

**COLLEGE OF PROFESSIONAL STUDIES - INTERNATIONAL CENTER OF PROFESSIONAL
STUDIES**
(hereinafter: ICEPS)

Study program:

Undergraduate professional studies

PROFESSIONAL MEDICAL LABORATORY TECHNOLOGIST

~ COURSE BOOK ~

Courses by semesters and years of study program Nursing, undergraduate professional studies

- **Marks for Form of Teaching:** **theor lect** = theoretical lectures; **exer** = theoretical exercises; **other** = other forms of teaching (individual work with students, project work...); **st-res pap** = study-research paper; **prof pract** = professional (clinical) practice (in the School's Teaching Bases)
- **Marks for Mandatory/Elective courses:** **m** = mandatory course; **e** = elective course
- **Marks for Type of Courses:** **ag** = academic-general education; **p** = professional; **pa** = professional-applicative

No	Course Code	Course Name	Sem.	Active Lessons				Prof pract	ECTS	Course m/e	Course Type
				theor lect	theor exer	other forms	st-res pap				
THE FIRST YEAR											
1	lab-01	Anatomy and Physiology	1	30	30	0	0	0	7	m	pa
2	lab-08	Basics of Biochemistry	1	30	30	0	0	0	5	m	pa
3	lab-06	Ethics in Health Care	1	30	30	0	0	0	5	m	ag
4	lab-05	Basics of Information and Communication Technologies	1	30	30	0	0	0	5	m	p
5	lab-izb-01	Elective Course 1	1	30	30	0	0	0	5	e	
5a	lab-izb-01-g	Business Communication Skills	1	30	30	0	0	0	5	e	pa
5b	lab-izb-01-a	Medical and Pharmaceutical Waste	1	30	30	0	0	0	5	e	ag
5v	lab-izb-01-b	Specialized English for Medicine 1	1	30	30	0	0	0	5	e	ag
5g	lab-izb-01-v	Specialized German for Medicine 1	1	30	30	0	0	0	5	e	ag
6	lab-02	Histology	2	30	30	0	0	0	6	m	pa
7	lab-04	Bacteriology and Parasitology	2	60	60	0	0	0	8	m	pa
8	lab-03	Biological Materials and Laboratory Techniques	2	30	30	0	0	0	5	m	pa
9	lab-07	Professional Practice 1	2	0	0	0	0	300	9	m	pa
10	lab-izb-02	Elective Course 2	2	30	30	0	0	0	5	e	
10a	lab-izb-02-a	Hygiene with the Basics of Microbiology	2	30	30	0	0	330	5	e	p
10b	lab-izb-02-b	Public Health	2	30	30	0	0	0	5	e	ag
10v	lab-izb-02-v	Organization of Health Care Systems	2	30	30	0	0	0	5	e	ag
10g	lab-izb-02-d	Health Care Education Methodology and Health Promotion	2	30	30	0	0	0	5	e	p
Total number of classes and ECTS per year:				300	300	0	300		60		
THE SECOND YEAR											
11	lab-11	Pathophysiology	3	45	30	0	0	0	6	m	pa
12	lab-13	Medical Genetics and Molecular Biology	3	45	45	0	0	0	7	m	pa
13	lab-09	Basics of Immunology	3	30	45	0	0	0	7	m	pa
14	lab-15	First Aid	3	30	30	0	0	0	5	m	pa
15	lab-izb-03	Elective Course 3	3	30	30	0	0	0	5	e	
15a	lab-izb-03-b	Specialized English for Medicine 2	3	30	30	0	0	0	5	e	ag
15b	lab-izb-03-v	Specialized German for Medicine 2	3	30	30	0	0	0	5	e	ag
15v	lab-izb-03-d	Marketing of Health Care Institutions	3	30	30	0	0	0	5	e	pa
15g	lab-izb-03-g	Nutritionism	3	30	30	0	0	0	5	e	ag
16	lab-10	Pathology	4	45	45	0	0	0	10	m	p
17	lab-12	Medical Biochemistry 1	4	75	75	0	0	0	10	m	pa
18	lab-14	Professional Practice 2	4	0	0	0	0	300	5	m	p
19	lab-izb-04	Elective Course 4	4	30	30	0	0	0	5	e	
19a	lab-izb-04-b	Human Resources Management in Health Care	4	30	30	0	0	0	5	e	pa
19b	lab-izb-04-g	Allergology	4	30	30	0	0	0	5	e	p
19v	lab-izb-04-d	Rare Diseases	4	30	30	0	0	0	5	e	p
19g	lab-izb-04-z	Basics of Nuclear Medicine	4	30	45	0	0	240	5	e	p
19d	lab-izb-04-ž	Psychology in Nursing and Health Care	4	15	30	0	0	0	5	e	p
Total number of classes and ECTS per year:				330	330	0	300		60		

THE THIRD YEAR											
20	lab-22	Medical Biochemistry 2	5	45	45	0	0	0	10	m	pa
21	lab-17	Virusology	5	30	30	0	0	0	4	m	pa
22	lab-16	Hematology	5	45	45	0	0	0	9	m	ag
23	lab-izb-05	Elecitive Course 5	5	30	30	0	0	0	5	e	
23a	lab-izb-05-a	Mental Hygiene	5	30	30	0	0	0	5	e	pa
23b	lab-izb-05-b	Business English	5	30	30	0	0	0	5	e	ag
23B	lab-izb-05-v	Business German	5	30	30	0	0	0	5	e	ag
24	lab-18	Hemostasis	6	60	60	0	0	0	7	m	p
25	lab-19	Business Organization	6	30	30	0	0	0	5	m	p
26	lab-20	Quality Control	6	30	30	0	0	0	5	m	p
27	lab-22	Transfusiology	6	30	30	0	0	0	5	m	p
28	lab-21	Professional Practice 3	6	0	0	0	0	300	5	m	pa
29	lab-izb-06	Elective Course 6	6	30	30	0	0	0	5	e	
29a	lab-izb-06-a	Health Care and Social-Security Legislation	6	30	30	0	0	0	5	e	ag
29b	lab-izb-06-b	Research Methodology	6	30	30	0	0	0	5	e	p
29v	lab-izb-06-d	Laboratory Nuclear Medicine	6	30	30	0	0	180	5	e	pa
29g	lab-izb-06-g	Basics of Integrative Medicine	6	30	30	0	0	0	5	e	p
Total number of classes and ECTS per year:				330	330	300	300	60			

Total number of classes and ECTS per all three years of studies:	2.220	900	180		
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COURSE CONTENT
(in alphabetical order as listed below)

Anatomy and Physiology
Allergology
Bacteriology and Parasitology
Basics of Biochemistry
Basics of Immunology
Basics of Information and Communication Technologies
Basics of Integrative Medicine
Basics of Nuclear Medicine
Biological Materials and Laboratory Techniques
Business Communication Skills
Business English
Business German
Business Organization
Ethics in Health Care
First Aid
Health Care and Social-Security Legislation
Health Care Education Methodology and Health Promotion
Hematology
Hemostasis
Histology
Human Resources Management in Health Care
Hygiene with the Basics of Microbiology
Laboratory Nuclear Medicine
Marketing of Health Care Institutions
Medical and Pharmaceutical Waste
Medical Biochemistry 1
Medical Biochemistry 2
Medical Genetics and Molecular Biology
Mental Hygiene
Nutritionism
Organization of Health Care Systems
Pathology
Pathophysiology
Professional Practice 1
Professional Practice 2
Professional Practice 3
Psychology in Nursing and Health Care
Public Health
Quality Control
Rare Diseases
Research Methodology
Specialized English for Medicine 1
Specialized English for Medicine 2
Specialized German for Medicine 1
Specialized German for Medicine 2
Transfusiology
Virusology

ALLERGOLOGY

Study program: Professional Medical Laboratory Technologist				
Type and level of study: undergraduate professional studies				
Course: Allergology				
Language of instruction: Serbian				
Course status: elective				
Semester: second year, fourth semester				
ECTS: 5				
Requirement: no				
Course objective: The objective of the course is to familiarize students with and their understanding of the basic principles of allergology, their capability to use specialist literature relating to this field and to state their opinion in the field of allergology.				
Course outcome: The outcome of the course is the acquisition of fundamental knowlede in allergology, familiarizaiton with the basics of diagnostics in allergology and capability of students of taking measures in the prevention of allergic reactions or their elimination. The outcome of the course is also familiarization of students with basic pathological cases in the field of allergology and their capability to use specialist literature relating to this field.				
Course content: <i>Lectures</i> Objects, definition and tasks of allergology; respiratory allergy (rhinitis, rhinoconjunctivitis, asthma); drug allergy; poison allergy (wasps, bees); allergic contact dermatitis; food allergy; latex allergy; hives (urticaria); plant allergy; pollen allergy; anaphylaxis; application of allergy elimination techniques; skin testing for allergy; provocation test; desensitization; allergen specific immunotherapy. <i>Exercises</i> Types of allergies – case studies; applications of allergy elimination techniques – case studies; analysis of most frequent allergic reactions in Serbia; first aid measures, nursing in case of allergic reactions; searching e-literature and presentation of certain less known allergic reactions; renowned health-care and scientific institutions in Serbia in the field of allergology.				
Literature: <i>Literature in English:</i> 1. Wesley Burks A., Holgate S. T., O'Hehir R. E., Broide D. H., Bacharier L. B.: Middleton's allergy: principles and practice, Elsevier, Amsterdam, 2020. <i>Literature in Serbian:</i> 2. Ljajević J., Ljajević M., Dimčić Radovanović Z.: Alergologija i klinička imunologija u Srbiji, Evropski centar za mir i razvoj, Beograd, 2005. 3. Ramić Z., Pravica V., Popadić D.: Priručnik za nastavu iz imunologije, Medicinski fakultet, Beograd, 2020. 4. Dadarno P. Dž., Vitni K.: Alergije, Sezam book, Beograd, 2020.				
Number of classes:				
Theoretical lectures	Theoretical exercises	Professional practice	Study research work	Other forms of teaching (individual work with student, projects...)
30	30	0	0	0
Methods of teaching: interactive classes, demonstration, practical exercises, analysis of examples from practice, case studies, discussion, e-learning.				
Grading (maximum 100 points)				
Pre-Exam commitments	Points	Final Exam	Points	
Lecture attendance	3	Exam	30	
Activity	7			
Projects/Seminars	0			
Exercises/professional practice	30			
Colloquiums	30			

ANATOMY AND PHYSIOLOGY

Study program: Professional Medical Laboratory Technologist				
Type and level of study: undergraduate professional studies				
Course: Anatomy and Physiology				
Language of instruction: Serbian				
Course status: mandatory				
Semester: first year, first semester				
ECTS: 7				
Requirement: segment Anatomy is a condition for segment Physiology				
Course objective: Acquisition of knowledge on organ and human body system morphology; familiarity with and understanding normal anatomical and histological structures and notions; acquisition of knowledge in area of cell, tissue, organ system and human organism physiology aimed at understanding the changed, pathological functioning and treatment possibilities; knowledge of and understanding the role of organ control mechanisms, as well as understanding connection between regulatory systems in human organism; provision of theoretical basis required for learning other courses.				
Course outcome: Capability of defining, describing, integrating and reproducing notions relating to normal anatomical and histological structures; upon the completion of the course and passing the exam students will have a command of the corresponding part of medical nomenclature, be able to explain functioning of individual organs and organ systems, will be familiar with and will understand integrated functions of individual organs and the role of organism control mechanisms and they will know and understand the connection of the regulatory system of human organism enabling its adaptation to changes in internal and external environment under everyday conditions.				
Course content: <i>Lectures</i> <i>Anatomy:</i> Basic anatomical terminology; body areas and parts; upper extremities; bones, joints, muscles, blood vessels and nerves; lower extremities; bones, ankles, muscles, blood vessels and nerves; rib cage; walls, division and content of the thoracic cavity; lungs and pulmonary pleurae; heart; mediastinum organs; abdomen; walls, division and content of abdominal cavity; peritoneum, peritoneal cavity (liver, stomach, spleen, pancreas, small intestine and large intestine); retroperitoneal space (kidney, adrenal gland, aorta, inferior vena cava, celiac plexus); pelvis; wall and content; urinary bladder, rectum, male and female reproductive system, pelvic diaphragm; head and neck; head and facial bones; head and neck muscles; head and neck large blood vessels and nerves; central nervous system. <i>Physiology:</i> Human physiology study; transport through cell membrane; intercellular communication; excitation physiology; membrane potential of inactivity; action potential; nervous impulse transmission; skeletal muscle physiology; neuro muscular sinapse; morphophysiological characteristics of skeletal muscles; smooth muscle physiology; characteristics of smooth muscle tissue structure, types, innervation, electrical activity of smooth muscles, specific features of contraction; central nervous system organization, nerve cell; hematoencephalic barrier, cerebrospinal fluid, composition and function; spinal cord; medulla oblongata; midbrain; functional characteristics; reticulo-cortical relations, decerebration rigidity and skeletal muscle tone; cerebellum, structure and function; diencephalon, hypothalamus, vegetative nervous system; basal ganglia; cerebral cortex; senses; definition, importance and general principles of sensory systems; sense of hearing and balance; sense of taste and smell; eyesight; pain perception; introductory notes in pathophysiology. <i>Exercises</i> Demonstration of all teaching units on anatomical dummies. Use of atlas; video presentations. Membrane potentials and synaptic transmission. Patellar reflex and pupillary reflex. Impact of different factors on muscular contraction. Haemoglobin, erythrocyte and leukocyte concentration in human blood. Plasma buffer solution capacity. Coagulation. Discussion and analysis of selected physiological systems.				
Literature: <i>Literature in English:</i> 1. Scanlon V., Sanders T.: Essentials of Anatomy and Physiology, Kindle Edition, London, 2018 2. Netter F. H., Machado C. A. G.: Atlas of Human Anatomy & CD, ILS, Mala velika knjiga, Novi Sad, 2005. 3. Drake L. R., Wayne Vogl A., Mitchell A. W. M., et al.: Gray's Anatomy for Students, textbook, Elsevier, New York, 2014. 4. Arroyo J. P.: Back to Basics in Physiology, textbook, Academic Press, London, 2013. <i>Literature in Serbian:</i> 5. Stojić-Džunja Lj.: Anatomija za studente zdravstvene nege, udžbenik, Medicinski fakultet, Novi Sad, 2017. 6. Veličković D.: Fiziologija za studente farmacije, udžbenik, Medicinski fakultet, Niš, 2013. 7. Despopoulos A., Silbernagl S.: Fiziološki atlas u boji za studente medicine, Medicinski fakultet, Niš, 2007. 8. Mačvanin Đorđe: Anatomija, udžbenik, Fakultet za menadžment u sportu, Alfa univerzitet, Beograd, Matica srpska, Novi Sad, 2005. 9. Milisavljević M. i sar.: Klinička anatomija, udžbenik, Nauka, Beograd, 2004. 10. Guyton A.C., Hall J. E.: Medicinska fiziologija, Savremena administracija, Beograd, 2006. 11. Mujović i sar.: Medicinska fiziologija, udžbenik, Medicinski fakultet, Kosovska Mitrovica (Priština), 2008.				
Number of classes:				
Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with

				student, projects...)
45	15	0	0	0
Methods of teaching: lectures and practical exercises with anatomical and hystological devices, use of atlas, video projections, computer animations and simulations of physiological processes.				
Grading (maximum 100 points)				
Pre-Exam commitments	Points	Final Exam	Points	
Lecture attendance	3	Exam	20 (Anatomy) 20 (Physiology)	
Activity	7			
Projects/Seminars	0			
Exercises/professional practice	10 (Anatomy) 10 (Physiology)			
Colloquiums	15 (Anatomy) 15 (Physiology)			

BACTERIOLOGY AND PARASITOLOGY

Study program: Professional Medical Laboratory Technologist				
Type and level of study: undergraduate professional studies				
Course: Bacteriology and Parasitology				
Language of instruction: Serbian				
Course status: mandatory				
Semester: first year, second semester				
ECTS: 8				
Requirement: no				
Course objective: Familiarization with the cellular organization and basic characteristics of prokaryotic and eukaryotic microorganisms and viruses. Acquisition of fundamental knowledge for working in a microbiological laboratory; introduction to microorganisms that cause diseases, the symptoms and treatments of microbiological illnesses, epidemiology and methods of prevention, mechanisms of acquiring antibiotic resistance, and measures for preventing the emergence of multidrug-resistant strains.				
Course outcome: Upon the completion of the course the student will possess knowledge required for aseptic work in microbiology laboratory, pharmaceutical industry and practice, identification of etiologic agents of infectious diseases, interpretation of in vitro sensitivity of microorganisms to antibiotics and chemotherapeutics tests, application of principles of rational antibiotic therapy, chemoprophylaxis and active immunization, good manufacturer's practice, methods of microbiological testing and application of microorganisms in industry.				
Course content: <i>Lectures</i> General bacteriology; classification of microorganisms, anatomy and physiology of bacterial cell, bacterial metabolism, effects of physical and chemical agents on microorganisms, pathogenicity and virulence factors, antibiotics, antimycotics and chemotherapeutics, physiological functions of microflora, fast diagnostic tests and molecular methods in microbiological diagnosis. Special bacteriology: gram-positive and gram-negative cocci important for human pathology, gram-positive non-spore-forming rods and gram-positive spore-forming bacilli, gram-negative enterobacteriaceae, spiral bacteria, chlamydiae and mycoplasmas. Microbiological control of pharmaceutical preparations: principles of good manufacturer's practice and methods of preventing microorganism contamination, basic principles of recombinant DNA technology, medically important polypeptides and proteins obtained by DNA technology, application of microorganisms in pharmaceutical industry, application of microorganisms and their products in various papers and models aimed drug metabolism testing. <i>Exercises</i> Methods of microscoping and staining, sterilization and disinfection, isolation and identification of bacteria, antibiogram, gram-positive cocci, gram-negative cocci, gram-positive non-spore-forming rods and spore-forming bacilli, enterobacteriaceae, microplasms and chlamydiae, microbiological testing of drugs, laboratory diagnosis of viral, parasitic and fungal infections. Case studies (selection of appropriate method). Part of exercises is carried out in microbiology laboratory.				
Literature: <i>Literature in English:</i> 1. Tortora G. J., Funke B. R., Case C. L.: Microbiology: An Introduction, Books a la Carte Edition, Benjamin Cummings, New York, 2009. 2. Denyer S. P., Hodges N., Gorman S. P. (eds.): Hugo and Russell's Pharmaceutical Microbiology, Willey, New York, 2004. <i>Literature in Serbian:</i> 3. Švabić Vlahović M. i sar.: Medicinska bakteriologija, udžbenik, Savremena administracija, Beograd, 2005. 4. Крањчић-Зеџ И.: Медицинска паразитологија, приручник за практичну наставу, Савремена администрација, Београд, 2000. 5. Suvajdžić Lj.: Priručnik iz mikrobiologije sa vežbama za studente farmacije, Ortomedics, Novi Sad, 2004. 6. Крањчић-Зеџ И.: Медицинска паразитологија, приручник за практичну наставу, Савремена администрација, Београд, 2000. 7. Gajin S., Gantar M., Petrović O., Matavulj M.: Praktikum iz mikrobiologije za studente biologije, Univerzitet u Novom Sadu, 2002.				
Number of classes:				
Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with student, projects...)
60	60	0	0	0
Methods of teaching: interactive classes, demonstration, practical exercises, analysis of examples from practice, case studies, discussion, e-learning.				
Grading (maximum 100 points)				
Pre-Exam obligation	Points	Final Exam	Points	
Lecture attendance	3	Exam	30	
Activity	7			

