmune diseases of the oral cavity. 16. Acute and chronic inflammation of pharyngeal mucosa. Pharyngeal abscesses. 17. Diseases of the tongue. Tumors of oral cavity. Tongue tumors. 18. Neurogenic and non-infectious pharyngeal diseases. 19. Tumors of the epipharynx and mesopharynx. 20. Anatomy and physiology of the larynx. Diagnostic methods in laryngology and phoniatrics. Symptoms of larynx diseases and voice and speech disorders. Congenital malformations of the larynx. 21. Laryngeal edema. Laryngeal paralysis. Laryngeal trauma. 22. Acute and chronic inflammatory processes of the larynx. 23. Benign tumors of the larynx. Pseudo tumors of the larynx. 24. Malignant tumors of the larynx and hypopharynx. 25. Basics of phoniatrics. 26. Foreign bodies of the laryngotracheal tree. Stenosis of the larynx and trachea. Coniotomy and tracheotomy. 27. Esophageal motility disorders. Dysphagia. Esophageal diverticulum. Injuries and foreign bodies of the esophagus. Esophageal tumors. 28. Congenital cysts and fistula in the neck. Lymphadenitis. Neck abscesses. Neck trauma. 29. Neck lymph node metastases. Tumors of thyroid gland. 30. Anatomy and Physiology of salivary glands. Acute and chronic inflammatory processes of salivary glands. Benign and malignant tumors of the salivary glands.

Practical education

1. Introduction to practical otorhinolaryngology classes. Anamnesis. 2. Working place (head mirror, light source, the position of patients, optical aids, directoscop, microscope). 3. Examination of the nose. 4. Examination of the mouth and oropharynx. 5. Examination of the ear. 6. Examination of the larynx and the neck. 7. Interventions in rhinology (extraction of foreign bodies of the nose, method of evacuation of secretions from the nose and sinuses according to Protz, Aerosol therapy of rhinosinusitis, application of nose drops). X-ray of the nose and paranasal cavities – the interpretation of the results. 8. Stopping the nose bleedong. 9. Rhinomanometry, allergy testing of patients. Patients with injuries of the nose and sinuses, reposition of nasal bones. Displaying patients with frontoethmoidal injuries. Patients with sinusogenic complications. 10. Functional endonasal sinus surgery and surgery of paranasal cavities. Patients with benign and malignant tumors of the nose and sinuses. 11. Interventions in the oral cavity and pharynx, extraction of foreign bodies. Interventions in the oral cavity and throat, incision of the peritoneal abscess. 12. Patients with acute and chronic tonsilitis. Patients with phlegmon and neck abscess. 13. Patients with pharyngeal tumors, biopsy of the tumor in oral cavity and pharynx. Diagnostic procedures and principles of surgical treatment of patients with throat tumors. 14. Patients with facial injuries, X-ray diagnosis of parapharyngeal space tumors. Patients with salivary gland tumors. Post-operative care of patients after surgery in the region of oral cavity and maxilla. 15. Diagnosing throat diseases, clinical diagnostics, ultrasound, X-ray diagnosis. Patients with cervical metastases. Neck dissection. 16. Rinsing foreign bodies and cerumena from external ear canal. Local therapy of ear surpuration. Management of outer and middle ear injuries, incision of othematoma, setting the sterile strips. Paracentesis. 17. X-Ray diagnostics of otological diseases, interpretation of basic X-ray scans. Politzer methods. 18. Quantitative and qualitative methods for hearing evaluation. Evaluation of hearing through whispering and loud speech. Tuning fork tests (Weber, Rhinne, Schwabach, Gele). Tonal audiometry, types of hearing impairments, types of audiograms. 19. Impedancemetry, Tympanometry and typical curves, stapedius reflex. 20. Examination of vestibular apparatus, orthostatic and dynamostatic tests, caloric test (Dix Hallpike), electronystagmography. 21. Directoscopy of the larynx, laringomicroscopy. Diagnostics of laryngeal and hypopharyngeal tumors. X-ray diagnosis of the diseases of the larynx and hypopharynx. Ultrasound diagnostics of the neck. Biopsy of laryngeal and hypopharyngeal tumors. 22. Treatment of acute inflammation of the larynx, inhalation therapy. 23. Treatment of acute laryngeal edema in children and adults, subglottic laryngitis, Quincke laryngeal edema. 24. Endoscopic surgery of laryngeal tumors and pseudotumors. 25. Surgical therapy of tumors of the larynx, post-operative care of patients after laryngectomy, nasogastric probe, tracheostoma, rehabilitation of swallowing. 26. Videostroboscopy, dysphonia treatment. Speech of patients underwent laryngoectomy, laryngophone, esophageal voice and speech, vocal prosthesis. 27. Foreign bodies in the airways, diagnosis and therapy. 28. Tracheostomy, demonstration of surgical intervention, postoperative care of patients underwent tracheotomy, replacement of cannila. 29. Foreign bodies of the esophagus, diagnosis and extraction. 30. Corrosive injuries of the oral cavity, pharynx and esophagus, first aid in corrosive injuries, diagnosis and treatment of corrosive injuries, therapy of late complication of corrosive injuries of the esophagus.

Literature

1. Probst R, Grebers G, Iro H. Basic Otorhinolaryngology. Thieme, 2006.

Number of active classes	**Theoretical classes:** 30	**Practical classes:** 30

Teaching methods

Theoretical lectures, seminars, practical

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	10	Written	20
Practices	20	Oral	50
Colloquium			
Essay			

Course title: Clinical Pharmacology

Course status: compulsory

ECTS Credits: 2

Condition: –

Course aim

To apply clinical knowledge in the field of pharmacology in clinical practice.

Expected outcome of the course

Students should be able to analyze the existing data on drugs, analyze references for clinical trials, analyze data obtained in clinical trials, to get familiar with pharmacotherapy in target-groups of patients. Student must know the ethical rules of clinical research, basic principles of pharmacoepidemiology and pharmacoeconomics. Students should be trained to write and present information to patients – participants in clinical researches and to present, analyze and define the optimal pharmacotherapy for the most common diseases.

Course description

Theoretical education

Stages of clinical trials.Pharmacoepidemiology. Pharmacoeconomy. Pharmacovigilance. Pharmacotherapy during pregnancy. Pharmacotherapy during breastfeeding. Pharmacotherapy in respiratory infections. Optimal use of antibacterial drugs. Pharmacotherapy in urinary infections. Pharmacotherapy in ophthalmology. Pharmacotherapy in dermatology.

Practical education

Ethical aspects of clinical research; ethics of clinical pharmacologists. Interpretation of results of preclinical research – significance for clinical testing. Information for participants when conducting an academic and sponsored research – processing, presentation and discussion. Information on drugs – a comparison of information provided by pharmaceutical industry and independent information sources. Educational activity of clinical pharmacologists. Pharmacotherapy problems – processing a pharmacotherapy problem; presentation and discussion. Pharmacotherapy of depression. Pharmacotherapy of kidney failure. Pharmacotherapy of arterial hypertension. Pharmacotherapy of pain in the outpatient facilities. Pharmacotherapy of chronic bronchitis.

Literature

Compulsory

1. Brown MJ, Sharma P, Bennet PN, Mir FA: Clinical Pharmacology (12th edition). London: Churchill Livingstone, 2018**;**
2. Rang HP, Dale MM, Ritter JM, Moore PK. Pharmacology (9th edition). Elsevier, 2019;
3. Brenner GM, Stevens C. Pharmacology (5th edition). Elsevier, 2017.

Additional

1. Royal Pharmaceutical Society of Great Britain. British National Formulary 78. Royal Pharmaceutical Society, 2019.

Number of active classes	**Theoretical classes:** 30	**Practical classes:** 30

Teaching methods

Theoretical and practical

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	5	Written*	(60)
Practices	5	Oral	30
Colloquium	2x30		
Essay			

Course title: Occupational Medicine

Course status: compulsory

ECTS Credits: 2

Condition: Internal Medicine; Epidemiology (exam)

Course aim

Education in field of occupational medicine i.e. occupational health.

Expected outcome of the course:

Students should adopt knowledge concerning organization of occupational medicine, occupational hazards, occupational diseases, preventive health surveillance at work, work physiology, occupational toxicology, workplace injuries and health protection of various occupational groups. Students should adopt skills related to: evaluation of working environment, occupational diseases and intoxications, work ability assessments, prevention of injuries at work, prevention of work disability and application of work safety measures.

Course description

Theoretical education

Introduction to occupational medicine 2. Work physiology 3. Radiation in work environment 4. Occupational diseases 5. Work related diseases 6. Occupational traumatism 7. Occupational toxicology – general 8. Occupational toxicology – metals 9. Occupational toxicology – toxic gases 10. Occupational toxicology – organic solvents 11. Occupational toxicology – pesticides 12. Occupational respiratory diseases 13. Carcinogens in working environment 14. Work conditions in some industries 15. Effect of working conditions on women and youth health and safety measures.

Practical education

Microclimate of working environment 2. Heat indices 3. Air pollution of working environment – dust 4. Air pollution of working environment – gasses and vapors 5. Noise at working environment 6. Workplace injuries 7. Pneumoconiosis – radiology classification 8. Work ability assessment in diseases due to organic dust 9. Work ability assessment in diseases due to vibrations 10. Work ability assessment in occupational skin and infectious diseases 11. Work ability assessment in intoxications due to organophosporous pesticides 12. Work ability assessment in occupational liver and haematopoetic disorders 13. Work ability assessment in occupational musculoskeletal disorders 14. Work ability assessment in persons exposed to ionizing radiation 15. Characteristics of work conditions in some branches of industry

Literature

Compulsory

1. Levy BS, Wegman DH, Baron SL, Sokas SR. Occupational and environmental health. New York: Oxford University Press, 2017.
2. Koh D, Aw TC. Textbook of occupational medicine practice. Singapore: World Scientific Publishing, 2016.

Number of active classes	**Theoretical classes:** 30	**Practical classes:** 15

Teaching methods

Lectures, practice

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	30	Written	55
Practices	15	Oral	
Colloquium			
Essay			

Course title: Medical Rehabilitation

Course status: compulsory

ECTS Credits: 2

Condition: Surgery

Course aim:
Adopting principles of theory and practice of modern rehabilitation.

Expected outcome of the course
After finishing the course, students are expected to grasp basic concepts of medical rehabilitation both in preventive and curative setting. They will be able to assess abnormalities – hereditary or secondary to diseases or injuries either temporary or permanent. Furthermore, they will be able to evaluate functional or psychological impairments, both in children and adults. Students will be provided with skills to help different categories of disabled people.

Course description
Theoretical education
The Cultural Background of Rehabilitation. Stroke. Spinal cord injury. Multiple sclerosis. Rehabilitation of people with Parkinson's disease. Amputations. Hip fractures. Sport injuries. Degenerative and inflammatory joint disorders, fibromyalgia and osteoporosis. Spinal deformities. Principles of management of acute and chronic pain: the example of low back pain. Balance troubles and the risk for falls in the elderly. Specific process of habilitation and rehabilitation of children. Rehabilitation settings and the concept of interdisciplinary care.

Practical education
Getting familiar with specialized institutions for medical rehabilitation. Evaluation of patients involved in medical rehabilitation program. Basic principles of practical application of physical therapy procedures in medical rehabilitation. Basics of therapeutic modalities and physical agents used in medical rehabilitation. Medical rehabilitation of patients after trauma and polytrauma and patients after limb amputation. Medical rehabilitation of patients with peripheral nerve lesions. The most common habilitation and rehabilitation conditions in children and adolescents. Medical rehabilitation of patients with chronic lumbar and cervical syndrome. Medical rehabilitation of patients after stroke and spinal cord injuries. Medical rehabilitation of patients with degenerative and inflammatory joint disorders, fibromyalgia and osteoporosis.

Literature
Compulsory:
1. Ceravolo M, Cristodoulou N. Physical and Rehabilitation Medicine for Medical students. Digital edition. Milan, 2018.
Additional:
1. Frontera WR, Silver JK, Rizzo TD. Essentials of Physical Medicine and Rehabilitation. 2nd ed. Philadelphia: Elsevier, 2008:1232.

Number of active classes	**Theoretical classes:** 30	**Practical classes:** 15 **Other classes:** 15

Teaching methods: Lectures, practical work, consultation hours

Student activity assessment (maximally 100 points)			
Pre-exam activities	**points**	**Final exam**	**points**
Lectures	30	Written	
Practices	30	Oral	40
Colloquium			
Essay			

Course title: Emergency Medicine

Course status: compulsory

ECTS Credits: 2

Condition: Surgery; Internal medicine; Pharmacology and Toxicology 2.

Course aim
Students are introduced to prehospital and initial hospital organization and management of emergency and critical conditions in medicine, basic and extended measures of cardiopulmonary resuscitation. It is essential to introduce a student to sudden death diagnosing and management, not only sudden death victims, but those who survive, as well as positive and comforting influence on family and friends. Mastering skills for practical application of acquired knowledge in practice. Development of critical thinking and capability for scientific research.

Expected outcome of the course
Knowledge: Introducing students to prehospital and initial hospital organization and management of emergency and critical cases in medicine. Introducing students to mistakes that can occur during management in emergency medical practice. Obligations of a doctor in case of sudden death. Use of medicaments and sophisticated technologies in emergency medicine and possibility of use in scientific research.
Skills: Mastering basic and extended measures of cardiopulmonary resuscitation (adults and children), basic and extended measures and procedures in injury management (adults and children). Mastering skills is conducted on phantoms and patients, as well as presentations of possible health issues with questions, answers and discussions.

Course description

Theoretical education

1. Principles of emergency medicine. Vital function assessment. Pain as vital parameter. 2. Assessing, maintaining and providing airway. Artificial ventilation. 3. Acute chest pain (evaluation and management). 4. Acute coronary syndromes. 5. Cardiogenic shock. Acute hearte failure. 6. Emergency conditions in vascular medicine (dissection, rupture, acute occlusions, deep venous thrombosis, emboly). 7. Peri-arrest arrhythmia (tachycardia, bradycardia) Syncope. 8. Hypertensive emergency conditions. 9. Acute cardiac arrest. Basic and extended measures of cardiopulmonary resuscitation in adults and children. 10. Death – phases of sudden death diagnosis, communication with the family. Medico legal aspects of emergency medicine. 11. Acute peripheral arterial ischemia. 12. Acute active hemorrhaging. Hypovolemic shock. Volume resuscitation. 13. Anaphylactic shock. 14. Respiratory insufficiency. Acute asphyxia (identification signs, initial management). 15. Acute abdominal pain (evaluation, differential diagnosis, initial management). 16. Acute intracranial / spinal compression. 17. Acute intestinal obstruction. Acute urinary obstruction. 18. Epilepsy and convulsions. Delirium and acute states of confusion. 19. Acute headache. Ischemic stroke. Transitory ischemic attack (TIA). 20. Subarachnoid hemorrhage (SAH). 21. High body temperature in children. Dehydrated child. 22. Trauma – severe isolated and severe multiple. Prehospital primary examination (ABCDE principle) and on-site stabilization. 23. Prehospital management during transportation. Initial hospital management. 24. Acute poisoning.

Practical education

1. Evaluating and maintaining airways – practice on mannequin. Side relaxing position – practice on mannequin. 2. Mechanical devices for airway securing. Bolus obstruction in adults and children (algorithm to procedures) – practice on mannequin. 3. Difficult airway (algorithm to procedures). 4. Methods of artificial respiration – practice on mannequin. 5. Intravascular access (peripheral venous, central venous, intraoseal) – practice on mannequin. 6. Infusion solutions for volume compensation. 7. Vasoactive, inotropic and anti-arrhythmic medicines as initial pharmacotherapy of emergency conditions (ways of administration, preparation, dosage, indications). 8. Basic measures of CPR in adults and children (algorithm to procedures) – practice on mannequin. 9. ECG forms of cardiac arrest and ECG recognition of periarrest arrhythmia. 10. Early defibrillation (types of defibrillators, indications). Cardioversion. Trans acute cardiac pacing – practice on mannequin. 11. Extended CPR measures in children and adults (algorithm to procedures) – practice on mannequin. 12. Pharmacotherapy of cardiac arrest (types of medicaments, ways of administration). 13. Therapeutic algorithm of asistoly – practice on mannequin. 14. Therapeutic algorithm of pulsless electrical activity – practice on mannequin. 15. Therapeutic algorithm of ventricular fibrillation and ventricular pulsless tachycardia – practice on mannequin. 16. Simulation of cardiac arrest and CPR in adults and children. 17. Simulation and management of peri-arrest arrhythmia and management. 18. External compression, compress bandage. Application of MAST. Insertion of nasogastric tube. Bladder catheterization. Front and back nasal tamponade. Toracostomy with needle. Decompressive pericardic intesis with needle – practice on mannequin. 19. Simulation of multiple trauma: primary ABCDE and secondary examination. 20. Simulation of multiple traumas – score system in diagnostics and assessment of the outcome of the traumatized. 21. Sedation and analgesia (indications, types of medicaments and ways of administration). 22. Introducing to contents of prehospital management of the Institute for emergency medicine. 23. Introducing to contents of initial hospital management in Emergency Centre.

Literature

Compulsory

1. Hans L, Mawji Y. The ABCs of Emergency medicine. 12th ed. Universsity of Toronto. 2012.

Additional

2. ERC (European Resuscitation Council) ALS manual 2016 (PDF). (available at Medical Faculty site)
3. ERC (European Resuscitation Council) Paediatric ALS 2016 (PDF). (available at Medical Faculty site)

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 30 **Other classes:** 30

Teaching methods

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	15	Written	30
Practices	15	Oral	40
Colloquium			
Essay			

Course title: Oncology

Course status: compulsory

ECTS Credits: 3

Condition: Surgery; Gynecology and Obstetrics; Internal Medicine

Course aim

The aim of this course is to provide medical students with knowledge and skills for early screening, diagnosis, therapy and palliative care of oncology patients. Students learn about the etiology of malignant cells, their spread, epidemiology, prevention, early detection of precancerous lesions and malignant tumors, adequate diagnostic procedures, staging, clinical manifestations, signs and symptoms, complications during treatment, emergency situations, therapeutic modalities including surgery, radiotherapy, chemotherapy, immunotherapy, hormone therapy, target therapy, rehabilitation, palliative care, psychological attitude to patients and their families, better quality of life. Special attention is paid to diagnostic and therapeutic procedures of solitary localized tumors.

