UNIVERSITY OF KRAGUJEVAC
FACULTY OF MEDICAL SCIENCES

INTEGRATED ACADEMIC STUDIES OF MEDICINE

COURSE BOOK - STUDY PROGRAM

(Note: Press CTRL + click on the Course unit name)

CONTENTS

Study program: Integrated academic studies of medicine

Course unit: **MEDICAL CHEMISTRY**

Teachers: Manojlovic Nedeljko, Jelic Ratomir

Course status: Mandatory

ECTS: 3

Prerequisites:

For attending classes: enrolled in I semester.

For taking exam: –

Course unit objective

The objectives of the course are: acquisition of basic knowledge and skills in the field of medical chemistry; to inform/train students in general, inorganic and organic chemistry; to inform students about the basic concepts of chemistry, the structure and properties of simple and complex molecules, as well as the reactions of organic and inorganic compounds that are important for the development of processes in biological systems; to enable students to understand the chemical aspect of basic physiological and biochemical processes. The aim of the laboratory exercises is to familiarize/train students with both basic laboratory procedures and modern instrumental methods used in medical chemistry.

Learning outcomes of course unit

After completing the course in Medical Chemistry, from the student is expected: Acquiring knowledge about general chemistry and the importance of chemistry as a science; Knowledge of basic chemical concepts, chemical laws, chemical bonds, intermolecular interactions, types of chemical compounds, solutions, chemical analysis, kinetics and equilibrium, buffers, redox reactions; Acquiring knowledge about inorganic chemistry and chemistry of bioelements - properties of elements of the main groups of the periodic system of elements; Acquiring knowledge about organic chemistry - organic compounds, aliphatic and aromatic organic compounds, classification of organic compounds, primary and secondary biomolecules, amino acids, proteins, carbohydrates, lipids, nucleic acids; Skills of conducting experiments, preparing solutions, measuring pH, calculating concentrations, knowledge of buffers, physiological solutions and organic molecules important for medicine.

Course unit contents

Theoretical classes

Introduction to Medical chemistry; The importance of chemistry as a science; General chemistry; Basic chemical terms, chemical laws, chemical bonds, intermolecular interactions, types of chemical compounds, water, solutions, chemical analysis, kinetics and equilibrium, acidity of solutions, ionic product of water, pH value and pH of body fluids, redox reactions; Inorganic chemistry and chemistry of bioelements - properties of elements of the main groups of the periodic system of elements; Inorganic compounds; Acids, bases and salts; Salt hydrolysis; Chemical reactions; Types of chemical reactions; Dispersion systems; Solubility; Types of solutions; Infusion solutions; Concentration of the solution; Electrolytes; Diffusion; Dialysis; Osmosis; Buffers; Biologically important buffers; Biogenic elements, macro and microelements, properties, forms and reactions in biological systems; Organic chemistry: functional groups, chemical reactions of organic molecules in biological systems and their role, organic compounds, aliphatic and aromatic organic compounds, properties and reactivity in biological systems; Carbonyl group, aldehydes, ketones, carboxylic acids and their derivatives, properties and reactivity in biological systems; Heterocyclic compounds as components of important biomolecules; Organic compounds with nitrogen and organic compounds with sulfur, properties and reactivity; Other biologically important organic molecules; Primary biomolecules and their role and importance; Amino acids, structure, classification and significance; Peptides, peptide bonds and natural peptides and their role in the body; Proteins, structure, division and their role and importance; Carbohydrates, monosaccharides, disaccharides and polysaccharides and their role and importance; Nucleic acids; Lipids, division of lipids, fatty acids, glycerides, sterols, complex lipids, phospholipids; Secondary biomolecules and their importance; Structures of some important pharmacologically active substances; Instrumental methods in medicine, gas chromatography, liquid chromatography (HPLC), spectroscopic methods.

Practical classes

Laboratory equipment; Preparation of solutions of different concentrations, concentration calculations, dilution of solutions, determination of solubility, determination of acidity and measurement of pH values, buffers, physiological solutions; Organic molecules important in medicine.

Literature

- Kaim W, Schwederski B, Klein A. Bioinorganic Chemistry: Inorganic elements in the Chemistry of Life: An Introduction and Guide. Chichester, West Sussex, United Kingdom: Wiley; 2006.
- McMurry JE, Ballantine DS, Hoeger CA, Peterson VE. Fundamentals of General, Organic, and Biological Chemistry. 7th edition. Boston: Pearson; 2012.

Number of active teaching classes: 45	**Lectures:** 30	**Practice:** 15

Teaching methods

Lectures, Practical work, Problem solving.			
Examination methods (maximum 100 points)			
Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student's activity during lectures		written exam	
practical classes	15	practical exam	
colloquiums	15	oral exam	70
seminars			

Study program: Integrated academic studies of medicine

Course unit: **BIOPHYSICS**

Teachers: Jakovljevic Vladimir, Sretenovic Jasmina, Vojinovic Radisa, Vukomanovic Vladimir

Course status: Mandatory

ECTS: 3

Prerequisites:

For attending classes: enrolled in I semester.

For taking exam: –

Course unit objective

Acquaintance of students of integrated academic studies of medicine with the biophysical foundations of the functioning of the body's organic systems. Adoption of basic principles from the domain of nuclear physics. Understanding of basic principles in the field of radiological physics.

Learning outcomes of course unit

Upon completion of the Biophysics course, the student is expected to acquire basic knowledge of: Basic principles of transport through the cell membrane; Distribution of body fluids and electrolytes in different parts of the body; Biomechanical properties of skeletal muscles; Biomechanical characteristics of the locomotor system; Biomechanical properties of the cardiovascular system; Basic principles of nuclear physics; Use of radioactive isotopes for medical purposes; Biophysical effects of radiation and radiation protection; Basic principles of radiological physics; Characteristics of the X-ray tube, apparatus and types of X-ray apparatus. Basic features of multidetector computed tomography. Use of radiological information system and image archiving system-PAKS. Upon completion of the Biophysics course, the student is expected to master the following skills: Understanding the importance of transport processes through the cell membrane in maintaining cell homeostasis; Knowledge of the distribution of body fluids and the concentration of electrolytes in different parts of the body fluid; Learning the basic principles of biomechanics of the locomotor system, skeletal muscles and cardiovascular system; Knowledge of the physical principles of radioactivity and half-life; Determination of types of radioactive decay; Knowledge of the basic principles of interaction of gamma radiation with matter; Application of radioactive isotopes in medicine; Biological effects of ionizing radiation; Knowledge of the functioning mechanism of the X-ray tube and apparatus. Knowledge of the working mechanism of multidetector computed tomography and the radiological information system.

Course unit contents

Theoretical classes

Transports through the cell membrane; Body fluids. Distribution and composition of body fluids in different parts of the body. Membrane potentials; Biomechanical characteristics of the locomotor system; Biomechanical properties of skeletal muscles; Biomechanical properties of the cardiovascular system; Atom and nucleus structure; Conventional and quantum model of the atom; Units of radioactivity; Physical half-life; Biological and effective half-life; Basic principles of interaction of gamma radiation with matter; Basic characteristics of x and γ rays; Radiation detection mechanism and types of detectors; Types of radioactive decay; Basic characteristics of alpha, beta and gamma decay; Application of radioactive isotopes in medicine; Biophysical effects of radiation; Radiation protection; Basic features of the X-ray tube and apparatus; Types of x-ray machines. Multidetector computed tomography. Radiological information system and image archiving system - PAKS.

Practical classes

Osmosis; Registration of electrical potentials of the cell membrane; Functional tests of the locomotor system; Functional tests of skeletal muscles; Functional tests of the cardiovascular system; Fundamentals of nuclear physics; Application of radioactive isotopes in medicine; Biophysical effects of radiation; Radiation protection; Acquaintance with the technical characteristics of the X-ray tube; Quality and quantity of X-rays; Introduction with the basic parts of the X-ray machine; Introduction with the basic types of X-ray machines; Introduction with the basic types of multi-detector computerized tomography devices (scanners); Acquaintance with the functioning of the radiological information system; Significance and application of PAKS.

Literature

- Barrett KE, Barman SM, Yuan J, Brooks H. Ganong's review of Medical Physiology. 26th edition. New York: McGraw-Hill; 2019.
- Hall JE, Hall ME. Guyton and Hall Textbook of Medical Physiology. 14th edition. Philadelphia, PA: Elsevier; 2020.
- Adam A, Dixon AK, Gillard JH, Schaefer-Prokop C. Grainger & Allison’s Diagnostic Radiology. 7th edition. Elsevier Science; 2020.
- Shah C, Bradshaw M, Dalal I, editors. Nuclear Medicine: A Core Review. 2nd edition. Philadelphia: Wolters Kluver Lippincott Williams&Wilkins; 2021.

Number of active teaching classes: 45	**Lectures:** 30	**Practice:** 15

Teaching methods

Lectures, Practice, Work in small groups.

Examination methods (maximum 100 points)			
Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student's activity during lectures		written exam	70
practical classes	30	practical exam	
colloquiums		oral exam	
seminars			

Study program: Integrated academic studies of medicine

Course unit: **BIOLOGY**

Teachers: Milosevic-Djordjevic Olivera, Volarevic Vladislav, Ljujic Biljana, Todorovic Danijela, Gazdic Marina

Course status: Mandatory

ECTS: 3

Prerequisites:

For attending classes: enrolled in I semester.

For taking exam: –

Course unit objective

Introducing students to fundamental and practical knowledge in the field of biology. The program covers the following areas: cell biology, cell reproduction and development.

Learning outcomes of course unit

Upon completion of the Biology course, the student is expected to acquire basic knowledge of: Organization of prokaryotic and eukaryotic cells-cell organelles; Chemical composition of the cell; Nucleic acids - DNA and RNA; Replication of DNA molecules. Genetic code code, codon, anticodon; Protein synthesis-transcription, translation, regulation of transcription and translation; Reproduction of molecules, viruses, bacteria and cells - mitosis; Reproduction by gametes, stages in gametogenesis, meiosis and the importance of meiosis; Fertilization and embryonic development in mammals. Upon completion of the Biology course, the student is expected to master the following skills: Microscopy; Cell cultivation; Basic techniques for isolation, identification and quantification of nucleic acids and proteins; Schematic representation of the phases of mitosis and meiosis.

Course unit contents

Theoretical classes

Organization of prokaryotic and eukaryotic; Chemical composition of the cell; DNA replication; Protein synthesis; Mitosis and meiosis; Fertilization and embryonic development in mammals.

Practical classes

Organization of prokaryotic and eukaryotic cells - practical examples; Chemical composition of the cell - practical examples; DNA replication - practical examples; Protein synthesis - practical examples; Mitosis and meiosis - practical examples; Fertilization and embryonic development in mammals - practical examples.

Literature

- Alberts B. Molecular biology of the cell. 6th edition. New York, NY: Garland Science; 2015.
- Lanza R, Atala A. Essential of Stem Cell Biology. 3rd edition. San Diego: Academic Press; 2014.

Number of active teaching classes: 45	**Lectures:** 30	**Practice:** 15

Teaching methods

Lectures, Practical work, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student's activity during lectures	30	written exam	70
practical classes		practical exam	
colloquiums		oral exam	
seminars			

Study program: Integrated academic studies of medicine

Course unit: **ANATOMY 1**

Teachers: Vulovic Maja, Zivanovic-Macuzic Ivana, Jeremic Dejan, Stojadinovic Dobrivoje, Sazdanovic Predrag

Course status: Mandatory

ECTS: 12

Prerequisites:

For attending classes: enrolled in I semester.

For taking exam: –

Course unit objective

Acquiring knowledge and skills in human anatomy.

Learning outcomes of course unit

After successfully completing the Anatomy 1 course, students will be able to: Identify and describe the skeletal, muscular, neural, vascular and lymphatic structures of upper and lower limbs, thorax, abdomen and the pelvis and know their major functions; Demonstrate sufficient knowledge about the structure and function of the locomotoric system; Identify and describe the organs of the cardiovascular, respiratory and urogenital systems and organs of the gastrointestinal tract; Discuss about the anatomic subunits and topographic regions of the of the human body as well as their conections and relations; Synthesize ideas to make connections between anatomy and physiology ; Develop a vocabulary of appropriate terminology to effectively communicate anatomy-related information to future coworkers.

Course unit contents

Theoretical classes

Anatomy of upper limb; Anatomy of lower limb; Anatomy of thorax; Anatomy of abdomen; Anatomy of pelvis; Basic anatomical nomenclature; Anatomical planes and lines; Anatomy of the bones, joints, muscles, vascularization and innervation of the upper limb; Anatomy of the bones, joints, muscles, vascularization and innervation of the lower limb; Anatomy of the chest wall and the brest; Anatomy of the upper mediastinum, trachea and the lungs, lower mediastinum and the heart; Anatomy of the abdominal wall; Anatomy of the oesophageus and the stomach, abdominal aorta and celiac plexus; Anatomy of the small and large intestine, the liver, pancreas and the spleen; Anatomy of the kidneys and retroperitoneal space; Anatomy of the wall of the pelvis; The vascularization and the innervation of the plelvic cavity; Anatomy of the urinary bladder, rectum, male and the female genital organs.

Practical classes

Basic anatomical nomenclature; Anatomical planes and lines; Anatomy of the bones, joints, muscles, vascularization and innervation of the upper limb; Anatomy of the bones, joints, muscles, vascularization and innervation of the lower limb; Anatomy of the chest wall and the brest; Anatomy of the upper mediastinum, trachea and the lungs, lower mediastinum and the heart; Anatomy of the abdominal wall; Anatomy of the oesophageus and the stomach, abdominal aorta and celiac plexus; Anatomy of the small and large intestine, the liver, pancreas and the spleen; Anatomy of the kidneys and retroperitoneal space; Anatomy of the wall of the pelvis; The vascularization and the innervation of the plelvic cavity; Anatomy of the urinary bladder, rectum, male and the female genital organs. The laboratory component of the course generally parallels and reinforces lecture concepts through the use of models, skeletal materials and cadaver demonstration.

Literature

- Dalley AF, Agur AM. Moore's Clinically Oriented Anatomy. 9th, International Edition. Philadelphia, PA: Lippincott Williams and Wilkins; 2022.
- Netter FH. Atlas of human anatomy. 5th edition. Philadelphia: Elsevier; 2011.
- Ellis H, Mahadevan V. Clinical anatomy: Applied anatomy for students and junior doctors. 12th edition. Hoboken, New Jersey: Wiley-Blackwell; 2010.

Number of active teaching classes: 165	**Lectures:** 90	**Practice:** 75

Teaching methods

Lectures, Practical work, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student's activity during lectures		written exam	
practical classes	15	practical exam	
colloquiums	15	oral exam	70
seminars			

Study program: Integrated academic studies of medicine

Course unit: **MEDICAL ENGLISH LANGUAGE**

Teachers:

Course status: Mandatory

ECTS: 4

Prerequisites:

For attending classes: enrolled in I semester.

For taking exam: –

Course unit objective

Enabling students to use common and medical terms in English as well as to read scientific literature in English; enabling students to improve their speaking and writing skills as well as their skills of translating texts into and from English.

Learning outcomes of course unit

After successfully completing the Medical English language course, students will gain: Knowledge about the adequate and proper use of common and medical vocabulary in English; Knowledge about different grammatical terms and structures; Knowledge about translation techniques (skills of translation into or from English); Knowledge about English speaking skills; Knowledge about writing skills in English (writing essays); Knowledge about the use of scientific literature in English.

Course unit contents

Theoretical classes

Human body; organ systems; diseases and treatment; mental health; medical history.

Practical classes

Human body – reading, writing, discussion; organ systems – reading, writing, discussion; diseases and treatment – reading, writing, discussion; mental health – reading, writing, discussion; medical history – reading, writing, discussion.

Literature

- Lazić D. English for Students of Medicine. Kragujevac: Medicinski fakultet Univerziteta u Kragujevcu; 2003.

Number of active teaching classes: 45	**Lectures:** 45	**Practice:** 0

Teaching methods

Lectures, Practical work.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student's activity during lectures	15	written exam	
practical classes		practical exam	
colloquiums	35	oral exam	50
seminars			

Study program: Integrated academic studies of medicine

Course unit: **PHYSICAL EDUCATION**

Teachers: Stojanovic Emilija

Course status: Elective

ECTS: 3

Prerequisites:

For attending classes: enrolled in I semester.

For taking exam: -

Course unit objective

An acquaintance of the student with the importance and possibilities of applying physical activity in preserving health

Learning outcomes of course unit

Upon completion of the Physical education course, the student is expected to: Understand the role and importance of physical activity in perserving health; Understand the impact of physical activity on organ systems of the human body; Understand the basic kinesiology principles of human movement analysis; Understand the basic methods and means of developing human physical abilities; Understand the importance of maintaining a correct postural status during daily activities; Gain knowledge and skills from the chosen sport.

Course unit contents

Theoretical classes

Exercise and health – epidemiological studies; The impact of exercise on organ systems of the human body; Physical performance development; Anatomical and physiological fundamentals of human motion, Kinesiological analysis; Postural status; Fatigue and overtraining

Practical classes

Exercise according to the plan and program of the chosen sport (swimming, folklore, physical preparation, corrective gymnastics, aerobics, basketball, volleyball, handball, futsal, table tennis, archery, chess, bowling, activities in nature).

Literature

- Hall J. Guyton and Hall Textbook of Medical Phisiology. Philadelphia: Elsevier; 2016.
- Waterbrook A. Sports Medicine Emergency Physician. New York: Cambridge University Press; 2016.
- Barrett KE, Barman SM, Yuan J, Brooks H. Ganong's review of Medical Physiology. 26th edition. New York: McGraw-Hill; 2019.

Number of active teaching classes: 15	**Lectures:** 15	**Practice:** **Other classes:** 30

Teaching methods

Lectures, Practice

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student's activity during lectures	20	written exam	
practical classes	50	practical exam	
colloquiums		oral exam	30
seminars			

Study program: Integrated academic studies of medicine

Course unit: **HISTORY OF MEDICINE**

Teachers: Ignjatovic-Ristic Dragana, Radmanovic Branimir, Radovanovic Snezana, Janjic Vladimir

Course status: Elective

ECTS: 3

Prerequisites:

For attending classes: enrolled in I semester.

For taking exam: –

Course unit objective

Acquiring knowledge about medicine, definition of medicine; Seeing medicine in relation to other scientific disciplines; Understanding the importance of medicine for the social community and the individual; Getting to know different approaches and definitions of health and disease; Understanding the doctor-patient relationship in the treatment process; Getting to know the basic terms in medicine; Understanding medical terminology and abbreviations; Acquiring knowledge about medical terms derived from Latin and ancient Greek; Acquiring knowledge about basic medical terms in the Serbian language.

Learning outcomes of course unit

Upon completion of the History of Medicine course, the student is expected to acquire basic knowledge related to: Development of medicine from the empirical to the scientific stage; Development of medicine and specificities through time periods from prehistory to modern times; Modern achievements of medicine; Development of medicine in our region.

Course unit contents

Theoretical classes

Medicine as a social and cultural entity; Official, traditional and alternative medicine, religion and magic; Homeopathy; The beginnings of medicine; Galen and Roman medicine; Paracelsus, Magendy and Claude Bernard as the founders of the experimental approach in medicine; The most important medical discoveries in the 19th century; Serbian medieval medicine; Hilandar medical codex; Establishment of the Serbian Medical Association.

Practical classes

Significant historical achievements in medicine are covered; Significant historical achievements in Serbian medicine are discussed; Writing an essay on a given topic from the history of medicine; students search electronic databases over the Internet, find relevant literature, examine the validity of historical sources found, and write a short essay on a specific topic in the history of medicine.

Literature

- van Servellen G. Communication Skills for the Health Care Professional: Context, Concepts, Practice, and Evidence. 3rd edition. Burlington, MA: Jones & Bartlet learning; 2020.

Number of active teaching classes: 45	**Lectures:** 30	**Practice:** 15

Teaching methods

Lectures, Seminars.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student's activity during lectures		written exam	60
practical classes		practical exam	
colloquiums		oral exam	
seminars	40		

Study program: Integrated academic studies of medicine

Course unit: **HUMAN GENETICS**

Teachers: Milosevic-Djordjevic Olivera, Volarevic Vladislav, Ljujic Biljana, Todorovic Danijela, Gazdic Marina

Course status: Mandatory

ECTS: 6

Prerequisites:

For attending classes: enrolled in II semester.

For taking exam: passed course unit Biology.

Course unit objective

Introducing students to fundamental and practical knowledge in the field of human genetics. The program covers the following areas: structure and function of the hereditary basis, mutations, types of inheritance, developmental genetics, population genetics.

Learning outcomes of course unit

Upon completion of the Human Genetics course, the student is expected to acquire basic knowledge of: Structures of genetic material; Disorders of the structure of genetic material; Mechanisms of repair of damaged genetic material; The most important cytogenetic techniques; Basic recombinant DNA techniques; Cell cultivation techniques; Mechanisms of inheritance in humans; The genetic basis of immune abilities; The genetic basis of cancer; Genetics of stem cells. Upon completion of the Human Genetics course, the student is expected to master the following skills: Microscopy; Cultivation of cells and preparation of chromosomes; Analysis of chromosomes stained with the most commonly used chromosome staining techniques; Karyotype analysis; Preparation and analysis of Barr's body; Creation and analysis of genealogical trees; Determining the mechanism and types of inheritance of normal and pathological traits.

Course unit contents

Theoretical classes

Organization of the human genome; Biological significance of gene mutations; Biological significance of chromosomal mutations; Genetic determination of traits and sex; Developmental and population. genetics.

Practical classes

Organization of the human genome – practical aspects; Biological significance of gene mutations – practical aspects; Biological significance of chromosomal mutations – practical aspects; Genetic determination of traits and gender – practical aspects; Developmental and population genetics – practical aspects.

Literature

- Strachan T, Read A. Human molecular genetics. 4th edition. New York: Garland Science; 2011.
- Turnpenny PD, Ellard S. Emery's elements of medical genetics. 15th edition. Philadelphia: Elsevier; 2017.

Number of active teaching classes: 60	**Lectures:** 30	**Practice:** 30

Teaching methods

Lectures, Practical work, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student's activity during lectures	30	written exam	70
practical classes		practical exam	
colloquiums		oral exam	
seminars			

Study program: Integrated academic studies of medicine

Course unit: **HISTOLOGY AND EMBRYOLOGY**

Teachers: Tanaskovic Irena, Milosavljevic Zoran, Jovicic Nemanja, Milovanovic Jelena, Sazdanovic Maja, Miletic-Kovacevic Marina

Course status: Mandatory

ECTS: 12

Prerequisites:

For attending classes: enrolled in II semester.

For taking exam: –

Course unit objective

Students are expected to acquire knowledge about microscopic structure and function of the human cells, tissues and organs, as well as process of development of human embryo.

Learning outcomes of course unit

After completion of the course Histology and Embryology students are expected to understand the following: General characteristics of the structural organization and function of the cell, nuclei, organelles and cell membrane as well as characteristics of the specific human cell populations; Morphological and functional properties of the epithelial, connective, muscle and nervous tissue; Structural details of the special cells and composition of the extracellular matrix; Detailed structure and function of the human organs and their cells; Functional organization of the organs systems; Stages and processes of development of human embryo. Students will also be required to identify basic cells and tissues and to understand histological structure of the organs.

Course unit contents

Theoretical classes

Cytology-structural organization of the cell; Cytoskeleton, nucleus, organelles and inclusions, cell membrane trafficking and cellular transport; Tissues - Epithelial tissue classification, epithelial cell polarity, cell membrane special features, cell junctions; Connective tissue, cells types and extracellular matrix, connective tissue proper and special connective tissues, adipose, cartilage, bone tissue, blood and hematopoietic tissue; Muscle tissue, structural organization of the smooth and striated muscle cells, function and contraction; Nervous tissue, structure and function of the neurons, synapses and neurotransmission, glial cells; Organs – Morpho-functional characteristics of the Cardiovascular, Respiratory, Digestive, Urinary, Integumentary, Nervous, Endocrine, Lymphatic and Reproductive System (Female and Male); The embryology of the humans from fertilization to the full development of the organ systems.

Practical classes

The student will be able to identify the structure of cells, tissues and organs and describe their contribution to the normal function; Obtained data will be transferred to a drawings or computer images accompanied with marking of the important histological structures.

Literature

- Pawlina W, Ross MH. Histology: A text and Atlas: With Correlated Cell and Molecular Biology. 8th edition. Philadelphia: Wolters Kluwer; 2020.
- Sadler TW, Sadler-Redmond SL, Tosney K, Byrne J, Imseis H, Langman J. Langman's medical embryology. Philadelphia: Wolters Kluwer; 2019.
- Mescher A. Junqueira's Basic Histology: Text and Atlas. 15th Edition (International edition). New York: McGraw-Hill; 2018.

Number of active teaching classes: 165	**Lectures:** 90	**Practice:** 75

Teaching methods

Lectures, Practical work, Work in small groups, Problem based learning.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student's activity during lectures	15	written exam	
practical classes	15	practical exam	
colloquiums		oral exam	70
seminars			

Study program: Integrated academic studies of medicine

Course unit: **ANATOMY 2**

Teachers: Vulovic Maja, Zivanovic-Macuzic Ivana, Jeremic Dejan, Stojadinovic Dobrivoje, Sazdanovic Predrag

Course status: Mandatory

ECTS: 11

Prerequisites:

For attending classes: enrolled in II semester.

For taking exam: passed course unit Anatomy 1.

Course unit objective

Acquiring knowledge and skills in human anatomy.

Learning outcomes of course unit

After successfully completing the Anatomy 2 course, students will be able to: Identify and describe the skeletal, muscular, neural, vascular and lymphatic structures of head and neck; Identify and describe the parts of central and peripheral nervous system, including the brain, spinal cord, peripheral nerves and the autonomic nervous system and know their major functions; Discuss about the anatomic subunits and topographic regions of the of the head and neck as well as their conections and relations; Understand how the nervous system functions as one of the major control systems of the body; Synthesize ideas to make connections between anatomy and physiology; Develop a vocabulary of appropriate terminology to effectively communicate anatomy-related information to future coworkers..

Course unit contents

Theoretical classes

Anatomy of head and neck; Anatomy of nervous system; Anatomy of the skull and facial bones and cervical vertebrae; Anatomy of the craniofacial cavities and its osseal conections; Joints of the skull; Anatomy of the muscles of the head and neck; Anatomy of cervical plexus, cranial nerves, autonomic nervous system, arteries, veins and lymphatics of the head and neck; Anatomy of the oral cavity and the pharynx, nasal cavity and larynx; Anatomy of the eye and ear; Introduction to the anatomy of the central nervous system; Anatomy of the spinal cord and the spinal nerves; Anatomy of the brain stem, cerebellum and the 4th cerebral ventricle, diencephalon and 3th cerebral ventricle, telencephalon and lateral cerebral ventricles; Anatomy of subcortical gray matter; Limbic system; Sex dimorphism of the human brain; Pathways of the nervous system (motor, sensitive, sensorial); Vascularization of the brain.

Practical classes

Anatomy of the skull and facial bones and cervical vertebrae; Anatomy of the craniofacial cavities and its osseal connections; Joints of the skull; Anatomy of the muscles of the head and neck; Anatomy of cervical plexus, cranial nerves, autonomic nervous system, arteries, veins and lymphatics of the head and neck; Anatomy of the oral cavity and the pharynx, nasal cavity and larynx; Anatomy of the eye and ear; Introduction to the anatomy of the central nervous system; Anatomy of the spinal cord and the spinal nerves; Anatomy of the brain stem, cerebellum and the 4th cerebral ventricle, diencephalon and 3th cerebral ventricle, telencephalon and lateral cerebral ventricles; Anatomy of subcortical gray matter; Limbic system; Sex dimorphism of the human brain; Pathways of the nervous system (motor, sensitive, sensorial); Vascularization of the brain; The laboratory component of the course generally parallels and reinforces lecture concepts through the use of models, skeletal materials and cadaver demonstration.

Literature

- Dalley AF, Agur AM. Moore's Clinically Oriented Anatomy. 9th, International Edition. Philadelphia, PA: Lippincott Williams and Wilkins; 2022.
- Splittgerber R, Snell RS. Snell's clinical neuroanatomy. Philadelphia: Wolters Kluwer; 2019.
- Netter FH. Atlas of human anatomy. 5th edition. Philadelphia: Elsevier; 2011.

Number of active teaching classes: 120	**Lectures:** 75	**Practice:** 45

Teaching methods

Lectures, Practical work, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student's activity during lectures		written exam	
practical classes	15	practical exam	
colloquiums	15	oral exam	70
seminars			

Study program: Integrated academic studies of medicine

Course unit: **FUNDAMENTALS OF HISTOLOGICAL AND PATHOHISTOLOGICAL TECHNIQUES**

Teachers: Stankovic Vesna, Milosavljevic Zoran, Mitrovic Slobodanka, Tanaskovic Irena, Sazdanovic Maja, Jovicic Nemanja, Miletic-Kovacevic Marina

Course status: Elective

ECTS: 3

Prerequisites:

For attending classes: enrolled in II semester.

For taking exam: –

Course unit objective

Students are expected to acquire knowledge about microscopic analysis and common techniques of pathohistological tissue processing and staining

Learning outcomes of course unit

After completion of the course students are expected to understand the following: Microscopy skills; Common histological tissue processing and staining techniques; Modern visualization methods in histology and pathology.

Course unit contents

Theoretical classes

Microscopy and analysis; Sample collection followed by tissue processing, sectioning and mounting; Standard, histochemical and immunochemical cell and tissue staining; Isolated cell sorting, visualization and counting.

Practical classes

The student will learn how to perform basic histotechniques and staining methods. Microscopy techniques.

Literature

- Pawlina W, Ross MH. Histology: A text and Atlas: With Correlated Cell and Molecular Biology. 8th edition. Philadelphia: Wolters Kluwer; 2020.
- Sadler TW, Sadler-Redmond SL, Tosney K, Byrne J, Imseis H, Langman J. Langman's medical embryology. Philadelphia: Wolters Kluwer; 2019.

Number of active teaching classes: 45	**Lectures:** 30	**Practice:** 15

Teaching methods

Lectures, Practical work.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student’s activity during lectures		written exam	50
practical classes	50	practical exam	
colloquiums		oral exam	
seminars			

Study program: Integrated academic studies of medicine

Course unit: **INTRODUCTION TO MEDICINE AND MEDICAL TERMINOLOGY**

Teachers: Radmanovic Branimir, Radovanovic Snezana, Zaric Milan, Ignjatovic-Ristic Dragana, Janjic Vladimir, Simic-Vukomanovic Ivana

Course status: Elective

ECTS: 3

Prerequisites:

For attending classes: enrolled in II semester.

For taking exam: –

Course unit objective

Acquiring knowledge about medicine, definition of medicine; Seeing medicine in relation to other scientific disciplines; Understanding the importance of medicine for the social community and the individual; Getting to know different approaches and definitions of health and disease; Understanding the doctor-patient relationship in the treatment process; Getting to know the basic terms in medicine; Understanding medical terminology and abbreviations; Acquiring knowledge about medical terms derived from Latin and ancient Greek; Acquiring knowledge about basic medical terms in the Serbian language.

Learning outcomes of course unit

Upon completion of the classes in Introduction to Medicine and Medical Terminology, the student will be able to: Define medicine in content and methodology; Examine medicine in relation to other scientific disciplines and its importance for society and the individual; Understand the doctor-patient relationship in the treatment process and recognizes different approaches to health and illness; Understand the basic terms in medicine in the Serbian language, as well as terms derived from Latin and ancient Greek.

Course unit contents

Theoretical classes

Definition of medicine; Medicine as a scientific discipline; Natural and scientific bases of medicine; Social foundations of medicine; Social tasks of medicine; Preclinical medicine; Clinical medicine; Psychological medicine; Official and alternative medicine; Characteristics of the medical profession; Introduction to medical terminology; Language, titles and symbols in the medical profession; Medical terms derived from Latin and ancient Greek; Medical terminology derived from the Serbian language; Medical terminology derived from other languages.

Practical classes

They deal with topics related to medicine as a scientific discipline and its place in society and natural sciences, as well as the social aspects of medicine, the relationship to health and disease; They provide an overview of preclinical, clinical and psychological medicine, the characteristics of the medical profession, as well as the basic terminology used in medicine and healthcare.

Literature

- van Servellen G. Communication Skills for the Health Care Professional: Context, Concepts, Practice, and Evidence. 3rd edition. Burlington, MA: Jones & Bartlet learning; 2020.

Number of active teaching classes: 45	**Lectures:** 30	**Practice:** 15

Teaching methods

Lectures, Seminars.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student's activity during lectures		written exam	60
practical classes		practical exam	
colloquiums		oral exam	
seminars	40		

Study program: Integrated academic studies of medicine

Course unit: **PHYSIOLOGY**

Teachers: Rosic Gvozden, Jakovljevic Vladimir, Pantovic Suzana, Selakovic Dragica, Srejovic Ivan, Zivkovic Vladimir, Joksimovic Jovana, Sretenovic Jasmina, Cubrilo Dejan

Course status: Mandatory

ECTS: 18

Prerequisites: For attending classes: enrolled in III semester. For taking exam: passed course units Biophysics, Human Genetics, Histology and Embriology, Anatomy 2.

Course unit objective

Introducing students with basic physiological processes and the mechanisms of the human body, on theoretical and practical aspects. Understanding of the basic principles in the functioning of various cells, tissues, and organs in the unique functional unit. Introducing to the regulatory and control mechanisms in the human body. Evaluation of the basic techniques and procedures to obtain parameters of human body functional status. The estimation of the clinical importance to follow the estimated parameters.