Projects/Seminars	0		
Exercises/professional practice	30		
Colloquiums/exam	30		

BASICS OF BIOCHEMISTRY

Study program: Professional Medical Laboratory Technologist				
Type and level of study: undergraduate professional studies				
Course: Basics of Biochemistry				
Language of instruction: Serbian				
Course status: mandatory				
Semester: first year, first semester				
ECTS: 5				
Requirement: no				
Course objective: Student will acquire basic knowledge in biochemistry and understand the impact of biochemistry on other sciences, understand interrelationship between molecule structure and biological function, acquire knowledge on structure and function of cell membranes, understand enzyme action mechanism, acquire knowledge in basic metabolic pathways, acquire knowledge in intercellular signaling, understand reactions of biotransformations of exogenous and endogenous substances and acquire knowledge on nucleic acids and protein biosynthesis.				
Course outcome: Upon the successful completion of the course students are expected to be able to describe and analyze the course of principal catabolic, anabolic and common metabolic pathways, apply knowledge on enzyme kinetics and intercellular signaling in interpreting regulation of metabolic pathways in human organism, explain biochemical basis of protein synthesis, regulation and posttranslational modifications of proteins, as well as to successfully apply the acquired knowledge when attending classes and acquiring knowledge in medical biochemistry.				
Course content: <i>Lectures</i> Introduction; structure and mechanism of enzyme and coenzyme action, enzyme kinetics and inhibition; chemical composition of biological membranes and transport through membranes; basic principles of bioenergetics; carbohydrate catabolism; glycolysis; glycogenolysis; phosphogluconate pathway, catabolism of other hexoses; lipid catabolism: fatty acid oxidation, triglyceride, phospholipid, sphingolipid, cholesterol; nitrogen compound catabolic process, amino acids, urea, protein, nucleotide cycle; common metabolic pathways; citric acid cycle, respiratory chain and oxidative phosphorylation; carbohydrate anabolism: gluconeogenesis, glycogenesis; lipid anabolism; nitrogen compound anabolism; intercellular signaling: by G-protein-linked receptors, enzyme-linked receptors, ion channel receptors and nicotinic acetylcholine receptors; biotransformations: cytochrome P450, FM-monooxygenase systems; glucuronic acid conjugation; biotransformation of some exogenous and endogenous substances; biosynthesis of proteins and nucleic acids, replication, transcription, translation and posttranslational modifications of proteins in human organism. <i>Exercises</i> Repetition of the acquired knowledge on biomolecules. Structure and function of fibrillar (keratin and collagen) and globular (hemoglobin and myoglobin) proteins. Solving problems relating to enzyme reaction kinetics and enzyme inhibition. Examples of disorders of some transport systems through cell membranes. Presentation of animations of principal metabolic pathways. Solving problems relating to certain metabolic pathway, linking theoretical knowledge in metabolism with practical examples. Familiarization with work of medical-biochemical laboratory.				
Literature: <i>Literature in English:</i> - Rodwell V., Bender D., Botham K., Kennelly P., Anthony P. W.: Harper's Illustrated Biochemistry, textbook, McGraw-Hill Education, New York, 2018. - Nelson D. L., Cox M. M.: Lehninger Principles of Biochemistry, Worth Publishers, New York, 2000. <i>Literature in Serbian:</i> - Spasić S., Jelić-Ivanović Z., Spasojević-Kalimanovska V.: Opšta biohemija, udžbenik, Farmaceutski fakultet, Beograd, 2003. - Topić A., Stanojević-Bogavac N., Kotur-Stevuljević J.: Laboratorijske vežbe iz opšte biohemije, Farmaceutski fakultet, Beograd, 2009. - Stojanović S.: Zbirka zadataka iz hemije, Omega MS Pharmacy, Novi Sad, 2017. - Kovačević D.: Biohemija, udžbenik, Savremena administracija, Beograd, 2003. - Petrović J., Velimirović S.: Biohemija, udžbenik, Novi Sad, 2002. - Mihajlović M.: Biohemija, udžbenik, Naučna knjiga, Beograd, 2000.				
Number of classes:				
Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with student, projects...)
30	30	0	0	0
Methods of teaching: interactive classes, demonstration, practical exercises, analysis of examples from practice, case studies, discussion, e-learning.				
Grading (maximum 100 points)				
Pre-Exam obligation	Points	Final Exam	Points	
Lecture attendance	3	Exam	40	

Activity	7		
Projects/Seminars	0		
Exercises/professional practice	20		
Colloquiums/exam	30		

BASICS OF IMMUNOLOGY

Study program:	Professional Medical Laboratory Technologist
Type and level of study:	undergraduate professional studies
Course:	Basics of Immunology
Language of instruction:	Serbian
Course status:	mandatory
Semester:	second year, third semester
ECTS:	7
Requirement:	no

Course objective:

Familiarization of students with the characteristics of innate and acquired immunity and their effector mechanisms in resisting antigens originating from infectious microorganisms (bacteriae, viruses, parasites and fungi); pathogenetic mechanisms and treatment of diseases caused by immune system disorders (oversensitivity reactions, autoimmune diseases, disease caused by excessive inflammatory response of the organism, immunodeficiencies); immune response to antigens of non-infectious origin (tumor antigens and transplantation antigen), as well as principles of tumor immunotherapy and immunotherapy strategies aimed at preventing transplant rejection; immunomodulation of disorders of the innate immune system; principles and application of immunologic tests based on antigen-antibody reaction; students also recognize the relationship between the fields of immunology and parasitology.

Course outcome:

After passing the exam students will have knowledge of the effector mechanisms of innate or acquired immunity in resisting infectious agents; they will also possess knowledge of the pathogenesis, most important clinical manifestations and treatment of diseases caused by immune system function disorders, immune response to tumors and transplanted tissue, as well as of the principles of tumor immune therapy and transplantation responses; students will have knowledge of principles of immunologic tests and how to qualitatively and/or quantitatively determine antigens and antibodies.

Course content:
Lectures

Innate immunity; taking, processing and presentation of antigens; lymphocyte antigen receptors; Development of the immune repertoire; cell-mediated immune response; effector mechanisms of the T-cell-mediated immune response; humoral immune response; effector mechanisms of the humoral immune response; immunological tolerance: importance and mechanisms; autoimmunity; immune response to non-infectious antigens (tumors and transplantation); diseases caused by excessive inflammatory response of the organism; innate and acquired immunodeficiencies (AIDS); immunomodulation of disorders of the innate immune system.

Exercises

Antigen, immunogene, hapten, immunization, obtaining polyclonal and monoclonal antibodies; precipitation reactions; agglutination reaction; complement fixation test and determination of total hemolytic activity of the complement (CH 50 test); tests with radioactive markers: RIA, RIST, RAST; tests with enzyme markers: ELISA, ELISA spot; fluorochromes as markers, immunofluorescence and flow cytometry; immunohistochemistry; methods of selective cell separation; methods of evaluation of humoral and cell immunity in vitro and in vivo; tests carried out prior to transplantation; detection of immune complexes in tissues and biological fluids; techniques of molecular biology in immunology; fundamentals of parasitology and its relation with the field of immunology.

Literature:
Literature in English:

1. Basta M. at all: The Complement System; Novel Roles in Health and Disease, Kluwer Academic Publishers, Boston, Dordrecht, New York, London, 2004.

Literature in Serbian:

2. Abbas A. K., Lichtman A. H.: Osnovna imunologija - funkcionisanje i poremećaji imenskog sistema, Data status, Beograd, 2007.
3. Arsenović-Ranin N., Stojić-Vukanić Z., Bufan B.: Priručnik za praktičnu nastavu iz imunologije i imunohemije, Farmaceutski fakultet, Beograd, 2007.

Number of classes:

Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with student, projects...)
30	30	0	0	0

Methods of teaching:

interactive classes, demonstration, practical exercises, analysis of examples from practice, case studies, discussion, e-learning.

Grading (maximum 100 points)

Pre-Exam obligation	Points	Final Exam	Points
Lecture attendance	3	Exam	40
Activity	7		
Projects/Seminars	0		
Exercises/professional practice	20		
Colloquiums	30		

BASICS OF INFORMATION AND COMMUNICATION TECHNOLOGIES

Study program: Professional Medical Laboratory Technologist				
Type and level of study: undergraduate professional studies				
Course: Basics of Information and Communication Technologies				
Language of instruction: Serbian				
Course status: mandatory				
Semester: first year, first semester				
ECTS: 5				
Requirement: no				
Course objective: Course objective is to enable students to acquire basic knowledge in the area of application of information-communication technologies in health care institutions, familiarizing with text processing software tools and with tabular calculations computer programs.				
Course outcome: Upon passing the exam students will be able to apply the acquired knowledge on computer hardware, peripheral units, software tools, multimedia and the internet in real-life situations in health care institutions, or to use the acquired knowledge to improve the current work in health care institutions. In addition to that, application of calculation or text processing program is important for everyday work of health care professionals.				
Course content: <i>Lectures</i> Organization of information technology service in health care institution; types of information systems; information systems within health care system; acquisition and acceptance of new information systems in health care, need for continuous updating; work of health care worker within IT system; professional equipment; basics of system analysis; system functioning testing; standards of information technologies system in health care; patient recording; importance of permanent and timely entry of data into system; connection of the system with other national systems, unique system of patient tracking; trends of connecting health care institutions system with pharmaceutical systems; patient data protection; the Internet, internet address, internet access, internet protocols, HTML, World Wide Web, internet services; Windows; specific program used in pharmacy practice; basic program languages used by health care professionals (Word, Excell, Power Point); security systems in health care institutions, panic keys. <i>Exercises</i> Types of information systems. Work of health care worker within IT system. Need for continuous updating. Basics of telecommunications and forms of telecommunication systems. Patient recording. Importance of permanent and timely entry of data into system. Work in patient recording program. Use of internet. Basic program languages in the work of health care professional (Word, Excel, Power Point), work in programs. Data processing, surveys. Graphic presentation and tabulating. Types of errors at data processing. Use of security system in health care institution.				
Literature: <i>Literature in English:</i> 1. Biheller B. R., Evans J., Pinard T. K., Romer M. R.: Microsoft Office 2007: Introductory Course, textbook, Course Technology, Boston, 2007. <i>Literature in Serbian:</i> 2. Marčičević Ž., Marošan Z.: Primena informacionih tehnologija, udžbenik, Visoka poslovna škola strukovnih studija, Novi Sad, 2010. 3. Marošan Z., Vesin B.: Primena informacionih tehnologija, praktikum, Visoka poslovna škola strukovnih studija, Novi Sad, 2009. 4. Gerlič I.: Savremene informacione tehnologije u obrazovanju, udžbenik, Nacionalna izdavačka kuća Slovenija, Ljubljana, 2000. 5. Softver HELIANT za rad u zdravstvenoj ustanovi, demo verzija. 6. Bunzel T.: Microsoft Office 2010 Kao od šale, CET, Beograd, 2010. 7. Ringstrom D.: Otkrijte skrivenu blaga Mikrosoft Eksela, Kompjuter Biblioteka, Beograd, 2022. 8. Arsić S.: Želim da naučim Eksel, Beosing, Beograd, 2005. 9. Tasić M., Čirić M.: Osnovi informatike, udžbenik, Prirodno-matematički fakultet, Niš, 2002. 10. Milošević Z., Bogdanović D.: Statistika i informatika u oblasti medicinskih istraživanja, udžbenik, Medicinski fakultet, Niš, 2012.				
Number of classes:				
Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with student, projects...)
30	30	0	0	0
Methods of teaching: lectures, parctical classes, work with software, exercises.				
Grading (maximum 100 points)				
Pre-Exam obligations	Points	Final Exam	Points	

Lecture attendance	3	Exam	30
Activity	7		
Projects/Seminars	0		
Exercises/professional practice	30		
Colloquiums	30		

BASICS OF INTEGRATIVE MEDICINE

Study program: Professional Medical Laboratory Technologist				
Type and level of study: undergraduate professional studies				
Course: Basics of Integrative Medicine				
Language of instruction: Serbian				
Course status: elective				
Semester: second year, fourth semester				
ECTS: 5				
Requirement: no				
Course objective: The objective of the course is to provide students with basic information on different ideas and approaches to therapy, enable acquisition of knowledge on most important techniques included in the notion of integrative medicine, provide basic information on certain techniques of integrative medicine and provide preconditions for understanding the integrative approach to therapy. The objective of the course is that students understand integrative medicine as a medicine parallel, complementary to the conventional medicine that jointly result in an improved condition of the patient.				
Course outcome: Having passed the exam, the student will be capable of logical judgment on different approaches to therapy and treatment, approaches to therapy and treatment health with within integrative medicine, basic characteristics of certain methods; current application of different forms of integrative medicine in Serbia and global trends. In addition to that, students will be trained to interpret current laws of the Republic of Serbia relating to integrative medicine branches.				
Course content: <i>Lectures</i> Presentation of different concepts in defining the notions of conventional and integrative therapy, holistic and integrative approach to therapy; notions and technique presently classified as nonconventional therapy techniques; currently used therapeutic tools; basics of integrative medicine methods: acupuncture (acupressure, magnetotherapy, laser therapy), quantum medicine (Bi-Digital O-Ring Test, BRT, MRT), herbal and vitamin supplements, homeopathy, nonconventional approach to nutrition, essential oils, manipulative therapies (osteopathy, chiropractic), applied kinesiology, naturopathy, relaxation techniques (yoga, meditations, tai-chi, autogenic training, hypnosis etc.), massages (shiatsu, reflexotherapy), anthroposophic medicine, aromatherapy, colour therapy, smell therapy, sound therapy, crystal therapy, mud therapy, water therapy, qigong, reiki, environmental medicine; providing information on current and new forms of complementary therapies (information diagnostic and therapy); traditional medicine vs. integrative therapy; main assumptions of traditional medicine (acupuncture, tui na, herbal), campo, Indian (ayurveda), fundamentals of other traditional medicine; traditional systems of therapy in the Balkan region; safety at selection or use of complementary medicine methods. <i>Exercises</i> Visits to integrative medicine centres; familiarization with actual cases; discussion; case studies; internet presentations; field visits (to centres of certain integrative medicine branches).				
Literature: <i>Literature in English:</i> - Omura Yoshiaki: Practice of the Bi-Digital O-Ring Test, Ido No Nippon, Tokyo 1986. - Robson Terry: An introduction to Complementary Medicine, Allen & Unwin, Sydney, 2003. - Micozzi S. Marc: Fundamentals of Complementary and Alternative Medicine, Saunders, Philadelphia, 2010. - Kotsirilos Vicki, Vitetta Luis, Sali Avni: A Guide to Evidence-based Integrative and Complementary Medicine, Churchill Livingstone, Edinburgh, 2011. - Hecker Hans-Ulrich, Steveling Angelika, Peuker Elmar, Kastner Joerg: Color Atlas of Acupuncture: Body Points - Ear Points - Trigger Points (Complementary Medicine), Thieme, Amsterdam, 2008. - Sutton Amy L: Complementary and Alternative Medicine Sourcebook, Omnigraphics, Detroit, 2010. - Zhanwen Liu, Liang Liu: Essentials of Chinese Medicine, Springer, London, New York, 2009. - Kligler Benjamin, Lee Roberta: Integrative Medicine principles for practice, Program in Integrative Medicine, University of Arizona. McGraw-Hill Companies, New York, Chicago, London, Madrid, Milan, Sydney, Toronto, 2004. <i>Literature in Serbian:</i> - Grupa autora: Tajne alternativne medicine: Medicinska knjiga, Beograd, 2016. - Škokljević A.: Akupunkturologija, Naučna knjiga, Beograd, 2009. - Jovanović-Ignjatić Zlata: Kvantno hologramska medicina kroz prizmu akupunkturnih i mikrotalasno rezonantnih (samo) regulatornih mehanizama, Quanttes, Beograd, 2010.				
Number of classes:				
Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with student, projects...)
30	30	0	0	0
Methods of teaching: interactive classes, demonstration, practical exercises, analysis of examples from practice, case studies, discussion, e-learning.				
Grading (maximum 100 points)				

Pre-Exam obligations	Points	Final Exam	Points
Lecture attendance	3	Exam	40
Activity	7		
Projects/Seminars	0		
Exercises/professional practice	20		
Colloquiums/exam	30		