Expected outcome of the course

This course provides medical students with knowledge about most important principles and specificities of treatment of oncology patients in order to be able to be a part of a multidisciplinary team as general practitioners. Physicians in primary care should be included in prevention and early detection of malignant diseases, recognition of signs and symptoms of malignant diseases, complications during treatment and contribute to better quality of life for oncology patients.

To acquire practical skills required in diagnosis, treatment and palliative care of oncology patients.

Course description

Theoretical education

1. Origin and biology of malignant tumors, carcinogenesis
2. Genetic predisposition to malignant diseases
3. Epidemiology, etiology and early detection of malignant diseases
4. Diagnosis (laboratory, pathology)
5. Diagnostic imaging in oncology
6. Neoplasm staging and therapeutic principles
7. Principles of surgical oncology
8. Principles of radiotherapy
9. Principles of chemotherapy
10. Emergency conditions in oncology
11. Complications of cancer therapy
12. Paraneoplastic syndrome
13. Rehabilitation in oncology
14. Supportive, symptomatic and palliative therapy
15. Tumors of the CNS, head and neck
16. Lung tumors
17. Breast tumors
18. Hematologic malignancies
19. Tumors of the digestive system
20. Tumors of the female reproductive organs
21. Tumors of the urinary tract and kidneys
22. Tumors of the male reproductive organs
23. Tumors of the skin, bones and soft tissues
24. Tumors of unknown primary origin

Practical education

History taking in oncology patients (examination of breasts, palpation of the lymph nodes, abdomen, digitorectal examination, gynecologic examination), performance status, diagnostic and therapeutic procedures in oncology (endoscopy, pleural and abdominal punction), psychological approach to patients and their families.

Case reports of oncology patients with special overview of diagnosis and therapy of certain malignant tumors.

Literature

Compulsory

1. Stephens FO. Basics of Oncology. Springer 2009.
2. Sabesan S. Clinical Oncology for Medical Students. Cancer Council Australia 2016.

Number of active classes	**Theoretical classes:** 30	**Practical classes:** 15 **Other classes:** 15

Teaching methods
Lectures and practice.

Student activity assessment (maximally 100 points)			
Pre-exam activities	**points**	**Final exam**	**points**
Lectures	15	Written	60
Practices	15	Oral	
Colloquium			
Essay	10		

Course title: Forensic Medicine

Course status: compulsory

ECTS Credits: 4

Condition: Surgery; Gynecology with obstetrics; Pediatrics

Course aim
The aim of this course is to provide students with knowledge and skills to understand and correlate medicine and law in order to provide personal physical and psychological integrity. Legal status of medical practice, ethical and legal responsibility of a physician. Use of acquired knowledge in practice. Development of skills necessary for scientific research.

Expected outcome of the course:
Practical application of theoretical knowledge. Examination of the deceased, determination of cause, manner and time of death. Identification of the deceased. Examination of injured persons, classification and qualification of injuries. Issuance of medical documents – death certificates and medical reports of injuries. Taking biological samples for purpose of identification and toxicology screening. Use of medical knowledge in trial cases. Understanding the principles of causation – complex relations between primary cause (injury or disease), course of injury or disease along with all possible complications, and final consequences (complete or incomplete recovery vs. death).

Course description
Theoretical education
1. Brief history of forensic medicine. Concept and tasks of forensic medicine. Forensic medicine in relation to other medical and academical branches, primarily law.
2. Diseases and injuries. Deaths due to natural causes. Classification of injuries. Medico-legal aspects of natural death. Relationship between injuries and personal characteristics of the injured. Morbous injuries and traumatic diseases.
3. External examination of injured and deceased. Death scene. Autopsy and exhumation.
4. Dying and death, terms and definitions. Forensic classification of death. Concept of brain death. Medicolegal aspects of transplantation.
5. Tanatology. Postmortem changes. Time of death.
6. Injury related organism reactions. Vital, agonal and postmortal injuries. Embolism. Shock.
7. Mechanical injuries – classification and characteristics. Common and specific features of wounds and injuries. Classification.
8. Physical injuries. Hyperthermia and hypothermia; the effect of heat and cold; electrocution; lightning injuries; radiation injuries.
9. Asphyxia. External and internal autopsy findings. Suffocation. Strangulation. Pressure on the chest and abdomen. Environmental suffocation and suffocating gasses.
10. General and special toxicology. Definitions and classification of poisons. Caustic poisons. Pesticides. Inhalants. Strychnine. Lead, iron and mercury poisoning. Mushroom poisoning. Convulsion poisons. Drugs, chemical warfare.
11. Drug addiction. Opioids, psychostimulants, hallucinogens.
12. Ethyl alcohol – forensic aspects.
13. Traffic injuries. Motor vehicle accidents, causes and categories. Traffic accidents (railway, air traffic and water transport). Pedestrian and cyclist deaths.
14. Craniocerebral injuries – classification and biomechanics. Types of cranial fractures, translation and rotation head injuries, primary and secondary brain injuries.
15. Falls from a height. Crush and blast injuries.
16. Nutritional, biological and psychic injuries. Sudden death during and immediately after mental and/or physical stress.
17. Forensic problems of sexual assaults. Infanticide – definition, medicolegal expertise. Paternity testing. SIDS.
18. Domestic violence.
19. Accident, suicide, homicide. Suicide vs. homicide – injury patterns. Bodies recovered from water or fire, self-inflicted injuries.
20. Forensic expert, legal provisions and basics of medicolegal expertise.
21. Forensic qualification of injuries. Legal provisions and medical criteria. Forensic expertise in civil proceedings (pain, fear, etc.).
22. Legal status of medical practice. Medicolegal aspects of medical interventions.
23. Forensic anthropology and identification in mass accidents.
24. Medical criminology, biological traces. DNA analysis.

Practical education

1. Institute of Forensic Medicine – introduction to basic fields of work.
2. Work in autopsy room.
3. External body examination. Identification. Time and cause of death.
4. Description of postmortem changes.
5. Evidence of injuries. Evidence of recent medical and/or surgical interventions.
6. Planning and proceedings of autopsy in accordance to specific cases. Demonstration of autopsy with discussion. Taking samples for pathohistology, toxicology screening, microbiological testing and DNA analysis. Presenting findings suitable for scientific research.
7. Issuing the death certificate in accordance to WHO. Natural or violent death.
8. Chemical and toxicology laboratory: GC, GC/MSD, HPLC and UV spectrophotometrics use in forensic chemistry.
9. Medicolegal expertise (findings, discussion and conclusion) of court files. Elements of analysis and synthesis. Relevant findings in reports, forensic issues and reports.
10. Video presentation of postmortem changes, mechanical injuries, physical injuries, craniocerebral injuries, asphyxia and infanticide.

Literature

Compulsory

1. DiMaio D, DiMaio VJ. Forensic pathology (Practical Aspects of Criminal and Forensic Investigations), second Edition. CRC press, 2001.
2. Mason JK. Forensic medicine (an illustrated reference). Chapman and Hall medical, 1993.

Number of active classes	**Theoretical classes:** 30	**Practical classes:** 45

Teaching methods:

Lectures including PowerPoint presentations; Practice: examination of injured persons; external examination of the deceased. Discussion of autopsy findings. Biological sampling. Court files analysis. Medical reports and death certificates.

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	25	Written	30
Practices	25	Oral	
Colloquium	20		
Essay			

Course title: Geriatrics

Course status: compulsory

ECTS Credits: 2

Condition: –

Course aim

The aim of this course is to provide medical students with knowledge and skills associated with current medical trends in care of elderly population. Students take part in clinical practice, history taking, examination and learn how to identify acute and chronic infectious diseases from the standpoint of general practitioners. Students also learn about basic methods of medical research.

Expected outcome of the course:

Students will acquire knowledge in the field of pathogenesis, clinical picture and therapy of common diseases and conditions in elderly population and specific features of this age group. Special attention is paid to the importance of preventive medical measures and procedures, such as depistage, to be implemented. Particular attention is also paid to care and treatment of the elderly who need long-term palliative care.

Course description

Theoretical education

1. Biology of aging
2. Metabolic and endocrine diseases in the elderly
3. Heart and vascular diseases in the lderly
4. Lung diseases diseases in elderly population
5. Oncologic and pulmonary diseases in elderly population
6. Hematologic and nephrologic diseases in elderly population
7. Gastroenterology and hepatology diseases in elderly population
8. Neurological diseases in elderly population
9. Psychiatric diseases elderly population
10. Infectious diseases in elderly population
11. Intensive care in the elderly
12. Urologic diseases in elderly population
13. Traumatology in the elderly
14. Gynecologic diseases in elderly population
15. Rehabilitation and physical activity of the elderly
16. Health care of the elderly

Practical education

– Practice incudes acquitance with specific work of geriatric health services and has 3 segments:

1. work in geriatric institutions
2. ambulatory health care
3. work of the Health center, Clinical Center of Vojvodina, Institute of oncology Vojvodina, Institute of cardiovascular diseases of Vojvodina, Institute of pulmonary diseases of Vojvodina, Home for elderly

– Introduction to geriatrics
– History taking in geriatrics
– General anamnesis conclusion
– Demonstration of a complete physical examination
– Specific treatment

Literature

Compulsory

1. Landefeld SC, Palmer MR, Johnson MA, Johnson BC, Lyons LW. Current Geriatric Diagnosis and Treatment. The McGroww Hill Companies, New York, USA, 2004.

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 15 **Other classes:** 15

Teaching methods

Theoretical and practical lessons, a visit to primary and secondary / tertiary health care institutions, home for elderly.

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	15	Written	55
Practices	30	Oral	
Colloquium			
Essay			

Course title: Social Medicine

Course status: compulsory

ECTS Credits: 2

Condition: –

Course aim: To introduce students to measures, levels and organization of health care and to enable students for using socio-medical approach in future practice.

Expected outcome: Students will be able to work in community, to comprehend health care system functioning, master the skills for analysis of population health status, to do proper management of medical documentation, health care planning, as well as to use health education and communication methods in health care.

Content

Theoretical education

The development and definition of social medicine. Health and quality of life. The public health. Health promotion. Health education. Communication in health care. Health care. Social inequalities in health and health care utilisation. Vulnerable groups. Health policy. The criteria for assessing the social-medical importance of health problems. Methods of prevention and control of chronic noncommunicable diseases. The health care systems of the world. Health care programming. The role of health institutions and health workers in the health care system. Health technology. The quality of health care. Classification systems and documentation in health care. Management in health care.

P*ractical education*

Health determinants. Analysis of population health status. The organization of health care. Medical documentation. International Classification of Diseases. Health care programming. Communication in health care. The quality of health care – Patient satisfaction. Health education methods and tools.

Literature

Compulsory

1. Guest C, Ricciardi W, Kawachi I, Lang I, editors. Oxford Handbook of Public Health Practice, 3rd ed. Oxford: Oxford University Press; 2013. Available from: https://abelmass.files.wordpress.com/2018/03/oxford-handbook-of-public-health-practice-3rd-ed.pdf
2. WHO. International Classification of Diseases, 10th Revision, Clinical Modification (ICD-10-CM). Available from: http://www.cdc.gov/nchs/icd/icd10cm.htm
3. Goldsteen R, Dwelle T, Goldsteen K. Introduction to Public Health Promises and Practice.Second edition. New York: Springer Publishing Company; 2014.

Additional

1. Glanz K, Rimer BK, Viswanath K, editors. Health behavior and Health Education, 4th edition. San Francisco, CA: Jossey-Bass A Wiley imprint; 2008.

Number of active classes	**Theoretical classes:** 30	**Practical classes:** 15

Teaching methods: Lecture, Practice and Seminar

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	5	Written	
Practices	15	Oral	70
Colloquium			
Essay	10		

Course title: Family Medicine and Primary Health Care

Course status: compulsory

ECTS Credits: 2

Condition: –

Aim of course:
Specific learning objectives relate to enabling the student to understand and distinguish the specificity of family medicine and primary health care in relation to other medical disciplines. Specific health problems in outpatient care, their recognition and management, clinical decision-making, the relationship patient-family-family physician, home treatment and follow-up of patients, prescribing medications, keeping records, cooperation with specialist-consultant services, teamwork and community work, patients' rights, legislation and funding.

Course outcome:
After completing this course the student will be capable of understanding and accepting the specific role, tasks, organization, conditions and work methodology of a family medicine doctor in the healthcare system, which provides comprehensive and continuous primary healthcare to individuals, families and the community.

Course contents

Theoretical education

Characteristics of family medicine, roles of general practitioners and scope of their work, organization, funding and operation of family medicine in Europe. Characteristics of healthcare issues in family medicine. Medical records. Cooperation with specialist consulting services and referral to specialists. Specific characteristics of clinical procedures in family medicine. Rational use of medications. Communication in family medicine. Family and health. Home visits and home treatment and care. Specific attention in family medicine and primary healthcare for patients suffering from acute respiratory disease, hypertension and the most common cardiovascular diseases, diabetes and thyroid disease, chronic lung disease, gastrointestinal diseases, urogenital diseases, hematological and skin diseases, neurological diseases, substance abuse, mental illnesses, rheumatic and malignant disease and terminal-stage diseases. Law-regulated and optimal space of a general medicine outpatient clinics. Equipment, medical bag. Work organization, scheduling and receiving patients. Team work. Management of an outpatient clinic as a business unit. Administrative and legal obligations. Educational and prevention activities as an integral part of the healthcare work. Prescribing drugs. Home visits. Patient's rights.

Practical education

– The role of primary health care physicians and their teams in family healthcare
– The first examination in the surgery/office
– Follow-up examinations
– Independently establishing diagnosis and prescribing treatment
– Independently prescribing medications, sick notes, orthopedic devices and medical certificates
– Administering IM and IV injections, dressing wounds, flushing the ear
– Taking blood samples for laboratory analyses
– Home visits with a mentor
– Home care (visits at home)
– Work in the children healthcare service
– Work in counseling and prevention centers
– Keeping a work log, catalogue of clinical skills and colloquium with the mentor

Literature

Mandatory

1. McWhinney IR, Freeman T. Textbook of Family Medicine. Third Edition, Oxford University Press, 2009.
2. World Book of Family Medicine – European Edition 2015.
3. Rakel RE, Rakel D.: Textbook of Family Medicine 9th Edition, Elsevier Saunders, 2016.

Number of active classes	**Theoretical classes:** 30	**Practical classes:** 45

Teaching methods:
Teaching is performed in the forms of lectures, seminars and practice. Lectures and seminars are performed at the premises of the Faculty of Medicine and the Health Center of Novi Sad. Practices are conducted at the outpatient clinics affiliated with the Health Center of Novi Sad, as well as in counseling and prevention centers

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	5	Written	25
Practices	20	Oral	20
Colloquium	20		
Essay	10		

Course title: Immunogenetic Testing

Course status: elective

ECTS Credits: 3

Condition: –

Course aim

Introducing students to the methods of immunogenetic testing of modern transfusion medicine. For their application in diagnosis of diseases and the association of immunogenic markers with disease, pretransplant and posttransplant testing, the selection of the proper blood component for transplanted patients, monitoring of posttransplant chimerism, the prediction of graft rejection.

Expected outcome of the course:

Gaining knowledge about the immunogenicity markers, their importance in transfusion and their relationship and the importance in other branches of medicine. Acquiring knowledge of the immunogenic testing methods: serological method for detection of an HLA (Human Leucocyte Antigens) antigen, the molecular detection methods of the HLA (Human Leucocyte Antigens) genes, methods for detecting anti-HLA antibodies, methods of detecting donor-specific anti-HLA antibodies, related methods (isolation of lymphocytes (T / mixture, B) and isolation of the genomic DNA, isolation of fetal free DNA, methods of detection of HPA (Human Platelet Antigens) genes, methods of detecting HNA gene (Human Neutrophil Antigens), methods for detection of natural killer cell's receptor – KIR genes, methods for detection of minor histocompatibility genes, methods for detection of cytokine genes, methods for detection of MICA genes, methods for detection of anti-HPA, –HNA, –MICA antibodies.

Training students to: – the isolation of cells as the basis of HLA typing serological methods, the isolation of genomic DNA as a basis for the molecular detection technique of immunogenetic markers.

Course description

Theoretical education

An immunogenic testing:
– isolation T and B lymphocytes from the peripheral blood;
– isolation of genomic DNA from peripheral blood;
– isolation of genomic DNA from saliva / mouth rinse;
– isolating genomic DNA from the hair; isolation of the free fetal DNA from maternal peripheral blood (pregnant women);
– Polymerase Chain Reaction-PCR; HLA genotyping by PCR-SSP (Sequence Specific Primers);
– by PCR –SSO (Sequence Specific Olygonucleotides), by PCR-SBT (Sequence Based Typing);
– genotyping the red blood cells genes, genes of natural killer cells's receptor – KIR;
– genotyping of the HPA (Human Platelet Antigens) gene, HNA gene (Human Neutrophil Antigens).

Detection of anti-HLA antibody assay by complement dependent cytotoxicity (CDC) and the bead array method (Luminex). Detection of anti-HPA and the anti-HNA antibody assay by flow cytometry. The detection of donor-specific anti-HLA antibodies (CROSS MATCH) assay by complement dependent cytotoxicity (CDC), the bead array method (Luminex) and the flow cytometry method. Place, role and importance of immunogenetic testing in transplantation medicine, studies of the association between the disease and in reproductive medicine. Place, role and importance of immunogenetic tests in prenatal care and posttransfusion reactions.

Practical education

Students are expected to be trained to:
1. isolation of lymphocytes from the peripheral blood, the isolation of genomic DNA from peripheral blood;
2. basic of polymerase chain reaction (Polymerase Chain Reaction-PCR);
3. HLA genotyping by PCR-SSP (Sequence Specific Primers);
4. introduction to the other methods of genotyping, detection of antibodies and detection of donor-specific antibodies (CROSS MATCH)

Literature

1. Christiansen, F.T., Tait, B. D. Immunogenetics-Methods and Applications in Clinical Practice. New York: Springer-Human Press, 2012.
2. Material from the lectures

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 30

Teaching methods:
lectures and practical work

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	25	Written	50
Practices	25	Oral	
Colloquium			
Essay			

Course title: Immunohematological Testing

Course status: elective

ECTS Credits: 3

Condition: –

Course aim

Introduce the students to methods of immunohaematological testing in modern transfusion medicine. Methods анд their use in the detection of pathophysiological conditions and disease as a result of alloimmunization to the blood group antigens on red blood cells, white blood cells, platelets and prenatal care. Methods for testing of blood products and preparation of safe blood and pretransfusion testing.