Learning outcomes of course unit

After successfully completing the Physiology course, students will obtain: Knowledge about the basic physiological principles of functioning of cells; Knowledge about the basic physiological principles of functioning of main organic systems (nervous system and excitable tissues, cardiovascular system, hematopoietic system and hemostasis, respiratory system, urogenital system, gastrointestinal system, endocrine system and reproduction); Skills about measurement of basic body functional parameters (blood pressure, ECG, spirometry, blood types, blood sugar and insulin levels, nervous reflexes)..

Course unit contents

Theoretical classes

Cell membrane physiology; Cell membrane potentials; Skeletal muscle physiology; Smooth muscle physiology; Cardiac cell membrane potentials; The analysis of heart cycle elements; Hemodynamic characteristics of cardiovascular system; Physiological characteristics of circulatory system specific elements; Cardiovascular system regulation; The analysis of elements involved in gass exchange systems; Gass transports and regulation of respiration; The analysis of urine formation proceses; The role of kidney in maintaining the content and concentration of body fluids; Acid-base balance regulation; Hematology; Motoric functions of gastrointestinal system; Secretory functions of gastrointestinal system; The regulation of food intake and energy metabolism; The analysis of elements and principles of endocrine system function; Hormones of pituitary and thyroid gland; Hormone regulations of glycemia and calcemia; Reproductive system physiology; The basic principles of neurophysiology; Sensor neurophysiology; Motor functions control; The regulation of mood and behavior; The higher intellectual functions, learning and memory; Autonomic nervous system; Physiology of vision and hearing; Physiology of smell and taste.

Practical classes

Introduction to laboratory practice, aesthesia, injection techniques; The heart sounds auscultation; The pulse quality estimation; Blood pressure determination; The ECG analysis; Load tests for estimation of cardiovascular system function; The determination of number of red blood cells and reticulocytes, and clinical importance; The determination of hematocryte and clinical importance; The blood type determination and clinical importance; The determination of number of leukocytes, leukocyte formula, and clinical importance; The determination of hematological indexes and clinical importance; The parameters for chemostasis evaluation; Static spirometry; Dynamic spirometry; The kidney functions testing; The determination of energy consumption; Defining and planning of energy intake; The individual dietary protocols; The tests for pituitary gland functions estimation; The tests for thyroid gland functions estimation; The parameters for glycemia estimation; The laboratory tests for adrenal gland functions estimation; The laboratory tests for reproductive system functions estimation; The examination of clinicaly important reflexes; The estimation of sensor system; The tests for evaluation of learning and memory; The emotional status evaluation tests; Brain waves and their clinical importance; The vision evaluation tests; The hearing and balance evaluation tests.

Literature

- Hall JE, Hall ME. Guyton and Hall Textbook of Medical Physiology. 14th edition. Philadelphia, PA: Elsevier; 2020.
- Barrett KE, Barman SM, Yuan J, Brooks H. Ganong's review of Medical Physiology. 26th edition. New York: McGraw-Hill; 2019.

Number of active teaching classes: 240	**Lectures:** 120	**Practice:** 120

Teaching methods

Lectures, Seminars, Practical work.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student's activity during lectures	15	written exam	
practical classes		practical exam	
colloquiums	35	oral exam	50
seminars			

Study program: Integrated academic studies of medicine

Course unit: **MEDICAL BIOCHEMISTRY**

Teachers: Zelen Ivanka, Mitrovic Marina, Andjelkovic Marija, Zaric Milan, Nikolic Ivana, Canovic Petar, Stanojevic-Pirkovic Marijana

Course status: Mandatory

ECTS: 12

Prerequisites:

For attending classes: enrolled in III semester.

For taking exam: passed course units Medical chemistry, Biophysics, Human Genetics, Histology and Embriology, Anatomy 2.

Course unit objective

Providing an overview of the main aspects of biochemistry by relating molecular interactions to their effects on the organism as a whole, especially related to human biology, including regulation of metabolic processes.

Learning outcomes of course unit

After successfully completing the Medical biochemistry course, students will be able to: Understand organization of macromolecules such as proteins, carbohydrates, lipids, nucleic acids and their hierarchical structure and understanding how their assembly into complexes is responsible for specific biological processes; Understand protein functions including enzyme kinetics, activators and inhibitors; coenzymes and prosthetic groups; allosteric enzymes and isozymes; clinical significance of serum enzymes level; Describe major metabolic pathways and their interconnection into tightly regulated networks in the whole human body; Discuss clinical significance of major biochemical parameters used for the diagnosis of various human diseases.

Course unit contents

Theoretical classes

Enzymology; Regulation of enzyme activity; Clinical enzymology; Vitamins and coenzymes; Oxidative phosphorylation; ROS - free radicals; Carbohydrates; Lipid metabolism; Cholesterol and lipoproteins; Nucleic acids; Amino acids and proteins; Protein synthesis; Biochemistry of hormones; Metabolism of water and bioelements; The biochemistry of the tissues; Integrative metabolism; Clinical biochemistry.

Practical classes

Enzymology, Regulation of enzyme activity, Clinical enzymology, Vitamins and coenzymes – practical aspects; Oxidative phosphorylation, ROS - free radicals – practical aspects; Carbohydrates – practical aspects; Lipid metabolism, Cholesterol and lipoproteins – practical aspects; Nucleic acids – practical aspects; Amino acids and proteins, Protein synthesis – practical aspects; Biochemistry of hormones – practical aspects; Metabolism of water and bioelements – practical aspects; The biochemistry of the tissues – practical aspects; Integrative metabolism, Clinical biochemistry – practical aspects.

Literature

- Baynes JW, Dominiczak MH. Medical Biochemistry. 5th edition. Philadelphia: Elsevier; 2018.
- Lieberman M, Peet A. Marks' basic medical biochemistry: A clinical approach. 6th edition. Baltimore, MD: Wolters Kluwer Health/Lippincott Williams & Wilkins; 2022.

Number of active teaching classes: 165	**Lectures:** 90	**Practice:** 75

Teaching methods

Lectures, Practical work, Problem solving.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student's activity during lectures	30	written exam	39
practical classes		practical exam	
colloquiums	31	oral exam	
seminars			

Study program: Integrated academic studies of medicine

Course unit: **COMMUNICATION SKILLS**

Teachers: Ignjatovic-Ristic Dragana, Radmanovic Branimir, Janjic Vladimir, Petrovic Marina, Sreckovic Suncica, Ravic-Nikolic Ana, Sorak Marija

Course status: Mandatory

ECTS: 4

Prerequisites:

For attending classes: enrolled in III semester.

For taking exam: passed course unit Medical English language.

Course unit objective

Introducing students to the definition and types of communication (verbal and non-verbal communication). Introducing the student to the characteristics of health communication (diagnostic and therapeutic). Introducing students to the principles of complex communication skills (empathy, assertiveness, active listening). Training students to establish quality contact with different users of health services; Mastering communication skills through the simulation of situations in the health context. Training students for teamwork in healthcare as well as for communication with the non-health sector.

Learning outcomes of course unit

Upon completion of the Communication skills course students will: Know and understand the structure, role and importance of applying communication skills between healthcare workers and different groups of users of healthcare services; be able to communicate assertively with different individuals and groups in the medical environment (medical and non;medical staff, patients, patient's family...); apply the skills of active listening and empathy; independently conduct interviews with patients and patients' family members; participates in the psychological preparation of patients for various medical interventions; demonstrate the skills of communicating bad news in different situations (communication with the bereaved, with parents of sick children, etc.); demonstrate the skill of establishing communication with users of medical services of different age categories (children, adults); demonstrate the skill of establishing communication with users of medical services who have different types of limited communication abilities; demonstrate assertive communication skills in situations of negotiation or conflict resolution; be able to to communicate adequately with colleagues and associates in teamwork.

Course unit contents

Theoretical classes

Definition of communication and the importance of communication in healthcare. Verbal communication. Non-verbal communication. The influence of personality characteristics and social aspects on communication. Communication with the non-health sector. Professional aspects and teamwork in healthcare. Information technologies and communication in healthcare. Communication in healthcare with children. Communication in healthcare with elderly people. Communication related to the implementation of diagnostic and therapeutic procedures. Specifics of communication with people with mental disorders.

Practical classes

Training elements of the communication process. The relationship between verbal and non-verbal communication and the interpretation of non-verbal signs. Conducting an interview and taking an anamnesis. Exercises for assertive, empathic behavior and active listening. Examples of solving conflict situations in the team. Exercises focused on communication with people of different ages and with people with limited communication skills. Communication exercises with people with mental disorders and conditions. Ways of preparing patients for diagnostic and therapeutic procedures. Ways of communicating bad news in a health context.

Literature

- van Servellen G. Communication Skills for the Health Care Professional: Context, Concepts, Practice, and Evidence. 3rd edition. Burlington, MA: Jones & Bartlet learning; 2020.

Number of active teaching classes: 45	**Lectures:** 30	**Practice:** 15

Teaching methods

Lectures, Practical work, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student’s activity during lectures		written exam	60
practical classes		practical exam	
colloquiums		oral exam	
seminars	40		

Study program: Integrated academic studies of medicine

Course unit: **INFORMATION AND COMMUNICATION TECHNOLOGIES IN HEALTHCARE**

Teachers: Vukomanovic Vladimir, Ignjatovic Vesna, Janjic Vladimir

Course status: Elective

ECTS: 3

Prerequisites:

For attending classes: enrolled in III semester.

For taking exam: passed course unit Medical English language.

Course unit objective

The main objectives of the course are to acquire knowledge about information technologies in communication in healthcare. Information technologies and communication in healthcare should enable students to acquire basic knowledge and skills for the application of information and communication technologies in healthcare. Specific goals are the acquisition of knowledge necessary for the adequate use of data, knowledge, and information in the health care system, understanding and harmonizing the requirements of health information systems, and the application of information technologies to improve the health of the population.

Learning outcomes of course unit

After listening to the lectures, independent study, and passing the exam, the student will master the knowledge and skills necessary for carrying out tasks and ensuring the standards of medical practice through the application of information and communication technologies. This includes the use of information and communication technologies in the process of implementation of prevention, diagnosis, treatment, and health care, the establishment of effective administrative systems, information management, and improvement of communication in order to improve the health of the population, community, family, and individuals, as well as continuous support and learning.

Course unit contents

Theoretical classes

Information technologies and their importance in healthcare communication; The role of information technologies in the acquisition of medical knowledge; Interactive healthcare; Health information system; Design, implementation, evaluation, and maintenance of health information systems; Electronic health documentation; Decision support and evidence-based practice; Mobile applications in healthcare; Basics of telemedicine, and its importance in modern medicine and society; Methods and possibilities of implementation of clinical communication between doctor and patient at a distance, and consultation possibilities of the expert with the prescribing doctor; Methods of visualization and spoken correspondence in the practical education of educators, and the creation of a database for certain medical fields, in the form of instructions and schematized questionnaires; Formation of a database in the form of video beam presentations and video clip demonstrations of certain diagnoses and diagnostic procedures; Preventive visualized health improvement programs, along with the formation of healthy lifestyle habits and lifestyles of certain subpopulations and categories of patients; Medical questionnaire, in the form of guided anamnesis and objective parameters, and additional diagnostic documents in the evaluation of diagnostics in physiatry; Application of information and communication technology in primary health care; Application of information and communication technology in internal medicine and other internal medicine branches; Application of information and communication technology in psychiatry; Application of information and communication technology in surgery and other surgical branches; Application of information and communication technology in connection with infectious diseases; Application of information and communication technology in preventive medicine.

Practical classes

They deal with topics related to Information; Technologies and their use in communication in healthcare; They enable observation and use in preclinical and clinical branches of medicine; Investigate all relevant postulates related to information systems as well as the possibility of horizontal and vertical application of information technology and its components in healthcare; Design and implementation of electronic health records, examples, use, and evaluation; Practical application of information and communication technology in primary health care, internal medicine, surgery, psychiatry, preventive medicine, and in connection with infectious diseases.

Literature

- Bengt EM. PubMed Essentials: A user's guide to smarter searching of medical information. Sweden: Forms Kunskop AB; 2006.

Number of active teaching classes: 45	**Lectures:** 30	**Practice:** 15

Teaching methods

Lectures, Discussions, Seminars, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student's activity during lectures		written exam	60
practical classes		practical exam	
colloquiums		oral exam	
seminars	40		

Study program: Integrated academic studies of medicine

Course unit: **MEDICAL GENETICS**

Teachers: Milosevic-Djordjevic Olivera, Volarevic Vladislav, Ljujic Biljana, Todorovic Danijela, Gazdic Marina

Course status: Elective

ECTS: 3

Prerequisites:

For attending classes: enrolled in III semester.

For taking exam: passed course unit Human genetics.

Course unit objective

Acquisition of basic and practical knowledge in the field of medical genetics. The program covers the following areas: principles of medical genetics, types of chromosomal aberrations, etiology, pathogenesis, clinical picture, biological significance of mutations and inheritance, diagnosing mutations, genetic counseling, application of DNA technology in medicine.

Learning outcomes of course unit

The student should be able to recognize the type of inheritance, choose a diagnostic method, analyze the karyotype with structural and numerical aberrations, interpret the results of cytogenetic and molecular-diagnostic methods, construct a family tree, and determine the type of inheritance of the disease, provide the patient with useful information, suggest preventive measures, and calculate the risk of disease recurrence.

Course unit contents

Theoretical classes

Molecular basis of inheritance; Mutations: point, deletion, duplication, insertion, expansion; Mutation analysis; Human chromosomes; Structure of chromosomes; Karyotype; Types of chromosomal aberrations; Consequences of chromosomal aberrations; Chromosome analysis methods; Chromosome disorders; Aneuploidy; Polyploidy; Disorders of the sex chromosomes; Disorders of sexual differentiation; Chromosomal breakage syndromes; Indications for chromosomal analysis; Monogenic diseases; Autosomal-dominant and autosomal-recessive inheritance; Sex-linked inheritance; Non-Mendelian inheritance: anticipation, mitochondrial inheritance; Genomic imprinting; Diagnostic methods; Polygenic and multifactorial inheritance; Identification of genes causing multifactorial disorders; Meiosis-gametogenesis; Fertilization; Embryonic development; Genome and disorders of embryonic development; Genetic causes of malformations; Teratogenic; Malformations of unknown cause; Spontaneous abortions; Counseling; Prenatal diagnostics; Indications; Screening methods; Invasive methods of prenatal diagnosis; Detection of fetal cells in maternal circulation; Preimplantation diagnostics; Genetics of hereditary metabolic disorders; Metabolism disorders of carbohydrates, amino acids, steroids, lipids, porphyrins, organic acids, copper; Lysosomal storage disorders; Peroxisomal disorders; Mitochondrial disorders; Prenatal diagnosis of inborn errors of metabolism; Hemoglobinopathies; Pharmacogenetics; Drug metabolism; Genetic variation and influence on drug metabolism; Cancer genetics; Share of environmental and genetic factors; Oncogenes; Tumor suppressor genes; Epigenetics and malignant diseases; Familial malignancies; Molecular biology of the immune response; Hereditary immunodeficiencies; Genetic factors in common diseases; Genetic counseling; Risk assessment; Therapy of genetic diseases.

Practical classes

Molecular genetic diagnostic methods; Cytogenetic diagnostic methods; Types of disease inheritance; Calculating the risk of disease recurrence; Creation and analysis of family trees.

Literature

- Turnpenny PD, Ellard S. Emery's elements of medical genetics. 15th edition. Philadelphia: Elsevier; 2017.

Number of active teaching classes: 45	**Lectures:** 30	**Practice:** 15

Teaching methods

Lectures, Discussions, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student's activity during lectures	40	written exam	60
practical classes		practical exam	
colloquiums		oral exam	
seminars			

Study program: Integrated academic studies of medicine

Course unit: **MEDICAL MICROBIOLOGY**

Teachers: Dejan Baskić, Slađana Pavlović, Nevena Gajović

Course status: Mandatory

ECTS: 6

Prerequisites:

For attending classes: enrolled in IV semester.

For taking exam: passed course units Human genetics, Histology and embryology, Anatomy 2.

Course unit objective

The aim of this course is to enable students to understand the scientific foundations of both traditional and contemporary microbiological concepts. Additionally, students will acquire the knowledge, practical skills, and critical awareness necessary for a functional understanding of medical microbiology. The program includes the following areas: basic characteristics of infectious disease agents (bacteria, viruses, fungi, and parasites), pathogenesis of infectious diseases, global health and epidemiology of infectious diseases, clinical microbiology, prevention, diagnosis, and treatment of infectious diseases.

Learning outcomes of course unit

Upon completing the course in medical microbiology, the student is expected to gain basic knowledge and understanding of: Fundamental biological characteristics of microorganisms; The significance of the normal microbiome and its role in health and disease; Pathogenesis of infectious diseases; Key epidemiological features and clinical manifestations of infectious diseases; Principles of laboratory diagnosis; The importance and methods of prevention and treatment of infectious diseases.

Additionally, students are expected to develop skills that enable them to: Describe the basic structural characteristics of microorganisms; Practically understand current epidemiological trends; Apply and perform fundamental methods and techniques necessary for the laboratory diagnosis of infectious diseases; Practically understand antimicrobial susceptibility testing; Differentiate the clinical manifestations of basic types and classes of vaccines and their application in the prevention of infectious diseases.

Theoretical classes

Basic characteristics of the bacterial cell, infection, pathogenicity, virulence, and diagnostics. Prevention and therapy of infectious diseases. Causative agents of pyogenic infections, diarrheal syndromes, tuberculosis, leprosy, and diphtheria. Spiral and obligate intracellular bacteria. Anaerobic and spore-forming bacteria. Causative agents of bacterial zoonoses and sexually transmitted diseases. General virology, viruses causing infections of the central nervous system and respiratory tract, diarrheal syndromes, arboviruses, zoonoses, and oncogenic viruses. Herpesviruses and other causative agents of rash fevers. Hepatitis viruses, retroviruses, and prions. Protozoa. Helminths. Fungi.

Practical classes

Biosafety and biosafety levels in the microbiology laboratory. Types of microscopes and microscopy methods. Gram staining. Ziehl-Neelsen staining. Nutrient media used in microbiology and cultivation of microorganisms. Antimicrobial drugs, sterilization, disinfection, and antibiotic sensitivity testing. Microbiological approach to diagnosing infectious diseases. Laboratory techniques for isolating, cultivating, and identifying microorganisms. Immunological approach to diagnosing infectious diseases (e.g., ELISA, Western Blot). Molecular biology approaches to diagnosing infectious diseases (e.g., Polymerase Chain Reaction, sequencing). Diagnosis and prevention of pyogenic infections, infections caused by mycobacteria, anaerobic and spore-forming bacteria, bacterial and viral respiratory tract infections, CNS infections, diarrheal syndromes, zoonoses, sexually transmitted infections, rash fevers, viral hepatitis, and retroviral infections. Diagnosis and prevention of infections caused by protozoa, helminths, and fungi.

Literature

- Branislava Savić, Sanja Mitrović, Tanja Jovanović. Medicinska mikrobiologija. Medicinski fakultet, Beograd, 2022.

Number of active teaching classes: 90	**Lectures:** 45	**Practice:** 45

Teaching methods

Lectures, Discussion, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student's activity during lectures	30	written exam	50
practical classes		practical exam	
colloquiums		oral exam	20
seminars			

Study program: Integrated academic studies of medicine

Course unit: **IMMUNOLOGY, INFECTION, INFLAMMATION**

Teachers: Jovanovic Ivan, Radosavljevic Gordana, Volarevic Vladislav, Milovanovic Marija, Pantic Jelena

Course status: Mandatory

ECTS: 6

Prerequisites:

For attending classes: enrolled in IV semester.

For taking exam: passed course units Human genetics, Histology and embryology, Anatomy 2.

Course unit objective

To enable students to learn the basics of immunology and immune basics of microbiology. The program covers the following areas: Immune system, innate and acquired immunity, effector mechanisms of acquired immunity, immune response to microorganisms and tumors, medical aspects of inadequate immune response. Immune basis of microbiology, microbiome.

Learning outcomes of course unit

Upon completion of classes in the course "Immunology, infection and inflammation", the student is expected to acquire basic knowledge of: immunological/serological techniques;

At the end of classes in the course "Immunology, infection and inflammation", the student is expected to master the following skills: basic techniques of laboratory work; basic immunological techniques.

Theoretical classes

Introduction to the immune system; Innate immunity; Antigen uptake and antigen presentation to lymphocytes; Antigen recognition in acquired immunity; Cellular immune response; Effector mechanisms of cellular immunity; Humoral immune response; Effector mechanisms of humoral immunity; Immune tolerance and autoimmunity; Immune response to tumors and transplanted tissues; Hypersensitivity; Congenital immunodeficiencies. Acquired immunodeficiency syndrome; Immune response to microorganisms; Sepsis and septic shock. Immunization and vaccination; The microbiome. Influence on the functionality of the immune system.

Practical classes

Introduction to the immune system - practical aspects; Innate immunity-practical aspects; Antigen uptake and antigen presentation by lymphocytes - practical presentation; Antigen recognition in acquired immunity - practical aspects; Cellular immune response - practical presentation; Effector mechanisms of cellular immunity - practical presentation; Humoral immune response-practical presentation; Effector mechanisms of humoral immunity - practical aspects; Immune tolerance and autoimmunity - practical aspects; Immune response to transplanted tissues and tumors - practical aspects; Hypersensitivity - practical presentation; Sepsis and septic shock - practical presentation; Immunization and vaccination - practical presentation; Microbiome, influence on the immune repertoire and functionality - a practical presentation.

Literature

- Abbas AK, Lichtman AH, Pillai S. Osnovna imuniologija: funkcije i poremećaji imunskog sistema. 6 izdanje. Beograd: Data Status; 2019.
- Chapel H, Haeney M, Misbah S, Snowden N. Essentials of Clinical Immunology. 6th edition. Chichester: Wiley Blackwell; 2015.
- Geha RS, Notarangelo L. Case Studies in Immunology: a Clinical Companion. 7th edition. New York: Garland Science; 2016.
- N. Cary Engleberg. Schaechter's Mechanisms of Microbial Disease. Walters Kluwer, 2012

Number of active teaching classes: 90	**Lectures:** 45	**Practice:** 45

Teaching methods

Lectures, Discussion, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student's activity in class	30	written exam	70
practical classes		practical exam	
colloquiums		oral exam	
seminars			

Study program: Integrated academic studies of medicine

Course unit: **FUNDAMENTALS OF ONCOLOGY**

Teachers: Jovanovic Ivan, Milovanovic Marija, Radosavljevic Gordana, Pantic Jelena, Pavlovic Sladjana, Arsenijevic Aleksandar, Gajovic Nevena

Course status: Mandatory

ECTS: 5

Prerequisites:
For attending classes: enrolled in IV semester.
For taking exam: –

Course unit objective
Introducing students to the basic principles of molecular oncology.

Learning outcomes of course unit
Upon completion of the course in Fundamentals of oncology, the student is expected to: describe the processes underlying the proliferation, differentiation and death of healthy and transformed cells; describe the genes involved in carcinogenesis (oncogenes, tumor suppressor genes, genes involved in apoptosis); describe the molecules responsible for carcinogenesis-products of oncogenes, antioncogenes, DNA repair enzymes, enzymes and proteins involved in apoptotic cell death; describe the processes of carcinogenesis and metastasis; distinguish between the most relevant oncogenic viruses and describe the mechanisms of virus-induced malignant transformation; distinguish between most relevant chemical and physical carcinogens, as well as their mechanisms of action; describe the basic mechanisms of signal propagation through the cell; describe the basic mechanisms responsible for invasive tumor growth, as well as the molecular basis of neoangiogenesis and metastasis; adopt the basic principles of tumor diagnostics and therapy; independently perform the analysis and synthesis of relevant data, identify and solve a problem, make a decision and, using teamwork, apply the acquired knowledge to practice.

Theoretical classes

Proliferation; Differentiation and cell death; Oncogenesis and metastasis mechanisms; Tumor etiology; Tumor immunotherapy.

Practical classes

Proliferation-practical presentation; Differentiation and cell death- practical aspects; Oncogenesis and metastasis mechanisms-practical presentation; Tumor etiology-practical presentation; Tumor immunotherapy-practical presentation.

Literature

- Abbas A. Basic Immunology. London: Mosby, Elsevier; 2016.
- Geha RS, Notarangelo L. Case Studies in Immunology: a Clinical Companion. 7th edition. New York: Garland Science; 2016.
- Chapel H, Haeney M, Misbah S, Snowden N. Essentials of Clinical Immunology. 6th Edition. Chichester: Wiley Blackwell Publishing Ltd, Massachusetts; 2015.

Number of active teaching classes: 60	**Lectures:** 30	**Practice:** 30

Teaching methods
Lectures, Discussions, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student's activity during Lectures	30	written exam	70
practical classes		practical exam	
colloquiums		oral exam	
seminars			

Study program: Integrated academic studies of medicine

Course unit: **FIRST AID**

Teachers: Jevdjic Jasna, Radovanovic Dragce, Vulovic Tatjana, Zornic Nenad, Matic Aleksandar

Study program: Integrated academic studies of medicine

Course unit: FIRST AID

ECTS: 3

Prerequisites:

For attending classes: enrolled in IV semester.

For taking exam: –

Course unit objective

Training students to provide first aid to victims, i.e. the application of basic measures of cardiopulmonary resuscitation, without the use of aids and drugs, as well as the performance of external cardiac defibrillation using an automatic external defibrillator (AED).

Learning outcomes of course unit

Upon completion of classes in First aid, the student is expected to acquire basic knowledge: frequency, causes, and diagnosis of cardiac arrest; chain of survival: the importance of each link; automatic external defibrillation; risks during the application of CPR (transmissible diseases); Basic Life Support algorithm; Goals and guidelines for further development of CPR+.

At the end of the First aid course, the student is expected to master the following skills: opening of the airway; breathing check; chest compressions: external heart massage; artificial respiration using the mouth-to-mouth technique; turning the victim to the side - "coma" position; Safety check for DC shock delivery; defibrillation using an AED.

Course unit contents

Theoretical classes

Basic life support; Automatic external defibrillation.

Practical classes

Basic life support- practical aspects; Automatic external defibrillation-practical presentation.

Literature

- Thygerson AL, Thygerson SM. First aid. 7th edition. Burlington: Jones & Bartlett Learning; 2016.

Number of active teaching classes: 30	**Lectures:** 15	**Practice:** 15 **Other classes:** 30

Teaching methods

Lectures, Discussions, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student's activity during lectures	10	written exam	50
practical classes	40	practical exam	
colloquiums		oral exam	
seminars			

Study program: Integrated academic studies of medicine

Course unit: **SPORTS MEDICINE**

Teachers: Rosic Gvozden, Jakovljevic Vladimir, Zivkovic Vladimir, Srejovic Ivan, Selakovic Dragica, Pantovic Suzana, Joksimovic Jovana, Sretenovic Jasmina, Cubrilo Dejan, Andjelkovic Nebojsa

Course status: Elective

ECTS: 3

Prerequisites:

For attending classes: enrolled in IV semester.

For taking exam: passed course unit Physiology.

Course unit objective

An acquaintance of students of integrated academic medical studies with the basic principles of exercise physiology and the function of organ systems during physical activity, with special reference to the cardiovascular system. Adopting the basic principles of proper nutrition and supplementation in sports. Knowledge of the mechanisms of the most common sports injuries.

Learning outcomes of course unit

The knowledge that students will acquire after mastering the program: the role of physical activity in maintaining the homeostasis of the organism; the positive effects of physical activity in the prevention and therapy of various pathophysiological conditions; basic physiological principles of effort; basic physiological principles of body fatigue; specifics of the response of organs and organ systems (locomotor system, nervous system, cardiovascular system, respiratory system, and endocrine system) to physical activity; specifics of athletes' nutrition and supplementation in sports; the mechanism of occurrence of the most common sports injuries.

Skills that students will acquire after mastering the program: understanding the necessity of maintaining regular and proper physical activity in preserving the proper functioning of the organism; knowledge of the physiological ways of using different types of physical activity in the prevention and treatment of a large number of diseases; determining an individual's physical ability and measuring the function of various organ systems during physical exertion; planning and individual orientation of physical activity for the purpose of improving and preserving the individual's health; designing meals for recreational and professional athletes; preventive procedures for the most common sports injuries.

Theoretical teaching

Historical development of sports medicine; Physical activity and physical ability; Anthropometric factors of physical ability; Functional determinants of physical ability; Bioenergetic determinants of physical ability; Adaptation reaction of the organism to training; Response of the cardiovascular system to physical activity; Cardiovascular conditions and diseases in sports; Principles of programming physical activities; Functional characteristics and physical activity of special groups; Fatigue, recovery, overtraining; Mechanism and etiology of sports injuries; Sports nutrition and supplementation; Oxidative stress and antioxidant protection in sports.

Practical teaching

Measurement of body height and body weight; Determination of height-weight ratio; Determination of body composition; Determining the functional capacity of the cardiovascular system; Determining the functional capacity of the respiratory system; Measurement of the functional ability of the musculoskeletal system; Methods of measuring and evaluating aerobic capacity; Cardiopulmonary resuscitation; Planning the frequency, dosage and duration of physical activity; Prevention of sports injuries; Proper nutrition of athletes; Basic principles of hydration in sports; Principles of athlete supplementation.

Literature:

- Hall J. Guyton and Hall Textbook of Medical Phisiology. Philadelphia: Elsevier; 2016.
- Waterbrook A. Sports Medicine Emergency Physician. New York: Cambridge University Press; 2016.

Number of active teaching classes: 45	**Lectures:** 30	**Practice:** 15

Teaching methods

Lectures, Discussions, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student’s activity during lectures	30	written exam	70
practical classes		practical exam	
colloquiums		oral exam	
seminars			

Study program: Integrated academic studies of medicine

Course unit: **BIOCHEMISTRY OF METABOLIC DISORDERS AND DISEASES**

Teachers: Zelen Ivanka, Mitrovic Marina, Andjelkovic Marija, Zaric Milan, Nikolic Ivana, Canovic Petar, Stanojevic-Pirkovic Marijana, Stankovic Sanja

Course status: Elective

ECTS: 3

Prerequisites:

For attending classes: enrolled in IV semester.

For taking exam: passed course unit Medical Biochemistry.

Course unit objective

This one-semester course is designed for students enrolled in Integrated academic studies of Medicine at the Faculty of medical science. It focuses on the basic biochemical and molecular causes of various metabolic disorders and diseases and on the types of these disorders that can arise as a result of genetic disorders, lack of certain enzymes, hormones, and other molecules, excessive consumption of certain foods, or a number of other factors. This course allows medical students to gain knowledge about most of these disorders including diabetes mellitus, inborn errors of carbohydrate, amino acid, lipid and nucleotide metabolism disorders including lactic acidosis, cystic fibrosis, gout, cardiovascular diseases, phenylketonuria and others, metabolic syndrome, bone and collagen diseases, disorders of mitochondrial, lysosomal and peroxisomal dysfunction

Learning outcomes of course unit

To gain knowledge about the basic molecular and biochemical mechanisms of the causes of various metabolic disorders and diseases; connect the cause of metabolic disorders with the clinical characteristic of the disorder; differentiate between certain common types of nutritional and metabolic disorders; analyze biochemical data and results related to various metabolic disorders and diseases.

Theoretical classes

Disorders of carbohydrate metabolism and clinical correlations: (diabetes mellitus, fructose intolerance, lactic acidosis, hypoglycemia, galactosemia; glycogen storage diseases); Disorders of lipid metabolism (hyperlipidemia, cholesterol, and cardiovascular diseases); Disorders of purine and pyrimidine metabolism (gout, arthritis, Lysch-Nyhan syndrome, SCID); Inborn errors of metabolism associated with amino acids (phenylketonuria, tyrosinemia, homocystinuria); Disorders of organic acid metabolism and amino acid transport (organic, propionic and methylmalonic acidemia, maple syrup urine disease - MSUD; cystinuria, cystinosis, Hartnup's disease); Urea synthesis disorders (ornithine transcarbamylase and carbamoyl phosphate synthase deficiency disorders, citrullinemia; Disorders of collagen and extracellular matrix metabolism (Ostegenesis imperfecta, Ehlers-Danlos syndrome, chondrodyplasias); Disorders of mitochondrial dysfunction (disorders associated with oxidative stress, apoptos,is and metal homeostasis; Friedreich's ataxia, Wilson's disease, Alzheimer's, Parkinson's, Huntington's disease); Lysosomal storage diseases or lipidosis (Fabry, Gauch,er and Tay Sachs Fabry diseases, Hunter syndrome); Peroxisomal disorders (Zellweger syndrome, adrenoleukodystrophy); Metabolic bone diseases (calcium balance, biological functions of calcium, phosp,hate and magnesium metabolism); Disorders in translation and post-translation (Cystic fibrosis, multiple sclerosis, Charcot-Marie, Tooth and Wolcott-Rallison diseases); Liver diseases (cirrhosis, specific liver diseases, hepatitis, obstructive jaundice); Hemoglobinopathies, Disorders of iron and porphyrin metabolism (porphyrias).