BASICS OF NUCLEAR MEDICINE

Study program: Professional Medical Laboratory Technologist				
Type and level of study: undergraduate professional studies				
Course: Basics of Nuclear Medicine				
Language of instruction: Serbian				
Course status: elective				
Semester: second year, fourth semester				
ECTS: 5				
Requirement: no				
Course objective: Acquisition of knowledge about the characteristics of isotopes used in nuclear medicine, the production of radioisotopes, generators, radiopharmaceuticals, instrumentation, quality control, and safety measures in the use of open sources of radiation.				
Course outcome: Upon completing the course and passing the exam, the student will be able to understand the principles of nuclear medicine; describe the preparation of nuclear medicine equipment for performing diagnostic procedures and measuring radioactivity; list acquisition parameters for various types of nuclear medicine diagnostic procedures; calculate the volume of a radiopharmaceutical that needs to be administered to a patient for a given radiopharmaceutical activity; describe the monitoring of equipment operation and patient condition during imaging; review the recorded examination; list radiation protection measures when working with open sources of radiation; determine radioactivity and operate a scintillation counter; analyze the quality and completeness of control planar images and specific parameters of SPECT, SPECT/CT, and PET/CT imaging; independently perform measurements with a dose calibrator for activity measurement; and critically interpret the results.				
Course content: <i>Lectures</i> Atom and radionuclides. Radioactivity, radioactive decay, and types of radiation. Interaction of ionizing radiation with matter. Biological effects of ionizing radiation. Measurement of radioactivity and SI units. Radionuclides and methods of obtaining radionuclides. Radiopharmaceuticals – applications in diagnosis and therapy. Detection of ionizing radiation and radiation detectors. Gamma camera and types of scintigraphy. Hybrid devices. Positron emission tomography. Sources of ionizing radiation and radiation exposure. Effects of ionizing radiation on the body. Biological effects of ionizing radiation. Protection from open sources of ionizing radiation. <i>Exercises</i> Quality control of radiopharmaceuticals. Specifics of working with and handling radioisotopes – basic principles and protection. Preparation of radioisotopes and radiopharmaceuticals – basic principles. Administration of radiopharmaceuticals. Determining the volume of a radiopharmaceutical to be administered to a patient for a given radiopharmaceutical activity. Independent measurements using a dose calibrator for activity measurement. Working with a gamma camera – acquisition, collimator replacement. Setting parameters for static, dynamic, SPECT, and SPECT/CT studies. Quality control of gamma cameras and hybrid systems. Working with a PET/CT scanner. Quality control and calibration of PET/CT scanners. Preparation and processing of the patient upon arrival for PET/CT imaging.				
Literature: <i>Literature in English:</i> 1. Ziessman H. A., O'Malley J. P., Thrall J. H.: Nuclear Medicine: The Requisites (Requisites in Radiology), Saunders, New York, 2013. <i>Literature in Serbian:</i> 2. Šobić Šaranović D., Artiko V.: Nuklearna medicina, udžbenik, Medicinski fakultet, Beograd, 2020. 3. Bogičević M., Ilić S.: Nuklearna medicina metodologija i klinika, udžbenik, Klinički centar Niš, 2007. 4. Vlajković M., Rajić M.: Repetitorijum kliničke nuklearne medicine, Galaksijanis, Niš, 2020. 5. Vlajković M.: Praktikum nuklearne medicine, Galaksijanis, Niš, 2020. 6. Han R., Obradović B., Pavlović S.: Nuklearna medicina, udžbenik, Medicinski fakultet, Beograd, 2008. 7. Borota R., Stefanović Lj.: Nuklearna medicina, udžbenik, Medicinski fakultet, Novi Sad, 1992. 8. Dodig D., Kusić Z.: Klinička nuklearna medicina, Medicinska naklada, Zagreb, 2012.				
Number of classes:				
Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with student, projects...)
30	45	240	0	0
Methods of teaching: interactive classes, demonstration, practical exercises, analysis of examples from practice, demonstrations.				
Grading (maximum 100 points)				
Pre-Exam obligations	Points	Final Exam	Points	
Lecture attendance	3	Exam	30	
Activity	7			
Projects/Seminars	0			
Exercises/professional practice	30			
Colloquiums/exam	30			

BIOLOGICAL MATERIALS AND LABORATORY TECHNIQUES

Study program: Professional Medical Laboratory Technologist				
Type and level of study: undergraduate professional studies				
Course: Biological Materials and Laboratory Techniques				
Language of instruction: Serbian				
Course status: mandatory				
Semester: first year, second semester				
ECTS: 5				
Requirement: no				
Course objective: Familiarization of students with the tasks of the laboratory in clinical diagnostics, familiarization with different biological materials, their extraction, adequate transportation and storage, laboratory result testing in clinical practice.				
Course outcome: Upon the completion of the course, students will possess knowledge of the basics of work in the medical-biochemistry laboratory, possibilities of its functioning and first of all of the types of biological materials, methods of preparing patients for sample collection, adequate sampling (preanalytical variables), ways of sample storage, transportation and processing, impact of medicines on the adequacy of sampling, as well as of the basics of interpreting results of medical-biochemical analysis.				
Course content: <i>Lectures</i> The notion of medical-biochemistry laboratory, clinical chemistry, clinical biochemistry, laboratory medicine, preanalytics, laboratory diagnostics; organization of the provision of laboratory services at primary, secondary and tertiary level; biological materials, their importance and adequate measures in sample collection, storage and transportation; capillary puncture and phlebotomy in standard conditions; blood draw procedure; anticoagulants – different coagulants and other additives used in sample preparation; preanalytical variables, the importance of adequate preparation of the patient and the impact of preanalytical variables on the quality of biological material; the impact of climate on the results of analysis; the impact of medicines on the analysis; types of patient preparation; control of appropriateness of taken samples; result control; basics of interpretation of results of medical-biochemical analysis; basics of laboratory procedure; sound laboratory practice; GMP standard; specific characteristics of sampling of certain categories of patients; specific characteristics of sampling certain types of biological materials; work with potentially contagious patients; ethics and data protection. <i>Exercises</i> Introduction into laboratory diagnostics; organization of work in the laboratory; types of biological materials; medical waste management; ISO15189 Standard; biological material taking and processing; venous and capillary blood draw; preanalytical, analytical and postanalytical stage; biochemical analyses; immunochemical analyses; microbiological sample collection and processing; urine analysis.				
Literature: <i>Literature in English:</i> 1. Morrow A. S.: Diagnostic and Therapeutic Technic: A Manual of Practical Procedures Employed in Diagnosis and Treatment, Forgotten Books, London, 2019. 2. Shankara S.: Laboratory Manual for Practical Biochemistry, Jaypee Brothers, New Delhi, 2018. 3. Guder W. G.: Samples from the patients to the laboratory-the impact of preanalytical variables on the quality of laboratory results, GIT Verlag, Darmschate, 2001. 4. Senger R. S.: Laboratory Manual of Biochemistry: Methods and Techniques, NIPA, London, 2014. 5. Marshall W. J., Bangert S. K.: Clinical Chemistry, Mosby, Edinburgh, 2004. <i>Literature in Serbian:</i> 6. Ubavić M.: Interpretacija najčešćih laboratorijskih analiza i uticaj lekova na njih, udžbenik, Omega MS Pharmacy, Novi Sad, 2017.				
Number of classes:				
Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with student, projects...)
30	30	0	0	0
Methods of teaching: interactive classes, demonstration, lectures and practical exercises in a laboratory.				
Grading (maximum 100 points)				
Pre-Exam obligations	Points	Final Exam	Points	
Lecture attendance	3	Exam	40	
Activity	7			
Projects/Seminars	0			
Exercises/professional practice	20			
Colloquiums	30			

BUSINESS COMMUNICATION SKILLS

Study program: Professional Medical Laboratory Technologist				
Type and level of study: undergraduate professional studies				
Course: Business Communication Skills				
Language of instruction: Serbian				
Course status: elective				
Semester: first year, first semester				
ECTS: 5				
Requirement: no				
Course objective: With his/her active participation in the learning process, student should acquire knowledge in the area of communications in order to acquire communication competency and skills required for professional work in nursing and treatment of senior citizens, organizational and team communication and in communication with social partners.				
Course outcome: At the end of the course student should be capable to apply the acquired knowledge in communication skills and to practically implement the acquired knowledge and skills within nursing.				
Course content: <i>Lectures</i> General notions, aspects, types, parts of communication; communication competency in professional work; barriers in communication; specific characteristics of communication with elderly persons; importance of verbal and non-verbal communication with elderly persons; specific features of application of communication health care education methods with elderly persons; communication and health care educational counselling – supporting methods; first contact establishing and talking with patients; specific features and communication with persons with sensory perception disorders; ethics in communication; political and social correctness in communication; professional identity and communication; communication styles; emotional communication, empathy; communication as social support; communication and pathological distress in nursing elderly persons and in palliative care; therapy and informational communication; psychological-social aspect of communication; communication with persons under stress and in crisis; communication with persons of diminished sensory and verbal abilities; communication with families of elderly persons; communication in grievance; interpersonal communication; team work and social partners; public relations of organization with an aim of reaching mutual understanding and attaining common interests; communication in crisis situations; managing conflicts and their understanding. <i>Exercises</i> Aspects of communication. Verbal and non-verbal communication with the old. Empathy. Ethical principles. Creative workshops of exercising methods of verbal communication: speaking, listening, reading, writing. Non-verbal communication.. Specific aspects of communication with patients with sensory perception disorders. Team work. Therapy and informational communication. Implementation of health care educational methods with old persons. Managing conflicts and their solution. Application of SOLER technique. Communication and psychological distress in palliative care. Procedures in grievance period.				
Literature: <i>Literature in English:</i> 1. Hugman B.: Healthcare Communication, textbook, Pharmaceutical Press, London, 2009. 2. Lloyd M., Bor R., Noble L.: Clinical Communication Skills for Medicine, textbook, Elsevier, New York, 2018. <i>Literature in Serbian:</i> 3. Kekuš D.: Komunikacije u profesionalnoj praksi zdravstvenih radnika, udžbenik, Beograd, 2010. 4. Kekuš D.: Modeli integrisanih komunikacija u zdravstvu, udžbenik, Fakultet organizacionih nauka, Beogradu, 2009. 5. Holi K.: Veština uspešne komunikacije, Laguna, Beograd, 2017. 6. Lejman K., Djufrej D.: Poslovna komunikacija, Data Status, Beograd, 2015. 7. Tomić Z.: Komunikacija i javnost, Čigoja štampa, Beograd, 2007.				
Number of classes:				
Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with student, projects...)
30	30	0	0	0
Methods of teaching: interactive classes, demonstration, practical exercises, analysis of examples from practice, case studies, discussion, e-learning.				
Grading (maximum 100 points)				
Pre-Exam obligations	Points	Final Exam	Points	
Lecture attendance	3	Exam	30	
Activity	7			
Projects/Seminars	0			
Exercises/professional practice	40			
Colloquiums	20			

BUSINESS ENGLISH

Study program: Professional Medical Laboratory Technologist				
Type and level of study: undergraduate professional studies				
Course: Business English				
Language of instruction: Serbian				
Course status: elective				
Semester: third year, fifth semester				
ECTS: 5				
Requirement: no				
Course objective: Course objective is familiarization with characteristics of the English language, adoption of phrases and patterns necessary for communication at professional level and adoption of techniques of written and oral expressing in professional communication.				
Course outcome: Students will be able to apply the acquired knowledge in professional communication, create corresponding written forms in accordance with their professional communication and use speech patterns appropriate to a given situation.				
Course content: <i>Lectures</i> Broadening of knowledge on past tenses, dependent and relative clauses; temporal conjunctions and temporal clause structure; historical and biographical texts; topics: health, connections and common life in English-speaking countries; extension of knowledge on future tenses, use of subjunctive, conjunctions, and relative clause structure; topics: sport, environment protections and business life in English-speaking countries; medical terminology relevant for student's profession. <i>Exercises</i> Students are taught to communicate in different situations (at doctor's, with service providers etc.), to seek and give information on the phone, to make bookings, to communicate in conflict situations, to express their views and feelings, to give accounts orally and in writing of past events through adequate use of past tenses and temporal conjunctions; students are taught to express their opinion orally and in writing on current topics, to participate in discussions, to independently present certain topics, to give reports on personal experience and to ask others on their experience.				
Literature: <i>Literature in English:</i> 1. MacLean J.: English in Basic Medical Science, textbook, Oxford University Press, Oxford, 2000. 2. Murphy R.: English Grammar in Use, Cambridge University Press, Cambridge, 2014. 3. McCarthy M., O'Dell F.: English Vocabulary in Use, Cambridge University Press, Cambridge, 2006. 4. Hornby A. S.: Oxford Advanced Learner's Dictionary of Current English, Oxford University Press, Oxford, 2008. 5. Evans V., Dooley J., Tran T. M.: Career Paths, Medical Book 1, udžbenik, Express Publishing, Berkshire, 2018. <i>Literature in Serbian:</i> 6. Dragović R.: Engleski za zdravstvene radnike, udžbenik, Naučna knjiga, Beograd, 2004.				
Number of classes:				
Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with student, projects...)
30	30	0	0	0
Methods of teaching: lectures, practical exercises, communication, e-learning.				
Grading (maximum 100 points)				
Pre-Exam obligations	Points	Final Exam	Points	
Lecture attendance	3	Exam	30	
Activity	7			
Projects/Seminars	0			
Exercises/professional practice	40			
Colloquiums	20			

BUSINESS GERMAN

Study program: Professional Medical Laboratory Technologist				
Type and level of study: undergraduate professional studies				
Course: Business German				
Language of instruction: Serbian				
Course status: elective				
Semester: third year, fifth semester				
ECTS: 5				
Requirement: no				
Course objective: Course objective is familiarization with characteristics of the German language, adoption of phrases and patterns necessary for communication at professional level and adoption of techniques of written and oral expressing in professional communication.				
Course outcome: Students will be able to apply the acquired knowledge in professional communication, create corresponding written forms in accordance with their professional communication and use speech patterns appropriate to a given situation.				
Course content: <i>Lectures</i> Broadening of knowledge on past tenses, dependent and relative clauses; temporal conjunctions and temporal clause structure; historical and biographical texts; topics: health, connections and common life in German-speaking countries; extension of knowledge on future tenses, use of subjunctive, conjunctions, and relative clause structure; topics: sport, environment protections and business life in German-speaking countries; medical terminology relevant for student's profession. <i>Exercises</i> Students are taught to communicate in different situations (at doctor's, with service providers etc.), to seek and give information on the phone, to make bookings, to communicate in conflict situations, to express their views and feelings, to give accounts orally and in writing of past events through adequate use of past tenses and temporal conjunctions; students are taught to express their opinion orally and in writing on current topics, to participate in discussions, to independently present certain topics, to give reports on personal experience and to ask others on their experience.				
Literature: <i>Literature in English:</i> 1. Menschen A1 KB und Menschen A1 AB, udžbenik, Klett Verlag, Stuttgart, 2018. 2. Pude E. A., Specht F.: Menschen, Deutsch als Fremdsprache Kursbuch mit DVD-ROM, udžbenik, Hueber Verlag, Munchen, 2012. 3. Loibl B. et al.: Schritte Plus im Beruf, Kommunikation am Arbeitsplatz, Max Hueber Verlag, Ismaning, 2015. 4. Becker N., Braunert J.: Alltag, Beruf, Kursbuch+Arbeitsbuch, Max Hueber Verlag, Ismaning, 2009. 5. Becker N., Braunert J., Schlenker W.: Unternehmen Deutsch Grundkurs. Kursbuch, Klett Verlag, Stuttgart, 2005. 6. Becker N., Braunert J.: Unternehmen Deutsch Grundkurs, Arbeitsbuch, KlettVerlag, Stuttgart, 2004. <i>Literature in Serbian:</i> 7. Grammatik - Ganz klar Übungsgrammatik A1-B1, uz audio materijal, Hueber Verlag, kratak pregled gramatike sa vežbanjima „Hallo aber Deutsch“. 8. Nikolovski V.: Gramatička vežbanja „Eine kleine Übungsgrammatik“, Zavod za udžbenike i nastavna sredstva, Schritte international 1, Grammatikspiele. 1. Vučković-Stojanović M.: Uvod u nemački poslovni jezik, udžbenik, Savremena administracija, Beograd, 2005.				
Number of classes:				
Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with student, projects...)
30	30	0	0	0
Methods of teaching: lectures, practical exercises, communication, e-learning.				
Grading (maximum 100 points)				
Pre-Exam obligations	Points	Final Exam	Points	
Lecture attendance	3	Exam	30	
Activity	7			
Projects/Seminars	0			
Exercises/professional practice	40			
Colloquiums	20			

BUSINESS ORGANIZATION

Study program: Professional Medical Laboratory Technologist				
Type and level of study: undergraduate professional studies				
Course: Business Organization				
Language of instruction: Serbian				
Course status: mandatory				
Semester: third year, sixth semester				
ECTS: 5				
Requirement: no				
Course objective: The objective of the course is familiarization with basic theoretical approaches and key concepts relevant for the management of organization and people in it. A specific objective is that students become aware of the importance and necessity of a business organization in the world, and in particular in enterprises, as well as the development of the skill of critical evaluation of the existing and designing new organizational structures.				
Course outcome: During the course students acquire knowledge enabling and facilitating them to solve practical tasks of organization and employee management, they also acquire skills enabling them to be successful managers with sufficient competence to understand, anticipate and control behaviour of employees and direct it towards the attainment of the projected organizational goals; they are trained to manage employee behaviour in organizational changes and conflicts as well as in the adoption of communication, motivation and decision-making techniques and skills.				
Course content: <i>Lectures</i> Development of the organization through history; organization theories: classical, neoclassical, modern, future-oriented estimations; organizational structures; basics of organizational behaviour: organizational behaviour of managers, organizational culture, motivation in organizations, power in organizations, groups in organizations, organizational conflicts, communication in organizations, decision-making, organizational learning; human-resources management; organizational changes and development; daily, monthly and annual personal organization, ways of work organization; modern technical aids in personal organization and work organization; time management, time stealers; time priorities (important/urgent); organization of work at the level of office, department, corporation; short-term and long-term plans, monitoring by stages; organization of meetings, realization monitoring. <i>Exercises</i> Organizational structures – exercise; motivation in organizations – workshop; organizational conflicts – workshop; communication in organization – workshop; daily, monthly, annual personal organization, ways of work organization – workshop; modern technical aids in personal organization and work organization; visit to a company; time management, time stealers – discussion, workshop; time priorities (important/urgent) – practical exercise; short-term and long-term plans; monitoring by stages – workshop.				
Literature: <i>Literature in English:</i> 1. Kuhre Lee W.: ISO 14000 Certification: environmental management systems, Prentice-Hall Inc., Harlow, 1995. 2. Konieczka P., Namiesnik J.: Quality Assurance and Quality Control in the Analytical Chemical Laboratory: A Practical Approach (Analytical Chemistry), CRC Press, New York, 2018. 3. Ivancevich J. M., Konopaske R., Matteson M. T.: Organizational Behavior and Management, McGraw-Hill, New York, 2011. <i>Literature in English:</i> 4. Ahmetagić E.: Organizacija preduzeća, udžbenik, Čikoš holding, Subotica, 2002. 5. Petković M., Janićijević N., Bogićević-Milikić B.: Organizacija, udžbenik, Ekonomski fakultet, Beograd, 2014. 6. Sajfert Z., Pavlović N.: Organizacija, udžbenik, Čikoš grupa, Subotica, 2014.				
Number of classes:				
Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with student, projects...)
30	30	0	0	0
Methods of teaching: lectures, workshop, case studies, discussion, e-learning.				
Grading (maximum 100 points)				
Pre-Exam obligations	Points	Final Exam	Points	
Lecture attendance	3	Exam	30	
Activity	7			
Projects/Seminars	0			
Exercises/professional practice	40			
Colloquiums	20			