Expected outcome of the course:

Acquiring knowledge of the methods of immunohaematological tests: determination of the blood group antigens on the erythrocytes, platelets, leukocytes, the detection of irregular antibodies generated after immunization events (transfusion, pregnancy, transplantation), testing of blood groups secretor status (ABO system) and their significance in transfusion and forensic medicine, immunohematological testing during antenatal and prenatal period (prenatal care), assays for posttransfusion reactions.

Training students to: – the determination of red blood cell-blood groups, direct and the indirect Coombs test, identification of antibodies, immunohaematological methods for selecting compatible blood components, monitoring of usage of the hyperimmune gamma globulin an anti-D.

Course description

Theoretical education

– determination of antigens on erythrocytes, predicting the incompatibility of ABO and Rh of the mother and the child.
– determination of antibodies ABO and differentiation of immune antibodies from naturally occurring.
– determination of Rh antibodies as well as their titre.
– Rh phenotyping of mother and the child.
– Direct Antiglobulin Test (Coombs Tets) of the child.
– Typing of erythrocyte antigens of the husband/partner and wife to determine homo or heterozygosity.
– determination of change in antibody titers in pregnant women during pregnancy.
– determination of change in antibody titers after delivery and decrease of antibody titer.
– determining the risk of the occurrence of the HBN and necessary preparations for delivery as well as the occupation of a certain attitude of gynecologists for currency and treatment in the prenatal period (intrauterine transfusions, plasmapheresis), and the outcome of the delivery.
– agglutination test in physiological saline.
– agglutination test with enzyme-treated erythrocytes; IAT (Indirect Antiglobulin Test).
– absorption of antibodies.
– elution of antibodies; determination of antibody specificity and identification of antibodies; hemolysins determination; bioassay for the presence of irregular antibodies to leukocyte and platelet antigens – leuco and thromboagglutination, leuco and thromboagglutinins detection by bead array method (Luminex).

Practical education

Students are expected to be trained to:

1. determination of red cell blood groups, and the indirect Coombs test.
2. immunohaematological tests during antenatal care.
3. immunohaematological testing of blood donors.
4. immunohaematological testing in selection of blood and blood products.
5. immunohaematological testing in posttransfusion reactions.

Literature

1. Klein HG, Anstee DJ, Mollison's Blood Transfusion in Clinical Medicine, 12th Edition, Wiley-Blackwell, 2014.
2. Material from the lectures

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 30

Teaching methods:

lectures and practical work

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	25	Written	50
Practices	25	Oral	
Colloquium			
Essay			

Course title: Tissue and Organ Transplantation

Course status: elective

ECTS Credits: 3

Condition: –

Course aim

The aim of this course is to provide students with knowledge in the field of transplant medicine.

Expected outcome of the course:

Students acquire basic knowledge on legal, ethical and medico-legal issues, as well as general medical knowledge related to organ and tissue transplantation.

Students acquire basic surgical skills and procedures related with tissue and organ transplantation.

Course description

Theoretical education

1. Introduction to organ and tissue transplantation. Terminology.
2. Tissues and organs for transplantation; basics of immunology and transfusion medicine.
3. Legislation and ethical norms in transplant surgery.
4. Organization of transplant networks. Transplant teams.
5. Defining brain death, donor evaluation, organ and tissue harvesting and selection of the recipient.
6. Application of drugs and medical equipment in transplantation.
7. Stem cells. Bone marrow transplantation.
8. Tissue transplantation: bone and vascular graft, skin, cornea, penis.
9. Multiorgan procurement and preparaton for organ transplant. Transport of tissues and organs.
10. Liver transplantation.
11. Kidney transplantation.
12. Pancreas transplantation. Intestine transplantation.
13. Heart and lung transplantation.
14. Anesthesia in transplant surgery; post transplant monitoring. Acute and chronic rejection.
15. Long term monitoring of transplant patients.

Practical education

1. Basic terminology in organ and tissue transplantation. Models of transplant networks in the world.
2. The role of media in the development of transplantation programs, interviews with donor's family, preparing the donor for living donor transplantation, preparation of the recipient.
3. Donor – recipient registries, collecting and processing data. Evaluation and placing patients on waiting lists.
4. Organization of transplant teams and permanent transplant services.
5. Anatomy, immunology, histopathology of organs and tissues for transplantation.
6. Harvesting and preparation of organs and tissues for transplantation; transportation.
7. Principles and administration of immunosuppressive therapy.
8. Technical aspects of stem cell transplantation.
9. Surgical techniques in multiorgan exlantation.
10. Surgical techniques in liver transplantation, whole and split cadaveric liver transplant, interposition of inferior vena cava and Piggy back technique, living donor transplantation, monitoring, complications.
11. Surgical techniques in renal transplantation, harvesting organs from living donors or cadaveric organs, implanting techniques, monitoring, complications.
12. Surgical techniques in pancreas transplantation; explanting; derivation of pancreatic juice, monitoring, complications; Indications and techniques of intestine transplantation.
13. Surgical techniques in heart and lung transplantation.
14. Technical aspects of bone and vascular grafts, skin, cornea and penis transplantation.
15. Anesthesia, postoperative monitoring, the organization of long-term monitoring of transplant patients.

Literature

Compulsory

1. Busuttil RW, Klintmalm GB. Transplantation of the liver. Saunders, 2005.
2. Price D. Legal and ethical aspects of organ transplantation**.** Cambridge University Press, 2000.

Additional

1. Chapman JR, Deierhoi M, Wight C. Organ and tissue donation for transplantation. Hodder Arnold Publishers, 1997.
2. Petechuk D. Organ transplantation (health and medical issues today). Greenwood, 2006.

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 30

Teaching methods

Student activity assessment (maximally 100 points)			
Pre-exam activities	**points**	**Final exam**	**points**
Lectures	20	Written	20
Practices	30	Oral	10
Colloquium	10		
Essay	10		

Course title: Experimental Surgery		
Course status: elective		
ECTS Credits: 3		
Condition: –		
Course aim The aim of this course is to provide students with theoretical and practical basis of experimental surgery.		
Expected outcome of the course: Acquiring theoretical knowledge in experimental surgery, essential for active participation in surgical procedures. Acquiring skills and procedures required for daily practice in all surgical disciplines.		
Course description *Theoretical education* 1. Introduction to experimental surgery – operation room, instruments. 2. Introduction to experimental surgery – preparation, scrubbing, operation field 3. Suture materials, instruments and other surgical accessories 4. Wounds – types, treatment. Surgical knots, tying surgical knots 5. Methods of experimental work 6. Experimental abdominal surgery 7. Experimental anesthesiology 8. Experimental neurosurgery 9. Experimental orthopedics 10. Experimental urology 11. Experimental vascular surgery 12. Experimental maxillofacial and plastic surgery 13. Experimental thoracic and cardiac surgery *Practical education* 1. Introduction to experimental surgery – operation room, instruments. 2. Introduction to experimental surgery – preparation, scrubbing, operation field 3. Suture materials, instruments and other surgical accessories 4. Wounds – types, treatment. Surgical knots, tying surgical knots 5. Methods of experimental work 6. Experimental abdominal surgery 7. Experimental anesthesiology 8. Experimental neurosurgery 9. Experimental orthopedics 10. Experimental urology 11. Experimental vascular surgery 12. Experimental maxillofacial and plastic surgery 13. Experimental thoracic and cardiac		
Literature *Compulsory* Outlines of lectures		
Number of active classes	**Theoretical classes:** 15	**Practical classes:** 30
Teaching methods		

Student activity assessment (maximally 100 points)			
Pre-exam activities	**points**	**Final exam**	**points**
Lectures	20	Written	30
Practices	30	Oral	
Colloquium	10		
Essay	10		

Course title: Pain Medicine

Course status: optional

ECTS Credits: 3

Condition: –

Course aim

The main aim of this course is to introduce to the student the concept of pain as a global, public health problem, and the components of biopsychosocial model of pain, evaluation of pain and pain therapy. Learning to implement knowledge into practice. Development of critical thinking and research work.

Expected outcome of the course:

Introducing students to the complex multidimensional pain phenomenon. Differentiation of pain according to mechanism of origin and duration. Introducing students to the right to eliminate pain as a basic human right. Evaluation of pain quantity and quality. Pain medication according to analgesic scale and pain quality. Pathways and techniques for pain medication and age-dependent comorbidity. Non-opioid and opioid analgesics. Opiophobia. Political and legal barriers to opioid use.
Pain identification and assessment of pain intensity. The skill of choosing medicines for the treatment of pain

Course description

Theoretical education

1. Neuroanatomical substrates of nociception.
2. Definition and classification of pain (nociceptive and nonnociceptive).
3. Pain as a health problem. Pain as a symptom and pain as a disease. Multidimensionality. Psychosocial and economic consequences.
4. Acute pain, significance, acute pain control services.
5. Chronic cancer and non-cancer pain.
6. Pain assessment: Unidimensional scales (VAS, NRS, VRS). Multidimensional scales and questionnaires.
7. Pharmacological therapy: Non-opioid analgesics. Opioids. Ways to administer medication. Opiophobia. Equianalgetic tables.
8. Coanalgesics: antidepressants, anticonvulsants and other adjuvant analgesics.
9. Migraines. Tension headache. Cluster headache.
10. Acupuncture in chronic pain therapy.
11. Trigeminal neuralgia. Cervical and lumbar radiculopathies.
12. Minimally invasive procedures in chronic pain therapy.
13. Painful diabetic neuropathy. Postherpetic neuralgia.
14. Central pain syndromes.
15. Physical therapy in the treatment of chronic pain.

Practical education

1. Outpatient clinic for chronic non-cancer pain
2. Headache Center
3. Acupuncture Center
4. Outpatient clinic for chronic cancer pain
5. Pain therapy in children

Literature

Compulsory

1. Drašković B. Anaesthesia and perioperative medicine 2019. (electronic version)

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 30

Teaching methods

Lectures. Practical teaching: medical cases and discussion. Choice of pain medication (stepped approach) and discussion. Special medications and formulations. Informing the patient.

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	20	Written	60
Practices	20	Oral	
Colloquium			
Essay			

Course title: Clinical Toxicology

Course status: elective

ECTS Credits: 3

Condition: –

Course aim

The main objective of training in clinical toxicology is to introduce students with ways of intoxication, basic physical and chemical properties of venoms, toxicokinetics and toxicodynamics of poisons, prevention and treatment of acute and chronic poisoning. Development of critical thinking and scientific research.

Expected outcome of the course

Students gain knowledge about the basic properties of venoms, methods of intoxication, interaction between the toxin and organism, basic measures aimed at prevention and treatment of poisoned patients. Students gain skills in this field: resuscitation of patients with acute poisoning, preventing penetration of toxins into the body, natural and artificial methods of detoxification, symptomatic treatment and antidote therapy.

Course description

Theoretical education

Toxicology – brief historical review, importance of toxicology today, definition of poison, chemical compounds and toxicity, exposure to toxins and routes of entry. Absorption, distribution, metabolism, excretion of toxins. Types of poisoning, toxic and lethal doses, accumulation of toxins, adoptation to poisons, factors that influence toxicity. Toxicity mechanisms. Genotoxicity. Carcinogenesis. Acute poisoning with drugs used in the treatment of mental and nervous disorders and poisoning with neurotoxins. Acute poisoning with drugs used in the treatment of cardiovascular diseases and cardiotoxins. Acute poisoning with drugs used in the treatment of respiratory, gastrointestinal and endocrine diseases. Acute poisoning with drugs and toxins used in hematological diseases, diseases of blood-forming organs, metabolic diseases, immunediseases, infectious and parasitic diseases. Effects of poisons and drugs on the reproductive system and skin. Acute poisoning by opiates and drugs, acute intoxication with drugs used in the treatment of musculo-skeletal, connective tissue diseases. Pesticide poisoning – terminology, general characteristics and measures of protection, classification of pesticides, biological experiments examining residue contamination of food through packaging. Ethanol, methanol, trichlorethylene, benzene, chloroform, phenol, aniline, carbon disulfide, cyanides. Carbon monoxide poisoning, carbon dioxide, hydrogen sulfide, sulfur dioxide, chlorine, nitrogen, oxides, ozone. Poisoning with acids and alkalis, heavy metal poisoning.

Practical education

CPR – cardiopulmonary resuscitation of patients with acute poisoning. Airway management (deflexion, triple grip, placement of the oropharyngeal tube, cleaning the airway manually or by aspiration, placing the patient in coma position, *Heimlich* maneuver, orotracheal intubation. Mechanical ventilation (mouth-to-mouth, mouth-to-nose, mouth-to-mask, Ambu balloon, mobile respirator. Artificial circulation methods (cardiac massage, defibrillator in cardiac arrest, CPR techniques – one rescuer, two rescuers CPR, CPR in children with acute poisoning, practicing techniques of peripheral and central venous lines. Medications in resuscitation of patients with acute intoxication. Prevention of toxin's through the mouth – inducing vomiting, nasogastric suction, charcoal treatment, laxative treatment. Natural detoxification – forced diuresis, forced ventilation, hyperbaric oxygenation. Artificial detoxification – peritoneal dialysis, hemodialysis, hemoperfusion, plasmapheresis. Prevention of toxin entry through breathing, skin, iatrogenic means, adequate detoxification methods. Antidote therapy in acutely and chronic intoxication. Symptomatic and infusion therapy in acute and chronic intoxication. Diagnosis of poisoning – medical history, clinical and laboratory algorithms. Toxicology databases and importance of forensic toxicology.

Literature

Compulsory

1. True BV, Dreisbach RH. Dreisbach's Handbook of Poisoning: Prevention, Diagnosis and Treatment, CRC Press; 13th ed, 2001.

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 30

Teaching methods Theoretical and practical

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	10	Written	
Practices	30	Oral	50
Colloquium			
Essay	2x5		

Course title: Palliative Medicine

Course status: elective

ECTS Credits: 3

Condition: –

Course aim

The goal of this course is to introduce philosophy and practice of palliative care, provide knowledge and skills necessary for effective and compassionate participation in palliative care.

Expected outcome of the course:

Through theoretical classes students should master basic knowledge in the affirmation of life and conception of death as normal processes, basic characteristics of pain management, psychosocial and spiritual aspects of palliative care and support to patients' families, during the period of disease, death, and mourning. Special attention is given to the ethical and legal issues related to helping people suffering from incurable diseases. Also, students acquire knowledge on communication, teamwork and develop self-awareness.

Through practice, students should master history taking in palliative medicine, as well as physical examination of patients, treatment, care and support to patients suffering from incurable diseases. Through essays and case studies, students will discuss different categories of patients (malignant patients, the elderly, children, patients with dementia, etc.) and design therapy programs for each patient individually.

Course description

Theoretical education

1. Philosophy and practice of palliative care
2. Basic principles of symptom control and pulmonary symptoms
3. Pain assessment and control
4. Neuropsychiatric symptoms
5. Gastrointestinal symptoms (including nausea, vomiting, anorexia, constipation, and diarrhea
6. Skin and oral cavity care and lymphedema control
7. Care in the last hours of life
8. Psychological problems and their management
9. Loss of a loved ones, grief and mourning
10. Spiritual care
11. Ethical and legal issues
12. Communication skills
13. Communication in specific situations, for example breaking bad news
14. Teamwork and self-awareness

Practical education

1. History taking in palliative medicine
2. Demonstration of a complete physical examination
3. Case presentations and discussions focused on specific issues related to children and the elderly
4. Case presentations and discussions focused on issues related to various groups of diseases
5. Case presentations and discussions focused on complex issues including emergencies in palliative care.

Literature

Compulsory

1. Watson M, Lucas C, Hoy A, Wells J. Oxford Handbook of Palliative Care (2nd Edition). Oxford Medical Handbooks, 2009.

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 30

Teaching methods: lectures, practice, essays

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	15	Written	60
Practices	15	Oral	
Colloquium			
Essay	10		

Course title: Sports Medicine

Course status: elective

ECTS Credits: 3

Condition: –

Course aim

The basic goal of education from Sporst Medicine is to familiarize students with the basics of sports medicine as well as the body function during the exercise. Getting acquainted with the mechanisms and the occurrence of injuries during training and competition. Diagnostics of sports injuries, health conditions and diseases and their therapy. A special review of cardiology in sports. Nutrition in sports and recreation. Diagnostics of functional abilities of athletes and recreational individuals.

Expected outcome of the course:

Acquiring knowledge and skills necessary for the club physician.

Course description

Theoretical education

1. Fundamentals of the physiology of the human body and its adaptation to sports training, the basics of sports training. Physiology in extreme conditions.
2. Injuries in sports and recreation.
3. Sports Cardiology.
4. Sport nutrition and supplementation.
5. Measurement of the functional abilities in sports.
6. Psychology in sport.

Practical education

1. Testing of functional abilities (selecting a functional test, selecting the type of load)
2. Determination of heart rate (palpation, auscultation, heart rate monitoring by ECG), echocardiography (basics).
3. Measurement of arterial blood pressure (TA monitoring in rest, monitoring TA during functional tests)
4. Physical examination, first examination of the injured. First aid (RICE protocol).
5. An overview of sports medicine specialist for a consent for competitive and recreational sports.
6. Protocols for medical rehabilitation and treatment of injuries.
7. Analysis of cognitive abilities in sport.

Literature

Compulsory

1. Wilmore, J.H.& D.L. Costill (2003). Physiology of sport and exercise.Human Kinetics.

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 30

Teaching methods

Student activity assessment (maximally 100 points)			
Pre-exam activities	**points**	**Final exam**	**points**
Lectures	20	Written	50
Practices	20	Oral	
Colloquium	5		
Essay	5		

Course title: Intensive Care and Therapy in Pediatrics

Course status: elective

ECTS Credits: 3

Condition: Pediatrics

Course aim:
The objective of the course is to provide students with information on the most commonly life-threatening conditions in the pediatric population, so that they are ready to timely diagnose and start treat them as young doctors.

Expected outcome of the course:
Acquiring knowledge about diagnostics and the therapy of life-threatened pediatric patients.