Practical classes

Disorders of carbohydrate metabolism and clinical correlations: (diabetes mellitus, fructose intolerance, lactic acidosis, hypoglycemia, galactosemia; glycogen storage diseases)-practical presentation; Disorders of lipid metabolism (hyperlipidemia, cholesterol, and cardiovascular diseases); Disorders of purine and pyrimidine metabolism (gout, arthritis, Lysch-Nyhan syndrome, SCID)-practical aspects; Inborn errors of metabolism associated with amino acids (phenylketonuria, tyrosinemia, homocystinuria)-practical aspects; Disorders of organic acid metabolism and amino acid transport (organic, propionic and methylmalonic acidemia, maple syrup urine disease – MSUD, cystinuria, cystinosis, Hartnup's disease)-practical aspects; Urea synthesis disorders (ornithine transcarbamylase and carbamoyl phosphate synthase deficiency disorders, citrullinemia-practical presentation; Disorders of collagen and extracellular matrix metabolism (Ostegenesis imperfecta, Ehlers-Danlos syndrome, chondrodyplasias)-practical presentation; Disorders of mitochondrial dysfunction (disorders associated with oxidative stress, apoptos,is and metal homeostasis-practical aspects; Friedreich's ataxia, Wilson's disease, Alzheimer's, Parkinson's, Huntington's disease)-practical aspects; Lysosomal storage diseases or lipidosis (Fabry, Gauch,er and Tay Sachs Fabry diseases, Hunter syndrome)-practical aspects; Peroxisomal disorders (Zellweger syndrome, adrenoleukodystrophy)-practical aspects; Metabolic bone diseases (calcium balance, biological functions of calcium, phosp,hate and magnesium metabolism)-practical presentation; Disorders in translation and post-translation (Cystic fibrosis, multiple sclerosis, Charcot-Marie, Tooth and Wolcott-Rallison diseases)-practical presentation; Liver diseases (cirrhosis, specific liver diseases, hepatitis, obstructive jaundice)-practical presentation; Hemoglobinopathies-practical presentation; Disorders of iron and porphyrin metabolism (porphyrias)-practical presentation.

Literature

- Bayens J. Medical Biochemistry. Philadelphia: Elsevier; 2019.
- Nessar A. Clinical biochemistry. 2nd edition. Oxford: Oxford University Press; 2016.

Number of active teaching classes: 45	**Lectures:** 30	**Practice:** 15	
Teaching methods Lectures, Discussion, Work in small groups.			
Examination methods (maximum 100 points)			
Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student's activity during lectures	30	written exam	39
practical classes		practical exam	
colloquiums	31	oral exam	
seminars			

Study program: Integrated academic studies of medicine

Course unit: **PATHOLOGICAL ANATOMY**

Teachers: Mitrovic Slobodanka, Stankovic Vesna, Vuletic Milena

Course status: Mandatory

ECTS: 18

Prerequisites

For attending classes: enrolled in V semester.

For taking exam: passed course units Physiology, Medical Biochemistry, Microbiology and Immunology.

Course unit objective

The aim of teaching the Pathological Anatomy course is to familiarize students with the subject, study, importance, and diagnostic methods used in pathology. During classes in general pathology, the student should acquire theoretical and practical knowledge about the basic micro and macromorphological characteristics of adaptive, degenerative, circulatory, inflammatory, and neoplastic processes. By listening to classes in special pathology, the student should acquire knowledge about the causes, mechanism of occurrence, and macromorphological and micromorphological expressions of diseases of different organs. In addition to the above, during the Pathological Anatomy classes, students learn about modern preoperative and postoperative histological, histochemical, cytological, and immunocytochemical methods that are used both in routine, diagnostic pathology and in scientific research work.

Learning outcomes of course unit

Upon completion of the course in Pathological Anatomy, the student is expected to acquire basic knowledge of: knowledge of basic diagnostic methods in pathology; cell damage, and cell adaptation; deposition of organic and inorganic substances; circulation disorders; general pathology of inflammation; organizational processes; immunopathology; amyloidosis; transplantation and explantation; general tumor pathology and the molecular basis of carcinogenesis; diseases caused by the environment; special forms of damage Pathology of the cardiovascular, respiratory, endocrine, neuroendocrine, gastrointestinal, hepatobiliary, hematopoietic, urogenital, central and peripheral nervous systems; breast pathology; pathology of soft tissues and bone-joint system; pathology of the skin and senses.

At the end of the Pathological Anatomy course, the student is expected to master the following skills: distinguishing between cytopathological, histopathological, histochemical, and immunocytochemical diagnostics; interpretation of results of the cytopathological, biopsy, and autopsy diagnostics; knowledge of the morphofunctional difference between basic inflammatory, degenerative, and tumor diseases; differentiation of histogenesis and biological behavior of benign and malignant lesions based on biopsy diagnostics; knowledge of the morphofunctional difference between histogenetically different tumors.

Theoretical classes

General pathology; Pathology of circulation disorders; Pathology of inflammation; Immunopathology; Tumor pathology; Cardiovascular system pathology; Respiratory system pathology; Breast, endocrine system, and thymus pathology; Gastrointestinal tract pathology; Hepatobiliary system pathology; Kidney and urinary system pathology; Male and female genital system pathology; Central and peripheral nervous system pathology; Pathology soft tissues of the locomotor system; Pathology of the lymphoid and hematopoiesis system; Pathology of the skin and senses.

Practical classes

General pathology-practical presentation; Pathology of circulation disorders-practical presentation; Pathology of inflammation-practical aspects; Immunopathology-practical presentation; Tumor pathology-practical presentation; Cardiovascular system pathology-practical presentation; Respiratory system pathology-practical aspects; Breast, endocrine system, and thymus pathology-practical aspects; Gastrointestinal tract pathology-practical presentation; Hepatobiliary system pathology-practical presentation; Kidney and urinary system pathology-practical presentation; Male and female genital system pathology-practical presentation; Central and peripheral nervous system pathology-practical aspects; Pathology soft tissues of the locomotor system-practical aspects; Pathology of the lymphoid and hematopoiesis system-practical presentation; Pathology of the skin and senses-practical aspects.

Literature

- Kumar V. Robbins Basic Pathology International Edition. 10th Edition. Elsevier Science; 2017.
- LeBoit P. Pathology and Genetic. Lyon: IARC Press; 2016.

Number of active teaching classes: 270	**Lectures:** 120	**Practice:** 150

Teaching methods

Lectures, Discussion, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student's activity during lectures	30	written exam	
practical classes		practical exam	20
colloquiums		oral exam	50
seminars			

Study program: Integrated academic studies of medicine

Course unit: **PATHOPHYSIOLOGY**

Teachers: Djukic Aleksandar, Jovanovic Zorica, Zivancevic-Simonovic Snezana, Jurisic Vladimir, Mihaljevic Olgica, Zdravkovic Nemanja, Jeftic Ilija, Petrovic Ivica

Course status: Mandatory

ECTS: 16

Prerequisites

For attending classes: enrolled in V semester.

For taking exam: passed course units Physiology, Medical Biochemistry, Microbiology and Immunology.

Course unit objective

An acquaintance of the student with the basic etiological factors (endogenous and exogenous) that cause disorders of the structure and function of cells, as well as specificities of disorders of the function of individual organs and organ systems.

Learning outcomes of course unit

After completing the course in pathophysiology, the student is expected to acquire the basic knowledge to: explain the basic mechanisms of the effect of etiological factors on the human organism and the compensatory mechanisms by which the organism counteracts the effect of those factors; explain functional disorders at the cellular level, as well as the mechanisms of recovery and death of damaged cells; explain the mechanisms of non-specific and specific protection of the organism and disorders of those protection mechanisms; explain disorders of cell growth control; explain the causes and mechanism of metabolic disorders; explain the etiology and pathogenesis of functional disorders of organs/organ systems (cardiovascular, respiratory, hematopoietic, gastrointestinal, urinary, endocrine and nervous).

After completing the course in pathological physiology, the student is expected to acquire the basic skills to: correctly interprets the results of analyzes that confirm/exclude the existence of inflammatory syndrome; correctly interprets the results of analyzes that confirm/exclude the existence of metabolic disorders; correctly interprets the results obtained from the functional examination of individual organs and organ systems (cardiovascular, respiratory, hematopoietic, gastrointestinal, urinary, endocrine and nervous).

Theoretical classes

Disturbance of local and systemic circulation; Etiological factors; Immune disorders; Disorders of water metabolism, electrolytes, and acid-base balance; Pathophysiology of the cardiovascular, respiratory, hematopoietic, urinary, gastrointestinal, hepatobiliary system; Metabolism of organic substances; Endocrine system; Nervous system; Pathophysiology of the skin and connective tissue; Locomotor system.

Practical classes

Disturbance of local and systemic circulation-practical presentation; Etiological factors-practical example; Immune disorders-practical presentation; Disorders of water metabolism, electrolytes, and acid-base balance-practical presentation; Pathophysiology of the cardiovascular, respiratory, hematopoietic, urinary, gastrointestinal, hepatobiliary system-practical presentation; Metabolism of organic substances-practical presentation; Endocrine system-practical presentation; Nervous system-practical presentation; Pathophysiology of the skin and connective tissue-practical presentation; Locomotor system-practical presentation.

Literature

- Copstead L-EC. Pathophysiology. St.Louis: Saunders; 2010.
- McPhee SJ. Pathophysiology of disease: An Introduction to Clinical Medicine. New York: McGraw Hill; 2010.
- Braun CA. Pathophysiology: A Clinical Approach. Philadelphia: Lippincot Williams & Wilkins; 2011.

Number of active teaching classes: 210	**Lectures:** 90	**Practice:** 120

Teaching methods

Lectures, Discussion, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student's activity during lectures		written exam	50
practical classes	15	practical exam	
colloquiums	35	oral exam	
seminars			

Study program: Integrated academic studies of medicine

Course unit: **PHARMACOLOGY AND TOXICOLOGY**

Teachers: : Jankovic Slobodan, Jakovljevic Mihajlo, Djordjevic Natasa, Kostic Marina, Milovanovic Dragan, Milovanovic Jasmina, Zivkovic-Zaric Radica, Milosavljevic Milos, Pejcic Ana, Ruzic-Zecevic Dejana

Course status: Mandatory

ECTS: 12

Prerequisites

For attending classes: enrolled in V semester.

For taking exam: passed course units Physiology, Medical Biochemistry, Microbiology and Immunology.

Course unit objective

The goal of pharmacology classes is to acquaint medical students with the origin, composition, and physical and chemical properties of drugs, with pharmacokinetic and pharmacodynamic properties of drugs, with purposeful dosing and administration of drugs, and with unwanted and toxic effects of drugs. The goal of toxicology classes is for students to acquire knowledge about the origin, physical and chemical properties of poisons, the pharmacokinetics of poisons, pharmacodynamics of poisons, as well as antidotes used in the treatment of poisoning.

Learning outcomes of course unit

After completing the course in Pharmacology and Toxicology, the student is expected to acquire basic knowledge on the following topics: pharmacodynamics; pharmacokinetics; factors affecting inter-individual variation in drug response; therapeutic drug monitoring; adverse drug effects; interactions; errors in treatment; poisoning; administration of drugs in specific groups of patients; legal aspects of drug administration; development of new medicines; medication management; ethics of prescribing medicines; medicines that are used most often; for each of the drugs, a student should know the mechanism of action, indications, route of administration, basic characteristics of pharmacokinetics, contraindications, and side effects; the most important therapeutic problems in general practice.

At the end of the Pharmacology and Toxicology course, the student is expected to master the following skills: taking a pharmacological history; writing a prescription to prescribe medicine; application of drugs in the most common therapeutic problems; recognizing side effects of drugs; correcting the drug dose based on its measured serum concentration; critical analysis of clinical studies, meta-analyses and systematic reviews; use of independent drug information; Finding key medical journals online; informing the patient and obtaining written consent for participation in the clinical study.

Theoretical classes

General pharmacology and pharmacology of vegetative transmission; Pharmacokinetics and pharmacodynamics of drugs for diseases of the central nervous system; Pharmacokinetics and pharmacodynamics of drugs for diseases of the cardiovascular system; Pharmacokinetics and pharmacodynamics of drugs for diseases of the respiratory and gastrointestinal tract; Pharmacokinetics and pharmacodynamics of hormones; Pharmacokinetics and pharmacodynamics of antibiotics, antifungals, and antivirals drugs; Pharmacokinetics and pharmacodynamics of cytostatics and immunosuppressants; Mechanism of action of poisons; Treatment of poisoning; The most common human poisonings.

Practical classes

Experiments and practical examples from clinical practice related to the following areas: General pharmacology and pharmacology of vegetative transmission; Pharmacokinetics and pharmacodynamics of drugs for diseases of the central nervous system; Pharmacokinetics and pharmacodynamics of drugs for diseases of the cardiovascular system; Pharmacokinetics and pharmacodynamics of drugs for diseases of the respiratory and gastrointestinal tract; Pharmacokinetics and pharmacodynamics of hormones; Pharmacokinetics and pharmacodynamics of antibiotics, antifungal, and antiviral drugs; Pharmacokinetics and pharmacodynamics of cytostatics and immunosuppressants; Mechanism of action of poisons; Treatment of poisoning; The most common human poisonings.

Literature

- Bertram K. Basic and Clinical Pharmacology. New York: McGraw-Hill; 2004.
- Randa DH. Goodman and Gilman's Manual of Pharmacology and Therapeutics. New York: McGraw-Hill; 2014.
- Von Boxtel CJ. Drug benefits and risks. Amsterdam: Ios Press; 2008.

Number of active teaching classes: 120	**Lectures:** 60	**Practice:** 60

Teaching methods

Lectures, Discussion, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student's activity during lectures		written exam	
practical classes	30	practical exam	
colloquiums	40	oral exam	30
seminars			

Study program: Integrated academic studies of medicine

Course unit: **INTRODUCTION TO CLINICAL PRACTICE**

Teachers: Zdravkovic Natasa, Andjelkovic Nebojsa, Djurdjevic Predrag, Stolic Radojica, Davidovic Goran, Petrovic Marina, Veselinovic Mirjana, Lazarevic Tatjana, Vucic RadavJovanovic Danijela

Course status: Elective

ECTS: 3

Prerequisites:

For attending classes: enrolled in V semester.

For taking exam: passed course unit Physiology.

Course unit objective

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 application of acquired knowledge in clinical and research scientific work; Developing critical thinking important in diagnosis and treatment; Students will get basic skills for daily clinical practice; Developing abilities for teamwork.

Learning outcomes of course unit

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, and its severity and to perform initial treatment of critically ill patients; acquisition of basic skills required by the 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 therapeutic procedures.

Theoretical classes

Relation of health practitioners and medical students toward patients; Admission of patients to the hospital; Identification of basic disorders on admission; Evaluation of the patient on admission and during hospitalization; Basic measurements; Vital functions; Mobile patients-basic care; Immobile patients-basic care; Hygiene of the patients; Nourishment of patients and types of diet; Infusions; Obtaining body fluids and blood for analysis; Patient transport; Hygiene for bedridden patients; Means and modes for heating and cooling the body.

Practical classes

Getting familiar with the Institute/Clinic and organization of work; Admission and history taking; Attending morning rounds-the role of doctors and nurses during rounds; Evaluation of patient's consciousness; Anthropometric measurement: patients' body height and weight, measuring waist circumference and limbs; 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); Mobility of patients and general condition; 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; Feeding the patient; basic types of diet; Recording of fluid intake.; Procedures for obtaining blood and body fluids for diagnostic purposes; Moving patients from bed to the wheelchair; Means and modes for heating and cooling the body; Preparation of patients for certain diagnostic procedures; preparation of instruments for sterilization.; Preparation of drugs for oral and parenteral use, the use of disposable syringes and needles, preparation of infusion; Help with the distribution of drugs: administration of drugs perorally, intradermally, parenterally (subcutaneously, intramuscularly, intravenously), intravaginally, rectally; infusionc рате цонтрол; administration of prescribed therapy in the prescribed manner (with supervision); Placement of urinary and other catheters.

Literature

- Talley NJ, Simon O'Connor. Clinical Examination Essentials: an introduction to clinical skills (and how to pass your clinical exams). 5th edition. Amsterdam: Elsevier; 2019.

Number of active teaching classes: 45	**Lectures:** 30	**Practice:** 15

Teaching methods

Lectures, Discussion, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student's activity during lectures		written exam	70
practical classes	30	practical exam	
colloquiums		oral exam	
seminars			

Study program: Integrated academic studies of medicine

Course unit: **IMMUNOPATHOLOGY - CLINICAL CASES**

Teachers: Jovanovic Ivan, Volarevic Vladislav, Milovanovic Marija, Radosavljevic Gordana, Pantic Jelena, Pavlovic Sladjana, Arsenijevic Aleksandar, Gajovic Nevena

Course status: Elective

ECTS: 3

Prerequisites:

For attending classes: enrolled in V semester.

For taking exam: passed course unit Microbiology and Immunology.

Course unit objective

The aim of this course is to introduce students to the pathogenesis of diseases with an immune basis, their clinical characteristics, as well as diagnostic principles, through presentations of selected clinical cases.

Learning outcomes of course unit

Upon completion of the course, the student is expected to acquire the basic knowledge to: describe the pathogenesis, clinical, laboratory, and other diagnostic characteristics of diseases with an immune basis; use acquired knowledge for differential diagnostic thinking and reasoning.

Theoretical classes

The theoretical sessions of the subject include presentations of selected clinical cases of the following diseases with an immune basis: hereditary immunodeficiencies of innate immunity; hereditary immunodeficiencies of acquired immunity; acquired immunodeficiencies; hypersensitivity diseases; rheumatic diseases; Hematologic diseases; gastrointestinal diseases; neurological diseases; skin diseases; infectious diseases; immunopathology of transplantation.

Practical classes

The theoretical sessions of the subject include presentations of selected clinical cases of the following diseases with an immune basis: hereditary immunodeficiencies of innate immunity-practical presentation; hereditary immunodeficiencies of acquired immunity-practical aspect; acquired immunodeficiencies-practical aspect; hypersensitivity diseases-practical aspect; rheumatic diseases-practical presentation; hematologic diseases-practical presentation; gastrointestinal diseases-practical presentation; neurological diseases-practical aspect; skin diseases-practical aspect; infectious diseases-practical aspect; immunopathology of transplantation-practical presentation.

Literature

- Geha RS, Notarangelo L. Case Studies in Immunology: a Clinical Companion. 7th edition. New York: Garland Science; 2016.
- Chapel H, Haeney M, Misbah S, Snowden N. Essentials of Clinical Immunology. 6th Edition. Chichester: Wiley Blackwell Publishing Ltd, Massachusetts; 2015.

Number of active teaching classes: 45	**Lectures:** 30	**Practice:** 15

Teaching methods

Lectures, Discussion, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student's activity during lectures	30	written exam	70
practical classes		practical exam	
colloquiums		oral exam	
seminars			

Study program: Integrated academic studies of medicine

Course unit: **CLINICAL PROPEDEUTICS**

Teachers: Miloradovic Vladimir, Petrovic Marina, Petrovic Dejan, Cupurdija Vojislav, Radovanovic Milan, Simic Ivan, Sreckovic Miodrag, Iric-Cupic Violeta, Zdravkovic Natasa, Mladenovic Violeta, Novkovic Ljiljana, Djukic Svetlana, Zdravkovic Vladimir, Vucic Rada

Course status: Mandatory

ECTS: 8

Prerequisites:

For attending classes: enrolled in VI semester.

For taking exam: passed course units Physiology, Medical Biochemistry, Communication skills, Microbiology and Immunology.

Course unit objective

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 professional, clinical work.

Learning outcomes of course unit

Students will acquire the necessary knowledge about the techniques of taking a history and physical examination. They will learn to recognize normal findings from various disorders in the morphology and function of organs and organ systems, i.e. to distinguish a normal finding from a pathological finding.

Theoretical classes

Propaedeutic as a medical discipline; Anamnesis; Physical examination of patients and methods of physical examination; Propedeutics and physical examination of the chest and respiratory organs; Propedeutics and physical examination of the heart and large blood vessels; Propedeutics and physical examination of the digestive tract, liver and bile ducts; Propedeutics and physical examination of the hematopoietic system; Propedeutics and physical examination of the kidneys and urinary tract; Propedeutics and physical examination of the locomotor apparatus; Propedeutics and physical examination of endocrine glands.

Practical classes

Taking a history; Assessment of vital parameters (measurement of temperature and pulse, blood pressure, number of respirations); General inspection; Head and neck examination; Examination of the chest and lungs: history, the topography of the chest, inspection, palpation, percussion and, auscultation; Examination of the heart and blood vessels: history, inspection, palpation, auscultation of the heart (heart sounds and murmurs), palpation of the pulse, interpretation of the ECG; Examination of the abdomen and abdominal organs: history, inspection, superficial and deep palpation, percussion, examination of the liver, examination of free fluid in the abdomen, digitorectal examination; Examination of the spleen and lymph glands. Examination of the kidneys and urinary system: history, inspection, palpation, succussion; Examination of endocrine glands: history and physical examination; Examination of the extremities: history and physical examination.

Literature

- Talley NJ, Simon O'Connor. Clinical Examination Essentials: an introduction to clinical skills (and how to pass your clinical exams). 5th edition. Amsterdam: Elsevier; 2019.

Number of active teaching classes: 135	**Lectures:** 45	**Practice:** 90 **Other classes:** 30

Teaching methods

Lectures, Discussion, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student's activity during lectures		written exam	
practical classes	15	practical exam	20
colloquiums	15	oral exam	50
seminars			

Study program: Integrated academic studies of medicine

Course unit: **PSYCHOLOGICAL MEDICINE**

Teachers: Ignjatovic-Ristic Dragana, Jovanovic Mirjana, Mihajlovic Goran, Janjic Vladimir, Borovcanin Milica, Radmanovic Branimir

Course status: Elective

ECTS: 3

Prerequisites:

For attending classes: enrolled in VI semester.

For taking exam: passed course unit Communication skills.

Course unit objective

Introducing students to the unique biopsychosocial being of man, different reactions of sick people to the disease, as well as different interactions between doctors/health workers and patients. They will master knowledge about the influence of psychological factors and the importance of stress in the development of psychosomatic diseases. They will also gain knowledge about ways to overcome stress and manage pain. They will master the knowledge that will enable them to recognize the burnout syndrome at work, along with strategies to overcome it.

Learning outcomes of course unit

The student acquires knowledge about the biopsychosocial unity of man; the sick person's reaction to the disease; understands psychological aspects of health and illness and psychological aspects in the treatment/care of various diseases; acquires knowledge about the psychologically healthy-desirable relationship of doctors/health workers with the patient and his immediate environment; the student masters the skill to recognize different psychological reactions to a symptom, disease and the importance of seeking professional help and social support, understands the role of stress in the onset of psychosomatic diseases and ways to overcome stress; understands the psychological aspects of serious diseases and terminal conditions (cancer, AIDS, etc.); understands the psychological aspects of illness and hospitalization in patients of different ages; acquires the opportunity to learn about different psychological situations in which he will find himself during his professional career and create models of adequate coping.

Theoretical classes

Introduction and concept of psychological medicine; Stress and psychological trauma; The influence of psychological factors on the onset of the disease; Psychosomatic medicine; Doctor patient-empathy relationship; Psychological reactions to symptoms, illness and the importance of seeking professional help and social support; The patient's reaction to the disease; Child's reaction to illness; Aging and the response to disease; Psychological reactions in diseases with unfavorable prognosis; The grieving process; Stigma, prejudice, and discrimination; Placebo and nocebo effect; Reactions to disability and support in rehabilitation; Health worker burnout syndrome.

Practical classes

Health behavior and change, as well as coping mechanisms and coping with illness; Understanding the relationship between stress and illness; Communication, empathy, professional relationship workshop; Psychological approach and interventions in working with patients suffering from various chronic and acute diseases; Conversation (communication) of a doctor/health worker with a sick person-workshop; Health and illness-workshop; Giving information to the patient and family about the disease; Preparation of patients for diagnostic and therapeutic processes; Getting to know the principles of establishing healthy habits at different ages; Factors that influence the development of healthy habits and lifestyle; Relationship between social support and health; Overview of health behavior promotion models and strategies aimed at reducing health problems; Recognizing the symptoms of burnout syndrome and adopting methods to overcome it.

Literature

- Casey P. Fish's Clinical Psychopathology. 4th edition. Cambridge, United Kingdom: Cambridge University Press; 2019.

Number of active teaching classes: 45	**Lectures:** 30	**Practice:** 15

Teaching methods

Lectures, Discussion, Seminars, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student's activity during lectures		written exam	60
practical classes		practical exam	
colloquiums		oral exam	
seminars	40		

Study program: Integrated academic studies of medicine

Course unit: **FUNDAMENTALS OF CLINICAL IMMUNOLOGY**

Teachers: Jovanovic Ivan, Volarevic Vladislav, Milovanovic Marija, Radosavljevic Gordana, Pantic Jelena, Pavlovic Sladjana, Arsenijevic Aleksandar, Gajovic Nevena

Course status: Elective

ECTS: 3

Prerequisites:

For attending classes: enrolled in VI semester.

For taking exam: passed course unit Fundamentals of oncology.

Course unit objective

The aim of this course is to introduce students to the immunopathogenesis of various chronic and autoimmune diseases.

Learning outcomes of course unit

After completing the course in Basics of Clinical Immunology, the student is expected to acquire the basic knowledge to: describe the immunopathogenesis of chronic and autoimmune diseases; distinguished the forms of immune response to various infectious agents, and describes the effector mechanisms of the immune response; explain the concepts of immune tolerance, immunology of reproduction, transplantation; explain the mechanisms of immunodeficiency; describe the basic features of immunopharmacological therapy, vaccines, monoclonal antibodies, immunotoxins, and cytokine therapy.

Theoretical classes

The immune basis of allergic diseases; Urticaria and anaphylaxis; Diseases of joints and muscles¸ heart and lungs; Diseases of the blood and blood-forming organs and glands with internal secretion; Gastrointestinal and hepatobiliary diseases and kidney diseases; Neurological diseases; Skin and eye diseases; Immunology of reproduction; Transplantation; Immunodeficiencies; Immunopharmacological therapy; Vaccines, monoclonal antibodies, immunotoxins, and cytokine therapy.

Practical classes

The immune basis of allergic diseases-practical presentation; Urticaria and anaphylaxis-practical presentation; Diseases of joints and muscles¸ heart and lungs-practical presentation; Diseases of the blood and blood-forming organs and glands with the internal secretion-practical presentation; Gastrointestinal and hepatobiliary diseases and kidney diseases-practical presentation; Neurological diseases-practical presentation; Skin and eye diseases-practical presentation; Immunology of reproduction-practical presentation; Transplantation-practical presentation; Immunodeficiencies-practical presentation; Immunopharmacological therapy-practical presentation; Vaccines, monoclonal antibodies, immunotoxins, and cytokine therapy-practical aspects.

Literature

- Abbas A. Basic Immunology. London: Mosby, Elsevier; 2016.
- Chapel H, Haeney M, Misbah S, Snowden N. Essentials of Clinical Immunology. 6th Edition. Chichester: Wiley Blackwell Publishing Ltd, Massachusetts; 2015.
- Grumezescu AM. Antimicrobial nanoerchitectonics: from synthesis to applications. Amsterdam: Elsevier; 2017.
- Klyosov AA. Galectins and disease implications for targeted therapeutics. Washington: American Chemical Society; 2012.

Number of active teaching classes: 45	**Lectures:** 30	**Practice:** 15

Teaching methods

Lectures, Discussion, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student's activity during lectures	30	written exam	70
practical classes		practical exam	
colloquiums		oral exam	
seminars			

Study program: Integrated academic studies of medicine

Course unit: **INTERNAL MEDICINE**

Teachers: Zdravkovic Natasa, Andjelkovic Nebojsa, Djurdjevic Predrag, Stolic Radojica, Cekerevac Ivan, Davidovic Goran, Miloradovic Vladimir, Petrovic Marina, Petrovic Dejan, Tomic-Lucic Aleksandra, Veselinovic Mirjana, Djukic Svetlana, Zdravkovic Vladimir, Lazarevic Tatjana, Iric-Cupic Violeta, Mladenovic Violeta, Novkovic Ljiljana, Radovanovic Milan, Simic Ivan

Course status: Mandatory

ECTS: 24

Prerequisites:

For attending classes: enrolled in VII semester.

For taking exam: passed course units Pathological anatomy, Pathophysiology, Pharmacology and toxicology, Clinical propedeutics, First aid.

Course unit objective

The main objective of education in the subject of Internal Medicine is the adoption of the current theoretical and practical expertise in internal medicine, as well as the application of acquired knowledge in professional work. Also, the goal of the course is to students acquire the ability to diagnose diseases, plan appropriate further diagnostics and prescribe therapy.

Learning outcomes of course unit

Students will acquire the necessary knowledge in all areas of internal medicine: cardiology, pulmonology, hematology, endocrinology, gastroenterology and hepatology, nephrology, rheumatology, and allergology, as well as the ability to recognize internal medicine diseases, carry out rational diagnostic procedures and treat these diseases from the perspective of a general practitioner. Students will acquire the necessary knowledge for the emergency treatment of serious and vitally endangered patients.

Theoretical classes

Cardiology; Non-invasive and invasive diagnostic procedures in cardiology; Coronary heart disease; Stable and unstable angina pectoris; Myocardial infarction; Arterial hypertension; Myocardiopathies and myocarditis; Congenital heart defects; Acquired heart defects; Acute pulmonary heart disease; Rheumatic fever; Pericardial disease; Heart failure; Heart rhythm disorders; Infective endocarditis; Disease of the aorta and peripheral arteries; Vein disease; Clinical manifestations on the heart during other diseases; Urgent conditions in cardiology; Pulmonology; Functional examination of lung function; Bronchial asthma; Chronic obstructive pulmonary disease; Chronic respiratory insufficiency; Pneumonia; Pulmonary thromboembolism; Acute respiratory distress syndrome; Interstitial lung diseases and lung sarcoidosis; Tuberculosis; Lung abscess and bronchiectasis; Pleural effusions; Malignant lung diseases; Hematology; Origin of blood cells; Hematopoietic organs; Concept of pluripotent stem cell; Diseases of hematopoietic pluripotent stem cells and determined stem cells; Acute leukemia; Chronic granulocytic leukemia; Granulocytopoiesis and its disorders; Disorders of the monocyte-macrophage lineage; Anemias-etiology, pathogenesis, classification and clinical manifestation; Aplastic anemia; Hypochromic anemia; Megaloblastic anemia; Hemolytic anemia; Anemias in chronic diseases; Modern concept of hemostasis; Hemorrhagic syndromes-division and clinical manifestation; Thrombocytopenia; Chronic lymphoproliferative diseases; Thrombophilia; Treatment with blood derivatives-indications, ontraindications, side effects; Coagulopathy; Endocrinology; Clinical aspects of neurogenic regulation; Diseases of the pituitary gland; Goiter and thyroiditis; Tumors of the thyroid gland; Diseases of the parathyroid gland; Hyper and hypothyroidism; Diseases of the gonads; Diseases of the cortex and medulla of the adrenal glands; Adrenogenital syndrome; Etiology, clinical manifestation, diagnosis of diabetes; Acute complications of diabetes; Chronic complications of diabetes; Gastroenterology; Esophageal diseases and esophageal tumors; Gastritis and gastropathies; Ulcer disease; Helicobacter pylori infection; Hypersecretory conditions; Gastric tumors; Malabsorption syndrome; Celiac disease; Wipple's disease; Protein-losing enteropathies; Inflammatory bowel disease; Other enteritis and colitis; Diverticuli and diverticulitis of the small intestine and colon; Irritable bowel syndrome; Anorectal diseases; Tumors of the small intestine; Carcinoid; Gastrointestinal polyps; Polyposis syndrome; Colon cancer; Acute and chronic pancreatitis; Pancreatic cancer; Gastrointestinal and pancreatic endocrine tumors; Biliary calculosis; Cholecystitis; Cholangitis; Tumors of the gallbladder and bile ducts; Other diseases of the biliary tract; Bilirubin metabolism disorder; Hereditary metabolic diseases of the liver; Drug-induced liver damage; Acute liver failure; Alcoholic liver disease; Fatty liver; Nonalcoholic steatohepatitis; Autoimmune hepatitis; Primary biliary cirrhosis; Primary sclerosing cholangitis; Vascular diseases of the liver; Cirrhosis of the liver; Portal hypertension; Renal complications of liver disease; Ascites; Spontaneous bacterial peritonitis; Hepatic encephalopathy; Liver tumors; Nephrology; Diagnosis of kidney diseases; Disorder of water and electrolyte metabolism; Glomerular kidney diseases; Tubulointerstitial kidney diseases; Vascular kidney diseases; Acute and Chronic renal failure; Methods for replacing kidney function; Rheumatology and allergology; Classification of rheumatic diseases; Rheumatoid arthritis; Spondyloarthritis; Ankylosing spondylitis; Psoriatic arthritis; Enteropathic arthritis; Systemic connective tissue diseases-general characteristics; Systemic lupus erythematosus; Sjogren's syndrome; Dermatopolimyositis; Systemic sclerosis; Mixed connective tissue disease; Vasculitis; Fibromyalgia; Style's disease. Degenerative and extra-articular rheumatism; Metabolic bone diseases; Gout; Osteoporosis and osteomalacia; Mechanisms of immune tissue damage; Atopic diseases; Systemic anaphylaxis; Urticaria and angioedema; Allergic rhinitis; Allergic reactions to

drugs; Aspirin intolerance; Intolerance to iodine contrast agents; Intolerance to anesthetics and muscle relaxants; Allergic reactions caused by food; Allergic reactions to latex; Drug-induced lupus erythematosus; Purpura Henoch-Schonlein.