ETHICS IN HEALTH CARE

Study program: Professional Medical Laboratory Technologist				
Type and level of study: undergraduate professional studies				
Course: Ethics in Health Care				
Language of instruction: Serbian				
Course status: mandatory				
Semester: first year, first semester				
ECTS: 5				
Requirement: no				
Course objective: Acquisition of basics of applied medicine ethics, understanding practical importance of ethics and recognizing differences between ethical and legal issues, development of critical thinking in the process of ethical analysis, understanding national, European and international legal regulations, knowing rights and responsibilities in health protection, health insurance, as well as knowing rights and responsibilities of providers of medical services, their beneficiaries and of the third party.				
Course outcome: After passing the exam, students will be able to critically think on normative and ethical principles, they will know the difference between legal and ethical issues, be able to make critical judgements at provision of health care services if they include moral duties and will be able to understand laws regulating aspects of health care activities, rights and responsibilities of health care professionals, patients and the third party.				
Course content: <i>Lectures</i> Normative ethics in medicine; ethical principles of importance for health care professionals; theories of medical ethics; ethical norms in medical practice; ethical case studies in health care practice, moral values, misjudgment; mistakes in practice, moral and criminal liability of health care professionals; ethical judgement in observance of moral values and rights of patients; non-observance of codified principles; ethics in preclinical and clinical studies (basics); ethics committee; European and international regulations; national health care policy; Serbian Medical Chamber; medical license; court of honor. <i>Exercises</i> Analysis and discussion on case studies (information and data generation and critical assessment). Problem-based learning (problem-solving with appropriate explanation of ethical concept and legal framework). Panel discussions, application of ethics and laws in current issues (drug testing, suicide, placebo, euthanasia, keeping confidential information on patient and medicine).				
Literature: <i>Literature in English:</i> 1. Fregmen B. F.: Medical Law and Ethics, textbook, Prentice Hall, New Jersey, 2011. <i>Literature in Serbian:</i> 2. Marić J.: Medicinska etika, autorsko izdanje, Beograd, 2008. 3. Lazarević A.: Socijalna medicina, autorsko izdanje, 2005. 4. Zakoni i podzakonska akta Republike Srbije iz oblasti zdravstva. 5. Nenadović M.: Medicinska etika, Medicinski fakultet, Priština, 2007. 6. Grujić V., Martinov Cvejic M., Legetić B.: Socijalna medicina, udžbenik, Medicinski fakultet, Novi Sad, 2001.				
Number of classes:				
Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with student, projects...)
30	30	0	0	0
Methods of teaching: lectures, workshops, case study, problem-based learning, exercises.				
Grading (maximum 100 points)				
Pre-Exam obligations	Points	Final Exam	Points	
Lecture attendance	3	Exam	40	
Activity	7			
Projects/Seminars	0			
Exercises/professional practice	20			
Colloquiums	30			

FIRST AID

Study program: Professional Medical Laboratory Technologist				
Type and level of study: undergraduate professional studies				
Course: First Aid				
Language of instruction: Serbian				
Course status: mandatory				
Semester: second year, third semester				
ECTS: 5				
Requirement: no				
Course objective: Principal goals of first aid education is familiarization of students with principles of initial care of suddenly injured or fallen ill persons, acquisition of skills for practical application of the acquired knowledge in practice, immediate life-saving care of a casualty, other persons, to preserve the environment and to improve protection from further injuries and hazards.				
Course outcome: Familiarization of students with the forms of sudden ailments and injuries and methods of prompt and immediate care; skills in examination and prompt recognition of signs and symptoms in sick or injured persons requiring immediate and urgent care.				
Course content: <i>Lectures</i> Examination and triage of the injured; evacuation of the injured (taking out, carrying out and transport); assessment of vital functions and state of consciousness; airway opening and keeping; bolus obstruction – partial, total, procedure algorithm in adults and children; artificial respiration – expiratory airflow; recovery positions of abruptly injured or sick person (side – relaxing, semi-side, stomach, semi-laying, semi-sitting, sitting, knee-elbow, kneeling, autotransfusion); cardiac arrest – identification and resuscitation measures in adults and children; application of semiautomated external defibrillators (AED); procedure algorithm – basic resuscitation measures in adults and children; bleeding – identification and procedures in external and internal bleeding; traumatic amputation care procedure; open injuries (wounds) – care; bone and joint system injuries (notion, types); temporary immobilization; head and vertebral column injuries; thoracic rib and stomach injuries; care procedures; complications and their prevention; injuries caused by heat and electricity, care; injuries caused by the cold, care; specific injuries, diseases and conditions, care. <i>Exercises</i> Examination and triage of the injured. Evacuation of the injured (taking out, carrying out and transport). Assessment of vital functions and state of consciousness. Airway opening and keeping. Bolus obstruction – partial, total, procedure algorithm in adults and children. Artificial respiration – expiratory airflow. Recovery positions of abruptly injured or sick person (side – relaxing, semi-side, stomach, semi-laying, semi-sitting, sitting, knee-elbow, kneeling, autotransfusion). Cardiac arrest – identification and resuscitation measures in adults and children. Application of semiautomated external defibrillators (AED). Procedure algorithm – basic resuscitation measures in adults and children. Bleeding – identification and procedures in external and internal bleeding. Traumatic amputation care procedure. Open injuries (wounds) – care. Bone and joint system injuries (notion, types). Temporary immobilization. Bone and joint system injuries (notion, types). Bone and joint system injuries (notion, types). Care procedures. Complications and their prevention. Injuries caused by heat and electricity, care. Injuries caused by the cold, care. Specific injuries, diseases and conditions, care.				
Literature: <i>Literature in English:</i> 1. Cydulka R., Cline D., Ma O. J., Fitch M., Joing S., Wang V.: Tintinalli's Emergency Medicine Manual, McGraw-Hill Education, New York, 2017. 2. Hammond B. B., Zimmermann P. G.: Sheehy's Manual of Emergency Care: Sheehy's Manual of Emergency Care, Mosby, London, 2012. Carsten Lott i sar.: Advanced life support course manual, European resuscitation council, textbook, ERC guidelines 2015. <i>Literature in Serbian:</i> 3. Pavlović A.: Prva pomoć, udžbenik, Obeležja, Beograd, 2007. 4. Pavlović A.: Kardiopulmonalna reanimacija, Obeležja, Beograd, 2007. 5. Newton C. R. H., Khare R. K.: Urgentna medicina, prevod, Besjeda, Banja Luka, 2007. 6. Advanced First Aid, CPR, and AED, American Academy of Orthopaedic Surgeons (AAOS), Jones & Bartlett Learning, 2017.				
Number of classes				
Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with student, projects...)
30	30	0	0	0
Methods of teaching: lectures, exercises, case studies; e-learning, exercises on dummy; visits of accredited specialists.				
Grading (maximum 100 points)				
Pre-Exam obligations	Points	Final Exam	Points	
Lecture attendance	3	Exam	30	

Activity	7		
Projects/Seminars	0		
Exercises/professional practice	40		
Colloquiums	20		

HEALTH CARE EDUCATION METHODOLOGY AND HEALTH PROMOTION

Study program: Professional Medical Laboratory Technologist				
Type and level of study: undergraduate professional studies				
Course: Health Care Education Methodology and Health Promotion				
Language of instruction: Serbian				
Course status: elective				
Semester: second year, third semester				
ECTS: 5				
Requirement: no				
Course objective: The purpose of health promotion in pre-schools and schools is the adequate development of children and the youth, so that they can grow into healthy, satisfied, successful, self-aware and responsible individuals. In addition to that, the objective of the course is to equip students to understand the role of both the health and non-health sectors and the ways in which they are actively integrated in the process of health promotion.				
Course outcome: Upon completion of the course and passing the exam, the student will possess skills necessary for work with health care and professionals and other community members, groups and individuals in carrying out on health promotion. Above all they will understand the importance of health care education and health promotion, especially for the successful development of preschool children, schoolchildren, and the youth.				
Course content: <i>Lectures</i> The definition and concept of health care promotion, principles and strategies; the promotion of health and health education in strategic documentation; environments for health promotion implementation ("Healthy City", "Healthy Kindergarten", "Healthy School"...); populational and high-risk strategy for prevention of chronic non-communicable diseases (cardiovascular diseases, diabetes, breast cancer, etc.); behavioral and biological risk factors for the onset of chronic non-communicable diseases; the importance of health promotion in the prevention of infectious diseases (sexually transmitted diseases, lice, viral diseases, measles, COVID-19, etc.); models of behavior which explain changes that lead to health; health education - definitions, goals, methods, and resources; structure of preventive-promotional programs in preschool and school institutions; maternity schools; preschool and school programs; training marginalized groups of people (homeless, Roma, safe houses, etc.); content and organization of work in Health Promotion Centers of public health institutes; evaluation of the health promotion program; continuous medical education for health care professionals. <i>Exercises</i> Work in pairs and small groups. Organizing lectures with discussions and panel debates. Pedagogical workshops. The development of opinions in discussions and debates. Case analysis. Use of available and appropriate content from internet resources. Visits of representatives of preschools and schools. Joint work on health promotion projects. Workshops. Existing project (city, provincial, national) analysis focused on health promotion and improvement. Comparative analysis of similar promotional campaigns in the region and the European Union. Joint activities with the Institute for Youth Protection. Visits by guests from safe houses. Collaborative work and visits by representatives of student organizations (senior students). Examples of health promotion campaigns in Serbia and the region.				
Literature: <i>Literature in English:</i> 1. Maville J. A., Huerta C. G.: Health Promotion in Nursing, textbook, Cengage Learning, London, 2012. 2. Glanz K., Rimer B. K., Viswanath K.: Health Behavior and Health Education: Theory, Research, and Practice, textbook, Jossey-Bass, New Jersey, 2008. 3. Poland B., Green L. W., Rootman I.: Settings for Health Promotion: Linking Theory and Practice, Thousand Oaks, Sage, 2000. <i>Literature in Serbian:</i> 4. Kekuš D.: Zdravstveno vaspitanje, udžbenik, Digital art, Beograd, 2009. 5. Hojer S.: Pristupi i metode u zdravstvenom odgoju, udžbenik, Koledž zdravlja, Ljubljana, 2005. 6. Gerlič I.: Savremene informacione tehnologije u obrazovanju, Nacionalna izdavačka kuća Slovenija, Ljubljana, 2000. 7. Kekuš D.: Komunikacije u profesionalnoj praksi zdravstvenih radnika, Digital Art, Beograd, 2010. 8. Jović S., Bašić S.: Promocija zdravlja i zdravstveno vaspitanje; u: Socijalna medicina sa epidemiologijom i higijenom. Medicinski fakultet Niš, Galaksija, Lukovo, 2011. 9. Pokorn D.: Ishrana u različitim fazama života: dodatak ishrani u ishrani, Maribor/Ljubljana, 2003. 1. Novaković B. Grujić V.: Higijena i zdravstveno vaspitanje, udžbenik, Medicinski fakultet, Novi Sad, 2006.				
Number of classes:				
Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with student, projects...)
30	30	0	0	0
Methods of teaching: classes, lectures using didactic methods, exercises, workshops, field work, seminar papers.				

Grading (maximum 100 points)			
Pre-Exam obligations	Points	Final Exam	Points
Lecture attendance	3	Exam	30
Activity	7		
Projects/Seminars	0		
Exercises/professional practice	30		
Colloquiums	30		

HEALTH CARE AND SOCIAL-SECURITY LEGISLATION

Study program: Professional Medical Laboratory Technologist				
Type and level of study: undergraduate professional studies				
Course: Health Care and Social-Security Legislation				
Language of instruction: Serbian				
Course status: elective				
Semester: third year, sixth semester				
ECTS: 5				
Requirement: no				
Course objective: Mastering basic legal concepts in the field of health legislation. Familiarizing students with the legal aspect of health care while developing professional awareness, responsibility, and humanity.				
Courses outcome: Upon the completion of the course and passing of the exam the student will be able to define the basic concepts of health care legislation; list the main aspects of the Law on Health Insurance and Health Care Protection, as well as the basic legal aspects of nursing; explain the organization of the Chamber of Health Care Professionals; and to outline the procedures for acquiring, renewing and revoking licenses for health care professionals. Additionally, the student will be able to identify indicators of health care quality and understand and explain the rights and responsibilities of health care professionals.				
Course content: <i>Lectures</i> The Law on Health Care Protection - basic provisions related to health care rights, participants in health care, health care activities, health care system, and financing of health care; principles of health protection; The Law on Health Insurance; The Law on Social Protection; Regulation on detailed conditions for performing health activities; Regulation on the internal organization of health care institutions; patient rights; legal regulations for the protection of the population from infectious diseases; legal aspects of the nursing profession; elements of the draft law on nursing; Law on Chambers, acquisition, renewal, and revocation of licenses for health care professionals; legal aspects of continuous medical education; Regulation on health care quality indicators; legal aspects of professional supervision and (re)accreditation processes of health care institutions; legal aspects of occupational health and safety; the specifics of health and social legislation relating to the area of health care from the perspectives of the patient, nurse, health institution, state, and society. <i>Exercises</i> During exercise sessions, a comparative analysis of legal aspects primarily in health care is conducted, comparing them to solutions from other countries in the region and the EU, as well.				
Literature: <i>Literature in English:</i> 1. Mossialos E., Permanand G., Baeten R., Hervey T.: Health systems governance in Europe: the role of European Union law and policy, Cambridge University Press, 2010. 2. De Gooijer R.: Trends in EU Health Care Systems, Winfried, 2007. 3. Morrissey M. A.: Health Insurance, textbook, Health Administration Press, London, 2007. 4. Beik Janet I.: Health Insurance Today: A Practical Approach, textbook, Saunders, Philadelphia, 2010. 5. Fregmen B. F.: Medical Law and Ethics, Prentice Hall, New Jersey, 2011. <i>Literature in Serbian:</i> 6. ICN regulativa i regulativa EU koje se odnose na sve aspekte leka, zdravstvenog osiguranja i prava i obaveza u pružanju zdravstvene zaštite, 2012. 7. Šolak Z.: Ekonomika zdravstvene zaštite, Zavod za udžbenike i nastavna sredstva, Beograd 2003. 8. Lazarević A.: Socijalna medicina, autorsko izdanje, Beograd, 2015. 9. Simić S. i sar.: Socijalna medicina, udžbenik, Medicinski fakultet, Beograd, 2012. 10. Šolak Z.: Ekonomika zdravstvene zaštite, Zavod za udžbenike i nastavna sredstva, Beograd 2003. 11. Aktuelni zakoni i podzakonska akta Republike Srbije iz oblasti zdravstva.				
Number of classes:				
Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with student, projects...)
30	30	0	0	0
Methods of teaching: lectures, workshops, case studies, problem-based learning, e-learning.				
Grading (maximum 100 points)				
Pre-Exam obligations	Points	Final Exam	Points	
Lecture attendance	3	Exam	40	
Activity	7			
Projects/Seminars	0			
Exercises/professional practice	20			
Colloquiums	30			

HEMATOLOGY

Study program: Professional Medical Laboratory Technologist				
Type and level of study: undergraduate professional studies				
Course: Hematology				
Language of instruction: Serbian				
Course status: mandatory				
Semester: third year, fifth semester				
ECTS: 9				
Requirement: Medical Biochemistry I				
Course objective: The objective of the course is adoption of basic laboratory methods in hematology, implementation in diagnostics and familiarization with legal procedures relating to this field.				
Course outcome: Upon the completion of the course the student will understand blood physiology and hemostasis, he/she will be able to apply basic hematological methods in the diagnostics of hematological disorders and thus have a basis for the commencement of his/her work in biochemistry laboratory dealing with hematology.				
Course content: <i>Lectures</i> Fundamentals of hematology; stem cells and hematopoiesis disorders; anemia; malignant tumors in hematology; laboratory procedures in the diagnosis of hematologic disorders; morphological analyses of bodily fluids within hematology tests; hemostasis and thrombosis; special tests; automation in hematology; hemostasis; quality control in hematology laboratories. <i>Exercises</i> Preparation of blood smear; determination of the number of blood elements using hemocytometer; cytochemical staining; diagnostic methods in anemia; laboratory methods in coagulation analysis; automated methods in hematology; case studies; part of exercises is conducted in biochemistry laboratory.				
Literature: <i>Literature in English:</i> 1. Bain Barbara J.: Blood cell, A practical guide, Blackwell Publishing, New York, 2006. 2. Hoffman R., Benz E., Furie B., Cochen H.: Hematology: Basic principles and practice, Churchill Livingstone, Edinburg, 2005. 3. Lewis S. Mitchell, Bain Barbara J., Bates Imelda: Dacie and Lewis Practical Haematology, Churchill Livingstone, Edinburg, 2001. 4. McKenzie S.: Clinical Laboratory haematology, Pearson, Harlow, 2004. 5. Williams W. J., Beutler E., Erslev A. J., Lichtman: Hematology, McGraw Hill, New York. 2001. <i>Literature in Serbian:</i> 6. Petrović M., Dopsaj V., Rajić M., Milojević Z.: Laboratorijska hematologija, Farmaceutski fakultet, Beograd, 2002. 7. Dopsaj V., Jelić-Ivanović Z., Marisavljević D., Mitić G., Terzić B., Matić G.: Antikoagulantna terapija – klinički i laboratorijski aspekti, Farmaceutski fakultet, Beograd, 2005. 8. Seferović P., Lalić N., Micić D.: Interna medicina, Medicinski fakultet, Beograd, 2021.				
Number of classes:				
Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with student, projects...)
45	45	0	0	0
Methods of teaching: interactive classes, demonstration, practical exercises, analysis of practical examples, case study, discussion, e-learning.				
Grading (maximum 100 points)				
Pre-Exam obligation	Points	Final Exam	Points	
Lecture attendance	3	Exam	30	
Activity	7			
Projects/Seminars	0			
Exercises/professional practice	30			
Colloquiums	30			