Course description
Theoretical education
1. Causes of life-threatening conditions in pediatric age. 2. Etics in Pediatric Intensive Care 3. Transport of critically ill children 4. Pediatric vascular access 5. Principles of invasive and noninvasive vital signs monitoring 6. Autopsy (clinical, forensic). 7. Talk with parents of critically ill children 8. Imaging methods for detection of urgent conditions 9. Emergency conditions of the respiratory system (Croup syndrome; respiratory insufficiency; status asthmaticus; foreign bodies of the airway; mechanical ventilation and air leak syndroma – pneumothorax, pneumomediastinum, pneumoperitoneum; acute respiratory distress syndrome). 10. Emergency conditions of cardiovascular system (Heart rhythm disorders and pharmacology of the cardiovascular system; congenital heart defects; shock). 11. Emergency conditions of central nervous system and muscle disorders (Neurophysiological assessment and monitoring; cerebrovascular accidents; status epilepticus; acute central nervous system infections – meningitis, encephalitis, hypoxic-ischemic encephalopathy; SIDS *(Sudden Infant Death Syndrome),* SADS (*Sudden Arrhythmia Death Syndromes*). 12. Emergency conditions of renal system (Electrolyte and acid-base equilibria disturbances in critically ill pediatric patients; acute kidney injury and modalities of renal replacement therapy in Pediatric Intensive Care Unit; hypertension in Pediatric Intensive Care Unit). 13. Emergency conditions in endocrinology and metabolic disorders (nutrition in critically ill children; inborn errors of metabolism; endocrine diseases significant in the critically ill pediatric patients – tirotoxicosis, hypoglycemia, congenital adrenal hyperplasia, diabetic ketoacidosis). 14. Emergency conditions in hematology (thromboembolism in critically ill pediatric patients; transfusion of blood and blood produsts; hematological and oncological diseases in Pediatric Intensive Care Units – febrile neutropenia, DIC). 15. Emergency conditions in gastroenterology (acute liver failure and Reye's syndrome; acute abdomen – volvulus, peritonitis, necrotizing enterocolitis, gastroinetstinal foreign bodies). 16. Immunology and infections (congenital immunodeficiency and acquired immunodeficiency; bacterial and nosocomial infections; use of antimicrobial drugs and antibiotic resistant microorganisms in Pediatric Intensive Care Units; anaphylactic shock). 17. Sepsis (newborns; childrens). 18. Accidents and traumas (poisoning; bites and stings; drowning; heat caused damages**;** frostbites; burns and inhalation damage; child abuse; intracranial haemorrhage). 19. Drugs use in a critically ill pediatric patients; analgesia and anesthesia (Neuromuscular blockers; sedation and analgesia). 20. Principles of drug availability in a critically ill pediatric patient, adverse drug reactions and drug interactions 21. Pediatric and neonatal cardiopulmonary resuscitation.

Practical education
– Anamnesis in urgent conditions in pediatric patients
– Assessing level of consciousness in critically ill pediatric patients
– Endotracheal and orotracheal intubation
– Basic and advanced cardiopulmonary resuscitation
– Quick recognition of basic heart rhythm disorders
– Medical records keeping

Literature
1. Shaffner DH, Nichols DG. Rogers' Textbook of Pediatric Intensive Care, 5th Edition. Wolters Kluwer, 2015.

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 30

Teaching methods Lectures and practices teaching

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures		Written	60
Practices	20	Oral	
Colloquium			
Essay	20		

Course title: Early Childhood Development

Course status: elective

ECTS Credits: 3

Condition: –

Course aim

The aims are to enable medical students to monitor the typical development of the child in the first three years of life; to recognize deviations from typical development; to learn how to communicate with the child's family and direct parents to promote the child's early development

Expected outcome of the course:

Students will:

– learn about the importance of early development and the possibilities of stimulating development in the first years of a child's life
– gain knowledge of the factors that stimulate early development and the factors that threaten it
– learn about the importance and role of the family for the development of the child and the encouragement of early development
– review different approaches to assessing early childhood development
– learn about the importance of a family-centred approach and family empowerment to stimulate early development
– become familiar with the importance of a transdisciplinary approach in monitoring and promoting early development
– learn about deviations in motor development and stimulation of motor development
– gain knowledge about developmental problems in premature infants, as well as to stimulate early development
– gain knowledge of hearing and speech disorders and procedures performed by the speech therapist
– gain knowledge about autism spectrum disorders and the therapeutic modalities that can be used
– gain knowledge of multiple disabilities and a multidisciplinary approach to stimulating the development
– understand the importance of implementing early interventions in children with developmental disabilities, psychological and behavioural evidence-based early interventions

Students will:

– gain communication skills necessary to work with children and family
– learn the use the tools to assess the development of a child up to the age of three, and to recognize typical development and developmental disabilities
– familiarize themselves with local community resources that can be used to encourage early child development

Course description

Theoretical education

– Health, determinants of health, early development, nature of early development and developmental tasks
– The importance of early childhood development; protective factors, risk factors for early development
– Nutrition and early development
– Pediatrician's role in primary care in early development monitoring and assessment.
– Different approaches to early development assessment – testing a child in an institution or at home, interviewing parents
– Principles of early development monitoring using the GMCD (Guide for Monitoring Child Development)
– ASQ Ages and Stages Questionnaire
– Tests used by psychologists in the assessment of early development
– Delay in motor development
– Early development in prematurely born infants
– Delay in speech development
– Hearing and vision disorders and early development
– Autism Spectrum Disorders
– Multiple disabilities
– Family-centred approach and early development stimulation
– Local community resources and early development stimulation

Practical education

– Communication process – from the idea of the person sending the message to the recipient of the message and his interpretation of the message
– Non-verbal communication, Verbal communication, Professional communication and behavior concerning the patient and family
– Interview techniques, Adaptation of communication to parents' ability to understand communication
– Adaptation of communication to cultural specificities
– Family interview and counseling
– Characteristics and application of the ASQ Ages and Stages Questionnaire
– Characteristics and implementation of an early childhood monitoring tool using the GMCD (Guide for Monitoring Child Development)
– Tests used by psychologists to evaluate early development
– Development of gross motor skills and stimulation of motor development – cooperation with a physiotherapist
– Development of fine motor skills and stimulation of fine motor development – cooperation with an occupational therapist
– Speech development and stimulation of speech development – observation of speech therapists

– Evaluation of children with autism spectrum disorders and working with these children – agreeing to work with these children with a child psychiatrist,
– Developmental stimulation in children with multiple disabilities – a collaboration with a physiotherapist, occupational therapist, speech therapist
– Promoting early development – breastfeeding, physical contact with the child, daily activities, reading with children,
– Toxic stress and impact on children's development
– Supporting the family after the developmental assessment
– Empowering the family for social support – cooperation of psychologists and sociologists with the family

Literature

Compulsory

1. Baum R. Positive parenting and support. In: In: Kliegman R, St Geme J, editors. Nelson textbook of pediatrics. 21st ed. Philadelphia, PA: Elsevier;2019. p 1093-1102
2. Olson JM. The Newborn. In: Kliegman R, St Geme J, editors. Nelson textbook of pediatrics. 21st ed. Philadelphia, PA: Elsevier;2019. p1111-1121.
3. Onigbanjo MT, Feigelman S. The first year. In: Kliegman R, St Geme J, editors. Nelson textbook of pediatrics. 21st ed. Philadelphia, PA: Elsevier;2019. p1122-1141
4. Carter RC, Feigelman S. The second year. In: Kliegman R, St Geme J, editors. Nelson textbook of pediatrics. 21st ed. Philadelphia, PA: Elsevier; 2019. p1142-1155
5. Carter RC, Feigelman S. The preschool years. In: Kliegman R, St Geme J, editors. Nelson textbook of pediatrics. 21st ed. Philadelphia, PA: Elsevier;2019. p1156-1167

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 30

Teaching methods

Lectures. Practical classes: medical history, physical examination of a healthy child and patients with eating disorders, differential diagnostic and therapeutic considerations for eating disorders with case reports, counseling and nutrition planning for a healthy (newborn, infant, young child, preschool and school child, adolescent, athlete, vegetarian)) and a sick child (liver and kidney failure, hereditary metabolic diseases, nutritional allergies, diabetes mellitus, etc.)

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	15	Written	70
Practices	15	Oral	
Colloquium			
Essay			

Course title: Health of School-Age Children and Adolescents

Course status: elective

ECTS Credits: 3

Condition: Pediatrics

Aim of the course

Introducing students to the specifics of the work of doctors and nurses in the implementation of preventive health –promotion activities in school children and adolescents in terms of promoting healthy lifestyles and preventing risky

Training students for permanent mastering of theoretical knowledge and training for health promotion activities in terms of promoting healthy lifestyles and prevention of risky behavior of children and adolescents.

Expected outcome of the course

The student should acquire knowledge about health promotion activities in terms of promoting healthy lifestyles and preventing risky behavior of young people.

The student should be able to independently perform health promotion activities in the sense of promoting healthy lifestyles and prevention of risky behavior among young people.

Course content

Theoretical education

- Healthy lifestyles: proper nutrition, stimulating physical activity, proper dental hygiene and caries prevention, prevention of exposure to sunlight.
- Active sporting and prevention of health risks in adolescents and athletes
- Prevention of risky behavior of young people such as: smoking, alcohol consumption, steroids consumption, consumption of illegal psycho-active substances, nd addiction internet, mobile phones and gambling.
- Prevention of sexually transmitted diseases (STD / HIV) and unwanted pregnancies
- Prevention of violence against children and protection against all forms of domestic violence, institutions and the social environment.

Practical education

Practical work within the framework of promotional activities in the preventive center of the Health center „ Novi Sad“

Literature

Compulsory

1. Mary Rudolf, Malcolm Levene. Pediatrics and Child Health, 2nd Edition, Wiley-Blackwell, 2010.

Additional

1. Kliegman, Robert; Nelson, Waldo E (Waldo Emerson). 1898-1997 Textbook of pediatrics. 19th ed. /Philadelphia, PA : Elsevier/Saunders, c2011.

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 30

Teaching methods

Theoretical lectures, video presentations, practical lessons and workshops. Independent, practical work in the presence of mentors in teaching basics.

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	10	Written	50
Practices	20	Oral	
Colloquium			
Essay	20		

Course title: Ethics in Pediatrics

Course status: elective

ECTS Credits: 3

Condition: –

Course aim

Introduction to the importance of basic ethical and deontological principles in pediatrics, from newborn to adolescent, ethical principles in the treatment of chronic diseases in children.

Expected outcome of the course

Acceptance and implementation of modern ethical norms that in the day-to-day work of the team can contribute to better outcomes of treatment of patients, with better quality of life for children and their families.

Course description

Theoretical education

Contemporary ethical attitudes in perinatology (extracellular disease, embryo freezing, surrogate mother, sperm donors), data protection. Fetal medicine ("damaged fetus", fetal surgery, consent and informing parents about the risks, outcomes, declarations. Neonatology: preterm birth, where is the limit? Procedures that have not yet been tested, safety. Ethical attitudes in research in children: placebo, benefit and risks, ethical aspects. Inaccessibility of diagnostic and treatment methods as a violation of basic human rights.

Practical education

Parents 'and children' informed consent. Ethical dilemmas of neonatal screening, treatment of chronic diseases in children: in rare and severe chronic diseases, how to communicate to children and parents, while actively treating chronic patients with poor prognosis, palliative care, end of life. Ethical aspects of organ transplantation: data protection, donors; determination of death, "separation from intensive care", informing parents, end of life, euthanasia and palliative medicine. Examples of Informed Consent in Pediatrics. The role of the team, doctors and nurses in the implementation of ethical principles – exercise and group work. Seminars – selected topics.

Literature

Compulsory

1. Bjelica A. An outline of medical ethics. Novi Sad: Faculty of Medicine; 2015.

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 30

Teaching methods

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	10	Written	60
Practices		Oral	
Colloquium			
Essay	30		

Course title: Health Promotion

Course status: elective

ECTS Credits: 3

Condition: –

Course aim:
To capacitate students in understanding the roll of health and other sectors of the society and their active cooperation in the health promotion process.

Expected outcome:
Acquiring skills to work with health and other professionals, groups and individuals in the community in order to implement health promotion.

Content

Theoretical education

Definition and term of health promotion, principles and strategies. Health promotion and health education in strategic documents. Settings for health promotion (WHO health promotion settings approach – „Healthy cities", Healthy school", „Healthy kindergarten"). Population and high risk strategies in the prevention of non-communicable diseases. Behavioural and biological risk factors for non-communicable diseases. Health promotion in prevention of communicable diseases. Behavioural models of health decision-making and behaviours. Health education – definitions, aims, methods and tools. Health promotion and prevention programme structure. Content and organization of work in health promotion centres in Institutes of Public Health. Evaluation of the health promotion programmes.

Practical education

Health education tools and methods, health promotion and prevention programme, action plan, health promotion campaigns.

Literature

Compulsory

1. Jakovljević Đ, Grujić V, urednici. Socijalna medicina. Novi Sad: Medicinski fakultet Novi Sad; 2014.
2. Novaković B, Grujić V, urednici. Higijena i zdravstveno vaspitanje. Novi Sad: Medicinski fakultet Novi Sad; 2004.

Additional

2. Simić S. i sar. Socijalna medicina – udžbenik za studente medicine. Beograd: Medicinski fakultet Univerziteta u Beogradu; 2012.
3. Poland B, Green LW, Rootman I, editors. Settings for health promotion: Linking theory and practice. Thousand Oaks, CA: Sage; 2000.
4. Glanz K, Rimer BK, Viswanath K, editors. Health behavior and Health Education. 4h edition. San Francisco, CA: Jossey-Bass A Wiley imprint; 2008.

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 30

Teaching methods

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	50	Written	
Practices	15	Oral	55
Colloquium			
Essay	25		

Course title: Personalized Medicine

Course status: elective

ECTS Credits: 3

Condition: –

Course aim

The basic aims of the elective course Personalized Medicine are to familiarize students of Integrated Academic Medicine with the basic concepts of personalized medicine. Acquiring knowledge about the possibilities of applying new technologies in medicine and clinical practice. Acquiring knowledge about the importance of team and multidisciplinary approach in everyday work. Introducing the novelty in the field of personalized medicine.

Expected outcome of the course:

While attending classes, students acquire all the necessary knowledge in the field of Personalized Medicine. Gaining knowledge of the specifics of personalized patient access from all clinical branches of medicine. Introducing of the challenges and difficulties of personalized medicine. Introducing new technologies such as microarray, next generation sequencing, whole genome sequencing. Familiarity with the possibilities of applying personalized medicine in all forms of healthcare. Acquiring knowledge about proper approach and communication with the patient with hereditary disease.

Course description

Theoretical education

– Vision of personalized medicine
– Evidence-based medicine
– Perspectives on personalized medicine
– Challenges and difficulties of personalized medicine
– Expectations in personalized medicine
– Personalized medicine in 2020-2025.
– Innovations related to personalized medicine
– Registers, electronic databases, biobanks and personalized medicine
– Digital phenotyping
– European Alliance for Personalized Medicine
– Genome, proteome, microbiome, transcriptome, epigenetic, metabolome and personalized medicine
– Neonatology and personalized medicine
– Personalized medicine and health care (primary, secondary, tertiary)
– Personalized medicine in rehabilitation
– Personalized medicine and treatment
– Personalized medicine and prevention
– Research in personalized medicine
– Genetic, genomic and next-generation sequencing
– A team and multidisciplinary approach
– Biomarkers
– Epigenetics
– Genetic modifiers
– Enzyme replacement therapy
– Screening and early diagnosis – potential challenges
– Predisposition, screening, diagnosis, prognosis, prediction, medical monitoring, monitoring and personalized medicine
– Low incidence diseases – rare diseases
– The role of patients and associations

Practical education

– History and personalized medicine
– Introducing new technologies
– Possibility of applying digital phenotyping in practical work
– Patients and physician reports
– Practical aspect and possibilities of applying genomics
– Practical aspect and possibilities of applying proteomics
– Practical aspect and possibilities of application of interactomics, metabolomics in clinical practice
– Personalized medicine and recent therapeutic approaches – case reports
– Personalized medicine and prevention – case reports
– Preventive medical aspect of epigenetics – presentations
– Overview of the work of the Molecular Genetics Cabinet
– Benefits of personalized medicine – case reports

– Limitations of personalized medicine – case reports
– Biobanks and personalized medicine – a practical aspect
– Microarray technology
– Next generation sequencing
– Clinical exome sequencing – presentation and capabilities
– Complete genome sequencing – views and capabilities
– Preimplantation genetic testing
– Patient informed consent – display protocol
– Patient registers – view
– Patient informed consent – display protocol
– Patient associations – overview
– Practical aspect of team and multidisciplinary approach in personalized medicine

Literature

Compulsory

1. Firth H, Hurst J. Oxford Desk Reference Clinical Genetic and Genomics, 2nd Ed. Oxford University Press 2017.
2. Nussbaum RL, McInnes RR, Willard HF. Thompson and Thompson Genetics in Medicine, 8th Ed. Elsevier Science Health Science 2015.

Additional:

1. Trninić-Pjević A, Milatović S, Havrljenko J, Kavecan I, Kopitović A. Birth of a healthy child after preimplantation genetic testing in a father with Klinefelter's syndrome in Serbia. Vojnosanitetski pregled 2019 OnLine-First Issue 00, Pages: 138. https://doi.org/10.2298/VSP190715138T-Di
2. Sanzo M, Cipolloni L, Borro M, La Russa R, Santurro A, Scopetti M, Simmaco M, Frati P. Clinical Applications of Personalized Medicine: A New Paradigm and Challenge. Curr Pharm Biotechnol 2017;18(3):194-203. doi: 10.2174/1389201018666170224105600.
3. Sharrer GT. Personalized Medicine: Ethical Aspects. Methods Mol Biol. 2017;1606:37-50. doi: 10.1007/978-1-4939-6990-6_3. Review.
4. Barker RW. Is precision medicine the future of healthcare? Per Med. 2017 Nov;14(6):459-461. doi: 10.2217/pme-2017-0060.
5. Goetz LH, Schork NJ. Personalized medicine: motivation, challenges, and progress. Fertil Steril. 2018 Jun;109(6):952-963. doi: 10.1016/j.fertnstert.2018.05.006.
6. Carrasco-Ramiro F, Peiró-Pastor R, Aguado B. Human genomics projects and precision medicine. Gene Ther. 2017 Sep;24(9):551-561. doi: 10.1038/gt.2017.77.
7. Shoaib M, Rameez MAM, Hussain SA, Madadin M, Menezes RG. Personalized Medicine in a New Genomic Era: Ethical and Legal Aspects. Sci Eng Ethics. 2017 Aug;23(4):1207-1212. doi: 10.1007/s11948-016-9828-4.

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 30

Teaching methods:

Lectures. Practical classes: Case reports of patients and the possibilities of applying personalized medicine. Outline of the work of the Medical Genetics Service: an outline of the work of the Medical Genetics Department, the Family Planning Cabinet, the Cytogenetic Laboratories, the Molecular Genetics Cabinet.