Practical classes

The history and physical examination of cardiac patients, diagnostic and therapeutic algorithms in cardiology; Treatment of cardiovascular diseases, as well as treatment of emergency conditions in cardiology; The history and physical examination of pulmonary patients, diagnostic and therapeutic algorithms in pulmonology, treatment of pulmonary diseases, as well as treatment of emergency conditions in pulmonology; The history and physical examination of patients with the hematological disease, diagnostic and therapeutic algorithms in hematology, treatment of hematological diseases, as well as management of emergency conditions in hematology; The history and physical examination of endocrine patients, diagnostic and therapeutic algorithms in endocrinology, treatment of endocrine disorders, as well as treatment of emergency conditions in endocrinology; The history and physical examination of patients with gastroenterology diseases, diagnostic and therapeutic algorithms in gastroenterology, treatment of gastrointestinal diseases, as well as treatment of emergency conditions in gastroenterology; The history and physical examination of patients with renal disorders, diagnostic and therapeutic algorithms in nephrology, treatment of renal disorders, as well as treatment of emergency conditions in nephrology; The history and physical examination of patients with rheumatology diseases and allergies, diagnostic and therapeutic algorithms in rheumatology and allergology, treatment of rheumatology diseases and allergies, as well as treatment of emergency conditions in rheumatology and allergology.

Literature

- Fauci A. Harrisons principles of internal medicine. New York: McGraw Hill; 2008.
- Longo DL. Harrison's hematology and oncology. New York: McGraw Hill; 2010.

Number of active teaching classes: 360	**Lectures:** 180	**Practice:** 180 **Other classes:** 120

Teaching methods

Lectures, Discussion, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student’s activity during lectures		written exam	
practical classes	15	practical exam	10
colloquiums	25	oral exam	50
seminars			

Study program: Integrated academic studies of medicine

Course unit: **RADIOLOGY**

Teachers: Vojinovic Radisa, Lukic Snezana, Mijailovic Milan

Course status: Mandatory

ECTS: 4

Prerequisites:

For attending classes: enrolled in VII semester.

For taking exam: passed course units Pathological anatomy, Pathophysiology, Clinical propedeutics.

Course unit objective

Introducing students to the theoretical and practical aspects of radiological diagnostic procedures applied in radiology modalities: acquiring basic knowledge about X-ray machines and devices; digitalization of X-ray images; computerized tomography; magnetic resonance; ultrasound; mammography; angiodiagnostics; interventional vascular and non-vascular methods; their practical application in diagnosing pathological conditions in patients and the possibilities of radiological-interventional therapeutic measures, basic measures of protection against ionizing radiation for patients and staff working in diagnostic X-ray offices.

Learning outcomes of course unit

Upon completion of classes in Radiology, the student is expected to acquire basic knowledge: basic principles of operation of diagnostic devices used in radiology; indications for using modern devices for diagnostic purposes; familiarity with diagnostic procedures in radiology by the system; basics of interventional radiology and therapeutic procedures in radiology; principles of protection against ionizing radiation; functioning of the radiological information system; application of the principles of telemedicine and teleradiology.

At the end of the Radiology course, the student is expected to master the following skills: preparing the patient for examination; interpretation of X-ray examinations of the respiratory system; interpretation of x-ray examinations of the digestive tract; interpretation of X-ray examinations of the musculoskeletal system; interpretation of x-ray examinations of the urogenital system; using an ultrasound machine; Interpretation of basic findings in computed tomography; application of contrast agents; protection of the patient from adverse effects of contrast agents; using the radiological information system; application of PACS; application of telemedicine and teleradiological procedures.

Theoretical classes

Medical physics-basics; Learning about modalities and radiology techniques (Physical principle of radilogy equipment and system overview); Radiology imaging in pulmonary diseases; Learning about pulmonal and mediastinal pathology on CT; Radiology imaging in cardiovascular diseases (Imaging techniques., Cardiac anatomy, Learning about diagnostic protocols); Learning about contrast media for radiology imaging; Learning about imaging of the gastrointestinal tract and imaging techniques; Imaging anatomy of the gastrointestinal tract; Learning about pathology of the digestive tract (US,CT,MRI); Imaging tehniques of the urogenital tract (conventional radiography, IVU, CT, MRI); Imaging pathology of the urogenital tract; Anatomy of the breast on US and mammography; Benign and malignant mass lesion of breasts; Neuroradiology Imaging techniques: conventional radiography, CT, MRI (Trauma to the skull and brain, Intracranial tumours, Intracranial infections, White matter pathology, Non-traumatic intracranial haemorrhage, Brain stroke, Spinal and spinal chord pathology); Interventional non-vascular and vascular radiology, modalities and techniques; Musculosceletal Imaging techniques: conventional radiography, CT, MRI (Musculoskeletal trauma, Bone tumours, Osteomyelitis); Radiotherapy.

Practical classes

Learning about radiology diagnostic devices; Radiology imaging in pulmonary diseases: conventional radiography interpretation; Radiology imaging in cardiovascular disease: conventional radiography interpretation; Learning about contrast media for radiology imaging; Normal radiology anatomy of the gastrointestinal tract; Abdominal radiography interpretation; Imaging interpretation of the gastrointestinal pathology; Imaging interpretation of the urogenital pathology; Mammography imaging interpretation; Interpretation of the skull and brain imaging; Learning about non-vascular and endovascular imaging procedures; Imaging interpretation of the musculoskeletal patology; Radiotherapy.

Literature

- Adam A, Dixon AK, Gillard JH, Schaefer-Prokop C. Grainger & Allison's Diagnostic Radiology. 7th edition. Elsevier Science; 2020.

Number of active teaching classes: 60	**Lectures:** 30	**Practice:** 30

Teaching methods: Lectures, Discussion, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student's activity during lectures	30	written exam	70
practical classes		practical exam	
colloquiums		oral exam	
seminars			

Study program: Integrated academic studies of medicine

Course unit: **NUCLEAR MEDICINE**

Teachers: Vukomanovic Vladimir, Ignjatovic Vesna

Course status: Mandatory

ECTS: 4

Prerequisites:

For attending classes: enrolled in VII semester.

For taking exam: passed course unit Fundamentals of oncology.

Course unit objective

Learning the basic postulates of application of open sources of ionizing radiation in medicine; biophysical bases of the application of radioactive isotopes; the working principle of visualization systems in nuclear medicine; differences and complementarity of nuclear medicine and other diagnostic methods in medicine. Through theoretical and practical teaching, students will be provided with basic information about the clinical possibilities of diagnostic and therapeutic application of radiopharmaceuticals.

Learning outcomes of course unit

After completing the course in Nuclear Medicine, the student is expected to acquire basic knowledge and skills to explain: basic biophysical postulates of the application of radioactive isotopes in medicine; working principles of visualization systems; characteristics of radiolabels as a basis for morphological and functional tests in nuclear medicine; principles and interpretation of diagnostic and therapeutic procedures in nuclear medicine; and provide adequate first aid in the event of a radiation accident.

Course unit contents

Theoretical classes

Biophysical basics of diagnostic and therapeutic procedures; Visualization systems in nuclear medicine; Basic principles of radiopharmacology; Basic postulates of radiobiology and radiation protection; Diagnostic methods of nuclear medicine, morphological and functional in: endocrinology, gastroenterology, cardiology, neurology and psychiatry, pulmonology, nephrourology, hematology and oncology; Application of nuclear medicine methods in the therapy of malignant diseases.

Practical classes

Basic principles and specifics of patient examination in nuclear medicine; Understand and adopt the working principles of: operation of visualization devices in nuclear medicine, preparation and application of radiopharmaceuticals, protection of staff, patients and third parties from ionizing radiation; Demonstration and discussion of various clinical cases considering disorders of the function of organs and organ systems and indications for diagnostic and therapeutic use of radionuclides and radiopharmaceuticals; Practical application of acquired knowledge in everyday practice in diagnosis of endocrinological, gastroenterological, cardiological, neurological and psychiatric, pulmonary, nephrourological, hematological and oncological disorders, as well as methods in the treatment of benign and malignant diseases.

Literature

- Shah C, Bradshaw M, Dalal I, editors. Nuclear Medicine: A Core Review. 2nd edition. Philadelphia: Wolters Kluver Lippincott Williams&Wilkins; 2021.
- O'Malley J, Ziessman H. Nuclear Medicine and Molecular Imaging: The Requisites. 5th edition. Elsevier Science; 2020.
- Chandra R, Rahmim A. Nuclear Medicine Physics. 8th edition. Philadelphia: Wolters Kluwer; 2018.

Number of active teaching classes: 45	**Lectures:** 15	**Practice:** 30

Teaching methods

Lectures, Seminars, Practical work, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points**	**Final exam**	**No. of points**
student's activity during lectures		written exam	
practical classes	20	practical exam	
colloquiums	40	oral exam	30
seminars	10		

Study program: Integrated academic studies of medicine

Course unit: **DERMATOVENEROLOGY**

Teachers: Ravic-Nikolic Ana, Milicic Vesna, Ristic Gordana

Course status: Mandatory

ECTS: 4

Prerequisites:

For attending classes: enrolled in VII semester.

For taking exam: passed course unit Clinical propedeutics.

Course unit objective

Obtaining knowledge about medical treatment of the most prevalent dermatological and venerological disorders (e.g. psoriasis, chronic eczema, atopic dermatitis, blister disorders, infectious diseases of skin and mucous membrane, nevi, skin tumors, venereal diseases, etc.). Acquiring knowledge about medical treatment and prophylaxis of the most prevalent dermatological and venerological diseases in population. Acquiring skills of making appropriate drug choices and tailoring dosage regimens according to the needs of patients.

Learning outcomes of course unit

Ability to diagnose chronic dermatological diseases; Ability to recognize clinically significant adverse reactions and drug-drug interactions in dermatovenerology; Acquisition of patient examination and clinical interview skills in dermatovenerology; Skills in prescribing drugs and adjusting dosage regimens according to the needs of patients with skin diseases.

Course unit contents

Theoretical classes

Dermatovenerology as a discipline; Basics of dermatovenerological examination and clinical interview; Diagnosis and treatment of chronic eczema; Diagnosis and treatment of psoriasis; Diagnosis and treatment of atopic dermatitis; Diagnosis and treatment of blister disorders; Diagnosis and treatment of infectious diseases of skin and mucous membranes; Diagnosis and treatment of skin tumors; Diagnosis and treatment of venereal diseases; Basics of pharmacotherapy in dermatovenerology; Basics of phototherapy; Clinically important adverse drug reactions and drug-drug interactions in dermatovenerology.

Practical classes

Principles of patient examination and treatment; Principles of tailoring dosage regimens according to a patient's needs; Dosing in children and elderly; Discovering potential drug-drug and drug-food interactions; Causal interpretation of adverse events.

Literature

- Kang S, Amagai M, Bruckner AL, Enk AH, Margolis DJ, McMichael AJ, Orringer JS. Fitzpatrick's Dermatology. 9th Edition. New York: McGraw-Hill; 2019.
- Wolverton S, Wu J. Comprehensive Dermatologic Drug Therapy. 4th edition. Philadelphia: Elsevier; 2021.

Number of active teaching classes: 45	**Lectures:** 30	**Practice:** 15

Teaching methods

Lectures, Practical work, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points**	**Final exam**	**No. of points**
student's activity during lectures	30	written exam	
practical classes		practical exam	30
colloquiums		oral exam	40
seminars			

Study program: Integrated academic studies of medicine

Course unit: **APPLICATION OF BIOLOGICAL THERAPY IN MEDICINE**

Teachers: Jovanovic Ivan, Volarevic Vladislav, Milovanovic Marija, Radosavljevic Gordana, Pantic Jelena, Pavlovic Sladjana, Gajovic Nevena

Course status: Elective

ECTS: 3

Prerequisites:

For attending classes: enrolled in VII semester.

For taking exam: passed course units Microbiology and immunology, Pharmacology and toxicology.

Course unit objective

The aim of this course unit is to introduce students to the application of biological therapy in the treatment of tumors and chronic inflammatory/autoimmune diseases.

Learning outcomes of course unit

After completing the course unit the student is expected to acquire the basic knowledge to: describe the mechanisms of action and know the side effects of monoclonal antibodies/cytokines/inhibitors of cytokines/stem cells/inhibitors of immune checkpoints that are approved for the treatment of chronic inflammatory, autoimmune and malignant diseases, or are in the phase of clinical trials; list the tumors (leukemias) that are treated with hematopoietic stem cell transplantation and know the complications of this therapy; describe the principles of developing and the mechanism of action of vaccines that are used in tumor therapy or are in the research phase; describe the basic principles of gene therapy and list the different viral vectors used in tumor gene therapy; describe the basic principles of CAR T-cell tumor therapy and the side effects of this therapy.

Course unit contents

Theoretical classes

Monoclonal antibodies in the therapy of chronic inflammatory and autoimmune diseases; Cytokine inhibitors in the treatment of chronic inflammatory and autoimmune diseases; Stem cells therapy of autoimmune diseases; Monoclonal antibodies in tumor therapy; Cytokines in tumor therapy; Stem cells therapy of tumors; Tumor therapy with immune checkpoint inhibitors; Vaccines in tumor therapy; Viral vectors for tumor gene therapy; Tumor therapy with CAR T-cells.

Practical classes

Monoclonal antibodies in the therapy of chronic inflammatory and autoimmune diseases – practical examples; Cytokine inhibitors in the treatment of chronic inflammatory and autoimmune diseases – practical examples; Stem cells therapy of autoimmune diseases – practical examples; Monoclonal antibodies in tumor therapy – practical examples; Cytokines in tumor therapy – practical examples; Stem cells therapy of tumors – practical examples; Tumor therapy with immune checkpoint inhibitors – practical examples; Vaccines in tumor therapy – practical examples; Viral vectors for tumor gene therapy – practical examples; Tumor therapy with CAR T-cells – practical examples.

Literature

- Burt RK, Farge D, Ruiz MA, Saccardi R, Snowden JA, editors. Hematopoietic Stem Cell Transplantation and Cellular Therapies for Autoimmune Diseases. 1st edition. CRC Press; 2021.

Number of active teaching classes: 45	**Lectures:** 30	**Practice:** 15

Teaching methods

Lectures, Practical work, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points**	**Final exam**	**No. of points**
student's activity during lectures	30	written exam	70
practical classes		practical exam	
colloquiums		oral exam	
seminars			

Study program: Integrated academic studies of medicine

Course unit: **FUNDAMENTALS OF CLINICAL PHARMACOLOGY**

Teachers: Folic Marko, Djuric Dusan, Kostic Marina, Milovanovic Dragan, Milovanovic Jasmina, Milosavljevic Milos, Pejcic Ana, Ruzic-Zecevic Dejana

Course status: Elective

ECTS: 3

Prerequisites:

For attending classes: enrolled in VII semester.

For taking exam: passed course units Microbiology and immunology, Pharmacology and toxicology.

Course unit objective

Teaching students with the principles and practice of clinical application of drugs in the most common diseases and conditions.

Learning outcomes of course unit

At the end of the course unit Fundamentals of clinical pharmacology the students are expected to master the following knowledge: principles and application of clinical pharmacokinetics; principles and application of pharmacovigilance; principles and application of pharmacoeconomics; principles and application of pharmacoepidemiology; principles and application of pharmacotherapy.

Skills that students will master at the end of the course will be: adequate choice of medicine for the most common diseases or conditions; the skill of individualizing the dose of drugs; the skill of interpreting the results of pharmacoeconomic studies; the skill of interpreting the results of pharmacoepidemiological studies; the skill of assessing the causality of adverse events; the ability to detect potential drug-drug and drug-food interactions; the skill of monitoring the effects of drugs.

Course unit contents

Theoretical classes

Place and role of clinical pharmacology; Principles and application of pharmacoeconomics; Principles of rational therapy of the most common diseases and conditions; Principles and application of pharmacokinetics in the treatment of patients; Prevention and detection of adverse effects of drugs; Prevention and detection of interactions between drugs and drugs and food; Principles and application of pharmacoepidemiology studies; Systematic reviews and meta-analyses.

Practical classes

Examples of application in clinical practice: pharmacoeconomic analyses, good practice guidelines, results of systematic reviews and meta-analyses, results of pharmacoepidemiological studies, calculators for individualizing drug dosages, software for detecting potential interactions between drugs and questionnaires for determining the causality of adverse drug effects; Taking and interpreting the pharmacological anamnesis; Reporting adverse drug reactions.

Literature

- Hilal-Dandan R, Brunton LL, editors. Goodman and Gilman's manual of pharmacology and therapeutics. 2nd edition. New York: McGraw-Hill; 2014.
- Chisholm-Burns M, editor. Pharmacotherapy: principles and practice. 3rd edition. New York: McGraw-Hill Medical; 2013.

Number of active teaching classes: 45	**Lectures:** 30	**Practice:** 15

Teaching methods

Lectures, Seminars.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points**	**Final exam**	**No. of points**
student's activity during lectures	30	written exam	
practical classes		practical exam	
colloquiums		oral exam	70
seminars			

Study program: Integrated academic studies of medicine

Course unit: **NEUROLOGY**

Teachers: Miletic-Drakulic Svetlana, Azanjac-Arsic Ana, Aleksic Dejan, Boskovic-Matic Tatjana, Vesic Katarina, Gavrilovic Aleksandar

Course status: Mandatory

ECTS: 6

Prerequisites:

For attending classes: enrolled in VIII semester.

For taking exam: passed course units Pathological anatomy, Pathophysiology, Pharmacology and toxicology, Clinical propedeutics.

Course unit objective

The aim of this course unit is to acquaint students with the etiology, pathogenesis, clinical picture, diagnosis, therapy and possible consequences of neurological diseases and conditions. Likewise, it is important to familiarize students with the leading neurological pathology, with the possibilities of successful prevention and treatment of emergency conditions.

Learning outcomes of course unit

After successfully completing the course unit, the student will be able to: explain the basic causes of neurological diseases; know the leading symptoms and signs of neurological diseases; apply appropriate methods and techniques of clinical examination; know prevention methods, importance of diagnostic procedures and treatment of neurological diseases; know emergency conditions and complications of neurological diseases.

Course unit contents

Theoretical classes

Episodic disorders of consciousness, delirium, coma; Sleep disorders; Epileptic seizures, epilepsy, febrile convulsions; Headaches, neuralgia; Vertigo; Cerebrovascular diseases; Edema of the brain; Infectious diseases of the central nervous system and neurological complications of systemic diseases; Dementia; Central nervous system trauma; Tumors of the central nervous system; Demyelinating diseases of the central nervous system; Movement disorders and diseases of the cerebellum; Developmental regression and disorders of the nervous system; Inborn errors of metabolism and chromosomal diseases of the nervous system; Neurocutaneous diseases; Motor neuron diseases and polyneuropathy; Diseases of the spinal cord; Diseases of the neuromuscular junction and muscles.

Practical classes

Episodic disorders of consciousness, delirium, coma – examples from practice; Sleep disorders – examples from practice; Epileptic seizures, epilepsy, febrile convulsions – examples from practice; Headaches, neuralgia – examples from practice; Vertigo – examples from practice; Cerebrovascular diseases – examples from practice; Edema of the brain – examples from practice; Infectious diseases of the central nervous system and neurological complications of systemic diseases; Dementia – examples from practice; Central nervous system trauma – examples from practice; Tumors of the central nervous system – examples from practice; Demyelinating diseases of the central nervous system – examples from practice; Movement disorders and diseases of the cerebellum – examples from practice; Developmental regression and disorders of the nervous system – examples from practice; Inborn errors of metabolism and chromosomal diseases of the nervous system – examples from practice; Neurocutaneous diseases – examples from practice; Motor neuron diseases and polyneuropathy – examples from practice; Diseases of the spinal cord – examples from practice; Diseases of the neuromuscular junction and muscles – examples from practice.

Other classes

Independent analysis of diagnostic and therapeutic principles by students' insight into medical records of patients.

Literature

- Rapper AH, Samuels MA. Adams and Victors Principles of Neurology. 9th edition. New York: Mc Graw-Hill; 2009.

Number of active teaching classes: 90	**Lectures:** 45	**Practice:** 45 **Other classes:** 15

Teaching methods

Lectures, Practical work, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points**	**Final exam**	**No. of points**
student's activity during lectures	15	written exam	
practical classes	14	practical exam	
colloquiums	15	oral exam	56
seminars			

Study program: Integrated academic studies of medicine

Course unit: **PSYCHIATRY**

Teachers: Janjic Vladimir, Ignjatovic-Ristic Dragana, Jovanovic Mirjana, Mihajlovic Goran, Borovcanin Milica, Radmanovic Branimir

Course status: Mandatory

ECTS: 6

Prerequisites:

For attending classes: enrolled in VIII semester.

For taking exam: passed course units Pathological anatomy, Pathophysiology, Pharmacology and toxicology, Clinical propedeutics.

Course unit objective

Introducing students with the basics of medical psychology and psychopathology, as well as with the etiology, pathogenesis, clinical picture, course, and prognosis of mental disorders. Students should learn preventive, diagnostic, therapeutic, and rehabilitation procedures in the treatment of mental disorders.

Learning outcomes of course unit

After successfully completing the course unit Psychiatry the student is expected to acquire the following basic knowledge: to explain psychopathology; to explain procedures for recognizing diagnosis of mental disorders; to understand the basics of the nature, diagnosis, therapy and rehabilitation of psychiatric disorders: neurotic and stress-related mental disorders, mood disorders, schizophrenic disorders, intellectual disorders, addiction to psychoactive substances, the basics of psychiatric expertise, the basics of consultative psychiatry, treatment of emergency conditions in psychiatry as well as a basic ethical principles in psychiatry and deontology.

After successfully completing the course unit Psychiatry the student is expected to master the following skills: to recognize the signs and symptoms of certain groups of mental disorders; to correctly interpret the findings of a psychiatry specialist in relation to diagnosis, therapy and rehabilitation treatment of patients with psychiatric disorders; reacts therapeutically in a proper manner in urgent psychiatric conditions; in a social environment, to professionally work on the prevention of mental disorders and the destigmatization of people with mental disorders.

Course unit contents

Theoretical classes

History of psychiatry and general psychopathology; Etiology, classification and diagnosis of mental disorders, personality theories; Personality disorders, eating disorders, sleep disorders and sexual disorders; Neurotic and stress-related disorders; Addiction 1 – alcohol dependence; Addiction 2 – dependence on psychoactive substances; Brain organic psychosyndromes; Schizophrenia, schizotypal disorders and delusional disorders 1; Schizophrenia, schizotypal disorders and delusional disorders 2; Mood disorders; Child and adolescent psychiatry; Therapy in psychiatry – biological therapy; Therapy in psychiatry – psychotherapy and sociotherapy; Emergency and consultative psychiatry; Ethical aspects and legal regulation of mental disorders, deontological approach in psychiatry and forensic psychiatry.

Practical classes

Examination of a psychiatric patient and psychiatric interview – presentation of a person with a mental disorder, medical history (anamnesis, somatic and neurological findings, mental status, psychiatric summary, provisional conclusion); Non-verbal communication (mimicry, posture, motor skills of the patient) and establishment of verbal contact; Independent conducting of interviews and psychiatric examination; examples of neurotic disorders from clinical practice; Examples from clinical practice: personality disorders, eating disorders, sleep disorders and sexual disorders; Examples of alcoholism from clinical practice; Examples of the effect of psychoactive substances from clinical practice; Examples of delirium and dementia from clinical practice; Examples of schizophrenia from clinical practice; Examples of delusional disorders from clinical practice; Examples of mood disorders from clinical practice; Examples of mental problems of childhood and adolescence from clinical practice; Indications for drug use, clinical aspects of drug use (term of polypharmacy) and possible side effects; Possibilities of applying psychotherapeutic and sociotherapeutic techniques – presentations and practical application exercises; Examples of emergency states in psychiatry from clinical practice; Introducing with practical aspects of forensic medical psychiatry.

Other classes

Independent analysis of diagnostic and therapeutic principles by students' insight into medical records of patients.

Literature

- Semple D, Smyth R, Burns J, Darjee R, McIntosh A. Oxford Handbook of Psychiatry. 1st edition. Oxford: Oxford University Press; 2005.
- Stahl S. Essential Psychopharmacology - The Prescriber's Guide. Cambridge: University Press; 2006.

Number of active teaching classes: 90	**Lectures:** 45	**Practice:** 45 **Other classes:** 15

Teaching methods

Lectures, Practical work, Work in small groups.

Examination methods (maximum 100 points)			
Exam prerequisites	**No. of points**	**Final exam**	**No. of points**
student's activity during lectures	15	written exam	
practical classes		practical exam	15
colloquiums	25	oral exam	45
seminars			

Study program: Integrated academic studies of medicine

Course unit: **INFECTIOUS DISEASES**

Teachers: Canovic Predrag, Mijailovic Zeljko, Popovska-Jovicic Biljana

Course status: Mandatory

ECTS: 6

Prerequisites:

For attending classes: enrolled in VIII semester.

For taking exam: passed course units Pathological anatomy, Pathophysiology, Pharmacology and toxicology, Clinical propedeutics.

Course unit objective

During the course unit, the students acquire basic knowledge of acute infectious diseases: bacterial, viral, parasitic infections. In addition, during practice, they acquire practical knowledge and certain skills in working with patients, which are necessary for a doctor of medicine in practice.

Learning outcomes of course unit

After completing the Infectious Diseases course unit, the student is expected to acquire the following basic knowledge: basic epidemiological characteristics of infectious diseases; microbiological characteristics of the causative agent; knowledge of typical clinical forms of the disease; complications during the course of the disease; making a clinical diagnosis; methods and procedures for determining the diagnosis of the disease; basic principles of patient treatment; prophylaxis of infectious diseases.

At the end of the Infectious Diseases course unit, the student is expected to master the following skills: taking anamnesis from the patient, companion or family member; body temperature measurement; measurement of arterial tension, pulse; determination of breathing frequency; examination of the head, eyes, nose, ears; examination of the oral cavity; examination of the neck, chest, abdomen, extremities; examination of meningeal signs; application of i.m. and i.v. injection, infusion of solution; assessment of the patient's level of consciousness disturbance; clinical signs of dehydration.

Course unit contents

Theoretical classes

Streptococcal and staphylococcal infections; Acute intestinal infections; Respiratory infections; Zoonosis and anaerobic infections; Central nervous system infections; Herpes viral infections; Viral hepatitis and parasitic infections.

Practical classes

Streptococcal and staphylococcal infections – examples from practice; Acute intestinal infections – examples from practice; Respiratory infections – examples from practice; Zoonoses and anaerobic infections – examples from practice; Central nervous system infections – examples from practice; Herpes viral infections – examples from practice; Viral hepatitis and parasitic infections – examples from practice.

Other classes

Independent analysis of diagnostic and therapeutic principles by students' insight into medical records of patients.

Literature

- Torok E, Cooke FJ, Moran E. Oxford Handbook of Infectious Diseases and Microbiology. 2nd edition. Oxford: Oxford University Press; 2017.
- Mims CA, Nash A, Stephen J. Mims' Pathogenesis of Infectious Disease. London: Elsevier; 2008.

Number of active teaching classes: 90	**Lectures:** 45	**Practice:** 45 **Other classes:** 45

Teaching methods

Lectures, Practical work, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points**	**Final exam**	**No. of points**
student's activity during lectures	15	written exam	
practical classes		practical exam	
colloquiums	25	oral exam	60
seminars			

Study program: Integrated academic studies of medicine

Course unit: **TROPICAL DISEASES**

Teachers: Canovic Predrag, Mijailovic Zeljko, Popovska-Jovicic Biljana

Course status: Elective

ECTS: 3

Prerequisites:

For attending classes: enrolled in VIII semester.

For taking exam: passed course unit Microbiology and immunology.

Course unit objective

Acquaintance of students with the most common and significant diseases encountered in regions with a tropical climate. Special importance is given to clinical manifestations, diagnosis, therapy, as well as prophylaxis of these diseases, given that imported cases can be expected in our region. Also, one of the important goals is to acquaint students with the most important measures to adapt the body to a warm climate.

Learning outcomes of course unit

After completing the course unit Tropical Diseases, the student is expected to acquire the following basic knowledge: knowledge of the most common diseases in tropical regions and the possibility of their transmission in our country; knowledge of clinical syndromes related to certain tropical diseases; knowledge of the diagnostic procedures used in these patients; knowledge of the basic therapeutic principles applied to patients suffering from various tropical diseases; knowledge of the most important prophylaxis measures, primarily immunoprophylaxis and chemoprophylaxis; knowledge of the most important measures of adaptation of the organism to the climatic conditions prevailing in tropical areas.

At the end of the Tropical Diseases course unit, the student is expected to master the following skills: the ability to recognize certain tropical diseases based on their clinical manifestations; the ability to conduct appropriate laboratory analyzes (hematological, biochemical, serological), as well as microbiological tests in order to diagnose these diseases; the ability to perceive and apply adequate therapeutic measures in order to cure the patient; the ability to understand and implement the most important prophylaxis measures applied to these patients; the skill of applying measures to adapt the organism to climatic conditions in tropical regions.

Course unit contents

Theoretical classes

Infectious diseases; Metabolic diseases; Skin diseases; Eye diseases; Diseases caused by a tropical climate; Diseases of the locomotor system; Diseases caused by poisonous animals; Malignant neoplasms; Prevention of tropical diseases.

Practical classes

Infectious diseases – examples from practice; Metabolic diseases – examples from practice; Skin diseases – examples from practice; Eye diseases – examples from practice; Diseases caused by a tropical climate – examples from practice; Diseases of the locomotor system – examples from practice; Diseases caused by poisonous animals – examples from practice; Malignant neoplasms – examples from practice; Prevention of tropical diseases – examples from practice.

Literature

- Nabarro L, Morris-Jones S, Moore D. Peters' Atlas of Tropical Medicine and Parasitology. 7th edition. Elsevier Science; 2018.

Number of active teaching classes: 45	**Lectures:** 30	**Practice:** 15

Teaching methods

Lectures, Seminars.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points**	**Final exam**	**No. of points**
student's activity during lectures	30	written exam	70
practical classes		practical exam	
colloquiums		oral exam	
seminars			

Study program: Integrated academic studies of medicine

Course unit: **THERAPEUTIC APPLICATION OF IONIZING RADIATION**

Teachers: Vukomanovic Vladimir, Ignjatovic Vesna, Dagovic Aleksandar

Course status: Elective

ECTS: 3

Prerequisites:

For attending classes: enrolled in VIII semester.

For taking exam: passed course unit Nuclear medicine.

Course unit objective

Introducing students to the biophysical basis of using ionizing radiation for therapeutic purposes, radiobiological effects of ionizing radiation, principles of protection of medical staff and population when using ionizing radiation for therapeutic purposes, as well as enabling the student to understands the basic indications and the principle of patient selection for the application of ionizing radiation sources in the treatment of benign and malignant diseases.

Learning outcomes of course unit

The knowledge acquired during the course enables the student to learn and adopt the basic clinical indications for the application of nuclear medicine therapeutic methods and radiotherapy procedures. The acquired knowledge will enable the student to prevent, recognize and take care of side effects after the application of nuclear medicine and radiotherapy procedures, to evaluate the effects of therapy, and to interpret nuclear medicine findings.

Course unit contents

Theoretical classes

Biophysical basis of the use of ionizing radiation sources in medicine; Devices for the production and detection of radionuclides; Radiotherapy devices; Basics of radiobiology; Basic principles of radiation protection of exposed staff and population; Basics of radionuclide therapy; Application of radioactive isotopes in the therapy of benign diseases of the endocrine and skeletal system; Application of radioactive isotopes in the treatment of malignant diseases of the endocrine, gastrointestinal, hepatobiliary system, skeletal system, central nervous system diseases and hematological diseases; Prevention and treatment of side effects; The principle of controlling patients and monitoring the effects of therapy; Application of radiotherapy in the treatment of malignant diseases; Radiotolerance of healthy organs and complications of radiotherapy treatment.

Practical classes

Choosing an adequate therapeutic option for the patient; Basics of interpretation of scintigraphic findings for different organ systems; Prevention and recognition of side effects during the use of ionizing radiation sources for therapeutic purposes; Evaluation of the success of the applied therapy; Place and role of radiotherapy within the multidisciplinary treatment of malignant diseases.

Literature

- Shah C, Bradshaw M, Dalal I, editors. Nuclear Medicine: A Core Review. 2nd edition. Philadelphia: Wolters Kluver Lippincott Williams&Wilkins; 2021.
- O'Malley J, Ziessman H. Nuclear Medicine and Molecular Imaging: The Requisites. 5th edition. Elsevier Science; 2020.
- Chandra R, Rahmim A. Nuclear Medicine Physics. 8th edition. Philadelphia: Wolters Kluwer; 2018.

Number of active teaching classes: 45	**Lectures:** 30	**Practice:** 15

Teaching methods

Lectures, Practical work, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points**	**Final exam**	**No. of points**
student's activity during lectures		written exam	
practical classes	30	practical exam	30
colloquiums	40	oral exam	
seminars			

Study program: Integrated academic studies of medicine

Course unit: **CLINICAL ASPECTS OF ACID-BASE BALANCE DISORDERS**

Teachers: Andjelkovic Nebojsa, Djurdjevic Predrag, Davidovic Goran, Petrovic Dejan, Veselinovic Mirjana, Zdravkovic Natasa, Iric-Cupic Violeта

Course status: Elective

ECTS: 3

Prerequisites:

For attending classes: enrolled in VIII semester.