HEMOSTASIS

Study program: Professional Medical Laboratory Technologist				
Type and level of study: undergraduate professional studies				
Course: Hemostasis				
Language of instruction: Serbian				
Course status: mandatory				
Semester: third year, sixth semester				
ECTS: 7				
Requirement: no				
Course objective: Acquisition of elementary knowledge of hemostasis mechanisms and clinical manifestations in hemostasis disorders, qualitative and quantitative disorders of thrombocytes, disorders of coagulation factors, clinical manifestations in vascular disorders, disorders of primary and secondary hemostasis.				
Course outcome: Acquired knowledge and possession of skills required for work organization and automation in hemostasis laboratories, acquired knowledge on modern hemostasis screening laboratory tests and of work with automated devices; training for laboratory technologist duties.				
Course content: <i>Lectures</i> Hemostasis mechanisms and clinical manifestation in hemostasis disorders, hemostasis screening laboratory tests and automation in hemostasis laboratory; qualitative and quantitative thrombocyte disorders; clinical manifestations in vascular disorders, disorders of first and second coagulation phase factors, deficit of coagulation factors dependent on vitamin K; primary pathologic fibrinolysis; disseminated intravascular coagulation; anticoagulant therapy and hemostasis screening tests aimed at monitoring hemostasis disorders. <i>Exercises</i> Organization of work and devices in automated hemostasis laboratory; taking samples for coagulation tests; determination of bleeding time (Duke, Ivy); fibrinogen determination methods; determination of prothrombin and thrombin time on coagulometer, determination of partial thromboplastin time, determination of activated partial thromboplastin time; determination of fibrin degradation products, determination of fibrin monomers; fibrinolysis blood test; determination of individual coagulation factors; determination of antithrombin-3 and plasminogen concentration; determination of D-dimer.				
Literature: <i>Literature in English:</i> 1. Goodnight S. H., Hathaway W. E. (eds.): Disorders of Hemostasis and Thrombosis, A Clinical Guide, The McGraw- Hill Companies, New York, 2002. 2. Harmening D. M.: Clinical Hematology and Fundamentals of Hemostasis, F. A. Davis Company, Philadelphia, 2002. 3. Hoffbrand V., Moss P. (eds.): Hoffbrand's Essential Hematology, John Wiley Sons, New York, 2015. 4. Koehane E., Smith L., Walenga J. (eds.): Rodak's Hematology, Clinical Principles and Applications, Elsevier Science, New York, 2015. <i>Literature in Serbian:</i> 5. Marisavljević D. i sar.: Klinička hematologija, udžbenik, Zavod za udžbenike i nastavna sredstva, Beograd, 2012. 6. Petrović M., Dopsaj V., Rajić M., Milojević Z.: Laboratorijska hematologija, Farmaceutski fakultet, Beograd, 2002. 7. Labar B., Hauptmani E. i sar.: Hematologija, udžbenik, Nova školska knjiga, Zagreb, 2007. 8. Seferović P., Lalić N., Micić D.: Interna medicina, Medicinski fakultet, Beograd, 2021.				
Number of classes:				
Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with student, projects...)
60	60	0	0	0
Methods of teaching: interactive classes, demonstration, practical exercises, analysis of examples from practice, case studies, discussion, e-learning.				
Grading (maximum 100 points)				
Pre-Exam obligation	Points	Final Exam	Points	
Lecture attendance	3	Exam	30	
Activity	7			
Projects/Seminars	0			
Exercises/professional practice	30			
Colloquiums	30			

HISTOLOGY

Study program: Professional Medical Laboratory Technologist				
Type and level of study: undergraduate professional studies				
Course: Histology				
Language of instruction: Serbian				
Course status: mandatory				
Semester: first year, second semester				
ECTS: 6				
Requirement: no				
Course objective: Mastering microscopy and becoming familiar with the basic characteristics of the normal structure of cells, tissues, and organs, which form the morphological basis necessary for understanding all vital processes in the body, with special emphasis on recognizing the cell types that are target sites of action for pharmacological substances (muscle cells, nerve cells, epithelial cells), metabolic products of cells that are used as active pharmacological substances (hormones, neurotransmitters), and the cells through which drugs are absorbed, secreted, or metabolized (enterocytes, nephrocytes, hepatocytes).				
Course outcome: Familiarization with basic micromorphological and functional characteristics of a normal structure of cells, tissues and organs.				
Course content: <i>Lectures</i> Basic microscopic methods; general characteristics of the structural cell organization; general characteristics and classification of tissues; epithelial, connective, muscle and nervous tissue; hematopoietic organs and blood; lymphopoietic (lymphatic) organs; cardiovascular system; respiratory system; digestive system; urinary system; male and female reproductive system; nervous system, endocrine system; skin and sensory organs. <i>Exercises</i> Forms of cells and nuclei, covering epithelia; connective tissue (loose connective tissue, adipose tissue, bone tissue); muscle tissue (smooth, skeletal and cardiac); nervous system (cerebrum, spinal cord, peripheral nerve); blood (blood smear: erythrocytes, leucocytes, thrombocytes); cardiovascular system (muscular artery and vein); immune system (palatine tonsil, lymph node); endocrine system (pituitary gland, thyroid gland, adrenal gland); respiratory system (trachea, lungs); digestive system (tongue, stomach, duodenum, liver, pancreas); urinary system (kidney); male and female reproductive system (testicle, ovary, uterus).				
Literature: <i>Literature in English:</i> 1. Mescher A.: Junqueira's Basic Histology, text and atlas, McGraw Hill Professional, New York, 2013. 2. Gray W., McKee G.: Diagnostic cytopathology, Churchill Livingstone, London, 2004. <i>Literature in Serbian:</i> 3. Trpinac D.: Histologija za studente farmacije, Kuća štampe, Beograd, 2001. 4. Trpinac D., Obradović M.: Repetitorijum histologije i embriologije, Medicinski fakultet, Beograd, 2005. 5. Trpinac D.: Praktikum za histološke vežbe za studente farmacije, Farmaceutski fakultet, Beograd, 2005. 6. Belić P., Mačvanin Đ., Šarac D.: Nova koža, Medicinski fakultet, Novi Sad, 2000. 7. Bokun R., Tatomirović Ž., Vukašinović-Bokun Z.: Medicinska citologija, udžbenik, Beograd, 2006.				
Number of classes:				
Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with student, projects...)
30	30	0	0	0
Methods of teaching: interactive classes, demonstration, practical exercises, analysis of examples from practice, case studies, discussion, e-learning.				
Grading (maximum 100 points)				
Pre-Exam obligation	Points	Final Exam	Points	
Lecture attendance	3	Exam	30	
Activity	7			
Projects/Seminars	0			
Exercises/professional practice	30			
Colloquiums/exam	30			

HUMAN RESOURCES MANAGEMENT IN HEALTH CARE

Study program: Professional Medical Laboratory Technologist				
Type and level of study: undergraduate professional studies				
Course: Human Resources Management in Health Care				
Language of instruction: Serbian				
Course status: elective				
Semester: second year, fourth semester				
ECTS: 5				
Requirement: no				
Course objective: Familiarization of students with the concept of human resources management. The intention of the course is to present to students principal issues in human resources management and segments of manager activities, with human resources management as one of most important. The final goal of the course predominantly determines the selection of contents (topics) and method or classes realization.				
Subjects outcome: Students will be able to apply the acquired knowledge in human resources management within their future profession.				
Course content: <i>Lectures</i> Introduction to management and human resource management; differences between management and leadership; basic concepts and functions of management; management in healthcare; management in nursing; main activities of personnel management and human resources management; differences between human resources management and personnel function; social protection in industry; recruitment and selection; adoption of other personnel activities; legislation; flexibility and diversity; information technology; professional associations of personnel members; human resources management; main characteristics of human resources management; issues of human resources management concept; human resources management marketing; human resources strategy and planning; strategy devising process; human resources planning; anticipation of human resources demand; job analysis; evaluation of internal and external human resources supply; unemployment; underqualification; competition; geographical factor; assets; development; rewarding; relations with employees; the European Union: recruitment procedures; job description and person specification, competence profile; person specification, competence profile in the recruitment context; vacancy advertising; targeted recruitment; administrative procedures; supplementary selection techniques; psychological testing; recommendations; health check; relations in employment; rights and responsibilities of both parties; Law on Employment; retirement; payment for work done or performance evaluation; role of employer; impact of personal problems on the job; confidentiality; counseling skill; communication process; hierarchical communication levels; protection at work; working time regulation in the EU; risk assessment; partnership and involvement of employees; employee involvement techniques; basic characteristics of disciplinary procedure; absence control; the role of human resources manager; dismissal and redundancy; fixed-term service agreement; illegal dismissal; rights of dismissed employees; work abroad. <i>Exercises</i> CV analysis – case studies. Recruitment of potential candidates, candidate selection – simulation. Employee training – workshop; coaching – simulation. Feedback – simulation. Leadership, difference between leader and director, leader's skills – workshop, simulation. Individual and group business meetings – simulation. Team spirit and team-building – workshop. Evaluation of employees' performance, employee personal development plan – case study and simulation. Motivation – workshop. Defining rule system, positive and negative bonus – workshop. Leaving the company, agreement termination, dismissal – workshop, simulation. Change of employee position, recognizing employee's potential and optimum job positions – workshop. Visits from economic sector (director of a successful company with a great number of employees).				
Literature: <i>Literature in English:</i> 1. Beik J. I.: Health Insurance Today: A Practical Approach, Saunders, Philadelphia, 2010. 2. Flynn W. J., Mathis R. L., Jackson J. H.: Healthcare Human Resource Management, textbook, Cengage Learning, Boston, 2006. <i>Literature in Serbian:</i> 3. Legetić B.: Principi menadžmenta, udžbenik, Ekonomski fakultet, Subotica, 2007. 4. Marinković Lj: Menadžment u zdravstvenim organizacijama, G.A.D. Beograd, 2001. 5. Mićović P.: Zdravstveni menadžment, Obeležja, Beograd, 2008. 6. Vujić D.: Menadžment ljudskih resursa i kvalitet, Centar za primenjenu psihologiju društva psihologa Srbije, Beograd, 2003. 7. Probbins S., Judge T.: Organizaciono ponašanje, Mate, Zagreb, 2009. 8. Frančesko M.: Kako unaprediti menadžment u preduzeću, Novi Sad, Prometej, 2003.				
Number of classes:				
Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with student, projects...)
30	30	0	0	0
Methods of teaching: lectures, practical exercises, workshop, discussion, simulation, case study, e-learning.				

Grading (maximum 100 points)			
Pre-Exam obligations	Points	Final Exam	Points
Lecture attendance	3	Exam	40
Activity	7		
Projects/Seminars	0		
Exercises/professional practice	20		
Colloquiums	30		

HYGIENE WITH THE BASICS OF MICROBIOLOGY AND PARASITOLOGY

Study program: Professional Medical Laboratory Technologist				
Type and level of study: undergraduate professional studies				
Course: Hygiene with the Basics of Microbiology and Parasitology				
Language of instruction: Serbian				
Course status: elective				
Semester: first year, second semester				
ECTS: 5				
Requirement: no				
Course objective: Acquisition of knowledge on health care training process as a measure of health protection at all levels, familiarization with principles, objectives and methods of application of health care educational measures and impact on change of risky behavior of individual, family and community. Development of interest of student in his/her permanent professional and general education, that its, training of health care professional in risk management in health care institutions. Familiarization with cell organization and main characteristics of bacteria, viruses and parasites.				
Course outcome: Students acquire practical knowledge on professional competencies within their profession, on the analysis and management of risk in health care institutions regarding hygiene and protection of health of medical professionals and beneficiaries of health care services at all levels of health protection. Additionally, upon completion of the course and passing of the exam, the student will be familiar with cellular organization and basic characteristics of bacteria, viruses, and parasites.				
Course content: <i>Lectures</i> Hygiene and health; hygiene requirements in planning and construction of health care institutions; illumination, ventilation and heating in health care institutions; air quality in health care institutions; water and health; health safety of drinking water; water supply of health care institutions; disinfection of drinking water; disposal of solid and liquid waste; disposal of medical waste; personal hygiene of health care professionals: hand hygiene and personal protection substances; hygiene procedures in maintaining hygiene of sick persons; hygienic-epidemiologically adequate solutions of sanitary area; hygienically adequate treatment of hospital laundry; hygienic requirements for kitchens and food distribution; application of HACCP system in food and drinking water handling; international and Serbian legislation in the area of food and general use objects safety; risk management in health care institutions; determining critical spots in health care institutions; epidemiological importance of defining critical spots and critical spot control plan in health care institutions; disease prevention; widely applicable international and national legislation on food safety; carrying out health care educational intervention – professional nurse in the health care system; general bacteriology; microorganism classification, anatomy and physiology of bacterial cell, bacteria metabolism, action of physical and chemical agents on microorganisms; pathogenicity and virulence factors, antibiotics, antimycotics and chemotherapeutics, physiological importance of microflora, rapid diagnostic tests and molecular methods in microbiology; general and special virology: general features of viruses, action of physical and chemical agents on viruses; pathogenesis and control of virus infections, interferons and antiviral drugs, laboratory diagnostics, DNA and RNA and viruses of importance for human pathology; parasitology. <i>Exercises</i> Planning hygienic requirements for health care institutions. Presentation of test results and air quality evaluation. Air sampling methods in health care institutions. Presentation of test results and evaluation of health safety of water. Disinfection of drinking water. Drinking water sampling methods. Environmentally adequate disposal of medical waste. Preparation for seminar paper: monitoring personal hygiene of health care professionals. Presentation of seminar paper in the area of monitoring personal hygiene of health care professionals. Drawing up HACCP system for kitchens in health care institutions. Determining critical spots in health care institutions. Demonstration of health care institution functioning in terms of hygienic requirements – field visit. Demonstration of functioning of microbiology institution and involvement in microbiological analysis.				
Literature: <i>Literature in English:</i> - Weston D.: Infection Prevention and Control: Theory and Practice for Healthcare Professionals, John Wiley & Sons, New York, 2008. - Andersen B. M.: Prevention and Control of Infections in Hospitals, textbook, Practice and Theory, Springer, Berlin, 2016. - Tortora Gerard J., Funke Berdell R., Case Christine L.: Microbiology: An Introduction, textbook, Books a la Carte Edition, Benjamin Cummings, New York, 2009. <i>Literature in Serbian:</i> - Novaković B., Grujić V.: Higijena i zdravstveno vaspitanje, udžbenik, Medicinski fakultet, Novi Sad, 2005. - Kekuš D.: Zdravstveno vaspitanje, udžbenik, Digital art, Beograd, 2009. - Kristoforović-Ilić M.: Higijena sa medicinskom ekologijom, udžbenik, Ortomedics, 2003. - Baračkov N., Bujak J., Ilić D., Jović S., Panić M. i sar.: Vaspitanje za zdravlje kroz životne veštine, Ministarstvo prosvete i sporta Republike Srbije, 2007.				
Number of classes:				
Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with student, projects...)

30	30	330	0	0
Methods of teaching: lectures, practical classes, discussion, problem-solving, clinical practice.				
Grading (maximum 100 points)				
Pre-Exam obligations	Points	Final Exam	Points	
Lecture attendance	3	Exam	40	
Activity	7			
Projects/Seminars	0			
Exercises/professional practice	20			
Colloquiums	30			

LABORATORY NUCLEAR MEDICINE

Study program: Professional Medical Laboratory Technologist				
Type and level of study: undergraduate professional studies				
Course: Laboratory Nuclear Medicine				
Language of instruction: Serbian				
Course status: elective				
Semester: third year, sixth semester				
ECTS: 5				
Requirement: Basics of Nuclear Medicine				
Course objective: The aim of the course is to acquire knowledge about the procedures of reception, synthesis, preparation, and quality control of radiopharmaceuticals; the in vitro application of isotopes in diagnostics; the basic principles of radioimmunological, immunoradiometric, and related assays; the application of these assays in endocrinology, oncology, and other related fields; as well as to familiarize students with the use of laboratory nuclear medicine methods in endocrinology, hematology, nephrourology, and other clinical indications.				
Course outcome: After completing the course and passing the exam, the student will have acquired knowledge and be qualified to participate in the application of nuclear medicine in the preparation, synthesis, and quality control of diagnostic and therapeutic radiopharmaceuticals, in laboratory methods (RIA, IRMA), as well as in hematology, nephrourology, and other clinical indications.				
Course content: <i>Lectures</i> Familiarization with the procedures of reception, synthesis, preparation, and quality control of radiopharmaceuticals, as well as with the principles and application of radioimmunological and immunoradiometric assays in determining the concentration of various biologically active substances (hormones, tumor markers). Application of nuclear medicine methods in hematology, nephrourology, and other clinical indications. <i>Exercises</i> Familiarizing the student with the principles of preparation, synthesis, and quality control of radiopharmaceuticals, as well as with the performance of radioimmunological, immunoradiometric, hematological, nephrourological, and other clinical methods of laboratory nuclear medicine in real conditions.				
Literature: <i>Literature in English:</i> 1. Mastenbjörk M., Meloni S.: Lab Values: Everything You Need to Know about Laboratory Medicine and it's Importance in the Diagnosis of Diseases, Medical Creations, London, 2020. 2. Bennett P. A.: Diagnostic Imaging: Nuclear Medicine, Elseiver, New York, 2020. <i>Literature in Serbian:</i> 3. Bogičević M., Ilić S.: Nuklearna medicina, metodologija i klinika, udžbenik, Medicinski fakultet, Niš, 2007. 4. Vlajković M.: Praktikum nuklearne medicine, Galaksijanis, Niš, 2020. 5. Šobić Šaranović D., Artiko V.: Nuklearna medicina, udžbenik, Medicinski fakultet, Beograd, 2020. 6. Dodig D., Kusić Z.: Klinička nuklearna medicina, Medicinska naklada, Zagreb, 2012.				
Number of classes:				
Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with student, projects...)
30	30	180	0	0
Methods of teaching: interactive classes, demonstration, practical exercises, analysis of examples from practice, case studies, discussion, e-learning.				
Grading (maximum 100 points)				
Pre-Exam obligation	Points	Final Exam	Points	
Lecture attendance	3	Exam	30	
Activity	7			
Projects/Seminars	0			
Exercises/professional practice	40			
Colloquiums/exam	20			

MARKETING OF HEALTH CARE INSTITUTIONS

Study program: Professional Medical Laboratory Technologist				
Type and level of study: undergraduate professional studies				
Course: Marketing of Health Care Institutions				
Language of instruction: Serbian				
Course status: elective				
Semester: second year, third semester				
ECTS: 5				
Requirement: no				
Course objective: Students acquire basic knowledge in the area of marketing in health care, get familiar with modern methods of marketing strategies and manner of communication in health care marketing. Accordingly, the primary course objective is to familiarize students with the genesis and goal of various areas of strategic marketing, including its dominant theories, which is necessary for successful development of activities. Students will also acquire knowledge on notions of marketing campaign, marketing plan designing and principal methods used in marketing of health care institutions, governmental bodies, or for the purpose of certain public campaigns and initiatives.				
Course outcome: Upon the completion of the course, students will be able to understand strategic marketing in health care and be capable to independently conduct research of marketing methods convenient for solution of a specific project task in terms of health care institutions, governmental bodies, or in terms of public campaigns or initiatives. Students will also be competent to evaluate relevant theories of strategic marketing in different empirical contexts and to understand interconnection between marketing strategy, operative-organizational parts of enterprises and market results. Students will understand how to manage marketing campaign, notion of marketing plan designing and primary methods used in marketing.				
Course content: <i>Lectures</i> Nature and character of marketing; evolution of marketing and approaches in studying it. Marketing management process; changes of marketing in health care institutions, government or governmental bodies. Presentation and analysis of marketing in health care. Marketing information system and market research; market analysis. Market segmentation and selection of targeted markets. Notion of public perception; importance of marketing in health care in strategic marketing: Market research; SWOT analysis, benchmarking and portfolio. BCG matrix.integrated marketing communications; promotional health campaigns; prevention, promotion of public health and marketing (examples of campaigns in Serbia or in the region: campaigns against smoking, diabetes, self-check promotions for breast cancer....). Value chain and cost efficiency; general principles of marketing (marketing mix, models, methods and marketing techniques). Designing promotional campaign plan; targeting; following post-marketing campaign. Medical marketing practice code; general marketing and targeted marketing campaigns. Different types of marketing materials in health care, depending on the target audience. Marketing outsourcing, marketing agencies; printed material, printed media, billboards, electronic media, social networks. Direct marketing; fairs, conferences, meetings; public events, health festivals. Sponsorships. Website; promotional material; presentation; marketing and PR. Public appearances of employees, health care institution management, governmental bodies. Marketing in crisis or emergency situations. Public appearances of employees. Dress code. Appearance of employees, institution. <i>Exercises</i> Analysis and discussion on practical examples of marketing campaigns – workshops. Market segmentation and research; SWOT analysis, benchmarking and portfolio. Designing promotional campaign plans in health care – workshop on a given topic in health care. Analysis of examples of marketing campaigns in Serbia examples of workshops (e-learning, analysis of existing initiatives and public events) and globally, workshops, e-learning, internet searching. Marketing in health care in Serbia – workshop. Designing promotional campaign plan on a given topic in health care, targeting, marketing mix, marketing models, methods and techniques - workshop. Printed material, printed media, billboards, electronic media, social networks - conceiving material on given topic in health care, with a focus on the target group type. Direct marketing - simulation. Fairs, conferences, meetings, public events - workshop. Sponsorships. Website - workshop. Promotional material - workshop. Presentation; marketing and PR. Public appearance of employees. Dress code - visit. Appearance of employees, institution. Visits from business community (marketing or PR manager of health care institution, marketing or PR manager of a business organization).				
Literature: <i>Literature in English:</i> 1. Berkowitz N. E.: Essentials of Health Care Marketing, textbook, Jones & Bartlett Learning, Boston, 2010. <i>Literature in Serbian:</i> 2. Kotler P.: Upravljanje marketingom, udžbenik, Mate, Zagreb, 2017. 3. Macura P.: Marketing – mikro, mala i srednja preduzeća, udžbenik, Ekonomski fakultet, Banja Luka, 2009. 4. Tasić Lj.: Farmaceutski menadžment i marketing, Nauka, Beograd, 2002. 1. Ljubojević Č. Ćirić M.: Marketing usluga, Novi Sad, 2017.				
Number of classes:				
Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with student, projects...)
30	30	0	0	0

Methods of teaching:

lectures, discussions, case study, workshop, visiting lectures of representatives of business community (marketing or PR manager of a health care institution, marketing or PR manager of business organization), exercises, e-learning.