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	20	Written	20
Practices	30	Oral	30
Colloquium			
Essay			

Course title: Nutrition of Healthy and Unhealthy Child

Course status: elective

ECTS Credits: 3

Condition: Pediatrics

Course aim

The main goals of the course *Nutrition of healthy and unhealthy child* is to get familiar medical students with specificities of the nutrition of the population up to the age of 18 years (healthy child), as well as to discuss and acquire knowledge of clinical manifestations, differentially diagnostic procedures and therapy of nutritional disorders of this age (sick child) as well as dietary options for certain pathological conditions. Educating physicians in general practice for proper access to the nutrition of this specific population.

Expected outcome of the course:

During their classes, students will acquire all the necessary knowledge about the role of specific nutrients in health and disease, the nutritional needs of children, the ability to assess the nutritional status of pediatric patients, and to understand and know the nutrition techniques for these patients. Information in the field of pathogenesis, clinical imaging and therapeutics of nutritional disorders occurring in the population from birth up to 18 years. Particular attention will be paid to the importance of preventive medical measures and procedures in order to provide adequate nutrition to support the normal growth and development of child.

Proper access to and communication with the patient from birth up to 18 years and members of their family. Specificity of anamnesis, examination and specificity of diet in this population. Particularities of physicians' work in outpatient clinics. Planning and teamwork at child and youth counseling centers.

Course description

Theoretical education

1. Pediatric nutrition
2. Assessment of the child's nutritional status
3. Assessment of the infant's ability to feed
4. Nutritional needs of children
5. Planning a healthy child's diet
6. Nutrigenetics
7. Functional food
8. Newborn's nutrition
9. Infant's nutrition
10. Nutrition of toddler, preschool and school child
11. Pathophysiology of malnutrition and obesity
12. Eating disorders in children
13. Specific nutrient deficiencies, including vitamins, minerals, trace elements and fatty acids
14. Special diets
15. Enteral nutrition
16. Parenteral nutrition
17. Nutrition counseling and the role of teamwork for nutritional support
18. Eating disorders in gastrointestinal tract diseases
19. Eating disorders in liver and pancreatic diseases
20. Nutrition of children with hemato-oncological diseases
21. Nutritional allergy and other sensitization to food
22. Hereditary diseases of metabolism
23. Diet of children with cystic fibrosis
24. Diet of a child with diabetes
25. Nutrition of a child with nephrological disorder
26. Nutrition of children with cardiac disease
27. Diet of a critically ill child
28. Nutrition and oral health
29. Nutritional problems in children with neurological impairment and psychiatric disorder
30. Food security

Practical education

1. Know the importance of proper nutrition in childhood on the health of an adult
2. Know the basics of normal growth and body mass index, nutritional status assessment; be familiar with the different types of growth norms available and how they are used; know the basics of normal feeding depending on age; be familiar with artifical feeding routes
3. Know the physiology of nutrient digestion, their absorption, metabolism and elimination from the body
4. Develop a diet plan for a child of different ages and physical activity
5. Know the concept of personalized nutrition, functional foods, balanced diets and biologically active compounds in foods

6. Know the types and ways of eating a healthy preterm and term newborn, infant, toddler, preschool and school child
7. Identify and treat eating disorders, malnutrition and obesity
8. Identify and treat eating disorders, including anorexia nervosa and bulimia
9. Identify and treat specific nutrient deficiencies, including vitamins, minerals, trace elements and fatty acids
10. Know the theory and technique of special diets for religious and sociological reasons
11. Know the indications and contraindications for starting enteral nutritional support, knowing the composition of various preparations for enteral nutrition
12. Know the indications and contraindications for starting parenteral nutritional support, knowing the composition of different solutions for parenteral nutrition
13. Acquisition of skills in cooperation with other specialists; understand the role of nutrition support teams in the hospital and in the community, as well as the roles of individual team members
14. To get familiar with eating disorders in liver and pancreatic diseases, dysphagia, digestive tract inflammation, short bowel syndrome, motility disorders and the like; identify and treat anemia for iron deficiency; nutrition planning for children with sickle cell anemia and thalassemia; the use of elimination diets in food sensitization; to know the basic principles of diet in phenylketonuria, glycogenosis and other congenital disorders of metabolism, in children with cystic fibrosis, diabetes, nephrotic syndrome, renal failure, heart failure; basic principles of nutrition for a critically ill child; understand the importance of proper nutrition in the prevention of dental erosion: know the indications for the use of fluorine supplements; identify eating disorders based on dental examination; nutrition planning for children with neurological impairment and psychiatric disorders; indications and significance of ketogenic diet
15. Know the factors that influence and threaten food safety: infectious agents, pesticides, industrial chemicals, toxins, antimicrobial preservatives, irradiation, genetically modified food

Literature

Compulsory

1. Robert M, Kliegman RM, Geme JS. Nelson Textbook of Paediatrics, 21st Edition, International Edition: 2-Volume Set; Elsevier Science, 2019
2. Ronald E, Kleinman RE, Greer FR. Paediatric Nutrition, 7th Edition, AAP Committee on Nutrition 2013

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 30

Teaching methods

Lectures. Practical classes: medical history, physical examination of a healthy child and patients with eating disorders, differential diagnostic and therapeutic considerations for eating disorders with case reports, counseling and nutrition planning for a healthy (newborn, infant, young child, preschool and school child, adolescent, athlete, vegetarian)) and a sick child (liver and kidney failure, hereditary metabolic diseases, nutritional allergies, diabetes mellitus, etc.)

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	10	Written	20
Practices	10	Oral	50
Colloquium			
Essay	10		

Course title: Balneoclimatology

Course status: elective

ECTS Credits: 3

Condition: –

Course aim:
Introducing students to the basics of balneology (mineral waters, peloids, medicinal gases) and human bioclimatology (medical meteorology, medical climatology, biological rhythms), as well as the basic regimes and therapeutic measures in balneoclimatic treatment.

Expected outcome of the course
Adoption of medical awareness and human principles in the application of natural spa resources, and the acquisition of knowledge in bioclimatology, from the aspect of impact on human health for preventive and therapeutic purposes. Mastering the manner of application of mineral waters, peloids, medicinal gases for the purpose of prevention and treatment; as well as the evaluation and selection of patients for the application of natural balneological and climatic resources.

Course description
Theoretical education
Balneology basics (mineral waters, peloids, medicinal gases); regimens and therapeutic measures in balneoclimatic treatment.
Fundamentals of human bioclimatology (medical meteorology – meteoropathology, measures of prevention of meteorotropism; medical climatology – climatic factors, climoprophylaxis, climatotherapy; biological rhythms – daily and annual)

Practical education
Exercises, Other forms of teaching, Study research work
Application of mineral waters, peloids, medicinal gases, introduction to modern types of healing in spa conditions
Using a Chronobiological Evaluation Questionnaire

Literature
Compulsory:

1. Verhagen, Arianne P.; Bierma-Zeinstra, Sita M. A.: Boers, Maarten; Cardoso, Jefferson R.; Lambeck, Johan; de Bie, Rob; de Vet, Henrica C. W. "Balneotherapy (or spa therapy) for rheumatoid arthritis", 2015.
2. Falagas ME; et al. "The therapeutic effect of balneotherapy: Evaluation of the evidence from randomized controlled trials". International Journal of Clinical Practice, 2009.
3. Anne Williams, Spa bodywork: a guide for massage therapists. Lippincott Williams & Wilkins, 2006.
4. Carola Koenig, Specialized Hydro-, Balneo-and Medicinal Bath Therapy. Publisher: iUniverse, 2005.
5. Nathaniel Altman, Healing springs: the ultimate guide to taking the waters : from hidden springs to the world's greatest spas. Inner Traditions / Bear & Company, 2000.

Number of active classes	**Theoretical classes:** 15	**Practical classes:** 30

Teaching methods: Lectures, practical work, consultation hours

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	10	Written	50
Practices	10	Oral	
Colloquium			
Essay	30		

Course title: Clinical Practical Training

Course status: compulsory

ECTS Credits: 8

Condition: Internal Medicine; Surgery; Pediatrics; Gynecology and Obstetrics

Aim of the course

The aim of clinical practical training is to provide necessary clinical experience, under supervision of medical professionals and experts in health centres, to constantly update knowledge according to demands of modern medical science and practice, to apply the methodology of research-scientific work in practice.

Expected outcome of the course

Students should be capable of performing health service in primary care institutions – prevention, diagnostics and therapy:
- to manage daily routine practice and keep records, to collect and manage information using information technology
- to participate in team-work and diagnostics and treatment of ill and injured patients
- to obtain medical history and to perform clinical examination of diseased and injured patients
- to apply appropriate diagnostic procedures in order to set differential diagnosis
- to properly interpret results of laboratory and clinical examination
- to suggest appropriate therapeutic procedures
- to become familiar with the principles of admittance and triage in emergency situations and provide assistance to ill or injured patients
- to apply procedures of care in severely ill and injured patients, including pain relief and and to help patients in the terminal phase of illness
- to know the principles of reproduction, including conception, pregnancy and childbirth
- to evaluate mental status of patients and act in appropriate manner
- to implement hygienic-sanitary and environmental protection measures
- to apply basic deontological principles: physician-patient relationship, among medical professionals, colleagues and associates
- to respect principles of professional secrecy and health practitioner codes.

Course content

Theoretical education

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Practical education

Exercises, other forms of education, research related activities:
1. work in outpatient units: surgery, internal medicine, pediatrics, gynecology and obstetrics
2. work in specialized outpatient units: surgery, internal medicine, pediatrics, gynecology and obstetrics
3. work at clinical departments: surgery, internal medicine, pediatrics, gynecology and obstetrics
4. work at obstetrics clinic

Literature

Same as references recommended for particular courses in Surgery, Internal medicine, Pediatrics, Gynecology and obstetrics

Number of active classes	**Theoretical classes:** –	**Practical classes:** – **Other classes:** 330

Teaching methods

Clinical practical training at clinics and health centers is carried out individually, under supervision of teachers and associates, including:
- practical work with patients
- performing clinical skills (independent)
- demonstration of clinical skills
- counseling

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures		Written	
Practices		Oral	
Colloquium			
Essay			

Course title: Graduation Paper (research topic development)

Course status: compulsory

ECTS Credits: 10

Condition: –

Course aim

- students develop their own *research design independently*
- students conduct literature searches independently
- students apply adequate methodology of scientific research
- students apply knowledge from the field of statistical data processing and the appropriate tabular and graphical presentation

Expected outcome of the course

Student are trained for independent preparation and defence of graduation thesis.

Course description

Working under the supervision of mentor:
– definition of research theme (paper can be theoretical, experimental or professional)
– research design
– literature search
– conduction of research
– assisting in statistical data processing
– interpretation of given results and discussion
– training for independent preparation and defence of graduation thesis.
Procedure of application of the graduation thesis is determined by the Bylaw on the Graduation Paper Preparation at Undergraduate, Undergraduate Academic and Integrated Studies at the Faculty of Medicine in Novi Sad, and technical instructions are given on the Faculty web-site.

Literature

1. Rašković A, et al. Authorized handouts for Introduction to scientific research work.
2. Stewart A. Basics statistics and epidemiology. A practical guide. Abingdon, UK: Radcliffe Medical Press Ltd; 2002.
3. Harris M, Taylor G, editors. Medical statistics made easy, third edition. Banbury, UK: Scion Publishing; 2014.
4. Moore DS, editor. The basic practice of statistics, third edition. New York: W.H. Freeman and Company; 2004.
Other relevant literature recommended by a mentor.

Number of active classes	**Theoretical classes:** –	**Practical classes (SRW):** 300

Teaching methods

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures		Written	
Practices		Oral	
Colloquium			
Essay			

Course title: Graduation Paper (preparation and defence)

Course status: compulsory

ECTS Credits: 10

Condition: –

Course aim

- to practically apply knowledge acquired during studies
- to apply the methodology of scientific research to an actual problem
- to apply knowledge from the field of statistical data processing and the appropriate tabular and graphical presentation
- to acquire the ability to search for appropriate literature data by searching national and international databases
- to acquire the ability to present results of a research paper in a written form and oral defence.

Expected outcome of the course

- successful defence of the Graduation paper and competence for further scientific-research work and independent publishing of the results of observation and research
- acquisition of competencies which students will use as educators in the process of continuing education.

Course description

Preparation and defence of the Graduation paper represent the last phase of the Graduation paper writing. After preparatory conversations with a mentor, which include defining the topic and research design and receiving instructions on how to search for relevant literature, and after data gathering and statistical data processing, a student starts to prepare independently for paper writing and defence.

Students prepare the Graduation paper in a form which consists of the following chapters: introduction, aims, material and methods, results, discussion, conclusion and literature. The technical stylesheet of the paper is determined by the Bylaw on the Graduation Paper Preparation at Undergraduate, Undergraduate Academic and Integrated Studies at the Faculty of Medicine in Novi Sad.

The paper requires two positive reviews. Students deliver the final hardbound version of the paper and the reviewers' report to the Student Affairs Office in order to set the date for the defence.

At the end, a student defends the paper in an oral presentation before a three-member committee. The defence is oral and public. The Committee assesses the Graduation paper by giving a grade from 5 to 10, and a received positive grade (from 6 to 10) enters a student's average grade. A paper which is not defended successfully receives the grade 5.

After the defence, all documents are submitted to the Student Affairs Office in order to issue the Higher Education Degree and Academic Title Acquisition Certificate.

Literature

Literature is recommended by a mentor.

Number of active classes	**Lectures:**	**Practical classes:** – **Other classes:** 90

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures		Written	
Practices		Oral	
Colloquium			
Essay			

SKILLS CATALOGUES

CLINICAL PROPEDEUTICS (30 HOURS)

The main educational goal of the Clinical Propedeutics course within the Integrated Studies of Medicine is to acquire current theoretical and practical knowledge in propedeutics of the internal medicine patient and to be able to apply the acquired knowledge to professional work: the development of clinical thinking, independence in conducting diagnostic procedures, and development of competencies in teamwork.

1. Anamnesis and clinical examination

- Analysis of the specifics of symptomatology and clinical examination of pulmonary patients: inspection, palpation, chest percussion and lungs auscultation. The signs of pulmonary hyperinflation and condensation, bronchial obstruction. Anamnesis and findings of pleural diseases and disorders of pulmonary circulation.
- Symptomatology of a patient with a cardiovascular disorder. The examination methods of the cardiovascular system. Palpation and auscultation of the heart. Heart murmurs. Etiology of cardiac and vascular disorders. Disorders of the cardiac rhythm frequency (cardiac arrhythmia). Diseases of the endocardium and heart defects. Pericardium diseases. Myocardium diseases, ischemic heart disease and characteristics of cardiac insufficiency. Congenital heart defects. Blood pressure measurement, hypertension diagnostics and pulse characteristics. Anamnesis and clinical findings of patients with arterial and venous diseases.
- Anamnesis and clinical finding of patients with haematological disorders. Haematological syndromes. Examination and disorders of the spleen and lymph nodes. The signs of anaemia, haemorrhagic syndrome and malignant haematological disorders.
- Propedeutics in patients with endocrinological disorders. Characteristics of the metabolic syndrome. Propedeutics in diseases of the hypothalamic-pituitary axis, disorders of the thyroid and parathyroid glands. Anamnesis and clinical findings of patients with the altered function of the adrenal glands and gonads. Findings in patients with diabetes and its acute and chronic complications. Eating disorders.
- Anamnesis and physical findings in patients with renal disorders. Blood and urine examination. Causes of the kidneys and urinary tract diseases. Characteristics of the acute and chronical kidney insufficiency and nephrotic syndrome.
- The examination methods of the abdomen and abdominal organs. Examination of patients with gastrointestinal disorders. Symptomatology and examination of patients with hepatobiliary disorders. Symptomatology of the oesophageal and gastroduodenal diseases, peptic diseases and stomach cancer. Characteristics of the pancreatic and peritoneum diseases.

INTERNAL MEDICINE (120 HOURS)

Cardiology (25 hours)

- Anamnesis and clinical examination of patients and interpretation of data specific to cardiovascular diseases.
- Planning of urgent and delayed diagnostics in cardiovascular patients.
- Planning and administering therapy in cardiovascular patients.
- Electrocardiogram registering and interpreting the findings.
- Defibrillation and electroconversion, endotracheal intubation and cardiopulmonary reanimation. Defibrillator handling.
- Interpreting the findings of the non-invasive cardiovascular diagnostics: echocardiographic findings, ergometric test, stress echocardiographic findings, Doppler blood vessel findings, perfusion scintigraphy.
- Interpreting the findings of the invasive cardiovascular diagnostics and introducing contemporary and invasive therapeutic methods.
- Diagnostics and therapy in the acute myocardial infarction, pulmonary oedema, cardiac insufficiency.
- Recognition of rhythmic disorders and conduction disturbances and their therapy: antiarrhythmics and pacemakers and cardioverter defibrillators, resynchronization therapy.
- The role the primary healthcare practitioner in early diagnosis, monitoring and treatment of patients with hypertension. Differential diagnosis of hypertension.
- The importance of preoperative preparation of patients with hypertension, cardiac insufficiency and other cardiovascular disorders.
- The role of the primary healthcare practitioner in the prevention of bacterial endocarditis, monitoring of patients with cardiac defects and artificial valves and their preoperative preparation.
- The role of the primary healthcare practitioner in monitoring pregnant women and pregnant women with hypertension and other cardiovascular disorders.
- The importance of preoperative preparation of patients with cardiovascular disorders.

Pulmonology (18 hours)

- Anamnesis and clinical examination of patients and interpreting data specific to pulmonary diseases.
- Planning of urgent and delayed diagnostics in pulmonary patients. Performing the pleural puncture, interpretation of findings. Bronchological examination.
- Planning and administering therapy in pulmonary patients.
- Assisting in performing pulmonary functions and interpreting the findings.
- Blood sampling for gas analysis, interpretation of findings, planning and application of oxygen therapy.
- Analysis and interpretation of findings of lung radiography, performing lung radioscopy.
- Conducting and interpreting allergy tests.
- Application of de-obstructive parenteral therapy and inhalation de-obstructive therapy. Physical therapy in patients with obstructive pulmonary disease.
- Diagnostics and treatment of lung tuberculosis.
- Diagnostics, classification and therapy of malignant lung and thorax diseases.
- Diagnostics, therapy and prevention of lung thromboembolism.
- The role of the primary healthcare practitioner in preoperative treatment preparation of pulmonary patients.