For taking exam: passed course unit Clinical propedeutics.

Course unit objective

The aim of the course unit is for students to become familiar with the: mechanisms that maintain a constant composition and extracellular fluid volume: renal mechanisms, respiratory and cardiovascular system reaction, voluntary mechanisms, the physiological roles of certain electrolytes (K^+, Na^+, Ca^{2+}) and the effects that occur during their imbalance changes in the functioning of the organism when the osmolarity of ECF is changed; the effect of changes in pH value on the function of the central nervous system and other systems disorders of the acid-base balance in endocrinological, nephrological and pulmonary diseases.

Learning outcomes of course unit

The acquired knowledge will enable the doctor of medicine to: solve the disturbances caused by the disruption of the water imbalance; recognize, regulate and treat electrolyte imbalances; recognize, regulate and treat disorders of acid-base balance.

Course unit contents

Theoretical classes

Physiological balance of the daily water intake and excretion; Extracellular fluid osmolarity and influence on cell volume and homeostasis function of water and regulation of urine concentration; Regulation of sodium homeostasis and extracellular fluid volume; Homeostasis of potassium and influence on electrical and mechanical muscle activity; Calcium, influence on excitability and on the electrical and mechanical activity of the heart, skeletal and smooth muscles; Interdependence of arterial blood pressure, osmolarity and extracellular fluid volume; Multisystem integration of maintenance of hydroelectrolyte balance (central nervous system, endocrine, kidney, cardiovascular and respiratory systems, voluntary control); Acid-base balance and the influence of pH changes on the function of the central nervous system; Solutions for parenteral use.

Practical classes

Body fluid compartments; Movement of fluids through the body; Water as a solvent, reactant and transporter; Importance of water in regulating body temperature, coating and lubrication; The balance of positive and negative charges in the solution; The influence of calcium and potassium on the excitability of the neuromuscular system; Calculation of extracellular fluid volume; Measurement of minimum diuresis; Osmosis and parenteral solutions; Determination of acid-base status.

Literature

- Gennari FJ, Adrogué HJ, Galla JH, Madias NE, editors. Acid-Base Disorders and Their Treatment. CRC Press; 2019.
- Loscalzo J, Fauci AS, Kasper DL, Hauser SL, Longo DL, Jameson JL. Harrison's Principles of Internal Medicine. 21st edition. New York: McGraw Hill; 2022.

Number of active teaching classes: 45	**Lectures:** 30	**Practice:** 15

Teaching methods

Lectures, Practical work, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points**	**Final exam**	**No. of points**
student's activity during lectures	15	written exam	40
practical classes	15	practical exam	
colloquiums		oral exam	
seminars	30		

Study program: Integrated academic studies of medicine

Course unit: **PEDIATRICS**

Teachers: Vuletic Biljana, Vujic Ana, Igrutinovic Zoran, Markovic Slavica, Simovic Aleksandra, Stojkovic-Andjelkovic Andjelka, Knezevic-Rangelov Sanja, Savic Dragana, Folic Nevena

Course status: Mandatory

ECTS: 14

Prerequisites:

For attending classes: enrolled in IX semester.

For taking exam: passed course units Internal medicine, Dermatovenerology, Infectious diseases.

Course unit objective

The main objectives of teaching pediatrics are familiarization and acquisition of knowledge about the specifics of the population from birth to 18 years of age (acquisition of knowledge about growth, development and nutrition), consideration and acquisition of knowledge about clinical manifestations, differential diagnostic procedures and treatment of diseases at this age, as well as education of doctors for proper access to this specific population in general medicine offices.

Learning outcomes of course unit

While attending classes, students acquire all the necessary knowledge in the field of pathogenesis, clinical picture, diagnosis and therapy of diseases and conditions that occur in the population from birth to 18 years, emphasizing all the specificities of this age group (growth, development and nutrition). Special attention is paid to the importance of preventive medical measures and procedures, proper diagnosis, differential diagnosis and therapy of the most common diseases and conditions characteristic for this population, proper approach and communication with the patient aged from birth to 18 years and his family members, specifics of anamnesis, examination and specifics of prescribing therapy for this population, specifics of the work of doctors in clinics where there is no pediatrician, planning and implementation of immunization and work in counseling centers for children and youth.

Course unit contents

Theoretical classes

Introductory lecture; Growth and development: assessment of growth and development and pathology of growth and development; Genetics: Chromosomes and genes, Types of inheritance and hereditary diseases, Neonatal screening for hereditary diseases; Neonatology: adaptation of the newborn to extrauterine life, Birth trauma, Characteristics of full-term and premature newborns, Neonatal jaundice, Hemorrhagic disease of the newborn, Neonatal infections, Respiratory disorders, Hypoxic-ischemic encephalopathy; Nutrition; Rickets; Diabetes in children; Thyroid dysfunction; Obesity and hyperlipoproteinemia; Congenital adrenal hyperplasia, Cushing, Addison, pheochromocytoma; Gastroenterology, diseases of the upper and lower gastrointestinal tract and intestinal parasitosis, Recurrent abdominal pain, Hepatology, Unconjugated hyperbilirubinemia (Gilbert syndrome), Conjugated hyperbilirubinemia (neonatal hepatitis), Extrahepatic biliary atresia, Chronic hepatitis; Pulmonology: Peculiarities of airways in children, Diseases of the upper and lower respiratory tract; Tuberculosis of the lungs; Cardiology: Fetal circulation, Heart defects (clinical picture, diagnosis, therapy), Rheumatic fever, Bacterial endocarditis, Heart muscle diseases, Heart rhythm and conduction disorders; Immunology: Immune system of immunodeficiency; Allergology; Rheumatology; Bones and muscles; Hematology and oncology: Anemias, Disorders of hemostasis, Hemostasis screening, Thrombocytopenia, Coagulopathy, Vasculopathies, Enlargement of lymph nodes in children, Acute leukemias, Oncology, Lymphomas, Solid tumors; Social Medicine; Neuropediatrics: Normal psychomotor development, Denver Developmental Score, Paroxysmal non-epileptic disorders of childhood, Epilepsies and epileptic syndromes of childhood, Headaches, Therapy of epilepsy and status epilepticus; Nephrology: Kidney and urinary system infections, Vesicourethral reflux, Reflux nephropathy and renoprotective therapy, Glomerular diseases (primary), Acute and chronic renal failure; Poisoning; Pharmacotherapy: Pharmacokinetics and pharmacodynamics in children, Doses of medicines in children, Medicines and breastfeeding, Necessity of taking medication anamnesis; Adolescence: Peculiarities of growth and development in adolescence, The most common problems of adolescents and their parents, Morbidity, mortality, risky behaviors, Eating disorders in adolescence; Resuscitation, emergency situations in pediatrics: Cardiopulmonary-cerebral resuscitation in pediatrics, Reanimation and therapeutic procedures in certain specific emergency situations in pediatrics (drowning, thunderstroke – electric shock).

Practical classes

Specifics of history and physical examination, Patient-doctor relationship, assessment of cooperation and general condition of the patient, Special features and specifics of history and physical examination; Endocrinological and metabolic diseases in pediatrics, Water and electrolyte disorders and principles of electrolyte imbalance correction, Diabetes, hypothyroidism, hyperthyroidism, KAH, obesity and hyperlipoproteinemia; Diseases of the heart and blood vessels in childhood, Heart defects, rhythm disorders, myocarditis, pericarditis, bacterial endocarditis; Diseases of the respiratory organs in children. Acute and chronic inflammation of the airways and lungs, bronchial asthma, cystic fibrosis; Natural artificial nutrition, nutrition workshop, principles of healthy and sick child nutrition; Diseases of the urogenital system, congenital anomalies of the urinary tract, The most common diseases of the stomach, urinary tract infections, acute and chronic renal failure, peritoneal dialysis; Hematological and oncological diseases - anemia, leukemia, malignant diseases in childhood, disorders of hemostasis; Diseases of the immune system, immunodeficiencies, anaphylactic shock, allergic diseases, neurodermatitis, arthritis in children; Diseases in neonatology assessment of GS, hyperbilirubinemia, IKH, hemorrhagic

disease of the newborn, prematurity, nutrition of premature and full-term newborns, RDS; Neurological and psychiatric diseases in childhood, convulsions, epilepsy, lumbar puncture, neurocutaneous diseases; Diseases in adolescence, Anorexia, risky behavior, bulimia, prevention of risky behavior; Diseases of the gastrointestinal system and liver: infectious and acute and chronic diseases of the upper and lower gastrointestinal system, liver diseases; Health care of children and youth, Health needs and health care in outpatient and inpatient conditions; Health care and social pediatrics; Poisoning in childhood and prevention; Urgent conditions and resuscitation in pediatrics.

Other classes

Independent analysis of diagnostic and therapeutic principles by students' insight into medical records of patients.

Literature

- Kliegman RM, St. Geme JW, editors. Nelson Textbook of Pediatrics. 21st edition. Philadelphia: Elsevier-Saunders; 2019.

Number of active teaching classes: 210	**Lectures:** 90	**Practice:** 120 **Other classes:** 30

Teaching methods

Lectures, Practical work, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points**	**Final exam**	**No. of points**
student's activity during lectures	15	written exam	
practical classes	15	practical exam	10
colloquiums	10	oral exam	50
seminars			

Study program: Integrated academic studies of medicine

Course unit: **SURGERY**

Teachers: Milisavljevic Slobodan, Jevdjic Jasna, Radovanovic Dragce, Ristic Branko, Stojadinovic Miroslav, Matic Aleksandar, Vulovic Tatjana, Cvetkovic Aleksandar, Kovacevic Vojin, Stojanovic Bojan, Lazic Dejan, Milosevic Bojan, Paunovic Milan, Radosavljevic Ivan, Arsenijevic Milos, Zornic Nenad, Spasic Marko, Petrovic Marko, Mirkovic Nikola, Stepanovic Zeljko

Course status: Mandatory

ECTS: 24

Prerequisites:

For attending classes: enrolled in IX semester.

For taking exam: passed course units Internal medicine, Dermatovenerology, Infectious diseases.

Course unit objective

Informing students about the basics of surgery, basic symptoms of surgical diseases and injuries, methods of diagnosing surgical diseases and injuries, as well as preoperative preparation and postoperative treatment.

Learning outcomes of course unit

After completing the course unit Surgery, the student is expected to acquire the following basic knowledge: surgical diseases of the stomach, small intestine and appendix; ileus; acute surgical diseases, diagnosis and treatment; basic principles of anesthesia and analgesia; surgical diseases of the esophagus and diaphragm; injuries, methods of treatment, complications caused by inadequate treatment; principles of laparoscopic surgery; surgical diseases of the pancreas, liver and bile ducts; surgical diseases of the colon, rectum and anus; surgical diseases of endocrine glands and breast; fundamentals of vascular surgery; basics of neurosurgery; surgical diseases of the central nervous system, spinal cord and peripheral nerves; principles of thoracic surgery; introducing students to the basic principles of surgery, plastic surgery, aesthetic and reconstructive surgery, and pediatric surgery; congenital and developmental anomalies; tumors in children; congenital anomalies in children; acute appendicitis, acute abdomen; basics of pediatric urology; basics of urology; fundamentals of orthopedics; basics of traumatology.

At the end of the course unit Surgery, the student is expected to master the following skills: establishing a working diagnosis based on observation, clinical examination and the objective condition of the patient; treatment of injuries according to the principles of asepsis and antisepsis; debridement and suturing of wounds; management of bleeding; setting indications for fluid replacement, recognizing dehydration; determination of blood groups; placement of peripheral IV catheters and venipuncture, assistance with placement of central venous catheter; administration of local anesthesia; placement of a nasogastric tube; surgical examination of the abdomen; rectal douches; inspection of the hernial openings of the anterior abdominal wall; palpation and assessment of the pulse in peripheral arteries; assisting with thoracic drainage; providing first aid for pneumothorax; assessment of consciousness in neurosurgical trauma; treatment of burns; burn shock therapy; basic principles in hand surgery; diagnostics in pediatric surgery; detection and diagnosis of developmental anomalies of the hip; surgical examination of the abdomen in newborns and infants; detection of urogenital anomalies in children; treatment of acute scrotum in children; diagnosis of kidney and bladder injuries; various forms of bladder drainage (catheter placement); first aid for spinal fractures and injuries; conservative management of limb fractures; treatment of pelvic injuries.

Course unit contents

Theoretical classes

General surgery; Surgery of the digestive system; Surgery of the breast and endocrine system; Cardiovascular surgery; Surgery of the central and peripheral nervous system; Chest surgery; Endoscopic surgery; Plastic and reconstructive surgery; Fundamentals of children's surgery; Fundamentals of urology; Orthopedics.

Practical classes

General surgery – examples from practice; Surgery of the digestive system – examples from practice; Surgery of the breast and endocrine system – examples from practice; Cardiovascular surgery – examples from practice; Surgery of the central and peripheral nervous system – examples from practice; Chest surgery – examples from practice; Endoscopic surgery – examples from practice; Plastic and reconstructive surgery – examples from practice; Fundamentals of children's surgery – examples from practice; Fundamentals of urology – examples from practice; Orthopedics – examples from practice.

Other classes

Independent analysis of diagnostic and therapeutic principles by students' insight into medical records of patients.

Literature

- Brunicardi CF. Schwartz's Principles of Surgery. 8th edition. New York: McGraw-Hill; 2005.

Number of active teaching classes: 360	**Lectures:** 180	**Practice:** 180	**Other classes:** 120

Teaching methods: Lectures, Practical work, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points**	**Final exam**	**No. of points**
student's activity during lectures	30	written exam	
practical classes	10	practical exam	30
colloquiums		oral exam	30
seminars			

Study program: Integrated academic studies of medicine

Course unit: **LEGAL ASPECTS IN HEALTHCARE**

Teachers: Janjic Vladimir, Ignjatovic-Ristic Dragana, Jovanovic Mirjana, Mihajlovic Goran, Radovanovic Snezana, Simic-Vukomanovic Ivana, Radmanovic Branimir

Course status: Mandatory

ECTS: 3

Prerequisites:

For attending classes: enrolled in IX semester.

For taking exam: –

Course unit objective

The aims of the course unit are as follows: adoption of basic legal concepts in the field of health legislation; to familiarize students with laws, ordinances, regulations and other legal acts that regulate the work of health workers, health activities and patients' rights; to familiarize students with the legal aspects of working in healthcare; to develop professional awareness, responsibility, humanity, and sense of deontology.

Learning outcomes of course unit

After attending lectures, independent study and passing the exam, the student will: be able to define the basic concepts of health legislation; learn the basic aspects of laws, decrees, regulations and other legal acts that regulate the work of health workers, health activities and patients' rights; master the basics of legal aspects of work in healthcare; understand the legal importance of adequate management of medical records; be able to explain the way of organizing the Chamber of Health Workers; understand and be able to explain the rights and responsibilities of healthcare workers.

Course unit contents

Theoretical classes

Deontology and basic concepts of health legislation; Law on health care - basic provisions related to the rights to health care, participants in health care, health activity, health care system and health care financing; Principles of health care and implications for the work of health workers; Law on Health Insurance; Patients' rights; The Law on the Rights of Patients in the Light of Clinical Work; The Law on the Rights of Persons with Mental Disabilities in the Context of Clinical Practice; Practical aspects of health regulations; Practical aspects of the health regulations; Law on Chambers; Acquisition, renewal and revocation of the license of healthcare workers; Legal aspects of continuing medical education; Legal significance of medical documentation; Legal aspects of professional supervision and the process of (re)accreditation of health institutions; Rights and responsibilities of healthcare workers.

Practical classes

Practical aspects and implications of different legal norms on the work of healthcare workers and patients' rights.

Literature

- Smajdor A, Herring J, Wheeler R. Oxford Handbook of Medical Ethics and Law. 1st edition. Oxford, United Kingdom: Oxford University Press; 2022.

Number of active teaching classes: 45	**Lectures:** 30	**Practice:** 15

Teaching methods

Lectures, Seminars.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points**	**Final exam**	**No. of points**
student's activity during lectures		written exam	60
practical classes		practical exam	
colloquiums		oral exam	
seminars	40		

Study program: Integrated academic studies of medicine

Course unit: **CLINICAL ONCOLOGY**

Teachers: Vukomanovic Vladimir, Dagovic Aleksandar, Ignjatovic Vesna

Course status: Mandatory

ECTS: 3

Prerequisites:

For attending classes: enrolled in IX semester.

For taking exam: passed course units Fundamentals of oncology, Radiology, Nuclear medicine.

Course unit objective

The aims of the course unit Clinical Oncology are as follows: acquisition of knowledge about the basic postulates of clinical oncology, acquisition of theoretical and practical knowledge in the field of prevention, diagnostics, clinical presentations of various types of malignant diseases and basic types of treatment of oncological diseases.

Learning outcomes of course unit

After completing the course unit Clinical Oncology, the student is expected to acquire basic knowledge and skills to explain: the basics of tumor etiopathogenesis, epidemiological characteristics of the most common tumors, laboratory and visualization diagnostic methods of malignant tumors, principles of chemotherapy, radiotherapy and radionuclide therapy, principles of oncological surgery, clinical presentations of head and neck, bronchopulmonary system and mediastinum, gastrointestinal system, urogenital system, breast, skin, endocrine system, central nervous system, hematopoietic and locomotor system tumors.

Course unit contents

Theoretical classes

General oncology: Epidemiology of malignant tumors; Molecular biology and immunology of malignant diseases; Radiological diagnostic procedures in oncology; Nuclear medicine diagnostic procedures in oncology; Basic principles of chemotherapy, immunotherapy and molecular targeted therapy; Basic principles of radiotherapy; Basic principles of radionuclide therapy; Basic principles of oncological surgery; Supportive therapy in oncology. Special oncology: Malignant tumors of the head and neck; Malignant tumors of the respiratory system; Malignant tumors of the digestive tract; Malignant tumors of the urogenital region; Malignant tumors of the female genital organs; Malignant tumors of the breast; Malignant tumors of the skin; Malignant tumors of bones and soft tissues; Malignant tumors of the central nervous system; Malignant tumors of endocrine glands; Malignant hematological disorders.

Practical classes

Basic principles and specifics of examination of oncology patients; Interview with the patient and epidemiological processing of anamnestic data; Establishing a working diagnosis; Completing medical documentation and introduction in basics of oncological therapeutic protocols (chemotherapy, radiotherapy, radionuclide therapy); Interpretation of laboratory and diagnostic findings; Implementation of supportive therapy: dressing wounds, pain relief therapy, application of analgesics, etc; Diagnosis and therapy of water, electrolyte and acid-base imbalances.

Literature

- DeVita VT, Hellman TS, Rosenberg SA. DeVita, Hellman, and Rosenberg's cancer: Principles and practice of Oncology. 11th edition. Wolters Kluver Lippincott Williams & Wilkins; 2018.

Number of active teaching classes: 45	**Lectures:** 30	**Practice:** 15

Teaching methods

Lectures, Practical work, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points**	**Final exam**	**No. of points**
student's activity during lectures	10	written exam	
practical classes	20	practical exam	30
colloquiums	40	oral exam	
seminars			

Study program: Integrated academic studies of medicine

Course unit: **SURGICAL PATHOLOGY**

Teachers: Milisavljevic Slobodan, Radovanovic Dragce, Mitrovic Slobodanka, Stojadinovic Miroslav, Ristic Branko, Arsenijevic Milos, Stankovic Vesna, Kovacevic Vojin, Spasic Marko, Petrovic Marko

Course status: Elective

ECTS: 3

Prerequisites:

For attending classes: enrolled in IX semester.

For taking exam: passed course unit Pathological anatomy.

Course unit objective

Getting to know the postulates of surgical pathology as the main determinant of diagnosis, prognosis and prediction of therapeutic response, as well as tumor histomorphology by organ systems.

Learning outcomes of course unit

Upon completion of the course unit, the student is expected to acquire basic knowledge about tumors of the heart, pericardium, vascular tumors, lung and pleural tumors, tumors of the oral cavity and salivary glands, tumors of the esophagus, stomach, small intestine, colon and anal tract, liver tumors, gallbladder and bile ducts tumors, tumors of the exocrine pancreas and peritoneum, tumors of the thyroid, parathyroid, adrenal gland, pituitary gland, endocrine pancreas and breast, tumors of the lymphoreticular and hematopoietic system, spleen and thymus, tumors of the male and female genital tract, tumors of the skin, soft tissues and osteoarticular system, tumors of the central, autonomic and peripheral system, as well as about neuroectodermal tumors and to get to know the methods of visualization and differentiation of tumor cells and tissues.

Course unit contents

Theoretical classes

Cytopathological, histopathological, histochemical and immunohistochemical diagnosis of heart tumors, pericardium, vascular tumors, lung tumors, pleura, oral cavity and salivary glands, esophagus, stomach, small intestine, colon and anal tract, liver, gall bladder and bile ducts, exocrine pancreas, peritoneum, thyroid, parathyroid, adrenal gland, pituitary gland, endocrine pancreas, breast, lymphoreticular and hematopoietic system, spleen and thymus, male and female genital tract, skin, soft tissues, osteoarticular system, central, autonomic, peripheral system and neuroectodermal tumors; Methods of visualization and differentiation of tumor cells and tissues.

Practical classes

Light-microscopic analysis of histological preparations of individual tumor entities.

Literature

- Goldblum JR, Lamps LW, McKenney JK, Myers JL. Rosai and Ackerman's Surgical Pathology. 11th Edition. Elsevier Science; 2017.

Number of active teaching classes: 45	**Lectures:** 30	**Practice:** 15

Teaching methods

Lectures, Practical work, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points**	**Final exam**	**No. of points**
student's activity during lectures		written exam	50
practical classes	50	practical exam	
colloquiums		oral exam	
seminars			

Study program: Integrated academic studies of medicine

Course unit: **CONTEMPORARY DIAGNOSTICS IN MEDICINE**

Teachers: Jovanovic Ivan, Cekerevac Ivan, Miloradovic Vladimir, Petrovic Dejan, Djurdjevic Predrag, Cupurdija Vojislav, Mijailovic Milan, Arsenijevic Aleksandar

Course status: Elective

ECTS: 3

Prerequisites:

For attending classes: enrolled in IX semester.

For taking exam: passed course unit Radiology.

Course unit objective

The aim of this course unit is to introduce students to modern diagnostic procedures in medicine.

Learning outcomes of course unit

Upon completion of this course unit, the student is expected to be able to: explain the basic diagnostic techniques; describe indications and contraindications for diagnostic procedures; explain patient preparation and the method of performing diagnostic procedures; use the obtained results in making a diagnosis.

Course unit contents

Theoretical classes

Modern approach in diagnostics; Immunoprecipitation; ELISA; Flow cytometry; PCR; Western blot; Biochemical diagnostic methods; Histopathological diagnostics; Immunohistochemistry; Immunofluorescence; Nuclear magnetic resonance; Computed tomography; Positron emission tomography; Scintigraphy; Ultrasound diagnostics; Endoscopic diagnostics.

Practical classes

Modern approach in diagnostics – practical aspects; Immunoprecipitation – practical aspects; ELISA – practical aspects; Flow cytometry – practical aspects; PCR – practical aspects; Western blot – practical aspects; Biochemical diagnostic methods – practical aspects; Histopathological diagnostics – practical aspects; Immunohistochemistry – practical aspects; Immunofluorescence – practical aspects; Nuclear magnetic resonance – practical aspects; Computed tomography – practical aspects; Positron emission tomography – practical aspects; Scintigraphy – practical aspects; Ultrasound diagnostics – practical aspects; Endoscopic diagnostics – practical aspects.

Literature

- Laposata M. Laboratory Medicine. The Diagnosis of Disease in the Clinical Laboratory. 3rd edition. New York: Mc Graw Hill Education; 2019.
- Rich RR, Fleisher TA, Shearer WT, Schroeder HW, Frew AJ, Weyand CM. Clinical Immunology. 5th edition. Amsterdam: Elsevier; 2019.
- Adam A, Dixon AK, Gillard JH, Schaefer-Prokop C. Grainger & Allison's Diagnostic Radiology. 7th edition. Elsevier Science; 2020.
- Turgeon ML. Immunology and serology in laboratory medicine. St. Louis: Mosby Co; 2009.

Number of active teaching classes: 45	**Lectures:** 30	**Practice:** 15

Teaching methods

Lectures, Practical work, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points**	**Final exam**	**No. of points**
student's activity during lectures	30	written exam	70
practical classes		practical exam	
colloquiums		oral exam	
seminars			

Study program: Integrated academic studies of medicine

Course unit: **FUNDAMENTALS OF LABORATORY WORK AND RESEARCH**

Teachers: Jovanovic Ivan, Volarevic Vladislav, Milovanovic Marija, Radosavljevic Gordana, Pantic Jelena, Pavlovic Sladjana, Arsenijevic Aleksandar, Gajovic Nevena

Course status: Elective

ECTS: 3

Prerequisites:

For attending classes: enrolled in IX semester.

For taking exam: passed course unit Microbiology and immunology.

Course unit objective

The aim of this course unit is to introduce students to the basics of laboratory work and help them master the skills of choosing and evaluating research methodology.

Learning outcomes of course unit

Upon completion of course unit Fundamentals of Laboratory Work and Research, the student is expected to: know to explain the general principles of performing various laboratory techniques; use teamwork skills; acquire the ability to critically evaluate and select appropriate laboratory procedures relevant to research; use the acquired knowledge in evaluation and interpretation of research results.

Course unit contents

Theoretical classes

Basic principles of laboratory research; Laboratory techniques, laboratory safety, introduction to the equipment; Guidelines of working in the vivarium; Principles of *in vivo* experiments; Sacrificing laboratory animals; Basic techniques of cellular immunology: isolation of mononuclear and polymorphonuclear leukocytes from peripheral blood, determining the number of these cells, their viability and contamination; Direct and indirect immunofluorescence – fluorescence microscope; Maintenance of primary tumor cell cultures *in vitro*; *In vitro* cultivation of immune and malignant cells; Functional analysis of mononuclear and polymorphonuclear cells using the phagocytosis test; Cytotoxicity assays: MTT, Neutral red; Analyzing the oxidation and antioxidant status by spectrophotometric methods; Basic EIA techniques (ELISA); Basic techniques of immunochemistry on cryostat sections, using the enzymatic method; Basic principles of flow cytometry; Basic techniques of molecular biology: PCR, WB; Scientific projects: Phases of research; Choice of methodology.

Practical classes

Basic principles of laboratory research – practical aspects; Laboratory techniques, laboratory safety, introduction to the equipment – practical aspects; Guidelines of working in the vivarium – practical aspects; Principles of *in vivo* experiments – practical aspects; Sacrificing laboratory animals – practical aspects; Basic techniques of cellular immunology: isolation of mononuclear and polymorphonuclear leukocytes from peripheral blood, determining the number of these cells, their viability and contamination – practical aspects; Direct and indirect immunofluorescence – fluorescence microscope – practical aspects; Maintenance of primary tumor cell cultures *in vitro* – practical aspects; *In vitro* cultivation of immune and malignant cells – practical aspects; Functional analysis of mononuclear and polymorphonuclear cells using the phagocytosis test – practical aspects; Cytotoxicity assays: MTT, Neutral red – practical aspects; Analyzing the oxidation and antioxidant status by spectrophotometric methods – practical aspects; Basic EIA techniques (ELISA) – practical aspects; Basic techniques of immunochemistry on cryostat sections, using the enzymatic method – practical aspects; Basic principles of flow cytometry – practical aspects; Basic techniques of molecular biology: PCR, WB – practical aspects; Scientific projects: Phases of research – practical aspects; Choice of methodology – practical aspects.

Literature

- Laposata M. Laboratory Medicine. The Diagnosis of Disease in the Clinical Laboratory. 3rd edition. New York: Mc Graw Hill Education; 2019.
- Rich RR, Fleisher TA, Shearer WT, Schroeder HW, Frew AJ, Weyand CM. Clinical Immunology. 5th edition. Amsterdam: Elsevier; 2019.
- Turgeon ML. Immunology and serology in laboratory medicine. St. Louis: Mosby Co; 2009.

Number of active teaching classes: 45	**Lectures:** 30	**Practice:** 15

Teaching methods: Lectures, Practical work, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points**	**Final exam**	**No. of points**
student's activity during lectures	30	written exam	
practical classes		practical exam	
colloquiums		oral exam	70
seminars			

Study program: Integrated academic studies of medicine

Course unit: **TELEMEDICINE**

Teachers: Zdravkovic Nebojsa, Stojic Vladislava, Miloradovic Vladimir, Davidovic Goran, Djurdjevic Predrag

Course status: Elective

ECTS: 3

Prerequisites:

For attending classes: enrolled in IX semester.

For taking exam: passed course unit Internal medicine.

Course unit objective

Acquaintance of students with: Principles of digital and telemedicine; Innovations in medicine; Principles of protection and ethics of digital health data; Application of computer and artificial intelligence in medicine; Using micro and nanotechnologies, sensors, virtual and augmented reality in medicine; Principles and application of telemedicine and mobile and internet health (mHealth and eHealth).

Learning outcomes of course unit

After completing the course in Telemedicina, students are expected to: Be able to understand, explain and discuss the topic and gain practical experience in the field of digital and telemedicine; Gain an insight into innovations in healthcare, their importance and possibilities; Be familiar with the principles of protection and ethics in digital medicine; Understand the working concepts of machine learning, computer and artificial intelligence in medicine; Understand the working principles of micro and nanotechnologies, sensors in medicine; Gain insight into the possibilities of telemedicine, mobile and internet health, and virtual and augmented reality.

Course unit contens

Theoretical classes

Getting to know the basic concepts of digital and telemedicine; Computer literacy in medicine; Innovations in medicine and their importance; Large databases in healthcare; Digital protection data and ethics in digital medicine; Computational intelligence in medicine; Machine learning; Introduction, definition and application of neural networks; Artificial intelligence in medicine; Micro and nanotechnologies and their application in medicine; Using sensors in digital medicine; Telemedicine; Mobile and internet health – mHealth and e–Health; Getting to know the techniques of virtual and augmented reality, applications of virtual and augmented reality in medicine and rehabilitation, the future of augmented reality; Entrepreneurship in digital medicine; The future of digital and telemedicine.

Practical classes

Seminar papers, group and individual work, presentation preparation.

Literature

- Davies A, Mueller J. Developing Medical Apps and mHealth Interventions: A Guide for Researchers, Physicians and Informaticians. Springer, 2020.
- Rutkowski L. Computational Intelligence: methods and techniques. Springer, 2008.

Number of active teaching classes: 45	**Lectures:** 30	**Practice:** 15

Teaching methods

Lectures, practical classes, interactive classes, seminars.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points**	**Final exam**	**No. of points**
student's activity during lectures	20	written exam	
practical classes	20	practical exam	
colloquiums		oral exam	
seminars	30	presentations	30

Study program: Integrated academic studies of medicine

Course unit: **FUNDAMENTALS OF CLINICAL GENETICS**

Teachers: Milosevic-Djordjevic Olivera, Volarevic Vladislav, Gazdic Marina, Dimitrijevic Aleksandra, Arsenijevic Petar, Ljujic Biljana, Todorovic Danijela

Course status: Elective

ECTS: 3

Prerequisites:

For attending classes: enrolled in IX semester.

For taking exam: passed course unit Human genetics.

Course unit objective

The aim of the course is to provide students with information about the most common genetic syndromes, their clinical presentations and ways to establish a diagnosis.

Learning outcomes of course unit

Acquisition of knowledge in diagnostics and therapy of genetic diseases.

Course unit contens

Theoretical classes

Dysmorphology: approach and classification; Congenital anomalies from the aspect of clinical genetics;
Hypotonia of newborns and infants; Congenital heart defects from the aspect of clinical genetics; Genetic basis of mental retardation; Convulsions with/without developmental delay and with/without intellectual disabilities; Environmental factors as causes of genetic diseases; The most common microdeletion and microduplication syndromes; Skeletal dysplasias; Connective tissue diseases; Facial defects as the main anomaly; Deposition diseases; Approach to the child with neurocutaneous syndromes; Approach to the child with hearing loss from the aspect of clinical genetics; Approach to a child with an eye disease from the aspect of clinical genetics.

Practical classes

Communication skills in genetic counseling; Physical examination of a dysmorphic child; Isolated minor and major defects; Multiple anomalies; The most common diseases and syndromes as a cause of hypotonia; Syndromic and non–syndromic heart defects; Fetal alcohol syndrome; Syndromes caused by the use of drugs during pregnancy; Syndromes caused by viral infections in pregnancy; Identification of microdeletion and microduplication syndromes using molecular technologies; Growth disorder, craniosthenia and other skeletal dysplasia; Marfan sy, Ehlers Danlos sy, Osteogenesis imrerfecta sy; CHARGE sy, Treacher Collins sy; Mucopolysaccharidoses; Tuberous sclerosis, Neurofibromatosis, Sturge Weber sy; Connectional deafness; Congenital cataracts; Colobomas of the eye; Heterochromia of the iris; Dystrophy of the retina and retinal receptors.

Literature

- Firth HV, Hurst JA. Oxford Desk Reference: Clinical Genetics and Genomics (Oxford Desk Reference Series). Oxford: Oxford University Press, 2017.
- Turnpenny PD, Ellard S. Emery's elements of medical genetics. 15th edition. Philadelphia: Elsevier; 2017.