Grading (maximum 100 points)

Pre-Exam obligation	Points	Final Exam	Points
Lecture attendance	3	Exam	40
Activity	7		
Projects/Seminars	0		
Exercises/professional practice	20		
Colloquiums	30		

MEDICAL AND PHARMACEUTICAL WASTE

Study program: Professional Medical Laboratory Technologist				
Type and level of study: undergraduate professional studies				
Course: Medical and Pharmaceutical Waste				
Language of instruction: Serbian				
Course status: elective				
Semester: first year, first semester				
ECTS: 5				
Requirement: no				
Course objective: Course objective is that student understand the medical and pharmaceutical waste management, the risk of infectious waste and training students to individually or as team members identify and classify medical waste, as well as to use data on waste categorization aimed at drawing up and implementation of the Waste Management Plan.				
Course outcome: Acquisition of knowledge and skills to manage medical waste, in particular hazardous medical waste, and competence of professional staff to train medical staff, review the circumstances and accomplish waste management plans in health care and other institutions in Serbia.				
Course content: <i>Lectures</i> Medical waste, infectious, pharmaceutical, chemical, pathoanatomical and radioactive waste. Creation of waste. Waste flows in health care and other institutions. Quantity assessment and risks. Classification, collection, marking, storage, treatment and disposal of medical waste. Modern methods of treatment and disposal of medical waste in the world and in our country. Principles of waste management. Place and role of the person in charge of medical waste management in health care, as well as other institutions that generate such waste. National legal regulations, recommendations and good practice in the countries of the European Union. Drawing up waste management plan. <i>Exercises</i> Visit to medical biochemical laboratory, microbiological laboratory, blood transfusion institute, outpatient clinic, clinical centre, clinical centre infectious clinic; analysis of the work in real life circumstances; case studies, discussion; good practice in the EU countries.				
Literature: <i>Literature in English:</i> 1. Landrum V. J.: Medical Waste Management and Disposal, Elseiver, London, 2001. <i>Literature in Serbian:</i> 2. Tošović S. i sar.: Bezbedno upravljanje medicinskim otpadom, Nacionalni vodič dobre prakse, Ministarstvo zdravlja RS, Beograd, 2009. 3. Matović V., Đukić M., Antonijević B.: Praktikum iz kliničko-toksikoloških analiza, Paragon, Beograd, 2005. 4. Zakon o upravljanju otpadom, Sl. glasnik RS 36/09. 5. Direktiva o opasnom otpadu 91/689/EES. 6. Okvirna Direktiva o otpadu 75/442/EES. 7. Jokanović M.: Toksikologija, udžbenik, udžbenik, Elit Medica, Beograd, 2001.				
Number of classes:				
Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with student, projects...)
30	30	0	0	0
Methods of teaching: lectures, practical exercises with anatomical and histological specimens, use of atlases, video projections, computer animations, and simulations of physiological processes.				
Grading (maximum 100 points)				
Pre-Exam obligation	Points	Final Exam	Points	
Lecture attendance	3	Exam	40	
Activity	7			
Projects/Seminars	0			
Exercises/professional practice	20			
Colloquiums	30			

MEDICAL BIOCHEMISTRY 1

Study program:	Professional Medical Laboratory Technologist
Type and level of study:	undergraduate professional studies
Course:	Medical Biochemistry 1
Language of instruction:	Serbian
Course status:	mandatory
Semester:	second year, fourth semester
ECTS:	10
Requirement:	Basics of Biochemistry
Course objective: The objective of the course Medical Biochemistry 1 and 2 is the study and measurement of biochemical changes occurring in human diseases and while attending the course students need to: understand medical, professional and technological principles of medical biochemistry and its relationship with other sciences; acquire knowledge on the application of medical biochemistry in diagnostics; acquire knowledge on laboratory techniques, instruments and informatics; acquire knowledge on biochemical samples, methods and time of their collection, keeping, as well as of impacts of different factors on them; understand how diseases affect metabolism of different bioproducts; learn how to use instruments in biochemical medical laboratory; acquire skills required for performing biochemical tests; acquire knowledge on the selection of appropriate laboratory tests for diagnosis; learn how to interpret laboratory results; accept new trends in laboratory diagnostics (molecular diagnostics, patient tests, self-tests) and to understand the role of medical biochemist in the future.	
Course outcome: Upon the completion of the course students will understand the role of biochemical laboratory in diagnostics, monitoring and treatment of human diseases; they will understand the biochemical basis of human diseases, principles of analytical tests carried out in biochemical laboratories; they will be trained to monitor experimental procedures in laboratory testing of diseases, know how to evaluate the effectiveness of individual tests, strategies and protocols in disease testing, be capable of interpreting laboratory results, know how to read and use literature taking a critical approach, state valid points and take part in professional discussions with medical teams on the use of laboratory tests in diagnostics.	
Course content: <i>Lectures</i> Digestion and absorption of carbohydrates; glucose metabolism; regulation of carbohydrates metabolism: insulin and glucagon, epinephrine, thyroxine, ACTH, cortisol, growth hormone; diabetes mellitus; classification of diabetes mellitus; laboratory results in hyperglycemia; laboratory diagnosis and diabetes monitoring; oral glucose tolerance test; hypoglycemia; causes of hypoglycemia; genetic disorder on carbohydrate metabolism; the role of laboratory in differential diagnosis and monitoring patients with carbohydrate metabolism disorders; methods of determining glucose level; glycosylated hemoglobin; methods of determining glycosylated hemoglobin; ketones; methods of determining ketone; microalbuminuria; digestion and protein absorption; properties and function of plasma proteins: prealbumin, albumin, α 1-antitrypsin, α 1-fetoprotein, α 1-acidic glycoprotein, α 1-antichymotrypsin, haptoglobin, ceruloplasmin, α 2-macroglobulin, transferrin, hemopexin, β 2-microglobulin, fibrinogen, C-reactive protein, complement, immunoglobulins; disorders in concentration of total proteins: hypoproteinemia and hyperproteinemia; methods of protein determining; diagnostic value of determining different protein; fractioning, identification and quantification of specific proteins; electrophoresis of serum proteins; high resolution serum protein electrophoresis; proteins in other bodily fluids; proteins in urine; proteins in cerebrospinal fluid; metabolism of amino acids; amino acids in plasma; aminoacidopathies: phenylketonuria, tyrosinemia, alkaptonuria, homocystinuria, cystinuria; determining of amino acids; lipid digestion, absorption and transport; fatty acids, triglycerides, phospholipids and cholesterol: lipoprotein structure; lipoprotein metabolism: lipid absorption, exogenous and endogenous pathway, reverse cholesterol transport; distribution of lipids and lipoproteins in population; lipid metabolism disorders; biochemical markers and risk assessment for atherosclerosis; hyperlipoproteinemia; hypercholesterolemia; hypertriglyceridemia; combined hyperlipoproteinemia; increase in Lp(a) concentration; hypolipoproteinemia; hypoalphalipoproteinemia; lipid and lipoprotein determination; cholesterol, triglyceride, phospholipid and fatty acid determination; methods of separation and quantification of lipoproteins in serum; determination of HDL-, LDL-cholesterol and apolipoproteins; standardization of lipid and lipoprotein determination methods. <i>Exercises</i> Laboratory exercises; types of biological samples; sample collection and processing; factors affecting determination of different analytes; development and application of analytic techniques used in clinical biochemistry for diagnostic purposes, monitoring and detecting disease complications; safety in laboratory and relevant regulations. Removal of hazardous substances; calibration of laboratory equipment and accessories; determination of total serum proteins using the biuret method; determination of albumins using the bromocresol green assay; urine and serum protein electrophoresis; turbidimetric method and Ponceau S method for determination of urine proteins; immunochemical determination of different serum proteins; biuret method for fibrinogen determination; determination of glucose using glucose oxidase method; determination of glycosylated hemoglobin using ion exchange chromatography; enzymatic method for cholesterol determination; determination of HDL-cholesterol by settling with phosphotungstate/manganese; lipoprotein electrophoresis; computer simulations; part of exercises is carried out in biochemistry laboratory.	
Literature: <i>Literature in English:</i> 1. Caplan L. A., Pesce J. P., Kazmierzak C. K.: Clinical Chemistry, Mosby, Maryland Heights, Missouri, 2004. <i>Literature in Serbian:</i>	

2. Spasić S., Jelić-Ivanović Z., Spasojević-Kalimanovska V.: Medicinska biohemija, udžbenik, Farmaceutski fakultet, Beograd, 2004.
3. Spasić S., Jelić-Ivanović Z., Spasojević-Kalimanovska V.: Praktikum iz medicinske biohemije, Farmaceutski fakultet, Beograd, 2005.
4. Majkić-Singh N.: Medicinska biohemija, udžbenik, DMB SCG, Beograd, 2006.
5. Simić T., Marković I., Petronijević N., Isaković A.: Priručnik za vežbe iz biohemije, Medicinskifakultet, Beograd, 2008.
6. Ubavić M.: Interpretacija najčešćih laboratorijskih analiza i uticaj lekova na njih, udžbenik, Farmaceutski fakultet, Novi Sad, 2017.
7. Kovačević D.: Biohemija, Savremena administracija, Beograd, 2003.
8. Marković I., Isaković A.: Energetski metabolizam kroz pitanja i odgovore, Medicinski fakultet, Beograd, 2008.
9. Petronijević N., Misirlić Denčić S.: DNK, RNK i sinteza proteina kroz pitanja i odgovore, Medicinskifakultet, Beograd, 2008.

Number of classes:

Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with student, projects...)
75	75	0	0	0

Methods of teaching:

interactive classes, demonstration, practical exercises, analysis of examples from practice, case studies, discussion, e-learning.

Grading (maximum 100 points)

Pre-Exam obligation	Points	Final Exam	Points
Lecture attendance	3	Exam	30
Activity	7		
Projects/Seminars	0		
Exercises/professional practice	30		
Colloquiums/exam	30		

MEDICAL BIOCHEMISTRY 2

Study program:	Professional Medical Laboratory Technologist
Type and level of study:	undergraduate professional studies
Course:	Medical Biochemistry 2
Language of instruction:	Serbian
Course status:	mandatory
Semester:	third year, fifth semester
ECTS:	10
Requirement:	Medical Biochemistry 1
Course objective:	The objective of the course Medical Biochemistry 1 and 2 is the study and measurement of biochemical changes occurring in human diseases and while attending the course students need to: understand medical, professional and technological principles of medical biochemistry and its relationship with other sciences; acquire knowledge on the application of medical biochemistry in diagnostics; acquire knowledge on laboratory techniques, instruments and informatics; acquire knowledge on biochemical samples, methods and time of their collection, keeping, as well as of impacts of different factors on them; understand how diseases affect metabolism of different bioproducts; learn how to use instruments in biochemical medical laboratory; acquire skills required for performing biochemical tests; acquire knowledge on the selection of appropriate laboratory tests for diagnosis; learn how to interpret laboratory results; accept new trends in laboratory diagnostics (molecular diagnostics, patient tests, self-tests) and to understand the role of medical biochemist in the future.
Course outcome:	Upon the completion of the course students will understand the role of biochemical laboratory in diagnostics, monitoring and treatment of human diseases; they will understand the biochemical basis of human diseases, principles of analytical tests carried out in biochemical laboratories; they will be trained to monitor experimental procedures in laboratory testing of diseases, know how to evaluate the effectiveness of individual tests, strategies and protocols in disease testing, be capable of interpreting laboratory results, know how to read and use literature taking a critical approach, state valid points and take part in professional discussions with medical teams on the use of laboratory tests in diagnostics.
Course content:	Lectures Water; osmolarity; regulation of osmolarity and volume of bodily fluids; the importance of serum osmolarity as an indicator of water balance; determination of osmolarity; water metabolism disorders: dehydration and hyperhydration; sodium; regulation of sodium concentration in plasma; sodium metabolism disorders: hypernatremia and hyponatremia; sodium determination; potassium; regulation of potassium; potassium metabolism disorders: hyperkalemia and hypokalemia; potassium determination; chlorides; chlorides concentration disorders; chloride determination; acid base balance; H^+ concentration maintenance; regulation of acid base balance: buffers, lungs and kidneys; bicarbonate buffer system and the Henderson-Hasselbalch equation; main types of acid base balance disorders and their causes; interpretation of laboratory results of different metabolic and respiratory disorders; the importance of the anion gap in the evaluation of concentration of electrolytes and gases in blood; acid-base analyzers: pH, pCO_2 and pO_2; methods of determination of blood gases; calcium, magnesium and phosphate homeostasis; hormones controlling calcium absorption and homeostasis; causes and testing of calcium, magnesium and phosphate metabolism disorders; hypercalcemia and hypocalcemia; hypermagnesemia and hypomagnesemia; analytical methods in determination of calcium, magnesium and phosphate; the importance of determination of ionized calcium relative to the determination of total calcium; diagnostic value of determination of calcium, magnesium and inorganic phosphate; purine, pyrimidine and nucleotide metabolism; uric acid creation; analytical methods in determination of uric acid; samples for determination of uric acid and interfering substances; disease relating to increased concentration of uric acid in plasma; essential elements in traces: zinc, copper, manganese, cobalt, selenium, molybdenum, chromium, iodine; function of elements in traces and disorders; collection and preparation of samples and determination of elements in traces. Exercises Introduction to laboratory diagnostics. Organization of work in the laboratory. Types of biological materials. Medical waste management. ISO 15189 standard. Collection and processing of biological material. Venous and capillary blood sampling. Pre-analytical, analytical, and post-analytical phases. Biochemical analyses. Immunochemical analyses. Collection and processing of microbiological samples. Urine analysis.
Literature:	Literature in English: - Caplan L. A., Pesce J. P., Kazmierzak C. K.: Clinical Chemistry, Mosby, Maryland Heights, Missouri, 2004. Literature in Serbian: - Spasić S., Jelić-Ivanović Z., Spasojević-Kalimanovska V.: Praktikum iz medicinske biohemije, Farmaceutski fakultet, Beograd, 2005. - Spasić S., Jelić-Ivanović Z., Spasojević-Kalimanovska V.: Medicinska biohemija, udžbenik, Farmaceutski fakultet, Beograd, 2004. - Majkić-Singh N.: Medicinska biohemija, udžbenik, DMB SCG, Beograd, 2006. - Simić T., Marković I., Petronijević N., Isaković A.: Priručnik za vežbe iz biohemije, Medicinski fakultet, Beograd, 2008. - Ubavić M.: Interpretacija najčešćih laboratorijskih analiza i uticaj lekova na njih, udžbenik, Farmaceutski fakultet, Novi Sad, 2017. - Kovačević D.: Biohemija, Savremena administracija, Beograd, 2003.

8. Marković I., Isaković A.: Energetski metabolizam kroz pitanja i odgovore, Medicinski fakultet, Beograd, 2008.
9. Petronijević N., Misirlić Denčić S.: DNK, RNK i sinteza proteina kroz pitanja i odgovore, Medicinski fakultet, Beograd, 2008.

Number of classes:

Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with student, projects...)
45	45	0	0	0

Methods of teaching:

interactive classes, demonstration, practical exercises, analysis of practical examples, case study, discussion, e-learning.