Gastroenterology and hepatology (18 hours)

- Anamnesis and clinical examination of patients and interpreting data specific to diseases of the digestive tract and liver. Digitorectal examination.
- Planning of urgent and delayed diagnostics in gastroenterological patients.
- Planning therapy in gastroenterological patients.
- Performing abdominal puncture and interpreting the findings.
- Placement and control of nasogastric suction.
- SENGSTAKEN-BLAKEMORE oesophageal probe placement and monitoring.
- Gastric lavage and treatment of patients to remove various toxic substances.
- Macroscopic examination of stool and vomit.
- Taking materials for bacteriological, parasitological and biochemical examination.
- Ultrasonographic, endoscopic and radiological diagnostics in gastroenterohepatology.
- Diagnostics and therapeutic procedures in patients with gastroenterological bleeding.
- Indications, modalities and importance of endoscopic diagnostic and therapeutic procedures in gastroenterohepatology.
- Differential diagnosis of jaundice.
- Diagnostics and therapeutic procedures in patients with porphyria.

Endocrinology and metabolic diseases (18 hours)

- Prevention importance and measures in the occurrence of diabetes (risk factors).
- Diagnostic procedures and monitoring of patients with type 1 and type 2 diabetes, the importance of self-monitoring and its implementation – the role of the primary healthcare practitioner.
- The role of the primary healthcare practitioner in treating diabetic patients with an appropriate dietary regime (determining the total energy intake depending on age, physical activity, during pregnancy, adequate composition of the dietary regime, degree of physical activity, etc.).
- Various medication regimes during the treatment of type 2 diabetes (oral hypoglycaemics, combinations of oral hypoglycaemics and insulin, etc.) and training of patients for self-monitor – the role of the primary healthcare practitioners.
- Application of insulin therapy and various regimes of insulin therapy (introducing various insulin preparations, correct preparation and application of certain insulin preparations), self-monitoring of patients on insulin therapy – from the standpoint of the primary healthcare practitioners.
- Urgent and delayed diagnostics and therapy of diabetic ketoacidosis – ketoacidosis coma and hyperosmolar coma.
- Urgent and delayed diagnostics and therapy of hypoglycaemia and hypoglycaemic coma.
- Procedures in prevention, diagnostics and treatment of chronic degenerative complications of diabetes from the standpoint of the primary healthcare practitioners.
- The role of the primary healthcare practitioner in prevention and early diagnosis of primary osteoporosis (recognizing risk factors, *Frax* assessment).
- Algorithms in diagnostics and therapy of osteoporosis (introducing biochemical and diagnostic procedures).
- Secondary osteoporosis, diagnosis and therapy from the standpoint of the primary healthcare practitioner.
- Prevention, diagnostics and treatment of dyslipoproteinemia (implementation of various dietary regimes, physical activity, medication therapy).
- Measuring body height, body weight, determining body nutrition, measuring waist circumference, hip circumference, determining the WHR index, measuring body composition by implementing the bioelectrical impedance method.

- The role of the primary healthcare practitioner in prevention and treatment of obesity and metabolic syndrome.
- Electrolyte disorders in certain endocrinological disorders. Urgent and delayed diagnosis and treatment of hypercalcemia and hypocalcaemia.
- Endocrine hypertension, screening and the role of the primary healthcare practitioner in diagnostics and treatment.
- Screening and the role of the primary healthcare practitioner in diagnostics and treatment of the Cushing syndrome and primary hyperaldosteronism.
- Pheochromocytoma and paraganglioma screening and the role of the primary healthcare practitioner in diagnostics and treatment of hypertensive crisis in pheochromocytoma.
- Urgent and delayed diagnostics and therapy of acute adrenal insufficiency.
- Hyperthyroidism, screening and diagnostic-therapeutic algorithms.
- Urgent and delayed diagnostics of thyrotoxic crisis.
- Hypothyroidism, screening diagnostic and therapeutic algorithms.
- Diagnosis and differential diagnosis and therapy of hyperprolactinaemia from the standpoint of the primary healthcare practitioner.
- Fertility disorder in endocrinopathies (clinical aspects and anthropometric measurements).
- The role of the primary healthcare practitioner in monitoring pregnant women with diabetes and pregnant women with other endocrinological disorders.
- Importance of preoperative preparation of patients with diabetes and endocrinological disorders.

Nephrology, clinical immunology and rheumatology (18 hours)

- Disorder diagnosis in patients with pathological urinary findings: diagnostic algorithms of proteinuria and haematuria.
- Interpretation of finding of the ultrasound and radiological diagnostics.
- Importance and measures necessary in prevention of the occurrence of chronic kidney insufficiency.
- Diagnostic procedures and monitoring of patients with the first, second and third stage of chronic kidney insufficiency, the role of the primary healthcare practitioner.
- The role of the primary healthcare practitioner in the treatment of chronic kidney insufficiency, as well as hypertension in kidney insufficiency.
- Urgent and delayed diagnostics in patients with metabolic acidosis.
- Prevention of the occurrence of acute kidney insufficiency.
- Prevention, diagnostic and treatment procedures of anaemia related to kidney insufficiency.
- Prevention, diagnostic and treatment procedures of bone disorders related to chronic kidney insufficiency.
- Electrolytic disorders in patients with kidney function disorder.
- Handling of patients on haemodialysis.
- Handling of patients with a transplanted kidney.
- Importance of preoperative preparation of patients with kidney function disorder.
- Algorithm of diagnostics and therapy of urinary infections.
- Treatment of acute colic attack, monitoring and treatment of patients with urolithiasis.
- Diagnostics, differential diagnostics and treatment of patients suspected of immunodeficiencies.
- Differential diagnosis of arthritis.
- Treatment of rheumatoid arthritis.
- Treatment of autoimmune diseases with immunosuppressive therapy.
- Complications caused by the treatment with immunosuppressive therapy.

Hematology (18 hours)

- Differential diagnosis of anaemia at the level of primary healthcare.
- Diagnostic algorithm of sideropenic anaemia and sideropenic conditions.
- Therapeutic algorithm of sideropenic anaemia and sideropenic conditions.
- Diagnostic algorithm of anaemia in chronic diseases.
- Urgent and delayed diagnostics of haemolytic anaemia.
- The importance of anaemic syndrome in the elderly population.
- Indications for erythrocyte transfusion and monitoring of polytransfused patients.
- Differential diagnosis of haemorrhagic syndrome at the level of primary healthcare.
- Urgent and delayed diagnostics and therapy of thrombocytopenia.
- Outpatient monitoring of patients with haemophilia.
- Disseminated intravascular coagulation.
- Urgent diagnostics and therapy of macroangiopathic haemolytic anaemia.
- Indications for thrombocyte transfusion, plasma derivatives and coagulation factors.
- Antithrombotic prophylaxis: indications, patient follow-up and procedures for drug overdose.
- Urgent and delayed diagnostics of malignant haematological diseases.
- Principles of cytostatic therapy and its complications.
- Outpatient monitoring of patients with malignant haematological diseases.
- Prevention and treatment of infections in haematological patients in outpatient conditions.
- Differential diagnosis of leucocytosis and leukopenia in outpatient conditions.
- Medications as potential causes and inducers of haematological diseases.
- Diagnostics of splenomegaly and interpretation of findings.
- Diagnosis of lymphadenomegaly in outpatient conditions.
- Bone marrow puncture: indications, interpretation of findings and demonstration of the procedure.
- Bone biopsy: indications, importance, interpretation of findings and demonstration of the procedure.
- Diagnosis and therapy of haematological diseases at the molecular level: importance of indication, interpretation of findings and monitoring of patients.

Oncology (5 hours)

- Anamnesis and clinical examination of patients with oncological diseases.
- The role of the primary healthcare practitioner in diagnostics and monitoring of patients with oncological diseases.
- Monitoring patients on chemotherapy.
- The role of the primary healthcare practitioner in monitoring patients with terminal oncological diseases. Pain therapy.

INFECTIOUS DISEASES (45 HOURS)

- Proper taking of anamnesis with special reference to infectious diseases – anamnesis of the current disease by dates, anamnesis by systems and epidemiological survey.
- Examination of the respiratory tract with special reference to alterations in the oral cavity, tonsils and lymph nodes.
- Performing meningeal signs and basic neurological examination of patients.
- Observing the procedure of lumbar puncture and interpreting the cytobiochemical findings of cerebrospinal fluid.
- Examination of icteric patients, liver and spleen palpation.
- Examination of patients with intestinal infections, proper taking of anamnesis, assessing the degree of dehydration.
- Examination of patients with rash fevers, observing typical efflorescence.
- Examination of patients with skin and mucous membrane infections, observing changes which are pathognomonic for certain infectious diseases.
- Observing clinical manifestations in haemorrhagic fevers and observing initial signs of the haemorrhagic diathesis development.
- Examination of patients in septic condition, identifying certain characteristics in clinical findings.
- Examination of patients with HIV, introducing the characteristic anamnestic, epidemiological and clinical features of the disease.
- Interpretation of complete blood count in certain infectious diseases, practical application of knowledge from clinical practice.
- Biochemistry depending on the infectious disease, interpreting the results of microbiological testing.

NEUROLOGY (15 HOURS)

The catalogue of skills which a student is to master.

- Proper taking of neurological anamnesis.
- Mastering the neurological examination technique – head, neck, cranial nerves.
- Mastering the neurological examination technique – motility and sensibility.
- Mastering the neurological examination technique – pyramidal and extrapyramidal system.
- Mastering the neurological examination technique – cerebellum.
- Detection and clinical significance of gait and movement disorders.
- Introducing the basic diagnostic methods in neurology.
- Observation of the lumbar puncture procedure and clinical significance of cytobiochemical findings and findings of isoelectric focusing of cerebrospinal fluid.
- Introducing urgent conditions in neurology.
- Differential diagnostics of coma.
- Differential diagnostics of the crisis of consciousness.
- Headaches – differential diagnostic guidelines.
- Pain syndromes in neurology.
- Early detection of a stroke.
- Specifics of therapy in neurology.

PSYCHIATRY (15 HOURS)

The student, with the teacher or associate of the Department of Psychiatry and Psychological Medicine, observes the work in the admission clinic, does patient rounds, and observes the work in the post-hospital clinic.

- Mastering the skills of the psychiatric diagnostic interview.
- Considering the need for additional diagnostic methods.
- Considering differential diagnosis.
- Learning to keep medical records.
- Making a patient car plan.
- Learning to determine appropriate psychopharmaceuticals for a particular patient.
- Monitoring the effects of psychopharmacotherapy in a particular patient.
- Monitoring side effects of psychopharmaceuticals in a particular patient.

DERMATOVENEREOLOGY (15 HOURS)

- Taking and interpreting anamnestic data.
- Objective examination of skin and visible mucosa.
- Palpation of regional lymph nodes (determining their size, consistency, mobility and soreness).
- Vitropression technique and interpretation of its findings.
- Technique of scraping the skin surface and interpretation of its findings.
- The technique of obtaining the material for the native microscopic examination.
- Electrocauterization technique.
- Excochleation technique.
- Basic principles of local dermatological therapy (placement of dressings, placement of occlusive bandages).

For additional evaluation of knowledge, the students should master:

- Pathogenesis and pathohistology of dermatoses.
- Making a basic algorithm of therapy for certain dermatoses.

Further acquisition of skills

- The students should be introduced to differential diagnosis of certain dermatoses.
- For certain dermatoses, the student should demonstrate knowledge of data found in recommended literature.
- The students should demonstrate the ability to critically determine therapy of certain dermatoses.

SURGERY (30 HOURS)

The basics of surgery

- Interpreting the specificity of anamnesis of surgical and injured patients.
- Performing a complete examination of surgical patients.
- Applying aseptic techniques in surgery / preparation of the surgical field, surgeon's hands, instruments, etc.
- Performing and interpreting the results of the digital rectal examination.
- Performing the digital exploration of other natural orifices in surgical patients.
- Applying numerical systems to assess the severity of injuries and the condition of the injured patient.
- Setting priorities in the care of injured patients.
- Performing aseptic preparation of the wound for surgical treatment; choosing the right antiseptics for the wound toilet and irrigation; applying appropriate instruments for surgical treatment of the wound.
- Preparing appropriate suture material for surgical treatment of the wound.
- Performing surgical treatment of the wound
- Mastering wound suturing.
- Determining the method and implementing anti-tetanus protection after wound treatment.
- Determining and implementing the correct dressing of slow-healing wounds.
- Performing the incision, evacuation and drainage of a localized purulent infection.
- Recognizing the form and type of shock according to clinical and laboratory parameters.
- Determine an adequate venous approach for patients in shock.
- Determining the plan of initial shock therapy and implementing it.
- Determining the percentage of the burned body surface.
- Applying tests for determining the depth of the burn.
- Determining the best way to treat burns according to the criteria and implement it.
- Performing the local treatment of the burn and then further local treatment.
- Determining the minimum of functional and laboratory preoperative diagnostics for a surgical patient.
- Determining daily needs of patients regarding water, electrolytes and nutritious elements.
- Performing a pleural puncture.
- Performing a knee joint puncture.
- Applying the gastric probe and nasogastric suction.
- Applying autotransfusion in injured patients with signs of internal bleeding.
- Determining the correct manner of care of surgical patients.
- Applying all techniques of basic and advanced cardiopulmonary resuscitation.
- Mastering all practical techniques of venous approach in surgical patients. Anaesthesia with perioperative medicine.

Anesthesia with perioperative medicine

- Preoperative assessment and preparation of the patient.
- Implementing premedication.
- Placing an intravenous cannula and giving an intramuscular injection.
- Using a face mask and ventilating over it.
- Placing a laryngeal mask.
- Assisting the endotracheal intubation.
- Monitoring patients during general anesthesia.
- Postanaesthetic supervision.

- Monitoring critically ill patients.
- Assessing a patient's hydration and the plan of fluid compensation.
- Postoperative pain therapy.

Reanimation of a patient

- Basic and complex measurements of reanimation in adult patients (work on a model).
- Basic and complex measurements of reanimation in child patients (work on a model).

Thoracic surgery

- Recognizing the pneumothorax, rib fractures and other injuries of the thorax.
- Recognizing the congenital thorax anomalies.
- Performing a complete emergency thoracentesis in tension pneumothorax.
- Observing the fluid effusion in the pleural space and determining the guidelines for further therapy.
- Performing a complete examination of the breast, armpits and neck and interpreting the results.
- Observing larger shadows / infiltrations / on X-rays of the lungs.

Plastic and reconstructive surgery

- Performing the primary surgical treatment of the burn and continuing the further local treatment.
- Recognizing the melanocyte skin tumour and determining further procedures.
- Identifying purulent infections of the hand and determining the kind and type of surgical treatment.

Abdominal surgery

- Recognizing the signs of umbilical, femoral and inguinal hernia as well as scar hernia.
- Performing a detailed surgical examination of the abdomen and interpreting the results.
- Recognizing the signs of the acute abdomen and initiating diagnostics and basic therapy.
- Recognizing the signs of ileus and initiating diagnostics and basic therapy.
- Recognizing the signs of gastrointestinal bleeding and initiating diagnostics and basic therapy.
- Recognizing the signs of intraperitoneal bleeding and initiating diagnostics and basic therapy.
- Recognizing the signs of ascites and initiating diagnostics and therapeutic procedures.
- Recognizing congenital anomalies of the abdominal wall in children.

Urology

- Identifying the urinary syndrome and setting the scheme for further treatment.
- Recognizing the signs of urolithiasis and determining further treatment.
- Recognizing the signs of retention of urine and determining further procedures and treatment.
- Identifying the enlarged prostate on the digital rectal examination.
- Performing the examination of the scrotal sac contents.
- Performing a simple catheterization of the urinary bladder.

Neurosurgery

- Performing a general and neurological examination in patients with preserved and compromised consciousness.
- Approaching the comatose patient and determining further diagnostics and treatment based on the clinic.
- Identifying the signs of intracranial hypertension.
- Identifying the signs and symptoms of the lumbar compressive radiculopathy; identifying the signs and symptoms of the cervical compressive myeloradiculopathy.
- Interpreting the symptoms and signs of lesions of peripheral nerves.
- Interpreting the indication for the lumbar punction in neurosurgery.

Cardiovascular surgery

- Performing a complete angiology examination / inspection, palpation, auscultation.
- Recognizing acute phlebitis.
- Identifying the clinically manifested deep venous thrombosis.
- Recognizing the signs of acute ischemia of extremities and determining further procedures.
- Determining the measures of prevention and treatment of the diabetic foot.
- Determining the basic clinical minimum in the diagnosis of venous insufficiency.
- Oedema of the extremities and procedures.
- Determining available artery aneurisms, diagnostics and indications for surgical treatment.
- Murmur in the neck and its significance.

Orthopedics with traumatology

- Examination of the bone and joint system, orthopedic measurements and interpretation of findings.
- Bone and joint trauma and indications for temporary and definitive care.
- Installation of adequate transport and therapeutic immobilization.
- Soft tissue injuries / muscles, tendons, ligaments / in bone and joint trauma and their care.
- Recognizing the most common congenital malformations of the locomotor system in children and determining the procedure.
- Identifying complications of bone and joint trauma.
- Identifying and treating infections of bone and joint trauma.

PEDIATRICS (30 HOURS)

Anamnesis

- Introducing the basic elements of anamnesis and the specifics of anamnesis in pediatrics (heteroanamnesis), and proper taking of anamnesis.
- Special reference to personal anamnesis (prenatal, perinatal and early postnatal period, nutrition survey, vaccinations, drug allergies, especially in new-borns, infants, young and school children).
- Specifics of anamnesis in adolescents.
- Specifics of socioepidemiological survey.

Physical examination

- Mastering the skill of physical examination depending on the age of the patient with its specifics.
- Measuring the body temperature, body weight and head circumference.
- Examination of the head in new-borns and infants (examination of the large and small fontanelles).
- Assessment of nutritional status and degree of dehydration.
- Hip examination.
- Atavistic reflexes.
- Recognizing the signs of rachitis.
- Assessment of growth, development and puberty.
- Skin examination (recognizing the signs of dehydration, rash diseases, allergies and haemorrhage).
- Assessment of the state of consciousness.
- Signs of convulsions as one of the urgent conditions.
- Recognizing the signs of anaphylactic shock and therapy.
- Examination of the respiratory system includes measurement of respiration and knowledge of respiratory reference values according to age, as well as detection of deviations from normal respiratory murmur and registration of accompanying sound phenomena.
- Examination of the cardiovascular system includes measurement of pulse, blood pressure and comparison with reference values for age and determination of the presence of murmur.
- Liver and spleen palpation (referential values of dimensions depending on age).
- Knowledge of normal psychomotor development and recognition of deviations in psychomotor development.
- Recognizing anomalies.
- Recognizing basic characteristics of hereditary diseases.
- Introducing basic diagnostic procedures and elements of differential diagnosis and therapy (drug of choice and dose according to age and body weight).