Number of active teaching classes: 45	**Lectures:** 30	**Practice:** 15

Teaching methods

Lectures, Practical work, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points**	**Final exam**	**No. of points**
student's activity during lectures	15	written exam	
practical classes	15	practical exam	
colloquiums		oral exam	70
seminars			

Study program: Integrated academic studies of medicine

Course unit: **OTORHINOLARYNGOLOGY**

Teachers: Belic Branislav, Stojanovic Jasmina

Course status: Mandatory

ECTS: 5

Prerequisites:

For attending classes: enrolled in X semester.

For taking exam: –

Course unit objective

The aim of the course is to train medical students through theoretical and practical teaching for practical work, diagnosis and treatment in the ear, nose, laryngopharynx, neck and surrounding areas.

Learning outcomes of course unit

After completing the course in Otorhinolaryngology, the student is expected to acquire the basic knowledge: Good knowledge of the course and outcome of the disease in acute inflammatory diseases of the ear, nose, pharynx and larynx; Correct diagnosis, using all necessary methods, including specialist consultation; Familiarity with chronic inflammatory diseases of the otorhinolaryngological region, diagnosis and therapy; Basic knowledge about malignant diseases and the specifics of their spread depending on the primary localization – otorhinolaryngological region; Diagnosis and therapy of foreign bodies of the respiratory tract; Diagnosis and therapy of patients with corrosive changes in the otorhinolaryngological region.

After completing the course in Otorhinolaryngology, the student is expected to master the following skills: Use of natural and artificial light necessary for each examination; Use of specific instrumentation, required during routine examination; Basic principles of endoscopic examination; The skill of removing cerumen and foreign bodies from the external auditory canal and nose; Using a tuning fork and reading an audiogram; Performing Proetz therapy and Politzer therapy; Performing minor surgical interventions, opening atheroma and suturing the wound; Correct taking of anamnestic data according to the systems of otorhinolaryngological regions and their interpretation.

Course unit contens

Theoretical classes

Otorhinolaryngology as a discipline; Basics of otorhinolaryngology examination, clinical interview and otorhinolaryngology tests; Diagnosis and treatment of infections of ear, nose, throat; Basic principles of hearing and audiology; Diagnosis and treatment of otosclerosis, Meniers disease, acute hearing loss; Diagnosis and treatment of maxillofacial traumatology; Diagnosis and treatment of benign and malignant tumors of ear, nose and throat; Diagnosis and treatment of phoniatric diseases; Basic surgery principples of head and neck traumatology, oncology and inflammatory diseases; Principles of urgent procedures in otorhinolaryngology.

Practical classes

Principles of patient examination; Principles of clinical interview with patients; Principles of basic diagnosiic procedures in otorhinolaryngology; Principles of endoscopic procedures in otorhinolaryngology; Interpretations of clinical cases; Respresentation of patients with traceal cannula.

Literature

- Phillips JS, Erskine S. Landmark papers otolaryngology. Oxford: Oxford University Press, 2018.

Number of active teaching classes: 75	**Lectures:** 45	**Practice:** 30

Teaching methods: Lectures, Practical work with patients.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points**	**Final exam**	**No. of points**
student's activity during lectures		written exam	
practical classes	30	practical exam	
colloquiums	30	oral exam	40
seminars			

Study program: Integrated academic studies of medicine

Course unit: **OPHTHALMOLOGY**

Teachers: Petrovic-Janicijevic Mirjana, Jovanovic Svetlana, Sreckovic Suncica, Petrovic Nenad, Sarenac Tatjana, Todorovic Dusan

Course status: Mandatory

ECTS: 5

Prerequisites:

For attending classes: enrolled in X semester.

For taking exam: –

Course unit objective

Acquaintance of students with theoretical and practical aspects in the field of ophthalmology, methods of diagnosis and clinical treatment.

Learning outcomes of course unit

After completing the course in Ophthalmology, the student is expected to acquire the knowledge about: Organization of primary health care in ophthalmology; The most common health problems for which patients turn to doctors in primary health care of field of ophthalmology; Taking an ophthalmological history; Record in primary ophthalmological health care; Classification of the ophthalmic diseases, the conditions and the injuries; The possibilities of diagnostic, therapeutic, preventive and research methods in this area.

After completing the course in Ophthalmology, the student is expected to master the following skills: Talking with the patient and taking anamnestic data; Establishing working and clinical diagnosis based on local findings on the eye as well as the general condition of the patient; Determining distance and near vision acuity; Measurement of intraocular pressure; Biomicroscopic examination of the anterior segment of the eye, ectropion of the eyelids; Examination of the patency of tear ducts; Examination of the quality of the tear film; Determination of keratometric and refractometric values of the eye; Examination of clinical findings on the fundus; Exophthalmometry according to Hertel; Interpretation of perimetric findings; Caver test, motility; Extraction of subtarsal and corneal foreign body; Interpretation of eye smears and laboratory analyses; Application of ophthalmic therapy.

Course unit contens

Theoretical classes

The anterior segment of eye; The middle segment of eye; The iridolental diaphragm of eye; The back segment of eye; Glaucoma; The binocular vision and the strabism; The neuro–opthalmology; The eye injuries.

Practical classes

The anterior segment of eye – practical aspects; The middle segment of eye – practical aspects; The iridolental diaphragm of eye – practical aspects; The back segment of eye – practical aspects; Glaucoma – practical aspects; The binocular vision and the strabism – practical aspects; The neuro–opthalmology – practical aspects; The eye injuries – practical aspects.

Literature

• Salmon J. Kanski's clinical ophthalmology: a systematic approach. 9th ed. London: Elsevier, 2019.

Number of active teaching classes: 75	**Lectures:** 45	**Practice:** 30

Teaching methods

Lectures, Practical work, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points**	**Final exam**	**No. of points**
student's activity during lectures	30	written exam	
practical classes		practical exam	20
colloquiums	30	oral exam	20
seminars			

Study program: Integrated academic studies of medicine

Course unit: **PALLIATIVE MEDICINE**

Teachers: Zdravkovic Natasa, Mijailovic Zeljko, Ignjatovic-Ristic Dragana, Petrovic Marina, Mihajlovic Goran, Miletic-Drakulic Svetlana, Veselinovic Mirjana, Boskovic-Matic Tatjana, Novkovic Ljiljana, Zornic Nenad

Course status: Elective

ECTS: 3

Prerequisites:

For attending classes: enrolled in X semester.

For taking exam: passed course unit Clinical oncology.

Course unit objective

The objective of the course is for the student to gain appropriate theoretical and practical knowledge and master the art of palliative care, in order to provide the best quality of life for seriously ill patients and their families through the prevention and relief of suffering through adequate assessment and treatment of physical symptoms of the disease, as well as appropriate psychosocial and spiritual support.

Learning outcomes of course unit

After completing the course in Palliative medicine, the student is expected to acquire the knowledge related to: Basic causes of serious, incurable diseases that require palliative care; Recognition of leading symptoms and signs of severe, incurable diseases that require palliative care; Application of appropriate symptomatic therapy in patients requiring palliative care; Pain therapy in patients requiring palliative care; Alignment of care with the needs and values of each individual patient.

After completing the course in Palliative medicine, the student is expected to master the following skills: The use of pharmacological and non-pharmacological means in the treatment of symptoms of severe chronic conditions; Empathetic communication with patients who require palliative care; Applying the principles of medical ethics in working with patients who require palliative care; Ability for teamwork.

Course unit contens

Theoretical classes

Principles of palliative care; Pain control using pharmacological and non-pharmacological methods; Management of other disease symptoms (cardiological, neurological, gastrointestinal, pulmonological, urological) in patients who require palliative care; Emergencies in palliative care; Psychosocial and spiritual aspects of palliative care; Ethical and legal issues in palliative medicine; Communication skills to reveal difficult information; Multidisciplinary teams for palliative care.

Practical classes

Principles of palliative care – practical aspects; Pain control using pharmacological and non-pharmacological methods - examples from practice; Management of other disease symptoms (cardiological, neurological, gastrointestinal, pulmonological, urological) in patients who require palliative care – practical examples; Emergencies in palliative care – practical aspects; Psychosocial and spiritual aspects of palliative care – practical aspects; Ethical and legal issues in palliative medicine – examples for practice; Communication skills to reveal difficult information – practical examples; Multidisciplinary teams for palliative care – practical aspects.

Literature

- Hoppenfeld JD. Fundamentals of Pain Medicine: How to Diagnose and Treat your Patients. Philadelphia: Lippincott Williams & Wilkins; 2014.

Number of active teaching classes: 45	**Lectures:** 30	**Practice:** 15

Teaching methods

Lectures, Practical work, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points**	**Final exam**	**No. of points**
student's activity during lectures	20	written exam	60
practical classes	20	practical exam	
colloquiums		oral exam	
seminars			

Study program: Integrated academic studies of medicine

Course unit: **FUNDAMENTALS OF CLINICAL BIOCHEMISTRY**

Teachers: Zelen Ivanka, Mitrovic Marina, Andjelkovic Marija, Zaric Milan, Nikolic Ivana, Canovic Petar, Stanojevic-Pirkovic Marijana, Stankovic Sanja

Course status: Elective

ECTS: 3

Prerequisites:

For attending classes: enrolled in X semester.

For taking exam: passed course unit Medical biochemistry.

Course unit objective

Acquaintance of medical students with the theoretical foundations and medical importance of clinical-biochemical analyses, practical implementation of patient preparation for taking different biological material, practical implementation of taking and processing biological material, principles of performing various analyzes and correct interpretation of the obtained results performed clinical-biochemical analyses.

Learning outcomes of course unit

After completing the course in Fundamentals of clinical biochemistry, the student is expected to acquire the knowledge about: Organization of clinical–biochemical laboratories, techniques of handling devices and biological materials, Quality control of performed analyses; Metabolism of nutritional substances; Metabolic products and hormones; Clinical and biochemical tests of individual organs; Clinical–biochemical tests of secretions and excreta; Clinical–biochemical diagnosis of certain clinical conditions; Influence of drugs on the results of clinical and biochemical analyses; Interpretation of the results of clinical and biochemical analyses.

After completing the course in Fundamentals of clinical biochemistry, the student is expected to master the following skills: Talking to the patient and taking anamnesis; Review of the attached medical documentation that the patient has; Selection of a range of clinical and biochemical analyzes for each patient separately; Selection of biological materials in which the selected analyzes will be performed; Venipuncture and proper urine collection; Proper processing of the taken biological material; Monitoring the performance of assigned analyses; Updating the received data; Conversation with the patient and correct interpretation of the obtained results of clinical and biochemical analyses.

Course unit contens

Theoretical classes

Clinical–biochemical laboratory; Metabolism and hormones; Clinical–biochemical tests; Clinical diagnostics.

Practical classes

Clinical-biochemical laboratory – practical work; Metabolism and hormones – practical principles; Clinical-biochemical tests – practical work; Clinical diagnostics - practical examples.

Literature

- Nader R, Horvath AR, Wittwer CT. Tietz Fundamentals of Clinical Chemistry and Molecular Diagnostic. Elsevier Science, 2019.

Number of active teaching classes: 45	**Lectures:** 30	**Practice:** 15

Teaching methods

Lectures, Practical work, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points**	**Final exam**	**No. of points**
student's activity during lectures	30	written exam	39
practical classes		practical exam	
colloquiums	31	oral exam	
seminars			

Study program: Integrated academic studies of medicine

Course unit: **RESUSCITATION 1**

Teachers: Jevdjic Jasna, Zornic Nenad, Iric-Cupic Violeta, Cekerevac Ivan, Tomic-Lucic Aleksandra, Vulovic Tatjana

Course status: Elective

ECTS: 3

Prerequisites:

For attending classes: enrolled in X semester.

For taking exam: passed course unit First aid.

Course unit objective

Acquaintance of students with the causes of cardiac arrest, assessment of the condition of critically ill patients and prevention of cardiopulmonary arrest, familiarization with current recommendations and guidelines for cardiopulmonary resuscitation and training for the application of advanced life support measures and post-resuscitation treatment.

Learning outcomes of course unit

After completing the course in Resuscitation 1, the student is expected to acquire the following knowledge: Advance life support algorithm; Diseases and conditions that are the most common cause of cardiopulmonary arrest; Recognition, diagnosis and assessment of the condition of the critically ill; Oxygenation, ventilation and airway control; Maintaining circulation; Medicines in cardiopulmonary resuscitation; Ethical problems of resuscitation; Post-resuscitation treatment.

After completing the course in Resuscitation 1, the student is expected to master the following skills: Opening of the airway; Performing artificial respiration using a face mask and resuscitation (Ambu) balloon; Application of devices to maintain the airway (oro and nasopharyngeal tubes); Application of maneuvers and other means to secure the airway (triple grip, i-Gel, laryngeal mask); Performing the Heimlich maneuver; Assessment of the presence of a pulse; Performing external heart massage; Catheterization of peripheral veins; Application of monitors; Recognition of periarrest rhythms; Diagnosis of cardiac arrest; Interpretation of arterial blood gas analysis; Cardiopulmonary resuscitacion in special situations (severe asthma attack, anaphylaxis, acute coronary syndrome, pregnant women, toxins, electrolyte disorders); Therapy of severe asthma attack, anaphylaxis, acute coronary syndrome, periarrest arrhythmias, poisoning; ECG recording; Performing safe defibrillation; Performance of percussion and non-invasive transcutaneous pacing; Team work, the role of the leader and team members

Course unit contens

Theoretical classes

Cardiopulmonary resuscitation; Airway obstruction; Acute coronary syndrome; Defibrillation; Periarestic arrhythmia; Cardiac arrest in special circumstances.

Practical classes

Cardiopulmonary resuscitation – practical work; Airway obstruction – practical examples; Acute coronary syndrome – practical aspects; Defibrillation – practical aspects; Periarestic arrhythmia – practical aspects; Cardiac arrest in special circumstances – practical aspects.

Literature

• European Resuscitation Council. Advanced Life Support. Belgium: European Resuscitation Council, 2006.

Number of active teaching classes: 45	**Lectures:** 30	**Practice:** 15

Teaching methods

Lectures, Practical work, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points**	**Final exam**	**No. of points**
student's activity during lectures	10	written exam	50
practical classes	40	practical exam	
colloquiums		oral exam	
seminars			

Study program: Integrated academic studies of medicine

Course unit: **GYNECOLOGY AND OBSTETRICS**

Teachers: Djuric Janko, Zivanovic Aleksandar, Protrka Zoran, Arsenijevic Petar, Dimitrijevic Aleksandra, Sorak Marija, Babic Goran

Course status: Mandatory

ECTS: 10

Prerequisites:

For attending classes: enrolled in XI semester.

For taking exam: passed course units Pediatrics, Surgery.

Course unit objective

Mastering basic skills, diagnostic and therapeutic procedures in gynecology and obstetrics, which can be applied in accordance with the principles of good clinical practice in the field and in a health institution at the primary, secondary, and tertiary level of health care.

Learning outcomes of course unit

After completing the course in Gynecology and obstetrics, the student is expected to acquire the following knowledge and skills necessary for: Taking an anamnesis and performing a gynecological examination; Proper and safe application of basic diagnostic procedures in gynecology; Proper application of the basic principles of ultrasound examination in gynecology and obstetrics; Proper and safe application of diagnostic and therapeutic procedures in infertility; Proper and safe application of contraceptive methods and procedures; Proper and safe implementation of procedures for diagnosing and monitoring pregnancy; Proper and safe implementation of the basic techniques of vaginal and operative delivery; Proper and safe implementation of diagnostic and therapeutic procedures in conditions and diseases that complicate the course of pregnancy; proper and safe implementation of diagnostic and therapeutic procedures in patients with breast diseases.

Course unit contens

Theoretical classes

Anatomy and embryology of female genital organs; Normal position of genital organs and static disorders; Functional cycle of the menstrual cycle; Medical genetics in gynecology and obstetrics; Disorders of the menstrual cycle; Life span of a woman; Diagnostic procedures in gynecology and additional surgical and diagnostic procedures; Sexually transmitted diseases; Inflammation and injuries of the female external genital organs; Inflammation of the female internal genital organs and acute abdomen; Benign and malignant tumors of gynecology organs; Family planning and contraception; Infertility of women and men; Ovulation and fertilization; Early embryonic development; Fetal growth and development; Early pregnancy diagnostics and pregnancy monitoring methods; The amniotic fluid; Placenta; Bleeding and diseases in pregnancy; Hematological, cardiovascular, surgical and infectious diseases in pregnancy; Immunological aspects of pregnancy; Gestational trophoblastic diseases; Ectopic pregnancy; Childbirth and newborn; Modern management of childbirth; Irregularities of childbirth; Pelvic position of the fetus; Disrupted childbirth; Irregularities of childbirth; Premature and post-term birth; Vaccination and medicines in pregnancy; Shock in obstetrics; Breast; Operative gynecology and obstetrics; Puerperium and its pathology.

Practical classes

Anamnesis of gynecological patients; Gynecological examination and status; Physiology of the menstrual cycle; Ovulation; Menstrual phases and observation of changes that occur on the mucous membrane of the vagina, cervix, secretory and proliferative phase of the endometrium; Presentation of diagnostic procedures (one-step curettage), analysis of PH findings; Adolescent gynecology and pediatric gynecology: case report; Menopause: case report; Colposcopy: case report; Genitourinary infections and sexually transmitted diseases: case presentation with practical work with the patient; Method of taking VS and samples for bacteriological and virological tests; Analysis of results, familiarization with therapeutic procedures; Benign diseases of the external genitalia, vagina and cervix: case report; Benign diseases of the uterus: case report; Description of fibroids, diagnostic and differential procedures; Exploratory curettage; Presentation of the case of infertile patients; Diagnostic procedures in infertility; Termination of unwanted pregnancy up to the 10th week of gestation; Vacuum aspiration; Termination of pregnancy after the 10th week of gestation; Antepartum and intrapartum monitoring of the fetus and mother: case report and practical work; BHCG level monitoring with diagnostics and pregnancy monitoring; Non-invasive prenatal screening of the first trimester of pregnancy (NT, Doubletest); Invasive prenatal diagnostics; Practical work with a patient with early gestosis; Therapeutic procedures in the treatment of molar pregnancy; Therapeutic procedures in the application of methotrexate, actinomycin D and combined polychemotherapy; Control of normal pregnancy; Disorders during childbirth: case report and practical work; Cesarean section - practical aspects; Puerperium: case report and practical work; Newborn: case report and practical work.

Other classes

Independent analysis of diagnostic and therapeutic principles by students' insight into medical records of patients.

Literature

- Hacker NF, Gambone JC, Hobel CJ. Hacker & Moore's Essentials of Obstetrics and Gynecology. Elsevier Science, 2016.

Number of active teaching classes: 180	**Lectures:** 90	**Practice:** 90

		Other classes: 30

Teaching methods

Lectures, Practical work, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points**	**Final exam**	**No. of points**
student's activity during lectures		written examination	
practical classes	15	practical examination	10
colloquiums	35	oral examination	40
seminars			

Study program: Integrated academic studies of medicine

Course unit: **PHYSICAL MEDICINE AND REHABILITATION**

Teachers: Jurisic-Skevin Aleksandra, Zecevic-Lukovic Tanja, Grbovic Vesna, Parezanovic-Ilic Katarina

Course status: Mandatory

ECTS: 4

Prerequisites:

For attending classes: enrolled in XI semester.

For taking exam: passed course units Neurology, Surgery.

Course unit objective

Acquaintance of students with theoretical and practical aspects of physical and rehabilitation medicine, the most modern methods and goals of physical and rehabilitation medicine, therapeutic methods of physical and rehabilitation medicine in neurology, internal medicine, pediatrics, orthopedics and traumatology, orthotics and prosthetics, clinical application of physical agents for therapeutic purposes and a multidisciplinary approach in treatment and rehabilitation.

Learning outcomes of course unit

After completing the course in Physical medicine and rehabilitation, the student is expected to acquire basic knowledge: Organization of medical rehabilitation; Knowledge of the most common health problems for which patients turn to specialists in physical and rehabilitation medicine; Recognition of actual and potential incapacity and impaired functionality as a result of illness or injury; Recognition of indications for the application of primary and secondary rehabilitation measures, timely referral of the patient to a specialist in physical and rehabilitation medicine; The importance of spa resorts in the rehabilitation process.

After completing the course in Physical medicine and rehabilitation, the student is expected to master the following skills: Practical application of physical therapy; Practical application of kinesitherapy; History taking; Functional assessment – functionality tests, motor tests, cognitive tests, social tests, pain tests; Establishing a working diagnosis based on the observation of the general condition and functional testing; Creation of a rehabilitation plan; Evaluation of the results of medical rehabilitation; Education of family members.

Course unit contens

Theoretical classes

Thermotherapy; Mechanotherapy; Sonotherapy (infrasound and ultrasound); Electrotherapy–direct currents; Electrotherapy–alternating currents; Magnetotherapy and laser therapy; Phototherapy; Hydro and balneotherapy; Kinesitherapy; Prosthetics and orthotics; Rehabilitation in orthopedics and traumatology; Rehabilitation in central motor neuron lesions; Rehabilitation in peripheral motor neuron lesions; Rehabilitation in rheumatology; Rehabilitation in pulmonology and cardiology patients; Rehabilitation after acute myocardial infarction; Child Rehabilitation.

Practical classes

Thermotherapy – practical aspects; Mechanotherapy – practical aspects; Sonotherapy (infrasound and ultrasound) – practical aspects; Electrotherapy–direct currents – practical aspects; Electrotherapy –alternating currents – practical aspects; Magnetotherapy and laser therapy – practical aspects; Phototherapy – practical aspects; Hydro and balneotherapy – practical aspects; Kinesitherapy – practical aspects; Prosthetics and orthotics – practical aspects; Rehabilitation in orthopedics and traumatology – practical aspects; Rehabilitation in central motor neuron lesions – practical aspects; Rehabilitation in peripheral motor neuron lesions – practical aspects; Rehabilitation in rheumatology – practical aspects; Rehabilitation in pulmonology and cardiology patients – practical aspects; Rehabilitation after acute myocardial infarction – practical aspects; Child Rehabilitation – practical aspects.

Other classes

Independent analysis of diagnostic and therapeutic principles by students' insight into medical records of patients.

Literature

- Frontera WR. Essentials of Physical Medicine and Rehabilitation Musculoskeletal Disorders, Pain, and Rehabilitation. Elsevier Science; 2018.

Number of active teaching classes: 60	**Lectures:** 30	**Practice:** 30 **Other classes:** 15

Teaching methods

Lectures, Practical work, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points**	**Final exam**	**No. of points**
student's activity during lectures	30	written exam	
practical classes		practical exam	10
colloquiums	30	oral exam	30
seminars			

Study program: Integrated academic studies of medicine

Course unit: **SOCIAL MEDICINE**

Teachers: Kocic Sanja, Radovanovic Snezana, Simic-Vukomanovic Ivana, Radevic Svetlana, Janicijevic Katarina

Course status: Mandatory

ECTS: 3

Prerequisites:

For attending classes: enrolled in XI semester.

For taking exam: passed course unit Legal aspects in healthcare.

Course unit objective

Acquaintance of students with: The socio–medical approach when providing explanations of complex phenomena of personal health/illness experiences; Population health assessment methods; Organization of strategies implemented within the community for the purpose of population health promotion and maintenance; Structure, organization and functioning of the entire healthcare system; Healthcare measures, levels and organization.

Learning outcomes of course unit

Enabling students to: Recognize health problems in the community; Determine priorities and participate in improving the health of the population by applying various health care strategies; Understand the functioning of the healthcare system; Master the skills of health assessment; Master the skills of proper management of medical records; Master planning skills in healthcare; Master the methods of health education work.

Course unit contens

Theoretical classes

The development, definition and subject of study of social medicine; 21st century social medicine challenges; A contemporary concept and definition of health. Determinants of health; Health inequalities; Contemporary healthcare; The natural history of disease; Levels of disease prevention; Population health status assessment; Socio-medical aspects of major health issues; Healthcare protection of vulnerable population groups; International health cooperation; International Classification of Diseases, Injuries and Causes of Death; Health Information System; Medical documentation and records; Healthcare systems; Healthcare protection quality and patient safety; Health technologies; The Law on Health Care; Health promotion; Health education.

Practical classes

Population health status indicators; Medical documentation and records; International Classification of Diseases, Injuries and Causes of Death; Methods and aids of health education; Communication in healthcare; Healthcare organization levels; Healthcare of specific population groups; Healthcare quality management; Healthcare program development.

Literature

- Kawachi I, Lang I, Ricciardi W. Oxford Handbook of Public Health Practice. Oxford: Oxford University Press; 2020.
- Detels R, Karim QA, Baum F, Li L, Leyland A. Oxford Textbook of Global Public Health Oxford: Oxford University Press; 2009.

Number of active teaching classes: 45	**Lectures:** 30	**Practice:** 15

Teaching methods

Lectures, Discussion, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points**	**Final exam**	**No. of points**
student's activity during lectures	30	written exam	70
practical classes		practical exam	
colloquiums		oral exam	
seminars			

Study program: Integrated academic studies of medicine

Course unit: **EPIDEMIOLOGY**

Teachers: Ilic Milena, Djordjevic Gordana

Course status: Mandatory

ECTS: 3

Prerequisites:

For attending classes: enrolled in XI semester.

For taking exam: passed course units Infectious diseases, Legal aspects in healthcare.

Course unit objective

Acquaintance of students with the basic definitions, terms and goals of epidemiology, methods of epidemiological research and the application of the results of those researches to the prevention and suppression of health disorders.

Learning outcomes of course unit

After completing the course in Epidemiology, the student is expected to acquire the following knowledge: Looking at the scope of the phenomenon based on indicators of morbidity and mortality; The importance of different reservoirs and sources of infection on the examples of certain epidemics; The influence of disposition on the movement of a disease in the population; Contact, water, food, Flige drops and air as a way of spreading the infection; Risk factors in the development of chronic non-communicable diseases; Epidemic research; Professional and methodological instructions for mandatory and recommended immunizations; Surveillance of nosocomial infections in different healthcare institutions.

After completing the course in Epidemiology, the student is expected to master the following skills: Uses available medical documentation; Implementation of safe immunization practices; Preparation of a plan for the needs of the health institution in vaccines; Immunoglobulins of human origin and monoclonal antibodies for mandatory immunization; Suggesting measures to prevent the spread of the disease.

Course unit contens

Theoretical classes

Basic concepts of epidemiology; Epidemiological methods and their application; Prevention, preventive medicine and public health; Epidemiology of diseases of non-communicable and unknown etiology; Anti-epidemic measures; New directions of epidemiology development.

Practical classes

Basic concepts of epidemiology – practical aspects; Epidemiological methods and their application – practical aspects; Prevention, preventive medicine and public health – practical examples; Epidemiology of diseases of non–communicable and unknown etiology – practical aspects; Anti–epidemic measures – practical aspects; New directions of epidemiology development – practical aspects.

Literature

- Celentano DD, Szklo M. Gordis Epidemiology. Elsevier Science, 2019.
- Gamulin S. Clinical research – clinicl epidemiology. Zagreb: Medicinska naklada; 2017.
- Haynes B, Sackett DL, Guyatt GH, Tugwell P. Clinical Epidemiology: How To do Clinical Practice Research. Philadelphia: Lippincott Williams & Wilkins; 2005.

Number of active teaching classes: 45	**Lectures:** 30	**Practice:** 15

Teaching methods

Lectures, Practical work, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points**	**Final exam**	**No. of points**
student's activity during lectures	30	written exam	70
practical classes		practical exam	
colloquiums		oral exam	
seminars			

Study program: Integrated academic studies of medicine

Course unit: **HYGIENE AND ECOLOGY**

Teachers: Djonovic Nela, Vasiljevic Dragan, Sekulic Marija, Stajic Dalibor

Course status: Mandatory

ECTS: 6

Prerequisites:

For attending classes: enrolled in XI semester.

For taking exam: passed course units Infectious diseases, Legal aspects in healthcare.

Course unit objective

Acquaintance students with the basic principles of preserving and improving human health through the study of: the impact of the environment on human health, improvement and protection of the environment–ecology, risk factors from the environment–ecotoxicology (polluted air, polluted water, polluted food, polluted soil, noise, vibrations, waste materials) for people's health–communal hygiene, as well as the basic postulates of food hygiene, food health safety and proper nutrition, dietary products, diet prophylaxis and diet therapy, school hygiene, hygiene of growth and development, mental hygiene and preservation and improvement of mental health, personal hygiene, hygiene in emergency situations, hygiene of sports and physical activities, sanitary hygiene and prevention of hospital infections and hygiene of work and working environment

Learning outcomes of course unit

After completing the course in Hygiene and ecology, the student is expected to acquire the following knowledge about: Traits and characteristics of microbiological, biological, physical, chemical and radioactive risk factors from all sectors of the environment (air, water, soil, waste materials, radiation) for human health; Mechanisms of influence of environmental risk factors on human health; Ecotoxicology; The methodology of measuring the level–concentration of the presence of microbiological, biological, physical, chemical and radioactive substances in the environment; Assessment of possible impacts of measured levels–concentrations of microbiological, biological, physical, chemical and radioactive substances in the environment on human health; Procedures necessary for the improvement and protection of people's health and disease prevention; Health food safety, proper nutrition, diet prophylaxis and diet therapy; Preserving and improving mental health; Preserving and improving the health of children and youth, proper growth and development of children; Emergency situations and the role of doctors in emergency situations; Proper physical activity and its impact on health and illness, as well as sports hygiene; Personal hygiene; Hygienic and dietary regimes; Sanitary hygiene, asepsis and antisepsis, sterilization, disinfection, prevention of hospital infections; The impact of work and the working environment on people's health.

After completing the course in Hygiene and ecology, the student is expected to master the following skills to: Correctly interprets the results of measuring environmental risk factors and their impact on human health; Correctly proposes and implements preventive and remedial measures for the improvement and protection of the environment and the preservation of human health; Recommend an appropriate diet for healthy people of all age categories and a hygienic–dietary regimen for the sick; Correctly interprets the results of food analysis and assesses health safety, as well as participates in the work of the appropriate counseling centers.

Course unit contens

Theoretical classes

Introduction to ecology; Atmosphere – impact on health; Climate, microclimate, noise, vibrations, radiation – impact on health; Drinking water – impact on health; Waste materials – impact on health; Soil; Ecotoxicology; Environmental poisoning; Food hygiene: introduction and nutrition, foodstuffs, proper nutrition; Examination of nutrition and nutritional status; Malnutrition diseases; Obesity; Diet therapy; Health food safety; Quality systems; Food contamination; Growth and development hygiene; School hygiene; Sports and physical activity hygiene; Personal hygiene; Mental hygiene; Stress prevention; Hospital infection prevention; Sanitary hygiene; Hygiene in emergency situations; Work and work environment hygiene; Living and working environment – assessment of the impact on health.

Practical classes

Introduction to ecology – practical aspects; Atmosphere – impact on health – practical aspects; Climate, microclimate, noise, vibrations, radiation - impact on health – practical aspects; Drinking water – impact on health – practical aspects; Waste materials – impact on health – practical aspects; Soil – practical aspects; Ecotoxicology – practical aspects; Environmental poisoning – practical aspects; Food hygiene: introduction and nutrition, foodstuffs, proper nutrition – practical aspects; Examination of nutrition and nutritional status – practical aspects; Malnutrition diseases – practical aspects; Obesity – practical aspects; Diet therapy – practical aspects; Health food safety – practical aspects; Quality systems – practical aspects; Food contamination – practical aspects; Growth and development hygiene – practical aspects; School hygiene – practical aspects; Sports and physical activity hygiene – practical aspects; Personal hygiene – practical aspects; Mental hygiene – practical aspects; Stress prevention – practical aspects; Hospital infection prevention – practical aspects; Sanitary hygiene – practical aspects; Hygiene in emergency situations – practical ascepts; Work and work environment hygiene – practical aspects; Living and working environment - assessment of the impact on health – practical aspects.

Literature

- Detels R, Karim QA, Baum F, Li L, Leyland A. Oxford Textbook of Global Public Health Oxford: Oxford University Press; 2009.
- WHO. Preventing disease through healthy environments: a global assessment of the burdenof disease from environmental risks. Geneva: World Health Organization; 2016.
- WHO. Guidelines for drinking – water quality. 3 rd ed. Geneva: World Health Organization, 2011.
- WHO. Monitoring ambient air quality for health impact assessment. Copenhagen: WHO Regional Publications, European Series, No. 85; 2003.
- WHO. Hand Hygiene. WHO guidelines on hand hygiene in health care. Geneva: WHO; 2009.
- WHO. Diet, nutrition and the prevention of chronic disease. Geneva: WHO Technical Report Series 916; 2003.
- WHO. Burden of disease from environmental noise. Quantification of healthy life years lost in Europe. Geneva: World Health Organization; 2011.
- WHO. Promoting mental health: concepts, emerging evidence, practice : summary report / a report from the World Health Organization, Department of Mental Health and Substance Abuse in collaboration with the Victorian Health Promotion Foundation and the University of Melbourne. Geneva: World Health Organization; 2004.

Number of active teaching classes: 90	**Lectures:** 60	**Practice:** 30

Teaching methods

Lectures, Practical work, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points**	**Final exam**	**No. of points**
student's activity during lectures		written exam	
practical classes	15	practical exam	
colloquiums	20	oral exam	65
seminars			

Study program: Integrated academic studies of medicine

Course unit: **MEDICAL STATISTICS AND INFORMATICS**

Teachers: Zdravkovic Nebojsa, Stojic Vladislava

Course status: Mandatory

ECTS: 3

Prerequisites:

For attending classes: enrolled in XI semester.

For taking exam: –

Course unit objective

The main објецтиве of the course is to enable students to acquire basic knowledge and skills in the field of informatics and statistics that can be applied in biomedical research.