Grading (maximum 100 points)

Pre-Exam obligation	Points	Final Exam	Points
Lecture attendance	3	Exam	30
Activity	7		
Projects/Seminars	0		
Exercises/professional practice	30		
Colloquiums	30		

MEDICAL GENETICS AND MOLECULAR BIOLOGY

Study program: Professional Medical Laboratory Technologist				
Type and level of study: undergraduate professional studies				
Course: Medical Genetics and Molecular Biology				
Language of instruction: Serbian				
Course status: mandatory				
Semester: second year, third semester				
ECTS: 7				
Requirement: no				
Course objective: Familiarization of students with basic facts on the cell with a special focus on the importance of genetic factors in its functioning. The aim of the course is acquisition of a more extensive knowledge on the latest finding in the field of molecular and functional organization of the cell and to familiarize them with basic techniques used in the study of the cell.				
Course outcome: Upon the completion of the course, the student should be trained to apply the microscoping technique, describe and explain the structure and function of the cell as a basic unit of living organism structure, understand the organization of the processes in the cytoplasm and cell nucleus, describe and explain information transfer from DNA molecule through RNK to proteins, understand and explain mechanism of occurrence of mutations of genetic material (genotype) and to relate the said changes to an appropriate phenotype. Upon the completion of the course students are expected to understand principles on which modern research in the sphere of molecular biology is based, as well as to be trained and capable to apply the acquired knowledge in their future research work.				
Course content: <i>Lectures</i> Course concept. Methodology of research in cell biology and genetics. Main characteristics of the eukaryotic cell. Chemical composition and metabolism of the cell, Eukaryotic cell organization. Hereditary basis and its function. Changes in the structure of genes and chromosomes. The cell cycle and cell dying; gametogenesis, fertilization and biology of development. Gene and chromosome mutation. DNA and gene expression. DNA repair mechanism. Immunobiology. Oncogenetics. Molecular bases of human diseases. Pharmacogenomics. Emergence and evolution of cell genetic systems. Folding, processing, distribution, functionality regulation, changeability, degradation and emergence of new types of proteins. Molecular, structural and functional correlation between cell components: cell membrane, cytoskeleton, organelles, nucleus, chromatin. Extracellular matrix and intercellular communication. Nuclear architecture (nuclear matrix, nuclear compartments, chromosome territories) and their role in gene expression. Evolutionary changes in genome organization. Human genome. Reception and transduction of signals in the cell: signal molecules and their receptor, intracellular pathways of transduction of signals, signal pathways communication, selectivity and specific features of bidirectional transport between the cytoplasm and the nucleus. Constitutive, inducible, tissue-based and time specific gene expression. Gene expression regulation at transcriptive, post-transcriptive and post-translational level. Families of transcription factors, their role and regulation mechanisms of their activity. Structural modification of regulatory proteins: phosphorylation, glycosylation, ADP-ribosylation, sumoylation, ubiquitination. Cell cycle regulation. Cell proliferation during development and differentiation. Programmed cell death – apoptosis. Basic principles of genetic engineering, application, cloning. <i>Exercises</i> Microscope and microscoping; size and form of cells, nuclei, embryonic cell origin; plasma membrane; cytoplasmic organelles; interphase nucleus, chromatin; cell division: mitosis and meiosis; transcription and translation; chromosomal aberrations and gene mutations; practical classes are organized as experimental and demonstrative audio-visual exercises; familiarization of students with the latest techniques in molecular biology.				
Literature: <i>Literature in English:</i> 1. Alberts B.: Molecular Biology of the Cell, Garland Science, New York, 2008. 2. Nussbaum R. L., McInnes R. R., Willard H. F.: Genetics in Medicine, Saunders, Philadelphia, 2007. 3. Lodish H., Berk A., Zipursky S. L., Matsudaira P., Baltimore D., Darnell J.: Molecular Cell Biology, W. H. Freeman & Co., New York, 2003. <i>Literature in Serbian:</i> 4. Diklić V., Kosanović M., Dukić S., Nikoliš J.: Biologija sa humanom genetikom, udžbenik, Grafopan, Beograd, 2001. 5. Kovačević Z. L.: Biohemija i molekularna biologija, udžbenik, Medicinski fakultet, Novi Sad, 2002. 6. Tripeni P., Elard S.: Emerijevi osnovi medicinske genetike, Data Status, Beograd, 2009. 7. Hristić M., Potparević B.: Praktikum iz biologije sa humanom genetikom, Farmaceutski fakultet, Beograd, 2005. 8. Đelić N., Stanimirović Z.: Principi genetike, Elit Medica, Beograd, 2004.				
Number of classes:				
Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with student, projects...)

45	45	0	0	0
Methods of teaching: interactive classes, demonstration, practical exercises, analysis of examples from practice, case studies, discussion, e-learning.				
Grading (maximum 100 points)				
Pre-Exam obligation	Points	Final Exam	Points	
Lecture attendance	3	Exam	40	
Activity	7			
Projects/Seminars	0			
Exercises/professional practice	20			
Colloquiums	30			

MENTAL HYGIENE

Study program: Professional Medical Laboratory Technologist				
Type and level of study: undergraduate professional studies				
Course: Mental Hygiene				
Language of instruction: Serbian				
Course status: elective				
Semester: third year, fifth semester				
ECTS: 5				
Requirement: no				
Course objective: Students are trained to perceive phenomena of mental health and mental illness from a wider, multidisciplinary and multidimensional aspect, to assume responsible tasks in protection and improvement of mental health in their work within community, as well as to take care of sick persons against use of high technology and preserve human relationships in institutions and patients homes.				
Course outcome: Adoption of knowledge and mastering skills in evaluation, monitoring, creating and carrying out therapy communication with health protection beneficiaries – persons with mental health issues, members of their families and healthy members of the community.				
Subjects content: <i>Lectures</i> Subject and theoretical fundamentals of mental health; prevention of mental disorders; mental health of the entire human life cycle: birth and childhood; adolescence; adulthood; old age; modern life problems: alienation; living in urban environment; living in rural environment; nutrition issues; physical activities; life crises; sickness and disablement in family; stress and burn-out syndrome; emergencies; refugees, armed conflicts; natural disasters; posttraumatic conditions; social pathology and maladaptive behavior; extramarital status; LGBT population; domestic violence; violence against women; violence against old people; alcoholism; drug-addiction; prostitution; religious sects; pathological gambling; suicidality; new forms of addiction; approach to person from mental-hygiene aspect: health and sickness; dying and death; dehumanization and humanization of relations; communication in health care profession; comprehensive protection of mental health.				
<i>Exercises</i> Following theoretical classes. Case studies. Visits of representatives from relevant associations. Drawing up seminar papers. Devising conceptual project plans relating to current issues. Visit of a genuine representative of a marginalized group. Analysis of projects (city, provincial, republic) dealing with marginalized groups of people in the country. Visits of members of aid providing associations (victims of armed conflicts, natural disasters, etc.).				
Literature: <i>Literature in English:</i> 1. Bell G. E.: The Good Book of Mental Hygiene, Resource Publications, Borston, 2020. 2. Glen A.: Mental Hygiene: How To Change Your Mind, CreateSpace Independent Publishing Platform, London, 2018. 3. Tria G. E., Gaerlan J. E., Limpingco D. A.: Principles of Mental Hygiene, Pantas Publishing & Printing, Rotterdam, 2010. <i>Literature in Serbian:</i> 4. Simić M., Kovačević K.: Mentalna higijena, udžbenik, autorsko izdanje, Beograd, 2004. 5. Kaličanin P. i sar.: Stres, zdravlje, bolest, udžbenik, Obeležja, Beograd, 2007. 6. Berger D.: Zdravstvena psihologija, Društvo psihologa Srbije, Centar za primarnu psihologiju, Beograd, 2002. 7. Havelka M. i sar.: Zdravstvena psihologija, Naklada Slap, Jastrebarsko, 2002. 8. Nikolić D.: Bolesti zavisnosti, Narodna knjiga-Alfa, Beograd, 2007. 9. Stanković Z., Begović D.: Alkoholizam od prve do poslednje čaše, Kreativni centar, Beograd, 2005.				
Number of classes (per semester):				
Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with student, projects...)
30	30	0	0	0
Methods of teaching: lectures, exercises, workshop, discussion, seminar paper.				
Grading (maximum 100 points)				
Pre-Exam obligations	Points	Final Exam	Points	
Lecture attendance	3	Exam	40	
Activity	7			
Projects/seminar papers	0			
Exercise/professional practice	20			
Colloquiums	30			

NUTRITIONISM

Study program: Professional Medical Laboratory Technologist				
Type and level of study: undergraduate professional studies				
Course: Nutritionism				
Language of instruction: Serbian				
Course status: elective				
Semester: second year, third semester				
ECTS: 5				
Requirement: no				
Objective of the course: The objective of the course is the acquisition of knowledge on the structure, importance, physiological action and recommended consumption of nutritious food and how to select and combine food as a source of nutritious substances; they are to be explained the concept of adequate nutrition and to be familiarized with specific features of nutritional needs of certain groups of people according to their age, intensity of everyday body activity, body mass, genetic predispositions, possible pathological conditions etc., as well as to present them current trends of healthy food.				
Course outcome: Upon the successfully completed course students will possess the knowledge of the structure, importance, physiological action and recommended consumption of nutritious food and how to select and combine food as a source of nutritious substances, and they will be able to explain the concept of adequate nutrition and specific features of nutritional needs of certain groups of people according to their age, intensity of everyday body activity, body mass, genetic predispositions, possible pathological conditions etc.				
Course content: <i>Lectures</i> Historical development of food and food science; basic types of nutritional components; proteins; carbohydrates; lipids; vitamins; minerals; energy and nutritional needs of people and their dependence on external and internal factors; principles of adequate nutrition; healthy food trends; functional food; types of food, general classification; the importance of water in nutrition; meat and meat products; milk and dairy products; bread, pastries, pasta and products from cereals; fruit and vegetables; sweets; spices, sauces, gravies etc.; teas; coffee; non-alcoholic beverages, carbonated beverages; beer; wine, strong alcoholic drinks; oriental food; types of nutrition depending on geographic region; ecological farming and growing (organic food); GMO food; nutrition and religion; meat avoiding nutrition regimes, vegetarian nutrition, vegan nutrition; Mediterranean nutrition; nutrition of pregnant women and breast-feeding women; nutrition of pre-school children, elementary school children, adolescents; nutrition of elderly persons; nutritional analysis of meals, possibilities of substitution of high-calorie meals with analogues; diet due to medical reasons, diet aimed at reduction of body mass, positive and negative examples from practice. <i>Practical classes</i> Repetition of theory class lessons; basic types of nutritional components – presentation and discussion; types of food – presentation, discussion; organic food – discussion; GMO food – discussion; nutrition and religion – discussion; meat avoiding nutrition regimes, vegetarian nutrition, vegan nutrition – presentation, discussion; Mediterranean food – presentation; nutrition of pregnant women and breast-feeding women – presentation; nutrition of pre-school children, elementary school children, adolescents – presentation; nutrition of elderly persons – discussion; nutritional analysis of meals, possibilities of substitution of high-calorie meals with analogues – workshop; making menu for a certain case – project task; diet due to medical reasons, diet aimed at reduction of body mass, positive and negative examples from practice – workshop, discussion.				
Literature: <i>Literature in English:</i> 1. World Health Organisation: Nutrition, health and development, World Health Organisation, New York, 2000. 2. Mahan K. L., Escott-Stump S., Raymond J. L.: Krause's Food and Nutrition Care Process, Elsevier, St. Louis, Missouri, 2012. <i>Literature in Serbian:</i> 3. Ilić B.: Ishrana i dijetika, Visoka medicinska škola strukovnih studija iz Čuprije, 2014. 4. Novaković B., Jusupović F.: Ishrana i zdravlje, udžbenik, Medicinski fakultet, Novi Sad, 2014. 5. Alibabić V., Mujić I.: Pravilna prehrana i zdravlje, Veleučilište u Rijeci, Rijeka, 2016. 6. Trbović B., Nikolić M., Banković Paunović S.: Ishrana, udžbenik, Zavod za udžbenike, Beograd, 2014. 7. Smajić A.: Nutricionizam - ishrana stanovništva, Federalno ministarstvo poljoprivrede, vodoprivrede i šumarstva, Sarajevo, BiH, 2017. 8. Modić P.: Upotreba prehrambenih aditiva, Popo-knjiga, Beograd, 2001. 9. Petrović Malahov G.: Ishrana i hrana, IGP Prometej, Beograd, 2007.				
Number of classes:				
Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with student, projects...)
30	30	0	0	0

Methods of teaching: interactive classes, demonstration, practical exercises, analysis of examples from practice, case studies, discussion, e-learning.			
Grading (maximum 100 points)			
Pre-Exam obligations	Points	Final Exam	Points
Lecture attendance	3	Exam	30
Activity	7		
Projects/Seminars	0		
Exercises/professional practice	30		
Colloquiums	30		

ORGANIZATION OF HEALTH CARE SYSTEMS

Study program:	Professional Medical Laboratory Technologist			
Type and level of study:	undergraduate professional studies			
Course:	Organization of Health Care Systems			
Language of instruction:	Serbian			
Course status:	elective			
Semester:	first year, second semester			
ECTS:	5			
Requirement:	no			
Course objective: Course objective is to familiarize students with basics in organization of health care institutions and health care sector, manner of institution management, specific features of decision-making process in health care, motivation and medical team building, characteristics of internal communication in health care institutions, personnel and human resources building up, characteristics of business policy and planning strategy, administrative procedures and change management in health care institutions, mandatory and other forms of health insurance.				
Subjects outcome: Upon completing the course, student will be able to organize medical teams, ensure solid communication within health care institution, efficiently make decisions and manage changes under time pressure and understand systems of mandatory and other forms of health insurance.				
Subjects content: <i>Lectures</i> Health care system; the role of good communication; health care system and health care institution management; the role of manager, difference between commanding and leadership; employment policy and schedule; introduction process, interview and integration of new employees; training; health care institution organization; primary, secondary and tertiary health protection; types of health care institutions; Law on Health care Protection; principles of health protection; protection of population from infectious diseases; chamber of medical practitioners; administration bodies in charge of health care; inspection supervision. <i>Exercises</i> Discussion on organization of health care processes, health care institutions and health insurance. Analysis of practice in Serbia and abroad. Analysis of practical examples in the sphere of environment protection. Analysis and practical examples in the sphere of smoking and alcohol ban. Analysis and discussion; living environment, air protection. Analysis and discussion; process of waste removal from health care institutions.				
Literature: <i>Literature in English:</i> 1. Beik Janet I.: Health Insurance Today: A Practical Approach, Saunders, Philadelphia, 2010. 2. Mossialos E., Permanand G., Baeten R., Hervey T.: Health Systems Governance in Europe: The Role of European Union Law and Policy, textbook, Cambridge University Press, 2010. 3. Morrissey M. A.: Health Insurance, textbook, Health Administration Press, London, 2007. <i>Literature in Serbian:</i> 4. Ranković-Vasiljević R., Stojanović-Jovanović B., Terzić-Marković D.: Metodika i organizacija zdravstvene nege, Visoka zdravstvena škola strukovnih studija, Beograd, 2015. 5. Milović Lj.: Organizacija zdravstvene nege sa menadžmentom, udžbenik, Naučna knjiga, Beograd, 2004. 6. Tijanić M. i sar.: Zdravstvena nega i savremeno sestrinstvo, Naučna knjiga, Beograd, 2010.				
Number of classes:				
Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with student, projects...)
30	30	0	0	0
Methods of teaching: lectures, workshop, case study, discussion, e-learning.				
Grading (maximum 100 points)				
Pre-Exam obligations	Points	Final Exam	Points	
Lecture attendance	3	Exam	40	
Activity	7			
Projects/Seminars	0			
Exercises/professional practice	20			
Colloquiums	30			

PATHOLOGY

Study program: Professional Medical Laboratory Technologist				
Type and level of study: undergraduate professional studies				
Course: Pathology				
Language of instruction: Serbian				
Course status: mandatory				
Semester: second year, fourth semester				
ECTS: 10				
Requirement: Histology				
Course objective: Acquisition of theory and practical knowledge in general and special pathology; familiarization with the organization of work in pathology and histopathology laboratory, methods of processing and staining of tissue material, as well as familiarization with tissue damage and adaptation mechanisms, tumor pathology, disorders of the immune system and blood circulation, as well as with the pathology of cardiovascular, respiratory, urogenital, gastrointestinal tract, endocrine, muscular, skeletal and nervous system.				
Course outcome: Acquired knowledge and skills required for work in pathology laboratory including the reception and processing of material, assisting in material classification, solution preparation, laboratory record keeping and administration, application of histochemical and immunochemical methods.				
Course content: <i>Lectures</i> Definition and organization of laboratory work, types of tissue material, histopathological techniques, histochemical methods, tissue damage mechanisms, general mechanisms of cell and tissue adaptation, inflammation, tumors, immune system disorders, blood circulation disorders, the pathology of cardiovascular, respiratory, urinary, male and female genital tract, gastrointestinal tract, endocrine system, muscles, skeleton and central nervous system. <i>Exercises</i> Organization of laboratory work, laboratory administration, bowl cleaning, solution preparation, reception and classification of material, preparation of material, fixation, dehydration, impregnation, mold making, material cutting, cryocutting, basic histochemical and immunohistochemical staining.				
Literature: <i>Literature in English:</i> - Edward C. K., Vinay K., Robbins P., Cotran J.: Review of Pathology, Elsevier Science, London, 2014. - Sue E. H., Kathryn L. McC.: Understanding Pathophysiology, Elsevier Science, London, 2016. <i>Literature in Serbian:</i> - Tatić V.: Patologija, udžbenik, Viša medicinska škola, Beograd, 2005. - Atanacković M. i sar.: Patologija, udžbenik, Medicinski fakultet Beograd, 2003.				
Number of classes:				
Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with student, projects...)
45	45	0	0	0
Methods of teaching: interactive classes, demonstration, practical exercises, analysis of examples from practice, case studies, discussion, e-learning.				
Grading (maximum 100 points)				
Pre-Exam obligation	Points	Final Exam	Points	
Lecture attendance	3	Exam	30	
Activity	7			
Projects/Seminars	0			
Exercises/professional practice	30			
Colloquiums/exam	30			