GYNECOLOGY AND OBSTETRICS (30 HOURS)

1. Admission clinic

- Taking anamnesis (gynecological and obstetrical),
- Performing a vaginal speculum examination and a bimanual examination (rectal).

2. Colposcopy clinic

- Demonstration of taking and practical taking of a vaginal swab, cervical swab, Pap smear.
- Demonstration of performing colposcopic examination and normal and pathological colposcopic findings.

3. Ultrasound clinic

- Observing the ultrasound examinations of gynecological and obstetric patients and interventions under ultrasound control.

4. Outpatient interventions in gynecology

- Referral and preparation of the patient for small gynecological interventions.
- Introduction to instruments for small gynecological interventions.
- Demonstration of taking a clip – biopsy of the external genitalia and cervix.
- Demonstration of exploratory curettage.
- Demonstration of the patient's preparation for termination of pregnancy.
- Demonstration of cervical canal dilatation and instrumental evacuation of the uterine cavity contents.

5. Day hospital

- Performing cardiotocography and interpretation of normal and pathological CTG record.
- Demonstration of oxytocin test performance and interpretation of findings.

6. Surgical block

- Demonstration and treatment of operative wounds.
- Presence in the operating room, introduction to the work in the operating room and observation of the operation (caesarean section, hysterectomy, adnexectomy).
- If possible – assisting in the surgery.
- Observation and performance of endoscopic procedures in gynecology (laparoscopy, hysteroscopy).

7. Maternity hospital

- Taking the obstetrics anamnesis.
- Preparing the woman in labour and obstetrician for examination.
- External examination of the pregnant woman, taking pelvic measures.
- Internal examination of the pregnant woman and the woman in labour.
- Forming the obstetrics history.
- Attendance and participation in the management of labour under the control of an assistant (examination of the mother in the phase of dilation and expulsion, squeezing the placenta, examination of the placenta and membranes).

- Monitoring the mother's vital parameters.
- Introducing the procedure of caring for a new-born in the delivery room, resuscitation of the new-born, writing documentation for the new-born.
- Observing the preparation for obstetric interventions and possible participation in them.

8. Department of the midwives

- Monitoring the evolution of the uterus and the establishment of lactation.
- Episiotomy control.
- Monitoring the mother after a caesarean section.
- Treatment of the surgical wound (after the caesarean section and episiotomy).

MEDICAL REHABILITATION (15 HOURS)

- Introduction to the work and organization of specialized institutions in which medical rehabilitation is conducted.
- Treatment and evaluation of patients in medical rehabilitation.
- Basics of practical application of physical therapy procedures in medical rehabilitation.
- Medical rehabilitation of patients after trauma and polytrauma.
- Medical rehabilitation of patients after amputation.
- Medical rehabilitation of patients with the lesion of peripheral nerves.
- Habilitation of children with cerebral palsy.
- The most common conditions in children and youth in which habilitation and rehabilitation are carried out.
- Medical rehabilitation of patients with lumbar and cervical syndrome.
- Medical rehabilitation of patients with hemiplegia syndrome.
- Medical rehabilitation of patients with paraplegia and quadriplegia.
- Medical rehabilitation of patients with inflammatory rheumatic diseases.
- Medical rehabilitation of patients with degenerative rheumatic diseases.

EMERGENCY MEDICINE (30 HOURS)

- Airway patency assessment; Heimlich's manoeuvre.
- Basic airway maintenance manoeuvres (anatomical position, oropharyngeal tube insertion).
- Advanced airway maintenance and securing techniques (laryngeal mask insertion, I-gel mask, combitube, endotracheal tube and cricothyroidotomy on a mannequin).
- Artificial mouth-mouth breathing, mouth-pocket mask, self-expanding resuscitation balloon mask, self-expanding resuscitation balloon extratracheal mechanical means, self-expanding resuscitation balloon endotracheal tube).
- Chest compression.
- Basic CPR measurements.
- Defibrillation with automatic external defibrillator and manual defibrillator.
- Intravascular access (peripheral intravenous and intraosseous needle insertion).
- Preparation and placement of intravenous infusion.
- ECG recognition of cardiac arrest and care.
- ECG recognition of peri-arrest arrhythmias and care.
- Cardioversion.
- Immobilization of the spine and extremities.
- Placement of a nasogastric tube; gastric lavage.
- Urinary catheter placement.
- Thoracentesis (on a mannequin).
- Pericardiocentesis (on a mannequin)
- Transport of the critically ill and injured.

ONCOLOGY (15 HOURS)

- Introduction to the basic principles and specifics of the anamnesis and clinical examination of a cancer patient (examination of the breast, palpation of lymph nodes, abdomen, digitorectal examination, gynecological examination).
- Determining the performance status.
- Introduction to oncological diagnostics and therapy procedures (endoscopic procedures, pleural, abdominal puncture).
- Psychological approach to patients and their families.
- Case reports of oncology patients with special emphasis on the diagnosis and treatment of individual localizations of malignant tumours.

GERIATRICS (15 HOURS)

Practical classes consist of getting acquainted with the specifics of the geriatric service and is conducted in 3 segments: introduction to work in geriatric institutions, introduction to work in the Healthcare Centre, introduction to work at the University Clinical Centre of Vojvodina, Oncology Institute of Vojvodina and Institute for Pulmonary Diseases of Vojvodina.

- Introduction to geriatrics
- Anamnesis in geriatrics
- Anamnestic conclusion
- Demonstration of the complete physical examination
- Specifics of therapy
- Care of the elderly inpatient facilities.

CLINICAL PRACTICAL TRAINING (330 HOURS)

Internal Medicine (110 hours), Surgery (110 hours),
Pediatrics (55 hours), Gynecology and Obstetrics (55 hours)

- Work in the admission clinics of Surgery, Internal Medicine, Pediatrics and Gynecology and Obstetrics.
- Work in the specialized clinics of Surgery, Internal Medicine, Pediatrics and Gynecology and Obstetrics.
- Work in the departments of Surgery, Internal Medicine, Pediatrics and Gynecology and Obstetrics.
- Work in the maternity hospital.

Students perform practical classes during clinical practical teaching independently under the supervision of teachers and associates at clinics in certain fields of medicine, which includes:

- practical work with patients,
- independent conduct of clinical skills,
- demonstration of clinical skills,
- consultations.

The teacher, in charge of practical classes, keeps records of regular attendance and student activities during professional clinical practice. After fulfilling all the necessary requirements, the student does not receive a grade, and the estimated number of ECTS points is entered in the index.

Third year

CLINICAL PROPEDEUTICS (IWS 30 HOURS)

date from _____ to _____

....
(date) (teaching base) (signature and facsimile of the mentor)

Third year

CLINICAL PROPEDEUTICS (IWS 30 HOURS)

date from _____ to _____

.....	.....	.....
(date)	(teaching base)	(signature and facsimile of the mentor)

Fourth year

INTERNAL MEDICINE (IWS 120 HOURS)

During practical classes, the student is required to actively participate in the work of all branches and sectors of the Internal Medicine subject according to a certain program under the supervision of two mentors: 1. Sremska Kamenica Institute, 2. Internal Medicine Clinic, to master skills while working.

1. date from _____ to _____

....
(date) (teaching base) (signature and facsimile of the mentor)

2. date from _____ to _____

....
(date) (teaching base) (signature and facsimile of the mentor)

INFECTIOUS DISEASES (IWS 45 HOURS)

date from _____ to _____

....
(date) (teaching base) (signature and facsimile of the mentor)

DERMATOVENEREOLOGY (IWS 15 HOURS)

date from _____ to _____

....
(date) (teaching base) (signature and facsimile of the mentor)

NEUROLOGY (IWS 15 HOURS)

date from _____ to _____

....
(date) (teaching base) (signature and facsimile of the mentor)

PSYCHIATRY (IWS 15 HOURS)

date from _____ to _____

....
(date) (teaching base) (signature and facsimile of the mentor)

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....
(date) (teaching base) (signature and facsimile of the mentor)

PSYCHIATRY (IWS 15 HOURS)

date from _____ to _____

....
(date) (teaching base) (signature and facsimile of the mentor)

Fifth year

SURGERY (IWS 30 HOURS)

date from _____ to _____

....
(date) (teaching base) (signature and facsimile of the mentor)

GYNECOLOGY AND OBSTETRICS (IWS 30 HOURS)

date from _____ to _____

....
(date) (teaching base) (signature and facsimile of the mentor)

PEDIATRICS IWS (30 HOURS)

date from _____ to _____

....
(date) (teaching base) (signature and facsimile of the mentor)

Fifth year

SURGERY (IWS 30 HOURS)

date from _____ to _____

....
(date) (teaching base) (signature and facsimile of the mentor)

GYNECOLOGY AND OBSTETRICS (IWS 30 HOURS)

date from _____ to _____

....
(date) (teaching base) (signature and facsimile of the mentor)

PEDIATRICS IWS (30 HOURS)

date from _____ to _____

....
(date) (teaching base) (signature and facsimile of the mentor)

Sixth year

MEDICAL REHABILITATION (IWS 15 HOURS)

date from _____ to _____

....
(date) (teaching base) (signature and facsimile of the mentor)

EMERGENCY MEDICINE (IWS 30 HOURS)

date from _____ to _____

....
(date) (teaching base) (signature and facsimile of the mentor)

ONCOLOGY (IWS 15 HOURS)

date from _____ to _____

....
(date) (teaching base) (signature and facsimile of the mentor)

GERIATRICS (IWS 15 HOURS)

date from _____ to _____

....
(date) (teaching base) (signature and facsimile of the mentor)

Sixth year

MEDICAL REHABILITATION (IWS 15 HOURS)

date from _____ to _____

....
(date) (teaching base) (signature and facsimile of the mentor)

EMERGENCY MEDICINE (IWS 30 HOURS)

date from _____ to _____

....
(date) (teaching base) (signature and facsimile of the mentor)

ONCOLOGY (IWS 15 HOURS)

date from _____ to _____

....
(date) (teaching base) (signature and facsimile of the mentor)

GERIATRICS (IWS 15 HOURS)

date from _____ to _____

....
(date) (teaching base) (signature and facsimile of the mentor)

NAME AND SURNAME OF THE STUDENT:

_____

STUDY PROGRAM: _____

INDEX NUMBER: _____

SIXTH YEAR OF MEDICINE

– CLINICAL PRACTICAL TRAINING –

It includes work with patients in admission departments, departments, outpatient clinic, maternity hospital in the following subjects (22 HOURS OF PRACTICAL CLASSES WEEKLY, TOTAL OF 330 HOURS):

INTERNAL MEDICINE (110 HOURS – 5 WEEKS)

During practical classes, the student is required to actively participate in the work of all branches and sectors of the Internal Medicine subject according to a certain program under the supervision of two mentors: 1. Sremska Kamenica Institute, 2. Internal Medicine Clinic, to master skills while working.

Cardiology

Planning of urgent and delayed diagnostics in cardiovascular patients, planning and administering therapy in cardiovascular patients, defibrillation and electroconversion, endotracheal intubation and cardiopulmonary reanimation, interpreting the findings of the non-invasive cardiovascular diagnostics: echocardiographic findings, ergometric test, stress echocardiographic findings, Doppler blood vessel findings, perfusion scintigraphy. Interpreting the findings of the invasive cardiovascular diagnostics and introducing contemporary and invasive therapeutic methods. The role of the primary healthcare practitioner in diagnostics and therapy of the acute myocardium infarction, lung oedema, cardiac insufficiency. Recognition of rhythmic disorders and conduction disturbances and their therapy: antiarrhythmics and pacemakers and cardioverter defibrillators, resynchronization therapy. The role the primary healthcare practitioner in early diagnosis, monitoring and treatment of patients with hypertension. Differential diagnosis of hypertension. The importance of preoperative preparation of patients with hypertension, cardiac insufficiency and other cardiovascular disorders. The role of the primary healthcare practitioner in the prevention of bacterial endocarditis, monitoring of patients with cardiac defects and artificial valves and their preoperative preparation. The role of the primary healthcare practitioner in monitoring pregnant women and pregnant women with hypertension and other cardiovascular disorders.

CARDIOLOGY

date from _____ to _____

.....	.....	.....
(date)	(teaching base)	(signature and facsimile of the mentor)

Pulmonology

Planning of urgent and delayed diagnostics in pulmonary patients. Performing the pleural puncture, interpretation of findings. Bronchological examination. Planning and administering therapy in pulmonary patients. Assisting in performing pulmonary functions and interpreting the findings. Blood sampling for gas analysis, interpretation of findings, planning and application of oxygen therapy. Analysis and interpretation of findings of lung radiography, performing lung radioscopy. Conducting and interpreting allergy tests. Application of de-obstructive parenteral therapy and inhalation de-obstructive therapy. Physical therapy in patients with obstructive pulmonary disease. Diagnostics and treatment of lung tuberculosis. The role of the primary healthcare practitioner in diagnostics and therapy of malignant lung and thorax diseases. Diagnostics, therapy and prevention of lung thromboembolism. The role of the primary healthcare practitioner in preoperative treatment preparation of pulmonary patients.

PULMONOLOGY

date from _____ to _____

.....	.....	.....
(date)	(teaching base)	(signature and facsimile of the mentor)

NAME AND SURNAME OF THE STUDENT:

_____

STUDY PROGRAM: _____

INDEX NUMBER: _____

SIXTH YEAR OF MEDICINE

– CLINICAL PRACTICAL TRAINING –

It includes work with patients in admission departments, departments, outpatient clinic, maternity hospital in the following subjects (22 HOURS OF PRACTICAL CLASSES WEEKLY, TOTAL OF 330 HOURS):

INTERNAL MEDICINE (110 HOURS – 5 WEEKS)

During practical classes, the student is required to actively participate in the work of all branches and sectors of the Internal Medicine subject according to a certain program under the supervision of two mentors: 1. Sremska Kamenica Institute, 2. Internal Medicine Clinic, to master skills while working.

Cardiology

Planning of urgent and delayed diagnostics in cardiovascular patients, planning and administering therapy in cardiovascular patients, defibrillation and electroconversion, endotracheal intubation and cardiopulmonary reanimation, interpreting the findings of the non-invasive cardiovascular diagnostics: echocardiographic findings, ergometric test, stress echocardiographic findings, Doppler blood vessel findings, perfusion scintigraphy. Interpreting the findings of the invasive cardiovascular diagnostics and introducing contemporary and invasive therapeutic methods. The role of the primary healthcare practitioner in diagnostics and therapy of the acute myocardium infarction, lung oedema, cardiac insufficiency. Recognition of rhythmic disorders and conduction disturbances and their therapy: antiarrhythmics and pacemakers and cardioverter defibrillators, resynchronization therapy. The role the primary healthcare practitioner in early diagnosis, monitoring and treatment of patients with hypertension. Differential diagnosis of hypertension. The importance of preoperative preparation of patients with hypertension, cardiac insufficiency and other cardiovascular disorders. The role of the primary healthcare practitioner in the prevention of bacterial endocarditis, monitoring of patients with cardiac defects and artificial valves and their preoperative preparation. The role of the primary healthcare practitioner in monitoring pregnant women and pregnant women with hypertension and other cardiovascular disorders.

CARDIOLOGY

date from _____ to _____

.....	.....	.....
(date)	(teaching base)	(signature and facsimile of the mentor)

Pulmonology

Planning of urgent and delayed diagnostics in pulmonary patients. Performing the pleural puncture, interpretation of findings. Bronchological examination. Planning and administering therapy in pulmonary patients. Assisting in performing pulmonary functions and interpreting the findings. Blood sampling for gas analysis, interpretation of findings, planning and application of oxygen therapy. Analysis and interpretation of findings of lung radiography, performing lung radioscopy. Conducting and interpreting allergy tests. Application of de-obstructive parenteral therapy and inhalation de-obstructive therapy. Physical therapy in patients with obstructive pulmonary disease. Diagnostics and treatment of lung tuberculosis. The role of the primary healthcare practitioner in diagnostics and therapy of malignant lung and thorax diseases. Diagnostics, therapy and prevention of lung thromboembolism. The role of the primary healthcare practitioner in preoperative treatment preparation of pulmonary patients.

PULMONOLOGY

date from _____ to _____

.....	.....	.....
(date)	(teaching base)	(signature and facsimile of the mentor)

Gastroenterology and hepatology

Planning of urgent and delayed diagnostics in gastroenterological patients. Digitorectal examination. Planning therapy in gastroenterological patients. Performing abdominal puncture and interpreting the findings. Placement and control of nasogastric suction. SENGSTAKEN-BLAKEMORE oesophageal probe placement and monitoring. The role of the primary healthcare practitioner in gastric lavage and treatment of patients to remove various toxic substances. Macroscopic examination of stool and vomit. Taking materials for bacteriological, parasitological and biochemical examination. Ultrasonographic, endoscopic and radiological diagnostics in gastroenterohepatology. Diagnostics and therapeutic procedures in patients with gastroenterological bleeding. Indications, modalities and importance of endoscopic diagnostic and therapeutic procedures in gastroenterohepatology. Differential diagnosis of jaundice. Diagnostics and therapeutic procedures in patients with porphyria.