Learning outcomes of course unit

After implementing theoretical and practical lessons in the course Medical statistics and informatics, students will be able to use a computer independently and work in the Windows 10 operating system user environment, as well as in the Microsoft Office software package. They will acquire the knowledge that will enable them to design and choose an appropriate statistical analysis in order to solve problems during scientific research work.

Course unit contens

Theoretical classes

Basics of the Windows 10 operating system; Word processors; Spreadsheet program; Program for creating presentations; Internet; Review of medical databases, Pubmed; Introduction to statistical methods; Frequency distributions, data types, Histograms and other frequency charts; Measures of central tendency, modalities of frequency distribution, medians and quantiles, mean, variance, range and interquartile range, standard deviation; Data presentation, rates and proportions, significant digits, table presentation, graphs; Normal distribution, variables that follow the normal distribution, Normal distribution graph; Forecasting, sample distributions, standard error of the sample mean, confidence intervals; Hypothesis testing; Sign test, principles of significance tests, significance levels and types of errors, one-tailed and two–tailed significance tests; Comparing means of large samples. t distribution. One-sample t method. Means of two independent samples; Use of transformations; Scatter plots; Regression; Method of least squares; Standard error of the regression coefficient; Correlation; Use of correlation coefficient.

Practical classes

Installation and setup of the Windows 10 operating system, working in the Windows 10 operating system; Text formatting, inserting images and tables in Microsoft Word; Creating and formatting tables, using basic functions in Microsoft Excel; Creating and formatting slides, inserting images and tables in the Microsoft PowerPoint program; Browsing the Internet, security on the Internet, creating an e-mail account, communication on the Internet; Searching medical databases and medical journals on the Internet, downloading papers from the Internet; Introduction to the SPSS program, basic settings; Creating a data file and entering data; Types of variables; Frequency, median, mean, variance, standard deviation; Charts; Histogram, bar chart, line chart, scatter chart, boxplot; Tables; Editing tables; Importing tables into Word documents; Diagrams and editing diagrams; Importing diagrams into Word documents; Normal distribution; Normal distribution diagram; Assessment of normality of distribution; Identifying outliers; t distribution; Testing the hypothesis for the mean; paired samples t-test; t distribution; t–test of independent samples; Regression; Method of least squares; Correlation; Correlation coefficients.

Literature

- David J. Pharmaceutical statistics. London: Pharmaceutical Press; 2005.
- Field A. Discovering statistics using IBM SPSS Statistics. London: Sage; 2009.

Number of active teaching classes: 30	**Lectures:** 15	**Practice:** 15

Teaching methods

Lectures, Practical work, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points**	**Final exam**	**No. of points**
student's activity during lectures		written exam	70
practical classes	30	practical exam	
colloquiums		oral exam	
seminars			

Study program: Integrated academic studies of medicine

Course unit: **MEDICAL ETHICS**

Teachers: Ignjatovic-Ristic Dragana, Jovanovic Mirjana, Mihajlovic Goran, Janjic Vladimir, Radmanovic Branimir, Borovcanin Milica

Course status: Mandatory

ECTS: 2

Prerequisites:

For attending classes: enrolled in XI semester.

For taking exam: passed course units Psychiatry, Legal aspects in healthcare.

Course unit objective

Acquaintance of students with ethical aspects/principles in clinical practice; Acquiring knowledge about basic ethical principles, principles of scientific and clinical research, work in particularly sensitive groups of patients; Acquaintance with the ethical aspects of abortion; Acquaintance with the ethical aspects of organ transplantation; Acquaintance with the ethical aspects of the end of life (euthanasia, assisted suicide); Acquaintance with legal regulations in the field of medicine – rights and obligations of doctors.

Learning outcomes of course unit

After completing the course in Medical ethics, the student is expected to acquire the knowledge related to: Basic ethical principles; Application of ethical principles in clinical practice; Application of ethical principles in scientific and clinical research; Application of ethical principles in work with vulnerable populations; Ethical principles in the matter of abortion; Ethical principles in the matter of organ transplantation; Ethical aspects of the end of life; Application of the basic principles of medical deontology – obligations and duties of doctors.

Course unit contens

Theoretical classes

Introduction in ethics; Basic ethical principles; Hippocrates oath, other oaths, and declarations; Responsibilities and duties of patients; Decision making capacity; Informed consent; Ethical boards and IRBs; Principles of scientific and clinical research; Vulnerable populations – kids, mental health disorders, elderly, pregnancy; Abortion; Organ transplantation; End of life topics (Euthanasia, assisted suicide); Medical errors; Deontology, and low regulation in medicine.

Practical classes

Work on basic ethical principles; Oaths and declarations; Essay writing on topics from medical ethics – students find adequate literature in order to discuss significant ethical dilemmas with examples and write an essay on a topic from medical ethics according to their own affinities.

Literature

- Phalen R. Core ethics for health proffesionals. Irvin: Springer; 2017.
- Beauchamp TL. Priciples of biomedical ethics. New Jork: Oxford universaty press; 2009.

Number of active teaching classes: 45	**Lectures:** 30	**Practice:** 15

Teaching methods

Lectures, Seminars, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points**	**Final exam**	**No. of points**
student's activity during lectures	30	written exam	60
practical classes		practical exam	
colloquiums		oral exam	
seminars	10		

Study program: Integrated academic studies of medicine

Course unit: **EVIDENCE–BASED MEDICINE**

Teachers: Jankovic Slobodan, Djordjevic Natasa, Kostic Marina, Milovanovic Jasmina, Zivkovic-Zaric Radica, Milosavljevic Milos, Pejcic Ana, Ruzic-Zecevic Dejana

Course status: Elective

ECTS: 3

Prerequisites:

For attending classes: enrolled in XI semester.

For taking exam: passed course unit Pharmacology and toxicology.

Course unit objective

To teach students to critically read medical literature and interpret its recommendations from the aspect of validity and clinical significance of the results, as well as to base their practice in the future on valid evidence from the literature.

Learning outcomes of course unit

After completing the course in Evidence–based medicine, the student is expected to acquire the basic knowledge that will help him in: Setting clinical problems; Finding relevant data from the literature; Critical processing of data from the literature; Treatment of patients based on clinically significant results of valid (methodologically correctly conducted) clinical studies, meta–analyses and systematic reviews.

After completing the course in Evidence–based medicine, the student is expected to master the following skills: The skill of searching electronic databases of professional literature; Ability to detect methodological errors in clinical, prognostic, diagnostic, economic studies, meta–analyses and systematic reviews; Skill of writing systematic literature review.

Course unit contens

Theoretical classes

Basic principles of evidence-based medicine; Literature search; Evaluation of validity and clinical significance of the results of clinical, diagnostic, prognostic, and pharmacoeconomic studies; Assessment of the validity and clinical significance of meta–analysis, systematic reviews and good clinical practice guidelines; Synthesis and practical application of evidence–based medicine.

Practical classes

Basic principles; Types of studies; Synthesis and practical application of evidence–based medicine through the creation of one systematic review article on a topic from clinical practice, according to the student's choice.

Literature

- Sharon E. Straus, Paul Glasziou, W. Scott Richardson, R. Brian Haynes. Evidence-Based Medicine: How to Practice and Teach It. Edinburgh: Churchill Livingstone; 2018.
- Greenhalgh T. How to read a paper: the basic of evidence-based medicine. Massachussetts: Blackwell Publishing; 2006.

Number of active teaching classes: 45	**Lectures:** 30	**Practice:** 15

Teaching methods

Lectures, Practical work, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points**	**Final exam**	**No. of points**
student’s activity during lectures	30	written exam	70
practical classes		practical exam	
colloquiums		oral exam	
seminars			

Study program: Integrated academic studies of medicine

Course unit: **PRIMARY HEALTH CARE**

Teachers: Djonovic Nela, Ilic Milena, Kocic Sanja, Vasiljevic Dragan, Radovanovic Snezana, Simic-Vukomanovic Ivana, Sekulic Marija, Stajic Dalibor, Janicijevic Katarina, Djordjevic Gordana

Course status: Elective

ECTS: 3

Prerequisites:

For attending classes: enrolled in XI semester.

For taking exam: passed course unit Legal aspects in healthcare.

Course unit objective

Acquaintance of students with: Practical contemporary aspects and principles of primary health care (PHC) of the family, the working-age population, the elderly, children; Mental health protection; Mode of functioning of the primary health care system; Doctor–patient relationship; Patient movement through the healthcare system; Ways to solve the most common practical problems and needs of patients; Recognition of basic environmental risk factors (contaminated water and food) for human health, as well as intrahospital infections and methods of disinfection, disinsection, deratization and decontamination of the environment. The objective of the course also refers to the training of students for the practical application of acquired knowledge and the performance of epidemiological tasks within the scope of the activities of a general practitioner.

Learning outcomes of course unit

After completing the course in Primary health care, the student is expected to acquire the basic knowledge related to: Organization of primary health care; Records in primary health care; Knowledge of the classification of diseases and injuries according to the Tenth International Classification of Diseases; The importance of health legislation for the primary health care system; Health information system of primary health care; Basic properties and properties of microbiological, biological, physical, chemical and radioactive environmental risk factors on human health; Methodology for measuring the level of presence of microbiological, biological, physical, chemical and radioactive substances in the environment; Assess the possible impacts of measured levels of microbiological, biological, physical, chemical and radioactive substances in the environment on human health; Epidemic research; Examines risk factors in the development of chronic non-communicable diseases.

After completing the course in Primary health care, the student is expected to master the following skills needed to: Identify the importance and role of primary health care in the health care system; Identify the importance and role of individual primary health care institutions; Keep medical documentation and records; Correctly interpret the results of measuring environmental risk factors and their impact on human health; Properly propose and implement preventive and remedial measures for the improvement and protection of the environment and the preservation of human health; Propose and implement measures to prevent and suppress the spread of disease.

Course unit contens

Theoretical classes

The place and role of the community and the health service in the concept of primary health care; Environmental risk factors for human health; Epidemiology in public health practice.

Practical classes

The place and role of the community and the health service in the concept of primary health care – practical aspects; Environmental risk factors for human health – practical aspects; Epidemiology in public health practice – practical examples.

Literature

- Rector C, Stanley MJ. Community health nursing. Philadelphia: LWW Lippincott Williams and Wilkins; 2021.
- Detels R, Karim QA, Baum F, Li L, Leyland A. Oxford Textbook of Global Public Health Oxford: Oxford University Press; 2009.

Number of active teaching classes: 45	**Lectures:** 30	**Practice:** 15

Teaching methods

Lectures, Discussion, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points**	**Final exam**	**No. of points**
student's activity during lectures	30	written exam	70
practical classes		practical exam	
colloquiums		oral exam	
seminars			

Study program: Integrated academic studies of medicine

Course unit: **RESUSCITATION 2**

Teachers: Jevdjic Jasna, Zornic Nenad, Iric-Cupic Violeta, Cekerevac Ivan, Tomic-Lucic Aleksandra, Vulovic Tatjana

Course status: Elective

ECTS: 3

Prerequisites:

For attending classes: enrolled in XI semester.

For taking exam: passed course unit Resuscitation 1.

Course unit objective

Acquaintance of the student with epidemiology, pathophysiology and methods of treating injuries by organ system, as well as measures of effective prehospital resuscitation of the injured, their transport and definitive stabilization, diagnosis and treatment in intrahospital conditions (trauma centers).

Learning outcomes of course unit

After completing the course in Resuscitation 2, the student is expected to acquire the following knowledge: Initial assessment (ABCDE approach) and primary care of the injured; Secondary care of the injured; Final treatment of the injured; Trauma protocol; Airway in trauma; Injuries (epidemiology, injury mechanisms, pathophysiology, diagnostics, treatment); Thermal injuries (burns, frostbite, etc.); Hypothermia; Injuries caused by electric current and lightning strikes; Hemorrhagic shock and transfusion; Tasks and organization of pre-hospital care of the injured; Transport of the injured; Analgesia in trauma; Intrahospital treatment of the injured; Procedure in case of mass accidents.

After completing the course in Resuscitation 2, the student is expected to master the following skills: Maintaining airway patency ("double maneuver", oro- and nasopharyngeal tube); Artificial respiration - application of resuscitation balloon and face mask, supraglottic means; External heart massage with chest compression; Laryngoscopy and endotracheal intubation; Oxygenation and ventilation; Manual stabilization of the cervical spine; Placement of a firm collar to immobilize the cervical spine; Safe positioning of the patient on the spinal board; Placement of an intravenous cannula; Pupil evaluation in comatose patients; Scoring patients according to the Glasgow Coma Scale; Placement of a nasogastric tube; Placing a compression bandage; Temporary immobilization of the extremities; Catheterization of the urinary bladder with a Foley catheter; Monitoring vital functions of the injured; Physical examination by organ system.

Course unit contens

Theoretical classes

Measures of higher life support in the traumatized.

Practical classes

Measures of higher life support in the traumatized – practical aspects.

Literature

- Gullo A, Ristigano G. Resuscitation: translational research, clinical evidence, education, guidelines. Springer; 2014.

Number of active teaching classes: 45	**Lectures:** 30	**Practice:** 15

Teaching methods

Lectures, Practical work, Work in small groups.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points**	**Final exam**	**No. of points**
student's activity during lectures	10	written exam	60
practical classes	30	practical exam	
colloquiums		oral exam	
seminars			

Study program: Integrated academic studies of medicine

Course unit: **OCCUPATIONAL MEDICINE**

Teachers: Kulic Ljiljana

Course status: Elective

ECTS: 3

Prerequisites:

For attending classes: enrolled in XI semester.

For taking exam: passed course unit Internal medicine

Course unit objective:

Acquaintance of students with the basic postulates of safety and health at work, morphological and functional characteristics of occupational diseases, work-related diseases and work-related injuries, assessment of work ability and preventive measures of protection.

Learning outcomes of course unit:

Upon completion of classes in Occupational Medicine, the student is expected to: explain basic physical, chemical and biological agents at the workplace and their impact on health and ability to work; explain the principles for determining workplaces with an increased health risk; explain the principles of diagnostic procedures for determining work-related occupational diseases; explain the principles for determining and verifying injuries at work; explain therapeutic and preventive measures of occupational diseases; explain the principles for assessing work ability: when hiring, changing jobs, going on IC and determining the length of sick leave.

At the end of classes in the subject of Occupational Medicine, the student is expected to master the following skills: correctly interpret the findings of the occupational medicine specialist in all diagnostic and therapeutic procedures by systems and organs; correctly assesses temporary or permanent work capacity, in accordance with other clinical and diagnostic procedures, provides adequate first aid in the event of an accident

Course unit contents

Theoretical classes

Basics of occupational medicine and occupational pathology; Occupational diseases and diseases caused by radiation; Professional traumatism and assessment of work ability; Professional general toxicology; Characteristics of working conditions in certain branches of activity; Impact of working conditions on the health of women and youth and protection measures

Practical classes

Basics of occupational medicine and professional pathology - practical aspect; Occupational diseases and diseases caused by radiation - examples from practice; Professional traumatism and assessment of work ability - examples from practice; Noise in the working environment; Expertise of working ability in poisoning caused by organo-phosphorus pesticides

Literature

- Sadhra S, Bray A, Boorman S. Oxford Handbook of Occupational Health. 3rd edition. Oxford University Press; 2022.

Number of active teaching hours: 30	**Lectures:** 30	**Practice:** **Other Classes:** 15

Teaching methods

Lectures, Discussion, Work in small groups

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points**	**Final exam**	**No. of points**
student's activity during lectures	30	written exam	70
practical classes		practical exam	
colloquiums		oral exam	
seminars			

Study program: Integrated academic studies of medicine

Course unit: **PREVENTIVE PEDIATRICS**

Teachers: Vuletic Biljana, Vujic Ana, Igrutinovic Zoran, Markovic Slavica, Simovic Aleksandra, Stojkovic-Andjelkovic Andjelka, Knezevic-Rangelov Sanja, Savic Dragana, Folic Nevena

Course status: Elective

ECTS: 3

Prerequisites:

For attending classes: enrolled in XI semester.

For taking exam: passed course unit Pediatrics.

Course unit objective:

A systematic and multidisciplinary approach to the problems of the most important topics of preventive pediatrics. Acquiring specific knowledge and skills in various fields of pediatrics, in order to enable the proper growth and development of children and to prevent or alleviate the consequences of certain diseases or conditions**.**

Learning outcomes of course unit:

Getting to know the principles of prevention in pediatrics and the importance of appropriate information. Students will apply the acquired knowledge about prevention in pediatrics in their daily professional work, while simultaneously involving families, sports associations or parents' associations, as important actors in children's health**.**

Course unit contents:

Theoretical classes

Children's health parameters by age groups; Impact of genomics, ecology and environmental protection on children's health; Rare diseases: opportunities and perspectives; Predictive role of biochemical markers and scoring systems in neonatology; Prevention of the most common pathological conditions in infants and young children; Prevention of metabolic disorders and diabetes mellitus in children; The importance of natural nutrition in primary prevention; the influence of nutrition on the occurrence of premature puberty; Obesity and dyslipidemia; The most common respiratory diseases in children and respiratory rehabilitation; Prevention of emergencies in pediatrics; Prevention of infections in primary and secondary immunodeficiency; Sudden cardiac death in children: ECG screening of children and young athletes for long QTc syndrome; Recommendations for recreational and active sports in children with arrhythmia or potentially arrhythmogenic conditions; Pharmacotherapeutic protocols in primary health care for children; Vaccination and immunization; Use of probiotics, vitamins and other supplements in primary prevention; The importance of early detection, prevention, stimulation and intervention in children with developmental disabilities; Addictive diseases and sexually transmitted diseases in adolescence; Health care and care of an abused and neglected child; Prevention and therapy of pain in children; Prevention of dental problems in children

Practical classes

Familiarity with biochemical and physiological parameters of health, child development and motor skills; Genetic counseling as a modern model of health care for children and ethical aspects; Congenital anomalies from the perspective of etiopathogenetic factors; Direct impact of ecology and environmental protection (air-land-water) on children's health; Application of scoring and biochemical markers in the most common pathological conditions of a newborn child; Importance of determination of lipids and lipoproteins in children; Application of a hygienic-dietary regimen and statins in children with hyperlipidemia; Use of antibiotics in the prophylaxis of recurrent urinary infections and bacterial endocarditis; The use of anticonvulsants in the prophylaxis of recurrent crises of consciousness in children and its side effects; Application of antiarrhythmics in the prophylaxis of recurrent heart rhythm disorders in children in the first year of life; Correlation between the level of physical activity and the value of blood pressure in children; Application of antihypertensive drugs and side effects in pediatric practice; History taking, physical examination and ECG interpretation for the purpose of early screening for sudden cardiac death or exclusion of false positive results; Acquaintance with contraindications for playing sports in pediatric practice; Use of vitamins in childhood according to the principles of orthomolecular medicine; The role of probiotics in the primary prevention of atopic diseases, necrotic enterocolitis, functional diseases of the gastrointestinal tract, etc. Recognition of obesity in children and familiarization with possible complications and their prevention; Evaluation of a child with frequent respiratory infections; Recognition of atypical infections of the lower respiratory tract; Adoption of algorithms for the prevention and treatment of asthma, bronchiolitis and bronchiectasis (which are not related to cystic fibrosis); Getting to know the principles of respiratory rehabilitation. Adoption of appropriate algorithms for rapid assessment and prevention of emergency conditions in pediatrics: hypertensive crisis, status epilepticus, transfusion reaction, anaphylactic, septic, cardiogenic, etc. type of shock, etc.; Observing symptoms in children with autism spectrum disorders: inattention, hyperactivity and impulsivity, etc. Adoption of vaccination calendar, specific immunization and protection against sexually transmitted diseases; Prevention and treatment of the most common addiction diseases among adolescents (nicotine, alcohol, opiates, etc.); Adoption of therapeutic procedures for the treatment of neuropathic and oncological pain and preventive dental interventions in children.

Literature

- Pediatric Clinical Practice Guidelines & Policies (22nd ed.) by American Academy of Pediatrics; 2020
- Kliegman RM, St. Geme JW, editors. Nelson Textbook of Pediatrics. 21st edition. Philadelphia: Elsevier-Saunders; 2019.

Number of active teaching classes: 45	**Lectures:** 30	**Practice:** 15	
Teaching methods Lectures, Discussion, Work in small groups			
Examination methods (maximum 100 points)			
Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student's activity during lectures	15	written exam	70
practical classes	15	practical exam	
colloquiums		oral exam	
seminars			

Study program: Integrated academic studies of medicine

Course unit: **IMMUNIZATION AND VACCINATION**

Teachers: Jovanovic Ivan, Volarevic Vladislav, Milovanovic Marija, Radosavljevic Gordana, Vujic Ana, Igrutinovic Zoran, Pantic Jelena, Pavlovic Sladjana, Arsenijevic Aleksandar, Gajovic Nevena

Course status: Elective

ECTS: 3

Prerequisites:

For attending classes: enrolled in XI semester.

For taking exam: passed course unit Pediatrics.

Course unit objective:

Acquiring the knowledge about the basic principles of immunization and vaccination. The program includes the following fields: basic principles of immunization and the use of vaccines.

Learning outcomes of course unit:

Upon completion of the course in Immunization and vaccination, the student is expected to: Describe the basic principles of functioning of the human immune system;Explain the principles and the importance of vaccination; Describe the basic principles of vaccination in children

Course unit contents:

Theoretical classes

History of vaccination; Maturation of the immune system; Immunologic memory; Active and passive immunization; Immunodeficiencies and immunization; Types of vaccines; Composition and production of vaccines; Antitumor vaccines; Childhood diseases and vaccination; Vaccination schedule; Vaccines and respiratory diseases in children; Vaccination of immunodeficient children; Transplantation and vaccination; RSV vaccine; Legal and ethical aspects of vaccination

Practical classes

History of vaccination – examples; Maturation of the immune system – practice example; Immunologic memory – practice example; Active and passive immunization – practical aspect; Immunodeficiencies and immunization - practical aspect; Types of vaccines - practical aspect; Composition and production of vaccines - practical aspect; Antitumor vaccines - practical aspect; Childhood diseases and vaccination – practice example;Vaccination schedule - practice example; Vaccines and respiratory diseases in children- practical aspect; Vaccination of immunodeficient children - practical aspect; Transplantation and vaccination - practical aspect; RSV vaccine - practical aspect; Legal and ethical aspects of vaccination- practical aspect

Literature

- Abbas A, Lichtman A, Pillai S. Basic Immunology: Functions and Disorders of the Immune System. Elsevier Science; 2016.
- Rich RR, Fleisher TA, Shearer WT, Schroeder HW, Frew AJ, Weyand CM. Clinical Immunology. 5th edition. Amsterdam: Elsevier; 2019.

Number of active teaching hours: 45	**Lectures:** 30	**Practice:** 15

Teaching methods

Lectures, Seminars and Work in small group

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student's activity during lectures		written exam	50
practical classes		practical exam	
colloquiums		oral exam	
seminars	50		

Study program: Integrated academic studies of medicine

Course unit: **HEALTH EDUCATION**

Teachers: Djonovic Nela, Kocic Sanja, Vasiljevic Dragan, Radovanovic Snezana, Simic-Vukomanovic Ivana, Sekulic Marija, Stojanovic Emilija, Stajic Dalibor, Radevic Svetlana

Course status: Elective

ECTS: 3

Course status:

For attending classes: enrolled in XI semester.

For taking exam: passed course unit Internal medicine.

Course unit objective:

The acquisition of knowledge and skills in the field of health education as one of the instruments or strategies implemented within the healthcare policy along with being one of the key factors playing a significant role in the promotion and maintenance of health. The course aims are also related to enabling students to understand the concept of health education and health promotion, that is, to master the process of health education as a highly significant measure that should be undertaken for the purpose of health maintenance and disease prevention.

Learning outcomes of course unit:

Students should be able to apply the knowledge acquired during the course, complete with all the health education skills, methods and strategies that are intended to be tailored to each individual, family or the entire community if necessary; so that they could be able to use the needs recognized as such – as the foundation for their further creation and consequent administration of health education interventions, leading to the health maintenance and health promotion, that is, disease prevention. In addition, students should be able to use the most contemporary targeted and population-based health education strategies – during the implementation of prevention programs.

Course unit contents:

Theoretical classes

Health education – its subject, assignments and scientific discipline; Health education as a process: informing, studying, acquiring knowledge, mastering skills; Aims and principles; Health culture; Health and digital literacy; Behaviour and changes in behaviour of people; The need recognition; Education, counselling and informing; Attitudes, motives, customs, habits. Healthy lifestyles. Communication methods. Strategies in skill acquisition. Organizational methods; The concept of health promotion; The Public Health Event Calendar; The aids of health education; Health education in terms of prevention of chronic noncommunicable diseases (NCDs), contagious and addictive diseases; The maintenance and promotion of mental health; Reproductive health: its maintenance and promotion; Youth health. Vulnerable population groups in healthcare;

Practical classes

Methods & Aids of Health Education: communication, interviews, lectures, work in small groups, education, demonstration methods of teaching, role playing, organising community events, running campaigns, etc; Health education materials development; Planning of the health education activities according to the Public Health Event Calendar.

Literature:

- Phalen R. Core ethics for health Proffesionals. Irvin: Springer; 2017.
- Detels R, Roser R. Oxford Textbook of Public Health. Oxford: Oxford University Press; 2009.

Number of active teaching classes: 45	**Lectures:** 30	**Practice:** 15

Teaching methods: Lectures, Discussion, Seminars, Work in small groups

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points**:	**Final exam**	**No. of points**:
student's activity during lectures	15	written exam	30
practical classes		practical exam	
colloquiums	30	oral exam	
seminars	25		

Study program: Integrated academic studies of medicine

Course unit: **INTERPROFESSIONAL EDUCATION**

Teachers: Stolic Radojica, Veselinovic Mirjana, Djukic Svetlana, Djurdjevic Predrag, Zdravkovic Natasa, Vujic Ana, Vuletic Biljana, Igrutinovic Zoran, Jevdjic Jasna, Vucic Rada, Knezevic-Rangelov Sanja

Course status: Mandatory joint

ECTS: 2

Prerequisites:

For attending classes: enrolled in XII semester.

For taking exam: –

Course unit objective:

Acquaintance, understanding and application of interprofessional education for all profiles of future healthcare workers for the purpose of effective cooperation among members of the healthcare team and achieving greater well-being for the patient, improving health outcomes, and thus the quality of healthcare

Learning outcomes of course unit:

After mastering the program students will acquire certain knowledge: Describing the key elements of interprofessional education and collaborative practice; efficient and productive work in a team; recognition of the role of each member of the healthcare team.

Skills that students will acquire after finishing the program: Recognizing and presenting their contribution in the mutual provision of effective health care; sharing knowledge with other members of the healthcare team and achieving the best for the patient; communicating effectively with patients and their families, as well as with other members of the health care team about health care goals and priorities;

Attitudes that students will acquire after mastering the program: Understanding of basic geriatric syndromes, aspects of diabetes and acute coronary syndrome; effective discussion of case studies from geriatrics, acute coronary syndrome and non-communicable diseases and presenting their solutions

Course unit contents

Pracitcal classes

Interprofessional education - IPO (concept and importance, experiences from other countries, evaluation); Teamwork skills; Collaborative practice - KP (team work of health workers in order to achieve the highest level of health care); Competencies for interprofessional education and collaborative practice; Acute coronary syndrome (etiology, clinical signs and symptoms, management); Diabetes (etiology, clinical signs and symptoms, treatment).

Analyzes of case studies from three areas: Geriatrics, acute coronary syndrome and diabetes. Case studies have been prepared for each area, performed by groups of students; defining the role of each member of the health team; joint design and presentation of a therapeutic plan depending on the level of health care. The work of groups/teams during practical classes is coordinated by the moderator.

Literature

- World Health Organization: Framework for Action on Interprofessional Education and Collaborative Practice. Geneva, WHO; 2010. dostupno: http://www.int.hrh/resources/framework-action/en/
- https://www.escardio.org/Guidelines/Clinical-Practice-Guidelines (European Society of Cardiology)
- https://www.acc.org/guidelines (American College of Cardiology)
- http://www.diabetes.org/ (American Diabetes Association)
- https://www.easd.org/ (European Foundation for the Study of Diabetes)

Number of active teaching hours: 30	**Lectures:**	**Practice:** 30

Teaching methods

Work in small groups

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points**	**Final exam**	**No. of points**
student's activity during lectures	50	written exam	50
practical classes		practical exam	
colloquiums		Oral exam	
seminars			

Study program: Integrated academic studies of medicine

Course unit: **EMERGENCY MEDICAL CONDITIONS**

Teachers: Andjelkovic Nebojsa, Djurdjevic Predrag, Ignjatovic-Ristic Dragana, Jevdjic Jasna, Jovanovic Mirjana, Mijailovic Zeljko, Mihajlovic Goran, Vuletic Biljana, Djukic Svetlana, Zdravkovic Natasa, Markovic Slavica, Lazarevic Tatjana, Vulovic Tatjana, Miletic-Drakulic Svetlana, Cvetkovic Aleksandar

Course status: Mandatory

ECTS: 5

Prerequisites:

For attending classes: enrolled in XII semester.

For taking exam: passed course units Internal medicine, Neurology, Psychiatry, Pediatrics, Surgery.

Course unit objective:

Providing knowledge of the basic principles of pre-hospital and initial hospital approach to emergency situations in medicine, from the aspects of internal medicine, surgery, infectious diseases, otorhinolaryngology, ophthalmology, neurology and psychiatry. The goal is to acquire updated theoretical and practical knowledge, which will enable acquisition of basic and advanced cardiopulmonary resuscitation skills, application of appropriate diagnostic procedures and, in accordance with the established diagnosis, the prescription of adequate therapy.

Learning outcomes of course unit:

Mastering of theoretical knowledge and application of acquired skills in recognizing emergency medical conditions, undertaking necessary emergency care procedures, preventing complications and treating serious and vitally endangered patients in adult and pediatric population. Ability to rationally implement therapeutic and diagnostic modalities in patients.

Course description:

Theoretical classes:

1. Cardiology. Acute cardiac arrest and cardiopulmonary resuscitation. Sudden cardiac death. Acute pulmonary edema. Acute coronary syndrome. Malignant heart rhythm disorders. Acute heart decompensation. Hypertensive crisis. 2. Pulmology. Acute exacerbation of chronic respiratory insufficiency (HRI). Hemoptysis. Pulmonary thromboembolism. ARDS. 3. Endocrinology/Hematology. Acute complications of diabetes (ketoacidosis, non-ketogenic hyperosmolar coma, hypoglycemia). Addison's crisis. Pheochromocytoma. Acute hemorrhagic syndrome. Transfusion of blood and blood derivatives. 4. Nephrology/Gastroenterology. Acute renal failure. Differential diagnosis of hematuria. Urgent conditions in disorders of electrolytes, fluids and acid-base balance. Differential diagnosis of abdominal pain. Acute liver failure syndrome. Hepatorenal syndrome. 5. Pediatric. Pediatric cardiopulmonary resuscitation. Acute rhythm disorder in children. Acute poisoning in children. Acute respiratory failure in children. Acute gastroenterocolitis in children. Acute exacerbation of asthma in children. Hemorrhagic syndrome in children. Acute neurological disorder in children. 6. Infectious Diseases. Bacterial infections. Sepsis. Gastrointestinal infections. Infections of the central nervous system. Infections with exotoxin-producing bacteria. Snake bite and insect sting. 7. Neurology. Coma. Acute stroke. Epileptic status. 8. Surgery. Cardiopulmonary resuscitation. Hypovolemic shock. Water and electrolyte balance. Bleeding from the gastrointestinal tract. Acute abdomen. Management of multisystem injuries. Abdominal and pelvic injuries. Surgical care of the wound. Thermal injuries and burns. Craniocerebral injuries. Chest injuries. Injuries of the genitourinary tract. Renourethral colic. Extremity injuries. Urgent injuries of blood vessels. Acute occlusions of large arteries. 9. Psychiatry. The most common emergency conditions in psychiatry. States of psychomotor excitement, fugues and agitated states in intellectually deficient persons. Emergency conditions in affective disorders Emergency conditions in schizophrenia. Stupor as an emergency condition in psychiatry.

Practical classes:

Getting to know the basic principles of cardiopulmonary resuscitation, along with recognition, diagnostic procedures and treatment of emergency conditions in cardiology and pulmonology; To adopt the principles of use and dosage of antiplatelet, anticoagulant, fibrinolytic therapy, as well as other modalities of treatment of urgent cardiac conditions. Indications for non-invasive and invasive mechanical ventilation;The most important symptoms and signs of ABI, diagnostic algorithm, analysis of complications, monitoring and treatment, indications for acute hemodialysis in patients; Differential diagnosis of acute abdominal pain, clinical manifestations and therapeutic approach; Acquaintance of students with criteria for acute complications of diabetes, treatment of other endocrinological diseases, as well as treatment of emergency conditions in endocrinology; Familiarizing students with the causes of the most common emergency conditions in children and the specifics of cardiopulmonary resuscitation; Introducing the student to the pathogenetic mechanism of sepsis, septic shock and the principles of empiric antibiotic therapy, invasive and non-invasive intestinal infections and their prevention; Treatment of patients with anaphylactic shock; Examine the patient's state of consciousness; Application of scales for assessment of coma depth, neurological examination; Patient review, diagnostic procedures and therapy of ischemic stroke and patients with intracerebral hemorrhage, serial epileptic seizures; The student recognizes basic acid-base balance disorders; Mastering the skills of airway control, artificial respiration and circulatory support; Examination of a polytraumatized patient with a disturbed state of consciousness. Diagnostics of craniocerebral injuries; Evaluation of the integrity of the skeleton, signs of fractures; Interpretation of radiographs in limb injuries; Immobilization, hemostasis, performance of Homans - this test;

Familiarize yourself with the most common emergency conditions in psychiatry, as well as the specifics of admitting these patients to hospital conditions (voluntary consent, forced hospitalization, precautionary measures); The student should recognize and learn the clinical picture, diagnostics and therapeutic modules of emergency conditions within the framework of addiction;

Other classes

Independent analysis of diagnostic and therapeutic principles by student's insight into medical records of patients

Literature

- Loscalzo J, Fauci AS, Kasper DL, Hauser SL, Longo DL, Jameson JL. Harrison's Principles of Internal Medicine. 21st edition. New York: McGraw Hill; 2022.
- ERC (European Resuscitation Council) Adult advanced life support; 2021.
- ERC (European Resuscitation Council) Pediatric Life support; 2021.
- Shaffner D. Nichols D. Rogers Textbook of Pediatric Intensive Care, 5th ed: Wolters Kluwer; 2015.