GASTROENTEROHEPATHOLOGY

date from _____ to _____

.....	.....	.....
(date)	(teaching base)	(signature and facsimile of the mentor)

Endocrinology and metabolic diseases (18 hours)

Prevention of the occurrence of diabetes (risk factors). Diagnostic procedures and monitoring of patients with type 1 and type 2 diabetes, the importance of self-monitoring and its implementation – the role of the primary healthcare practitioner. Treating diabetic patients with a dietary regime (determining the total energy intake depending on age, physical activity, during pregnancy, adequate composition of the dietary regime, degree of physical activity, etc.). Oral hypoglycaemics, combinations of oral hypoglycaemics and insulin, etc. and training of patients for self-monitor. Application of insulin therapy and various regimes of insulin therapy (introducing various insulin preparations, correct preparation and application of certain insulin preparations), self-monitoring of patients on insulin therapy – from the standpoint of the primary healthcare practitioners. Urgent and delayed diagnostics and therapy of diabetic ketoacidosis – ketoacidosis coma and hyperosmolar coma. Urgent and delayed diagnostics and therapy of hypoglycaemia and hypoglycaemic coma (the importance of the primary healthcare practitioner. Procedures in prevention, diagnostics and treatment of chronic degenerative complications of diabetes. The role of the primary healthcare practitioner in prevention and early diagnosis of primary osteoporosis (recognizing risk factors, *Frax* assessment). Algorithms in diagnostics and therapy of osteoporosis (introducing biochemical and diagnostic procedures). Secondary osteoporosis. Prevention, diagnostics and treatment of dyslipoproteinemia (implementation of various dietary regimes, physical activity, medication therapy). Measuring body height, body weight, determining body nutrition, measuring waist circumference, hip circumference, determining the WHR index, measuring body composition by implementing the bioelectrical impedance method. The role of the primary healthcare practitioner in prevention and treatment of obesity and metabolic syndrome. Electrolyte disorders. Urgent and delayed diagnosis and treatment of hypercalcemia and hypocalcaemia. Endocrine hypertension, screening and the role of the primary healthcare practitioner in diagnostics and treatment. Screening and the role of the primary healthcare practitioner in diagnostics and treatment of the Cushing syndrome and primary hyperaldosteronism. Pheochromocytoma and paraganglioma screening and the role of the primary healthcare practitioner in diagnostics and treatment of hypertensive crisis in pheochromocytoma. Urgent and delayed diagnostics and therapy of acute adrenal insufficiency. Hyperthyroidism, screening and diagnostic-therapeutic algorithms. Urgent and delayed diagnostics of thyrotoxic crisis. Hypothyroidism, screening diagnostic and therapeutic algorithms. Diagnosis and differential diagnosis and therapy of hyperprolactinaemia from the standpoint of the primary healthcare practitioner. Fertility disorder in endocrinopathies (clinical aspects and anthropometric measurements). The role of the primary healthcare practitioner in monitoring pregnant women with endocrinological disorders. The importance preoperative preparation of endocrinological patients.

ENDOCRINOLOGY

date from _____ to _____

.....	.....	.....
(date)	(teaching base)	(signature and facsimile of the mentor)

Gastroenterology and hepatology

Planning of urgent and delayed diagnostics in gastroenterological patients. Digitorectal examination. Planning therapy in gastroenterological patients. Performing abdominal puncture and interpreting the findings. Placement and control of nasogastric suction. SENGSTAKEN-BLAKEMORE oesophageal probe placement and monitoring. The role of the primary healthcare practitioner in gastric lavage and treatment of patients to remove various toxic substances. Macroscopic examination of stool and vomit. Taking materials for bacteriological, parasitological and biochemical examination. Ultrasonographic, endoscopic and radiological diagnostics in gastroenterohepatology. Diagnostics and therapeutic procedures in patients with gastroenterological bleeding. Indications, modalities and importance of endoscopic diagnostic and therapeutic procedures in gastroenterohepatology. Differential diagnosis of jaundice. Diagnostics and therapeutic procedures in patients with porphyria.

GASTROENTEROHEPATHOLOGY

date from _____ to _____

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(date)	(teaching base)	(signature and facsimile of the mentor)

Endocrinology and metabolic diseases (18 hours)

Prevention of the occurrence of diabetes (risk factors). Diagnostic procedures and monitoring of patients with type 1 and type 2 diabetes, the importance of self-monitoring and its implementation – the role of the primary healthcare practitioner. Treating diabetic patients with a dietary regime (determining the total energy intake depending on age, physical activity, during pregnancy, adequate composition of the dietary regime, degree of physical activity, etc.). Oral hypoglycaemics, combinations of oral hypoglycaemics and insulin, etc. and training of patients for self-monitor. Application of insulin therapy and various regimes of insulin therapy (introducing various insulin preparations, correct preparation and application of certain insulin preparations), self-monitoring of patients on insulin therapy – from the standpoint of the primary healthcare practitioners. Urgent and delayed diagnostics and therapy of diabetic ketoacidosis – ketoacidosis coma and hyperosmolar coma. Urgent and delayed diagnostics and therapy of hypoglycaemia and hypoglycaemic coma (the importance of the primary healthcare practitioner. Procedures in prevention, diagnostics and treatment of chronic degenerative complications of diabetes. The role of the primary healthcare practitioner in prevention and early diagnosis of primary osteoporosis (recognizing risk factors, *Frax* assessment). Algorithms in diagnostics and therapy of osteoporosis (introducing biochemical and diagnostic procedures). Secondary osteoporosis. Prevention, diagnostics and treatment of dyslipoproteinemia (implementation of various dietary regimes, physical activity, medication therapy). Measuring body height, body weight, determining body nutrition, measuring waist circumference, hip circumference, determining the WHR index, measuring body composition by implementing the bioelectrical impedance method. The role of the primary healthcare practitioner in prevention and treatment of obesity and metabolic syndrome. Electrolyte disorders. Urgent and delayed diagnosis and treatment of hypercalcemia and hypocalcaemia. Endocrine hypertension, screening and the role of the primary healthcare practitioner in diagnostics and treatment. Screening and the role of the primary healthcare practitioner in diagnostics and treatment of the Cushing syndrome and primary hyperaldosteronism. Pheochromocytoma and paraganglioma screening and the role of the primary healthcare practitioner in diagnostics and treatment of hypertensive crisis in pheochromocytoma. Urgent and delayed diagnostics and therapy of acute adrenal insufficiency. Hyperthyroidism, screening and diagnostic-therapeutic algorithms. Urgent and delayed diagnostics of thyrotoxic crisis. Hypothyroidism, screening diagnostic and therapeutic algorithms. Diagnosis and differential diagnosis and therapy of hyperprolactinaemia from the standpoint of the primary healthcare practitioner. Fertility disorder in endocrinopathies (clinical aspects and anthropometric measurements). The role of the primary healthcare practitioner in monitoring pregnant women with endocrinological disorders. The importance preoperative preparation of endocrinological patients.

ENDOCRINOLOGY

date from _____ to _____

.....	.....	.....
(date)	(teaching base)	(signature and facsimile of the mentor)

Nephrology, clinical immunology and rheumatology

Disorder diagnosis in patients with pathological urinary findings: diagnostic algorithms of proteinuria and haematuria. Interpretation of finding of the ultrasound and radiological diagnostics. Importance and measures necessary in prevention of the occurrence of chronic kidney insufficiency. Diagnostic procedures and monitoring of patients with the first, second and third stage of chronic kidney insufficiency, the role of the primary healthcare practitioner. The role of the primary healthcare practitioner in the treatment of chronic kidney insufficiency, as well as hypertension in kidney insufficiency. Urgent and delayed diagnostics in patients with metabolic acidosis. Prevention of the occurrence of acute kidney insufficiency. Prevention, diagnostic and treatment procedures of anaemia related to kidney insufficiency. Prevention, diagnostic and treatment procedures of bone disorders related to chronic kidney insufficiency. Electrolytic disorders in patients with kidney function disorder. Handling of patients on haemodialysis. Handling of patients with a transplanted kidney. Importance of preoperative preparation of patients with kidney function disorder. Algorithm of diagnostics and therapy of urinary infections. Treatment of acute colic attack, monitoring and treatment of patients with urolithiasis. Diagnostics, differential diagnostics and treatment of patients suspected of immunodeficiencies. The importance of differential diagnosis of arthritis for the primary healthcare practitioner. Treatment of rheumatoid arthritis. Treatment of autoimmune diseases with immunosuppressive therapy. Complications caused by the treatment with immunosuppressive therapy.

NEPHROLOGY, CLINICAL IMMUNOLOGY AND RHEUMATOLOGY

date from _____ to _____

.....	.....	.....
(date)	(teaching base)	(signature and facsimile of the mentor)

Nephrology, clinical immunology and rheumatology

Disorder diagnosis in patients with pathological urinary findings: diagnostic algorithms of proteinuria and haematuria. Interpretation of finding of the ultrasound and radiological diagnostics. Importance and measures necessary in prevention of the occurrence of chronic kidney insufficiency. Diagnostic procedures and monitoring of patients with the first, second and third stage of chronic kidney insufficiency, the role of the primary healthcare practitioner. The role of the primary healthcare practitioner in the treatment of chronic kidney insufficiency, as well as hypertension in kidney insufficiency. Urgent and delayed diagnostics in patients with metabolic acidosis. Prevention of the occurrence of acute kidney insufficiency. Prevention, diagnostic and treatment procedures of anaemia related to kidney insufficiency. Prevention, diagnostic and treatment procedures of bone disorders related to chronic kidney insufficiency. Electrolytic disorders in patients with kidney function disorder. Handling of patients on haemodialysis. Handling of patients with a transplanted kidney. Importance of preoperative preparation of patients with kidney function disorder. Algorithm of diagnostics and therapy of urinary infections. Treatment of acute colic attack, monitoring and treatment of patients with urolithiasis. Diagnostics, differential diagnostics and treatment of patients suspected of immunodeficiencies. The importance of differential diagnosis of arthritis for the primary healthcare practitioner. Treatment of rheumatoid arthritis. Treatment of autoimmune diseases with immunosuppressive therapy. Complications caused by the treatment with immunosuppressive therapy.

NEPHROLOGY, CLINICAL IMMUNOLOGY AND RHEUMATOLOGY

date from _____ to _____

.....	.....	.....
(date)	(teaching base)	(signature and facsimile of the mentor)

Hematology

Differential diagnosis of anaemia at the level of primary healthcare. Diagnostic algorithm of sideropenic anaemia and sideropenic conditions. Therapeutic algorithm of sideropenic anaemia and sideropenic conditions. Diagnostic algorithm of anaemia in chronic diseases. Urgent and delayed diagnostics of haemolytic anaemia. The importance of anaemic syndrome in the elderly population. Indications for erythrocyte transfusion and monitoring of polytransfused patients. Differential diagnosis of haemorrhagic syndrome at the level of primary healthcare. Urgent and delayed diagnostics and therapy of thrombocytopenia. Outpatient monitoring of patients with haemophilia. Disseminated intravascular coagulation. Urgent diagnostics and therapy of macroangiopathic haemolytic anaemia. Indications for thrombocyte transfusion, plasma derivatives and coagulation factors. Antithrombotic prophylaxis: indications, patient follow-up and procedures of primary healthcare practitioners for drug overdose. Urgent and delayed diagnostics of malignant haematological diseases. Principles of cytostatic therapy and its complications. Outpatient monitoring of patients with malignant haematological diseases. Prevention and treatment of infections in haematological patients in outpatient conditions. Differential diagnosis of leucocytosis and leukopenia in outpatient conditions. Medications as potential causes and inducers of haematological diseases. Diagnostics of splenomegaly and interpretation of findings. Diagnosis of lymphadenomegaly in outpatient conditions. Bone marrow puncture: indications, interpretation of findings and demonstration of the procedure. Bone biopsy: indications, importance, interpretation of findings and demonstration of the procedure. Diagnosis and therapy of haematological diseases at the molecular level: importance of indication, interpretation of findings and monitoring of patients.

HEMATOLOGY

date from _____ to _____

.....	.....	.....
(date)	(teaching base)	(signature and facsimile of the mentor)

Oncology

The role of the primary healthcare practitioner in diagnostics and monitoring of patients with oncological diseases. Monitoring patients on chemotherapy. The role of the primary healthcare practitioner in monitoring patients with terminal oncological diseases. Pain therapy.

ONCOLOGY

date from _____ to _____

.....	.....	.....
(date)	(teaching base)	(signature and facsimile of the mentor)

Hematology

Differential diagnosis of anaemia at the level of primary healthcare. Diagnostic algorithm of sideropenic anaemia and sideropenic conditions. Therapeutic algorithm of sideropenic anaemia and sideropenic conditions. Diagnostic algorithm of anaemia in chronic diseases. Urgent and delayed diagnostics of haemolytic anaemia. The importance of anaemic syndrome in the elderly population. Indications for erythrocyte transfusion and monitoring of polytransfused patients. Differential diagnosis of haemorrhagic syndrome at the level of primary healthcare. Urgent and delayed diagnostics and therapy of thrombocytopenia. Outpatient monitoring of patients with haemophilia. Disseminated intravascular coagulation. Urgent diagnostics and therapy of macroangiopathic haemolytic anaemia. Indications for thrombocyte transfusion, plasma derivatives and coagulation factors. Antithrombotic prophylaxis: indications, patient follow-up and procedures of primary healthcare practitioners for drug overdose. Urgent and delayed diagnostics of malignant haematological diseases. Principles of cytostatic therapy and its complications. Outpatient monitoring of patients with malignant haematological diseases. Prevention and treatment of infections in haematological patients in outpatient conditions. Differential diagnosis of leucocytosis and leukopenia in outpatient conditions. Medications as potential causes and inducers of haematological diseases. Diagnostics of splenomegaly and interpretation of findings. Diagnosis of lymphadenomegaly in outpatient conditions. Bone marrow puncture: indications, interpretation of findings and demonstration of the procedure. Bone biopsy: indications, importance, interpretation of findings and demonstration of the procedure. Diagnosis and therapy of haematological diseases at the molecular level: importance of indication, interpretation of findings and monitoring of patients.

HEMATOLOGY

date from _____ to _____

.....	.....	.....
(date)	(teaching base)	(signature and facsimile of the mentor)

Oncology

The role of the primary healthcare practitioner in diagnostics and monitoring of patients with oncological diseases. Monitoring patients on chemotherapy. The role of the primary healthcare practitioner in monitoring patients with terminal oncological diseases. Pain therapy.

ONCOLOGY

date from _____ to _____

.....	.....	.....
(date)	(teaching base)	(signature and facsimile of the mentor)

SURGERY (110 HOURS – 5 WEEKS)

Students will contact the coordinator of the department at each Clinic, who will appoint them a mentor during their stay at the Clinic. Students will spend five working days at the Clinics with their mentor in the emergency department, operating room and outpatient clinic. In practical work with their mentors, the students will revise the skills they acquired during their studies.

Thorax surgery or Oncological surgery or Cardiovascular surgery (seven days)

date from _____ to _____

....
(date) (teaching base) (signature and facsimile of the mentor)

Pediatric surgery (seven days)

date from _____ to _____

....
(date) (teaching base) (signature and facsimile of the mentor)

Abdominal surgery or Vascular surgery or Urology (seven days)

date from _____ to _____

....
(date) (teaching base) (signature and facsimile of the mentor)

Anesthesia and Neurosurgery (seven days)

date from _____ to _____

....
(date) (teaching base) (signature and facsimile of the mentor)

Orthopedics and Plastic surgery (seven days)

date from _____ to _____

....
(date) (teaching base) (signature and facsimile of the mentor)

PEDIATRICS (55 HOURS – 2,5 WEEKS)

Cardiology/Pulmonology/Haematology (5 days)
Intensive care/General pediatrics/Infant/Neonatology (5 days)
Admission department/Gastroenterology/Endocrinology (3 days)

date from _____ to _____

....
(date) (teaching base) (signature and facsimile of the mentor)

GYNECOLOGY AND OBSTETRICS (55 HOURS – 2,5 WEEKS)

Perinatology – 5 days (admission obstetrics clinic – 2 days, delivery room – 2 days, puerperium – 1 day)

date from _____ to _____

....
(date) (teaching base) (signature and facsimile of the mentor)

Pathology of pregnancy – 2 days

date from _____ to _____

....
(date) (teaching base) (signature and facsimile of the mentor)

Gynecology – 3 days (surgical department – 1 day, conservative gynecology – 2 days)

date from _____ to _____

....
(date) (teaching base) (signature and facsimile of the mentor)

Human reproduction – 1 day

date from _____ to _____

....
(date) (teaching base) (signature and facsimile of the mentor)

Outpatient clinic – 2 days

date from _____ to _____

....
(date) (teaching base) (signature and facsimile of the mentor)

SURGERY (110 HOURS – 5 WEEKS)

Students will contact the coordinator of the department at each Clinic, who will appoint them a mentor during their stay at the Clinic. Students will spend five working days at the Clinics with their mentor in the emergency department, operating room and outpatient clinic. In practical work with their mentors, the students will revise the skills they acquired during their studies.

Thorax surgery or Oncological surgery or Cardiovascular surgery (seven days)

date from _____ to _____

....
(date) (teaching base) (signature and facsimile of the mentor)

Pediatric surgery (seven days)

date from _____ to _____

....
(date) (teaching base) (signature and facsimile of the mentor)

Abdominal surgery or Vascular surgery or Urology (seven days)

date from _____ to _____

....
(date) (teaching base) (signature and facsimile of the mentor)

Anesthesia and Neurosurgery (seven days)

date from _____ to _____

....
(date) (teaching base) (signature and facsimile of the mentor)

Orthopedics and Plastic surgery (seven days)

date from _____ to _____

....
(date) (teaching base) (signature and facsimile of the mentor)

PEDIATRICS (55 HOURS – 2,5 WEEKS)

Cardiology/Pulmonology/Haematology (5 days)
Intensive care/General pediatrics/Infant/Neonatology (5 days)
Admission department/Gastroenterology/Endocrinology (3 days)

date from _____ to _____

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(date) (teaching base) (signature and facsimile of the mentor)

GYNECOLOGY AND OBSTETRICS (55 HOURS – 2,5 WEEKS)

Perinatology – 5 days (admission obstetrics clinic – 2 days, delivery room – 2 days, puerperium – 1 day)

date from _____ to _____

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(date) (teaching base) (signature and facsimile of the mentor)

Pathology of pregnancy – 2 days

date from _____ to _____

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(date) (teaching base) (signature and facsimile of the mentor)

Gynecology – 3 days (surgical department – 1 day, conservative gynecology – 2 days)

date from _____ to _____

....
(date) (teaching base) (signature and facsimile of the mentor)

Human reproduction – 1 day

date from _____ to _____

....
(date) (teaching base) (signature and facsimile of the mentor)

Outpatient clinic – 2 days

date from _____ to _____

....
(date) (teaching base) (signature and facsimile of the mentor)

UNIVERSITY OF NOVI SAD
FACULTY OF MEDICINE
Number: _____

NAME AND SURNAME OF THE STUDENT

_____

STUDY PROGRAM _____

STUDENT REGISTRATION (INDEX-BOOK) NUMBER _____

THE DURATION OF THE STUDY PROGRAM (TOTAL NUMBER OF SEMESTERS)

_____

THE APPOINTED STUDENT ATTENDED THEORETICAL AND PRACTICAL CLASSES (TOTAL NUMBER OF SEMESTERS)

_____

THIS DOCUMENT CONFIRMS THAT THE APPOINTED STUDENT ATTENDED THEORETICAL AND PRACTICAL CLASSES ACCORDING TO THE AFOREMENTIONED STUDY PROGRAM.

VERIFIED BY AN AUTHORIZED PERSON _____

....
(date) (signature of an authorized person)

School stamp