Number of active teaching classes: 120	**Lectures:** 45	**Practice:**75 **Other Classes:** 60

Teaching methods

Lectures, Practice and Work in small groups

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student's activity during lectures		written exam	70
practical classes	30	practical exam	
colloquiums		oral exam	
seminars			

Study program: Integrated academic studies of medicine

Course unit: **GERIATRICS**

Teachers: Zdravkovic Natasa, Lazarevic Tatjana, Azanjac-Arsic Ana, Boskovic-Matic Tatjana, Djonovic Nela, Davidovic Goran, Petrovic Marina, Petrovic Dejan, Vasiljevic Dragan, Vucic Rada

Course status: Mandatory

ECTS: 2

Prerequisite:

For attending classes: enrolled in XII semester.

For taking exam: passed course unit Internal medicine.

Course unit objective

Students are taught how to recognize, treat and approach elderly patients, which brings with it numerous specificities. Through classical training in taking anamnesis, clinical examination of patients, students are trained in the timely recognition of acute and chronic infectious diseases from the perspective of a general practitioner, as well as chronic non-infectious diseases, which are characteristic of this population

Learning outcomes of course unit:

While attending classes, students acquire the necessary knowledge in the field of pathogenesis, clinical picture and therapy of the most common diseases and conditions that occur in the geriatric population, emphasizing all the specificities of this age group in relation to the working population. Special attention is paid to the importance of preventive medical measures and procedures, as well as screening measures that must be implemented. Part of the teaching is dedicated to home care and treatment of the elderly who need long-term or palliative care.

Course unit contents:

Theoretical classes

Biology of aging ; Metabolic and endocrine diseases of the elderly ; Diseases of the heart and blood vessels of the elderly ; Lung diseases of the elderly ; Oncology of the elderly; Hematology of the elderly and nephrology of the elderly ; Gastroenterology of the elderly; Neurological diseases of the elderly; Psychiatric diseases of the elderly; Intensive care of the elderly; Urological diseases of the elderly; Traumaa in the elderly; Rehabilitation and physical activity of the elderly; Health care for the elderly

Practical classes

Practical teaching consists of teaching students with the specifics of taking geriatric history, physical examination of the elderly, the specifics of therapy as well as caring for the elderly in inpatient institutions.

Other classes

Independent analysis of diagnostic and therapeutic principles by student's insight into medical records of patients

Literature

- Walter LC, Chang A, Chen P, Harper G, Rivera J, Conant R, Lo D, Yukawa M. Current Diagnosis & Treatment Geriatrics, 3e. New York: McGraw Hill; 2020

Number of active teaching hours: 30	**Lecture:** 15	**Practice:** 15 **Other classes**: 30

Teaching methods

Lectures, Discussion, Practical work

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student's activity during lectures		written exam	70
practical classes	30	practical exam	
colloquiums		oral exam	
seminars			

Study program: Integrated academic studies of medicine

Course unit: **FORENSIC MEDICINE**

Teachers: Todorovic Milos, Slovic Zivana

Status of course unit: Mandatory

ECTS: 5

Prerequisites: For attending classes: enrolled in XII semester.
For taking exam: passed course unit Surgery, Pediatrics, Legal aspects in healthcare

Course unit objective: Acquiring basic knowledge of forensic medicine as a science that serves to clarify legal problems in the area of health and illness, life and death of people.

Learning outcomes of course unit:
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. 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 unit contents

Theoretical classes

Brief history of forensic medicine; Basic tasks of forensic medicine; Tanatology; Dying and death, terms and definitions; Concept of brain death; Medical legal aspects of transplantation; Postmortem changes; Time of death; Deaths due to natural causes; Medico-legal aspects of natural death; Diseases and injuries; Classification of injuries; Reactions of the organism to injury; Vital, agonal and post mortal injuries; Mechanical injuries – classification and characteristics; Common features of wounds and injuries; Asphyxia; Craniocerebral injuries – classification and biomechanics; General and special toxicology; Definitions and classification of poisons; Drug addiction; Opioids, psycho stimulants, hallucinogens; Ethyl alcohol – forensic aspects; Physical injuries; Accident, suicide, homicide- identification; Traffic injuries; Legal status of medical practice; Forensic expert, legal provisions and basics of medico legal expertise; Forensic qualification of injuries; Legal provisions and medical criteria; Examination of the injured and defendants.

Practical classes

Description of post-mortem changes and post-mortem decomposition; External body examination of injured and deceased; Autopsy and exhumation; Death and signs of death; Brain death; Evidence and description of mechanical injuries; Asphyxia; Special autopsy of the neck organs; Analysis of head, injuries; Chemical injuries; Special autopsy of poisoned; Drugs and drug addiction; Forensic aspects of alcohol; Physical injuries; Medico legal expertise (findings, discussion and conclusion) in the cases of violent deaths; Child abuse; Forensic anthropology and identification; Special autopsy of those killed in traffic accidents; Special autopsy on closed pneumothorax; Medico legal significance of medical documentation; Medico legal expertise (findings, discussion and conclusion) of court files; Elements of analysis and synthesis; Relevant findings in reports, forensic issues and reports.

Literature

- Levine B. Kerrigan S.Principles of Forensic Toxicology 5th. Berlin: Springer; 2020.
- Wyatt JP, Squires T, Norfolk G, Payne-James J. Oxford Handbook of Forensic Medicine. Oxford University Press; 2011.

Number of active teaching hours: 75	**Lecture:** 45	**Practice:** 30

Teaching methods
Lectures, Discussion, Work in small groups

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student's activity during lectures	15	written exam	
practical classes		practical exam	20
colloquiums	15	oral exam	50
seminars			

Study program: Integrated academic studies of medicine

Course unit: **BIOLOGICAL TRACES AND FORENSIC GENETICS**

Teachers: Volarevic Vladislav, Ljujic Biljana, Todorovic Danijela, Todorovic Milos, Babic Goran

Course status: Elective

ECTS: 3

Prerequisites: For attending classes: enrolled in XII semester.
For taking exam: passed course unit Legal aspects in healthcare

Course unit objective:
The aim of this course is to provide students with knowledge about the type, significance and evidential strength of biological traces, as well as about the basic principles and methods of molecular biology for their analysis.

Learning outcomes of course unit:
Students will learn to adequately collect and analyze biological traces as evidence used in healthcare and justice; they will be trained to apply various techniques in the analysis of DNA molecules and interpret the results with the aim of connecting traces and persons.

Course unit contents

Theoretical classes

Crime scene; Classification of traces; Homicide investigation; Rape investigation; Biological traces; Parts of the human body; Hairs and structure of hair; Nails; Blood and bloodstains; Forensic hematology; Body fluids; Expertise in biological traces; Extraction and storage of biological traces; History of forensic genetics; Structure and function of nucleic acids; Coding and non-coding sequences in the human nuclear genome; The human mitochondrial genome; Genetic markers (conventional and molecular-biological) of importance for forensic genetics; Genetic markers on sex chromosomes; Genetic markers on mDNA; Isolation and quantification of DNA molecules from various biological samples; Methods for DNA analysis isolated from biological samples (RFLP, electrophoresis, PCR method and modifications, DNA sequencing); Advantages and disadvantages of biotrace analysis, legal regulations and ethical issues.

Practical classes

Work in the autopsy room; Microscopy; Solving the crimes problems through examples from practice; Complementarity of nucleic acids; Organization of the laboratory for forensic genetics; Methods for DNA isolation; Determination of yield and purity of isolated DNA; Spectrophotometry; Electrophoresis; PCR in the forensic analysis of DNA molecules; Interpretation of the DNA profile.

Literature

- Levine B. Kerrigan S.Principles of Forensic Toxicology 5th. Berlin: Springer; 2020
- Wyatt JP, Squires T, Norfolk G, Payne-James J. Oxford Handbook of Forensic Medicine. Oxford University Press; 2011

Number of active teaching hours: 45	**Lectures:** 30	**Practice:** 15

Teaching methods
Lectures, Discussion, Work in small groups, Practical classes

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points**	**Final exam**	**No. of points**
student's activity during lectures	30	written exam	70
practical classes		practical exam	
colloquiums		oral exam	
seminars			

Study program: Integrated academic studies of medicine

Course unit: **DIETARY PRODUCTS AND FOOD SUPPLEMENTATION**

Teachers: Djonovic Nela, Jakovljevic Vladimir, Zivkovic Vladimir, Cubrilo Dejan, Vasiljevic Dragan

Course status: Elective

ECTS: 3

Prerequisites:

For attending classes: enrolled in XII semester.

For taking exam: passed course unit Hygiene and ecology.

Course unit objective:

Ability of students to understand the application of dietary products for the purpose of diet prophylaxis and diet therapy, as well as the basics of nutritional supplementation.

Course outcome:

After completing the course in Dietary products and nutritional supplementation, the student is expected to acquire basic knowledge**:**Knowledge of the general principles of nutritional supplementation, the basis of the application of dietary products, health and nutritional statements, current legal regulations and recommendations for the use of dietary products for the purpose of diet prophylaxis and diet therapy.

At the end of the course in Dietary products and nutritional supplementation, the student is expected to master the following skills: The skill of solving practical problems in the field of application of dietary products; The skill of prescribing and recommending dietary products to different categories of healthy, adult people for the purpose of diet prophylaxis and diet therapy; The ability to interpret recommendations for the use of dietary products; Skill in interpreting analysis of dietary products; Proper use of dietary products as part of preserving and improving people's health.

Course unit contents:

Theoretical classes

Diet prophylaxis: nutrition in the prevention of disease, food, dietary products, proper nutrition, nutritional supplementation, nutritional testing, health safety of food and dietary products, planning nutritional supplementation for primary disease prevention

Diet therapy: nutrition as a therapy, application of dietary supplements and other dietary products in the various pathological conditions, planning of diet and application of dietary preparations and supplements for the purpose of secondary and tertiary prevention

Practical classes

Diet prophylaxis: health safety of dietary products, legal regulations, interpretations of recommendations for the use of dietary products, interpretations of analysis of dietary products

Diet therapy: planning nutrition and supplementation for various diseases (cardiovascular diseases, malignant diseases, metabolic disorders, endocrine diseases, diseases of the gastrointestinal tract, infectious diseases, etc.), preparation of menus and diets with recommendations for the use of dietary products

Literature:

- Gandy W. J. Oxford handbook of nutrition and dietetics.Oxford: Oxford University Press; 2020
- Lomer A. Advanced Nutrition and Dietetics John Wiley & Sons; 2014

Number of active teaching hours: 45	**Lecture:** 30	**Practice:** 15

Teaching methods

Lectures, Discussion, Seminars and Work in small groups

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student's activity during lectures		written exam	40
practical classes	30	practical exam	
colloquiums		oral exam	
seminars	30		

Study program: Integrated academic studies of medicine

Course unit: **INTERNAL MEDICINE DURING PREGNANCY AND THE POSTPARTUM PERIOD**

Teachers: Djurdjevic Predrag, Petrovic Marina, Vuletic Biljana, Stolic Radojica, Miloradovic Vladimir, Zivanovic Aleksandar, Djuric Janko, Knezevic-Rangelov Sanja, Savic Dragana, Lazarevic Tatjana

Course status: Elective

ECTS: 3

Prerequisites:

For attending classes: enrolled in XII semester.

For taking exam: passed course unit Internal medicine.

Course unit objective:

Teaching medical students to gain specific skills and competencies for recognition, diagnosis, and treatment of pathological conditions, including emergency conditions in Internal medicine during pregnancy and the postpartum period, and rational pharmacotherapy in pregnant and lactating women as patients.

Learning outcomes of course unit:

Training of students to timely recognize diseases in the field of Internal medicine during pregnancy and the postpartum period, including life-threatening conditions, plan diagnostic procedures and apply adequate treatment measures.

Course unit contents:

Theoretical classes

Physiology Of Pregnancy: Physiological changes in maternal organ systems during pregnancy and the postpartum period; Pharmacotherapy in Pregnancy: Drug safety during pregnancy and breastfeeding; *Cardiology:* Coronary artery disease in pregnancy; Stable and unstable angina pectoris during pregnancy and the postpartum period; Myocardial infarction during pregnancy; Arterial hypertension and hypertensive crisis in pregnancy; Preeclampsia and eclampsia; Cardiomyopathies;Postpartum cardiomyopathy; Acute heart failure during and after pregnancy; Venous thromboembolic disease during pregnancy and puerperium; Myocarditis, endocarditis and pericarditis in pregnancy; Congenital and acquired heart disease in pregnancy; Pulmonary hypertension in pregnancy; Rheumatic fever in pregnancy;Aortic diseases in pregnancy; *Pulmology:* Bronchial asthma in pregnancy; Asthma exacerbation in pregnancy; COPD in pregnancy; Acute exacerbation of COPD in pregnancy; Pneumonia during pregnancy and breastfeeding; ARDS in pregnancy; Pulmonary embolism in pregnancy; Hemoptysis in pregnancy; Tuberculosis in pregnancy; Interstitial lung diseases during pregnancy; *Gastroenterology:* Esophageal disorders during pregnancy; Hyperemesis gravidarum; Gastritis and gastropathies in pregnancy; Peptic ulcer disease in pregnancy; Helicobacter pylori infection during pregnancy and breastfeeding; Malabsorption syndrome in pregnancy; Inflammatory bowel diseases in pregnancy; Diverticulosis in pregnancy; Acute and chronic pancreatitis; Cholecystitis and cholangitis in pregnancy; Liver diseases in pregnancy; *Nephrology:* Structural and functional renal changes in normal pregnancy; Acute renal failure in pregnancy; HELLP syndrome; IgA nephropathy in pregnancy; Focal segmental glomerulosclerosis in pregnancy; Membranous nephropathy and pregnancy; Rapidly progressive glomerulonephritis and pregnancy; Lupus nephritis and pregnancy; Diabetic kidney disease and pregnancy; Autosomal dominant polycystic kidney disease and pregnancy; Calculosis and kidney infection in pregnancy; Chronic kidney disease and pregnancy;Pregnancy after kidney transplantation; *Hematology:* Anemia and thrombocytopenia during pregnancy;Thrombophilias and coagulopathies during pregnancy and the postpartum period; Thrombotic thrombocytopenic purpura in pregnancy; Hemolytic uremic syndrome in pregnancy; Acute hemorrhagic syndrome in pregnancy; Blood transfusion during pregnancy; Hematologic malignancies and pregnancy; *Endocrinology:* Pituitary gland disorders during pregnancy. Hypothyroidism and hyperthyroidism during pregnancy and breastfeeding. Thyroiditis during pregnancy. Parathyroid disease during pregnancy. Adrenal glands disorders during pregnancy. Diabetes mellitus and complications of diabetes in pregnancy. Endocrine glands neoplasms during pregnancy. *Rheumatology:* Rheumatoid arthritis during pregnancy and the postpartum period; Spondyloarthritis in pregnancy; Ankylosing spondylitis in pregnancy and the postpartum period; Psoriatic arthritis in pregnancy; Enteropathic arthritis in pregnancy; Systemic lupus erythematosus in pregnancy and the postpartum period; Sjogren's syndrome in pregnancy; Dermatomyositis in pregnancy; Systemic sclerosis in pregnancy; Mixed connective tissue disease in pregnancy; Systemic vasculitis in pregnancy; Still's disease in pregnancy; Fibromyalgia in pregnancy; Osteoporosis in pregnancy; Osteomalacia in pregnancy; Gout in pregnancy; *Allergology:* Systemic anaphylaxis, urticaria and angioedema during pregnancy and breastfeeding; Allergic rhinitis in pregnancy; Food and drug allergies during pregnancy and breastfeeding; Allergic reactions to anesthetics in pregnancy; Henoch Schönlein purpura and pregnancy.

Practical classes

Diagnostic evaluation and therapeutic approach to pathological conditions in internal medicine during pregnancy and the postpartum period - clinical case reports.

Literature:

- Loscalzo J, Fauci AS, Kasper DL, Hauser SL, Longo DL, Jameson JL. Harrison's Principles of Internal Medicine. 21st edition. New York: McGraw Hill; 2022.

Number of active teaching hours: 45	**Lectures:** 30	**Practice:** 15

Teaching methods Lectures, Discussion and practical work			
Examination methods (maximum 100 points)			
Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student's activity during lectures		written exam	
practical classes	20	practical exam	50
colloquiums	30	oral exam	
seminars			

Study program: Integrated academic studies of medicine

Course unit: **PAIN MEDICINE**

Teachers: Jevdjic Jasna, Folic Marko, Djordjevic Natasa, Miletic-Drakulic Svetlana, Vulovic Tatjana, Ruzic-Zecevic Dejana, Borovcanin Milica, Zornic Nenad

Course status: Elective

ECTS: 3

Prerequisites:

For attending classes: enrolled in XII semester.

For taking exam: passed course unit Surgery.

Course unit objective:

Mastering the skills of taking an anamnesis and physical examination of a patient in pain, keeping a pain diary, using pain assessment scales and measuring pain intensity, as well as the skills of treating acute postoperative and post-traumatic pain. As well as mastering the basics of pain pharmacotherapy, creating an individualized treatment plan, critically evaluating the effectiveness and side effects of drugs used in pain therapy, based on examples from clinical practice. Acquaintance of students with the modalities of physical medicine applied in the treatment of pain.

Learning outcomes of course unit:

The student should become familiar with the complex and multidimensional phenomenon of pain, the right to eliminate pain as a basic human right, and certain political and legal barriers to the use of certain analgesics. ; acquires the skills of identification and assessment of pain intensity; apply adequate medication for pain treatment depending on age and comorbidities.

Course unit contents

Theoretical classes

Physiology and classification of pain; Clinical evaluation of pain; Scales for assessing pain intensity; Mental, psychological and social factors in the development and maintenance of pain; Post-traumatic pain; Postoperative pain; Opioids in pain therapy; Non-steroidal anti-inflammatory drugs, paracetamol, COX inhibitors in pain therapy; Co-analgesics (antidepressants, antiepileptics), pharmacotherapy of neuropathic pain; Physical therapy in the treatment of pain; Invasive methods in the treatment of pain; Cancer pain; Neuropathic pain (diabetic polyneuropathy, postherpetic neuralgia); Headaches; Chronic non-specific back pain; Complex regional pain syndromes

Practical classes

Determining the type of pain based on the length of its duration and its characteristics; Use of questionnaires, pain diaries, and analog scales to supplement history and physical examination; Mental, psychological and social factors in the development and maintenance of pain - practical aspect; Measurement of pain intensity with numerical scales of first-line analgesia: continuous analgesia at regular fixed intervals, or alternatively patient-controlled analgesia; Opioid dose titration; Non-steroidal anti-inflammatory drugs, paracetamol, COX-inhibitors in pain therapy - case report Co-analgesics (antidepressants, antiepileptics) - practical aspect; Performing different types of active exercises in pain; Techniques of neurolysis; Application of the Pain Relief Ladder in the treatment of cancer pain; Recognition of typical localization and distribution of pain in polyneuropathy; Recognizing the symptoms of certain types of headache; Chronic non-specific back pain - case report; Physical therapy: passive and active exercises, cryotherapy, massage

Literature

- Hoppenfeld JD. Fundamentals of Pain Medicine: How to Diagnose and Treat your Patients. Philadelphia: Lippincott Williams & Wilkins; 2014.

Number of active teaching hours: 45	**Lectures:** 30	**Practice:** 15

Teaching methods

Lectures, Discussion, Work in small groups,

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points**	**Final exam**	**No. of points**
student's activity during lectures		written exam	70
practical classes	30	practical exam	
colloquiums		oral exam	
seminars			

Study program: Integrated academic studies of medicine

Course unit: **CONTEMPORARY PRINCIPLES OF NEURO-OPHTHALMOLOGICAL DISEASES**

Teachers: Petrovic-Janicijevic Mirjana, Jovanovic Svetlana, Sreckovic Suncica, Petrovic Nenad, Sarenac Tatjana, Todorovic Dusan

Course status: Elective

ECTS: 3

Prerequisites:

For attending classes: enrolled in XII semester.

For taking exam: passed course unit Ophtalmology.

Course unit objective

The goal of teaching in this subject is the integration of knowledge from the neuro-ophthalmic clinical entity within ophthalmology in order, to gain knowledge about the most common neuro-ophthalmic diseases today. Acquiring theoretical and practical knowledge and skills necessary for clinical work within ophthalmoneurological conditions and diseases and familiarizing the student with the possibilities of modern approaches of diagnosis, differential diagnosis, therapy and prevention of neuro-ophthalmic diseases.

Learning outcomes of course unit:

Acquaintance of students with modern clinical analyzes and laboratory techniques of neuro-ophthalmological diagnostics. The student should gain insight into the possibilities of diagnostic, therapeutic, preventive and research methods in this area.

Course unit contents:

Theoretical classes

Knowledge and application of basic principles in controlled data from anamnesis, then clinical and differential diagnosis, treatment and prevention of the following neuro-ophthalmological diseases - the conditions; Modern diagnostics includes analyzes of optical coherence tomography, field of view, microperimetry, fluorescein angiography, scanner-CT, multifocal ERG, VEP and others; Acquaintance with modern therapeutic modalities of neuro-ophthalmological diseases:Optic neuritis and neuroprotection; Neurouveitis and therapy; Glaucoma and neuroprotection; Paralytic strabismus and prevention; Diabetic neuropathy and neuroprotection; Injuries of the optic nerve and optic tract, diagnosis, therapy and prevention.

Practical classes

Knowledge and application of basic principles in controlled data from anamnesis, then clinical and differential diagnosis, treatment and prevention of the following neuro-ophthalmological diseases - the conditions-practical example; Modern diagnostics includes analyzes of optical coherence tomography, field of view, microperimetry, fluorescein angiography, scanner-CT, multifocal ERG, VEP and others- practical example; Acquaintance with modern therapeutic modalities of neuro-ophthalmological diseases:Optic neuritis and neuroprotection - case report; Neurouveitis and therapy; Glaucoma and neuroprotection - case report; Paralytic strabismus and prevention-case report; Diabetic neuropathy and neuroprotection – case report; Injuries of the optic nerve and optic tract, diagnosis, therapy and prevention - practically solving given clinical problem.

Literature

- Miller R, Subramanian P, Patel R. Walsh & Hoyt's Clinical Neuro-Ophthalmology: The Essentials: LWW; 2020

Number of active teaching hours: 45	**Lecture:** 30	**Practice:** 15

Teaching methods: Lectures, Discussion, Work in small groups,

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student's activity during lectures	12	written exam	
practical classes	6	practical exam	
colloquiums	30	oral exam	52
seminars			

Study program: Integrated academic studies of medicine

Course unit: **INTENSIVE CARE AND THERAPY IN PEDIATRICS**

Teachers: Vuletic Biljana, Markovic Slavica, Simovic Aleksandra, Stojkovic-Andjelkovic Andjelka, Knezevic-Rangelov Sanja, Savic Dragana, Folic Nevena, Vujic Ana, Igrutinovic Zoran

Course status: Elective

ECTS: 3

Prerequisites:

For attending classes: enrolled in XII semester.

For taking exam: passed course unit Pediatrics.

Course unit objective:

The goal of the course is to provide students with information about the most common life-threatening conditions in the pediatric population, so that they, as young doctors, are ready to timely diagnose and begin treatment.

Learning outcomes of course unit:

Acquiring knowledge in diagnostics and therapy of life-threatening pediatric patients.

Course unit contents:

Theoretical classes

Causes of life endangerment in the pediatric age ;Ethics in pediatric intensive care;Pediatric transport of a vitally endangered childPediatric vascular access; Principles of invasive and non-invasive monitoring of vital functions ;Imaging methods in emergency situations.; Emergency conditions of the respiratory system (croup syndrome; respiratory insufficiency; asthmatic status; foreign bodies in the respiratory tract; mechanical ventilation and air leakage syndrome - ;pneumothorax; pneumomediastinum; pneumoperitoneum; acute respiratory distress syndrome in children);Emergency conditions of the cardiovascular system (disorders of the heart rhythm and pharmacology of the cardiovascular system; congenital heart defects, shock);Urgent states of the central nervous system and muscle diseases (neurophysiological assessment and monitoring; cerebrovascular accidents; epileptic status; acute infections of the CNS – meningitis, encephalitis, hypoxic-ischemic encephalopathy; SIDS (Sudden Infant Death Syndrome), SADS (Sudden Arrhythmia Death Syndromes) ; Urgent states of the renal system (electrolyte and acid-base balance disorders in a critically ill pediatric patient; acute kidney damage and methods of renal function replacement in the pediatric intensive care unit; hypertension in the pediatric intensive care unit);Urgent conditions in endocrinology and metabolic diseases (nutrition of a critically ill child; congenital metabolic diseases; significant endocrinological diseases in a critically ill childpediatric patient - thyrotoxicosis, hypoglycemia, congenital adrenal hyperplasia; diabeticketoacidosis).;Urgent conditions in hematology (thromboembolism in critically ill pediatric patients, acute anemia, transfusions of blood and blood derivatives, hematological and oncological problems in intensive care units - febrile neutropenia, DIC); Urgent conditions in gastroenterology (acute liver failure and Rey's syndrome, acute abdomen - volvulus, peritonitis, necrotizing enterocolitis, foreign bodies in the digestive tract); Intensive care and therapy in premature newborns; Sepsis (neonatus; older child); Accidents and trauma (poisoning; bites and stings; drowning avoided; heat damage; frostbite; burns and inhalation damage; abused child, intracranial hemorrhage); Administration of drugs in a critically ill patient; analgesia and anesthesia (neuromuscular blockers; sedation and analgesia); Febrile status in children, causes, diagnosis and therapy; Pediatric and neonatal cardiopulmonary resuscitation.

Practical classes

Anamnesis in emergency situations in pediatrics; Assessment of the state of consciousness; Endotracheal and orotracheal intubation; Basic and advanced cardiopulmonary resuscitation; Quick recognition of basic heart rhythm disorders; Treatment of convulsive attack and coma in children; Treatment of severe forms of dehydration, correction of electrolyte and acid-base disorders; Treatment of acute endocrinological and hematological diseases; Acute treatment of respiratory insufficiency in children; Procedure in a patient with a fatal outcome, autopsy (clinical, forensic); Management of medical documentation.

Literature

- Shaffner D. Nichols D. Rogers Textbook of Pediatric Intensive Care, 5th ed: Wolters Kluwer; 2015.
- Marcdante K, Kliegman R, Schuh A. Nelson Essentials Of Pediatrics, International Edition, Wisconsin:Elsevier Science;2022.
- Pediatric Clinical Practice Guidelines & Policies (22nd ed.) by American Academy of Pediatrics; 2020.

Number of active classes: 45	**Lectures:** 30	**Practice:** 15

Teaching methods:

Lectures,Work in small group.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student's activity during lectures	15	written exam	70
practical classes	15	practical exam	
colloquiums		oral exam	
seminars			

Study program: Integrated academic studies of medicine

Course unit: **CLINICAL PRACTICE**

Course status: Mandatory

ECTS: 4

Prerequisites:

For attending classes: enrolled in XII semester.

For taking exam: –

Course unit objective

The goal of the Clinical practice course is to enable students to apply the knowledge they have acquired during their studies to practical examples (diagnosis of diseases through the selection of necessary laboratory and diagnostic procedures, proper therapeutic approach, professional attitude towards patients and colleagues).

Learning outcomes of course unit

After completing the Clinical Practice, the student will be able to: perform health care activities independently as a doctor in primary health care; properly take anamnesis and perform a clinical examination of the patient; recognize and timely diagnose the disease; apply appropriate diagnostic procedures in order to establish a differential diagnosis; correctly interpret the results of laboratory analyzes and clinical tests; determine therapy or to propose a specific therapeutic procedure to the patient; become familiar with the principles of triage in emergency situations; take care of a patient with an urgent condition; assess the mental status of the patient and respond appropriately; participate in teamwork; respect the principle of professional secrecy and the code of healthcare workers

Course unit contents

Other classes

Work in the internistic and surgical department of the Emergency Center; work in the ambulance of Clinic for Pediatrics and Gynecology and Obstetrics; work in the specialist ambulances of Clinics for Internal Medicine, Surgery, Pediatrics, Gynecology and Obstetrics; work in the departments of Clinics for Internal Medicine, Surgery, Pediatrics, Gynecology and Obstetrics; work in a maternity hospital;

taking anamnesis; performing a physical examination of the patient; diagnostic and therapeutic algorithms in treatment; taking care of emergency situations

Literature:

- Literature recommended for the course unit of Internal Medicine, Surgery, Pediatrics and Gynecology.

Number of active teaching hours:	**Lectures:**	**Practice:** **Other classes:** 330

Teaching methods

Practical classes in Clinical practice are performed by students under the supervision of doctors specializing in certain fields of medicine. Practical classes include:

- practical work with patients
- independent performance of clinical skills
- demonstration of clinical skills

The teacher in charge records regular attendance and student activities.

If the student fulfills all the requirements, he does not receive a grade, instead he get a certain number of ECTS points.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student's activity during lectures		written exam	
practical classes		practical exam	
colloquiums		oral exam	
seminars			

Study program: Integrated academic studies of medicine

Course unit: **FINAL WORK - RESEARCH**

Status of course unit: Mandatory

ECTS: 2

Prerequisites:

For attending classes: enrolled in XII semester.

For taking exam: –

Course unit objective: Teaching students to independently design research, conduct research, acquire the ability to find adequate literary data by searching foreign and domestic databases, acquire the skill of applying adequate methodology of research work, application of previous knowledge in the field of statistical processing of results

Learning outcomes of course unit:

Preparation and tutoring of students for independent writing and defense of the final work.

Course unit contents

The student's final work is developing under the supervision of the mentor: defining the topic of the final work; creation of a detailed research plan; literature search; conducting research on the choice of an adequate statistical method; interpretation of obtained results and discussion - training for independent creation and defense of work.

The final thesis application procedure itself is defined by the Rulebook on the preparation of final theses for basic, basic academic and integrated studies at the Faculty of Medical Sciences in Kragujevac, and detailed instructions are published on the Faculty's website.

Literature

- Literature in the field of students research
- Relevant literature recommended by the mentor

Number of active teaching hours:	**Lectures:**	**Practice:** **SRW:** 300

Teaching methods:

Consultative work with a mentor, collection and review of literature, conducting research, synthesizing theoretical knowledge and research results in written form, presentation.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
research work	40	written exam	
drafting of a written project	30	presentation and defense of the draft of the written project	30
colloquiums			
seminars			

Study program: Integrated academic studies of medicine

Course unit: **FINAL WORK – DESIGN AND DEFENCE**

Status of course unit: Mandatory

ECTS: 3

Prerequisites:

For attending classes: enrolled in XII semester.

For taking exam: –

Course unit objective:

Teaching student for practical application of knowledge acquired during studies; usage of the methodology of research work on a specific problem; utilization of knowledge in the field of statistical data processing and appropriate tabular and graphic presentation; acquiring the ability to present the results of research work in written form and through oral defense.

Learning outcomes of course unit:

Successful defense of the final thesis and qualification for further scientific research work and independent publication of the results of of their own research - acquisition of skills and knowledge that will he used as an educator in the process of continuous education.

Course unit contents

The creation and defense of the final thesis is the last stage of the final thesis. After consultation with the mentor in which, the topic, design of the research and the necessary literature are defined, and after the appropriate statistical analysis of the obtained results, the student approaches the independent creation and defense of the work. The final paper must be in a form that contains the following elements: introduction, objectives, material and methods, results, discussion, conclusion and references. The technical layout of the work is defined by the Rulebook on preparation of final theses for basic, basic academic and integrated studies at the Faculty of Medical Sciences in Kragujevac. The work must be positively evaluated by two reviewers. After the above, the final, bound version of the final work with the reviewers' reports is submitted to the Student Service and the date of the public oral defense in front of a three-member panel is scheduled. The commission evaluates the graduation thesis with a grade of 5-10, and the received positive grade (6-10) is included in the student's average grade. An undefended thesis is graded 5. Upon completion of the defense, all documentation is submitted to the Student Service in order to issue a certificate of graduation.

Literature

- Literature in the field of students research
- Relevant literature recommended by the mentor

Number of active teaching hours:	**Lecture:**	**Practice:** **Other classes:** 90

Teaching methods:

Consultative work with a mentor

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
student’s activity during lectures		written exam	
practical classes		defence of the final work	30
colloquiums			
creation of the final work	70		