PATHOPHYSIOLOGY

Study program:	Professional Medical Laboratory Technologist			
Type and level of study:	undergraduate professional studies			
Course:	Pathophysiology			
Language of instruction:	Serbian			
Subjects status:	mandatory			
Semester:	second year, third semester			
ECTS:	6			
Requirement:	Anatomy and Physiology segment 1 (General Pathophysiology: theoretical + practical exam) is a condition for segmet 2 (Special Pathophysiology: theoretical + practical exam)			
Course objective: Acquisition of knowledge on cell tissue and organ damaging mechanisms and familiarization of students with morphological alterations underlying diseases, ability to recognize morphological alterations on cells, tissues and organs, enabling students to get to know etiology, pathogenesis and clinical manifestations of most important metabolic disorders and functional disorders of organs and organ systems, causes and mechanisms of cell malignant transformation, as well as characteristic of tumor growth and changes it causes in organism.				
Course outcome: Upon the completion of the course students have a command of basic medical terminology and are able to adequately present medically relevant facts, understand etiology and pathogenesis of principal metabolic and functional disorders of human organs and organ systems. They are able to connect their clinical manifestations with causes and mechanisms of their appearance and have a basic pathobiological knowledge enabling them to understand mechanisms of chemical agents and drug action, as well as a diagnostic strategy in case of pathological occurrences at a level required for competent carrying out of their duties.				
Course content: <i>Lectures</i> Adaptation, growing old, death of cell; morphological changes in cell; acute and chronic inflammation etiopathogenesis; malignant cell transformation and its growth; water and electrolyte transport disorder; acid-base disorders; etiopathogenesis; undernutrition, obesity, diabetes mellitus, arteriosclerosis, cardiovascular system function disorder, respiratory system function disorder, renal function disorder, nervous system function disorder, endocrine gland and neuroendocrine regulation function disorder, digestive system disorder, blood composition and function disorder, skin function disorder. <i>Exercises</i> Cell injury and cell death. Inflammation etiopathogenesis. Malignant transformation of cell and its growth. Water, sodium and potassium transport disorder. Calcium, magnesium and phosphate metabolism disorders. Etiopathogenesis of diabetes mellitus, arteriosclerosis, acid-base. Disorders of cardiovascular, respiratory system, renal function, nervous function, endocrine gland and neuroendocrine regulation function, digestive tract and liver, blood composition and function.				
Literature: <i>Literature in English:</i> 1. Huether S. E.: Understanding Pathophysiology, Elsevier, London, 2011. 2. Nolan A.: Pathophysiology: Step By Step Guide for Nursing, textbook, Kindle Edition, London, 2020. 3. Banasik J. L.: Pathophysiology, textbook, Saunders, New York, 2018. <i>Literature in Serbian:</i> 4. Radić S.: Opšta patofiziologija, udžbenik, Medicinski fakultet, Niš, 2012. 5. Beleslin B.: Specijalna patološka fiziologija, Beograd, 2008. 6. Babić Lj., Borota R., Lučić A.: Priručnik praktičnih i seminarskih vežbi iz patološke fiziologije, Medicinski fakultet, Novi Sad, 2007. 7. Ubavić M.: Patološka fiziologija, interne skripte, ICEPS, 2017. 8. Gamulin M., Marušić M., Kovač Z.: Patofiziologija, udžbenik, Medicinska naklada, Zagreb, 2005. 9. Maličević Ž. i sar.: Osnovi patološke fiziologije, udžbenik, Panevropski univerzitet Apeiron, Banja Luka, 2009. 10. Kovač Z., Gamulin S. i sar.: Patofiziologija, Zadaci za problemske seminare, Medicinska naklada, Zagreb, 2006. 11. Živančević-Simonović S.: Opšta patološka fiziologija, udžbenik, Medicinski fakultet, Kragujevac, 2002. 12. Đorđević-Denić G. i sar.: Specijalna patološka fiziologija, udžbenik, Zavod za izdavanje udžbenika, Beograd, 2003.				
Number of classes:				
Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with student, projects...)
45	30	0	0	0
Methods of teaching: lectures, practical classes, problem-oriented tasks, case studies, discussion, visits of medical-biochemical laboratory employees.				
Grading (maximum 100 points)				
Pre-Exam obligations		Points	Final Exam	Points
Lecture attendance		3	Exam	30

Activity	7		
Projects/Seminars	0		
Exercises/professional practice	30		
Colloquiums	30		

PROFESSIONAL PRACTICE 1, 2, 3

Study program: Professional Medical Laboratory Technologist				
Type and level of study: undergraduate professional studies				
Course: Professional Practice 1 Professional Practice 2 Professional Practice 3				
Language of instruction: Serbian				
Course status: mandatory				
Semester: Professional practice 1: first year, second semester Professional practice 2: second year, fourth semester Professional practice 3: third year, fifth semester				
ECTS: 19 (9+5+5)				
Requirements: no				
Course objective: The objective of the course is to familiarize students with basic medical, experimental and informatics issues arising in the practice of medical laboratory technologist. That way, students review what they have learnt and acquire knowledge on the application of the studied methods and are stimulated to learn more, i. e. to repeat, check and supplement what they have previously learnt.				
Course outcome: Following a successfully completed course students are expected to possess practical knowledge and be ready to continue their studies and be better prepared for their future work in a medical biochemistry laboratory.				
Course content: Having met the requirements (attended all lectures and passed all mandatory exams in the current school year and passed all elective exams of the previous school year), students may start with mandatory professional practice in one of School Teaching Bases – medical-biochemistry laboratories or other departments/clinics of health-care institution. Namely, the School has signed agreements on professional and technical cooperation with several teaching bases (legal persons – health care institutions of primary, secondary or tertiary health protection). Professional Practice Coordinator is a competent person employed with an institution (Teaching Base) in which professional practice is conducted, with whom the School has an agreement on supplementary work under which that person is required to monitor the work of students, assist in education and subsequently to evaluate their works. The requirement for such person's formal education is at least a completed higher professional school. Professional Practice Mentor is a teacher employed with the School appointed as mentor depending on the field (course) dealt with within professional practice. At the beginning of professional practice a special attention is given to the rules defining the manner of conduct and operation of the entity in question, its other documents, safety at work measures, as well as to the organization of work process and provision of services, monitoring and recording of activities in the health care institution and decision-making process. That way, student passes through a number of segments of laboratory work and observes work as several workplaces, as defined in a professional practice order submitted by the School to the teaching base. Upon the completion of this phase, student is engaged in activities in accordance with the study programme he/she studies at which is literary to be reflected in the practical work (practice) of the student. Upon the completion of professional practice, the institution in question issues a signed and stamped (director's seal) report on professional practice and submits it to the School management – that way a teaching base issues a certificate of completed professional practice of a student. Data on the completed professional practice are entered in the student's file and diploma supplement issued to the student. When drawing up the report on Professional Practice completed by the student, the professional practice ments assesses: - student's involvement - theory knowledge of the student practical work of the student				
Literature: <i>Literature in English:</i> 1. literature related to the laboratory method 2. internal documents Teaching bases (statute, regulations ...) <i>Literature in Serbian:</i> 3. literature related to the laboratory method 4. internal documents Teaching bases (statute, regulations ...)				
Number of classes:				
Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with student, projects...)
0	0	300+300+300	0	0

		(Professional practice 1,2,3)		
Methods of teaching: professional (clinical) practice in real working conditions, work with anatomical and histological specimens, use of atlases, video projections, computer animations, and simulations of physiological processes.				
Grading (maximum 100 points)				
Pre-Exam commitments	Points	Final Exam	Points	
Lecture attendance	0	Exam	0	
Activity	0			
Projects/Seminars	0			
Exercises/professional practice	100			
Colloquiums/exam	0			

PSYCHOLOGY IN NURSING AND HEALTH CARE

Study program:	Professional Medical Laboratory Technologist
Type and level of study:	undergraduate professional studies
Course:	Psychology in Nursing and Health Care
Language of instruction:	Serbian
Course status:	elective
Semester:	second year, fourth semester
ECTS:	5
Requirement:	no
Course objective:	Acquisition of knowledge in psychology relating to the patient and his/her relatives at the moment of becoming aware of a health issue, the period of its solving, as well as in case of coping with severe or incurable diseases, their lasting consequences and similar situations. In addition to that, the course objective is to educate students in emotional and psychological states through which a medical professional may go through in the course of his/her work with patients. In addition to that, the objective of the course is for the student to acquire knowledge about the impact of psychological factors and the significance of stress in the development of psychosomatic disorders. They will also gain understanding of coping mechanisms for stress and pain management; as well as acquire knowledge that will enable them to recognize burnout syndrome in real-life professional environments, particularly within the health care sector, along with strategies to overcome it.
Course outcome:	Upon completion of the course and passing the exam, the student will gain knowledge of the psychology of patients and their families in the moment of health issue discovery, during the treatment process, and in uncertain situations. The student will also be trained in certain self-control techniques for managing emotional and psychological reactions they may experience as a health care professional while dealing with patients. Additionally, upon course completion, the student should be able to recognize and understand the health care psychology and theoretical models the course is based on; they should recognize psychological aspects of health and illnesses; to identify different psychological reactions to symptoms, illnesses and the importance of seeking professional help and social support; students will understand the role of stress in the development of psychosomatic illnesses and coping strategies; recognize the role of personal factors in experiencing and managing pain; understand the psychological aspects of severe illnesses and terminal condition; and to comprehend the psychological aspects of hospitalization in patients of different ages.
Course content:	<i>Lectures</i> Psychology of health and disease; accepting disease as a reality; determination in solving a health issue; psychology of a patient at the moment of becoming aware of his/her health issue and during treatment; psychological states in case of uncertainty, expectations, unexpected treatment, unsuccessful treatment, deterioration in diagnosis; work with patient's relatives, the role of relatives; support, openness in conversation, panic versus rationality; work with patient's relatives in case of poor prospects diagnosis, in case of a loss; work with medical professional in case of severe emotional states, patient being nervous, state of shock; social institutions, support of competent services; importance of communication; basics of occupational therapy; pain management; understanding the relation between the patient and health care professional; familiarization with the principles of health care habits development at different ages; the relationship between social support and health; review of models and strategies for promoting health related behaviors aimed at reducing health issues; recognition of burn out symptoms and the adoption of methods to overcome it, especially among those employed in health care. <i>Exercises</i> Accepting disease as a reality – workshop. Determination in solving a health issue – workshop. Psychology of a patient at the moment of becoming aware of his/her health issue and during treatment – workshop. Psychological states in case of uncertainty, expectations, unexpected treatment, unsuccessful treatment, deterioration in diagnosis – workshop. Work with patient's relatives – workshop. Work with medical professional in case of severe emotional states – workshop. Visits of professionals. Visits from representatives of institutions that provide psychological help to patients and employees (The Society of Psychologists of Serbia, the Institute of Mental Health, or the Psychopolis Institute).
Literature:	<i>Literature in English:</i> 1. Kubler Ross E.: On Death and Dying, Prentice Hall, 2001. 2. Friedman H. S.: Health psychology, textbook, Prentice Hall, 2003. <i>Literature in Serbian:</i> 3. Havelka M.: Zdravstvena psihologija. udžbenik, Jastrebarsko-Naklada Slap, 2008. 4. Kekuš D.: Komunikacije u profesionalnoj praksi zdravstvenih radnika, Digital Art, Beograd, 2010. 5. Payne S. H., Walker J.: Psihologija u zdravstveni negi, Educy, Ljubljana, 2002. 6. Berger D.: Zdravstvena psihologija, Društvo psihologa Srbije, Centar za primarnu psihologiju, Beograd, 2002. 7. Simić M., Kovačević K.: Mentalna higijena, udžbenik, autorsko izdanje, Beograd, 2004. 8. Milivojević Z.: Emocije, Psihopolis institut, Novi Sad, 2008. 9. Štajner K.: Školovanje srca, Psihopolis institut, Novi Sad, 2007.

10. Bern E.: Koju igru igraš, Beoknjiga, Beograd, 2003.
11. Kekuš D.: Zdravstveno vaspitanje, Digital art, Beograd, 2009.
12. Ranković Vasiljević R.: Metodika i organizacija zdravstvene nege, Viša medicinska škola, Beograd, 2004.
13. Forvard S., Frejžer D.: Emocionalna ucena, Psihopolis institut, Novi Sad, 2011.
14. Haris A. T.: Ja sam OK- ti si OK, Beograd, 2003.
15. Džejms M.: Životni pobednik, Psihopolis institut, Novi Sad, 2008.

Number of classes:

Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with student, projects...)
15	30	0	0	0

Methods of teaching:

lectures, exercises, discussions, problem solving.

Grading (maximum 100 points)

Pre-Exam obligations	Points	Final Exam	Points
Lecture attendance	3	Exam	40
Activity	7		
Projects/Seminars	0		
Exercises/professional practice	20		
Colloquiums	30		

PUBLIC HEALTH

Study program: Professional Medical Laboratory Technologist				
Type and level of study: undergraduate professional studies				
Course: Public Health				
Language of instruction: Serbian				
Course status: elective				
Semester: first year, second semester				
ECTS: 5				
Requirement: no				
Course objective: The objective of the course is familiarization of students with measures, levels and organization of health care and their training for applying a social-medical approach in future practice, primarily in the field of nursing.				
Course outcome: Upon completion of the course, the students will be familiar with the principles of public health, health care politics, indicators of the population health status, classification systems in health care, and they will understand the functioning of the health care system, especially in the area of nursing, from the perspective of patients, health care professionals, health care institutions, the government, and society.				
Course content: <i>Lectures</i> The development and definition of social medicine; health and quality of life; social care of health; communication in health care; health protection; social inequalities in health care and obtaining health protection; vulnerable categories; health care policy; criteria for evaluation of socio-medical importance of health issues; methods of prevention and control of chronic non-communicative diseases; health protection systems around the world; health protection programming; the role of health care institutions and health care professionals in the system of health care protection; health care technology; quality of health protection; classification systems in health care; management in health care; <i>Exercises</i> The analysis of public health aspects on the quality of life in the country and society. Comparative analysis of segments studied in public health and social medicine. Analysis of solutions to identical or similar situations in countries of the region and the European Union.				
Literature: <i>Literature in English:</i> 1. Mossialos E., Permanand G., Baeten R., Herve T.: Health systems governance in Europe: the role of European Union law and policy, Cambridge University Press, 2010. 2. Morrissey M. A.: Health Insurance, Health Administration Press, London, 2007. 3. Schneider M. J.: Introduction to Public Health, textbook, Jones-Barlett learning, New York, 2021. 4. Murphy F.: Community Engagement, Organization, and Development for Public Health Practice, Springer Publishing Company, New York, 2004. <i>Literature in Serbian:</i> 5. Lazarević A. i sar.: Javno zdravlje, socijalna politika i zdravstvena zaštita, udžbenik, Beograd, Visoka zdravstvena škola strukovnih studija, Beograd, 2016. 6. Hojer S.: Pristupi i metode u zdravstvenom odgoju, udžbenik, Koledž zdravlja, Ljubljana, 2005. 7. Lazarević A.: Socijalna medicina, autorsko izdanje, Beograd, 2015. 8. Simić S. i sar.: Socijalna medicina, udžbenik, Medicinski fakultet, Beograd, 2012.				
Number of classes:				
Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with student, projects...)
30	30	0	0	0
Methods of teaching: lectures, exercises, discussions, problem solving.				
Grading (maximum 100 points)				
Pre-Exam obligations	Points	Final Exam	Points	
Lecture attendance	3	Exam	40	
Activity	7			
Projects/Seminars	0			
Exercises/professional practice	20			
Colloquiums	30			

QUALITY CONTROL

Study program: Professional Medical Laboratory Technologist				
Type and level of study: undergraduate professional studies				
Course: Quality Control				
Language of instruction: Serbian				
Course status: mandatory				
Semester: third year, sixth semester				
ECTS: 5				
Requirement: no				
Courses objective: The objective of the course is to understand the concept and essence of quality as a market category, to recognize the specific characteristics of quality within a work organization, with special emphasis on the particularities of service in a specific sector, and to become familiar with the basics of institutional organization, methods of institutional management, specificities of decision-making processes, administrative procedures, and change management within the institution. The objective also includes understanding and accepting the concept of standardization and the importance of standards in the process of defining quality.				
Course outcome: After attending and passing the course, the student should be qualified to practically apply internal procedures and standards for the purpose of establishing and controlling the quality of services, to determine and rank quality criteria, to master techniques and methods for measuring and controlling quality, and to evaluate the application of established standards, with a special focus on the type of organization they belong to. Additionally, the student should be trained in how to adopt and implement corrective measures aimed at quality management.				
Course content: <i>Lectures</i> Quality management: concept, definition of quality, reasons for implementing quality control processes. Characteristics of quality in specific areas (e.g., specifics of quality control in healthcare...), forms and levels of quality manifestation. Quality management systems: definition and development of various quality systems. Service standardization as the basis of quality, areas of standard application, types of standards. Requirements of ISO 9000, ISO 9001, ISO 14000, ISO 22000 standards; implementation of the HACCP system, HALAL standards. The importance of internal procedures within an organization. Management chain. The role of employees in ensuring quality, the importance and role of human resources, the human resource management process. The importance and role of management in achieving quality, managers as quality factors. The role of service users in creating service quality: perception, deviations, satisfaction, methods for measuring service quality. Strategic approach to quality, trends in business orientation of companies, changes in the structure of offerings. Strategic adaptation of services to modern trends: market segmentation, differentiation, positioning, application of modern technologies. <i>Exercises</i> Discussion on topics related to institutional organization and quality control processes. Analysis of practical experiences in Serbia and abroad. Visit by a certified ISO evaluator. Visit by a manager from a public or private company that implements quality control effectively. Analysis of practical examples from domestic and foreign, public and private healthcare organizations. Analysis and practical examples from the field of safety. Employee and client safety, discussion.				
Literature: <i>Literature in English:</i> 1. Spath P.: Applying Quality Management in Healthcare: A Systems Approach, textbook, Health Administration Press, Boston, 2017. 2. Morrissey Michael A.: Health Insurance, 1st ed., Health Administration Press, 2007. 3. Swanwick T., Vaux E.: ABC of Quality Improvement in Healthcare, Wiley, New York, 2020. <i>Literature in Serbian:</i> 4. Kancir D., Antić Z.: Menadžment kvaliteta, Beogradska poslovna škola - Visoka škola strukovnih studija, Beograd, 2013. 5. Blešić I.: Menadžment kvaliteta u turizmu i hotelijerstvu, Prirodno-matematički fakultet, Novi Sad, 2017. 6. Legetić B.: Principi menadžmenta, udžbenik, Ekonomski fakultet, Subotica, 2007. 7. Milović Lj.: Organizacija zdravstvene nege sa menadžmentom, udžbenik, Naučna knjiga, Beograd, 2004. 8. Marinković Lj.: Menadžment u zdravstvenim organizacijama, G.A.D. Beograd, 2001. 9. Mićović P.: Zdravstveni menadžment, Obeležja, Beograd, 2008. 10. Službeni glasnici Republike Srbije. 11. Grujić V., Martinov Cvejin M., Legetić B.: Menadžment u zdravstvu, udžbenik, Medicinski fakultet, Novi Sad, 2007. 12. Grujić V., Martinov-Cvejin M., Legetić B.: Ekonomika zdravstva, Medicinski fakultet, Novi Sad, 1993. 13. Probbins S., Judge T.: Organizaciono ponašanje, Mate, Zagreb, 2009.				
Number of classes:				
Theoretical lectures	Theoretical exercises	Professional practice	Study research work	Other forms of teaching (individual work with student, projects...)
30	30	0	0	0

Methods of teaching: lectures, case study, discussion, workshop, e-learning.			
Grading (maximum 100 points)			
Pre-Exam obligations	Points	Final Exam	Points
Lecture attendance	3	Exam	40
Activity	7		
Projects/Seminars	0		
Exercises/professional practice	20		
Colloquiums	30		

RARE DISEASES

Study program: Professional Medical Laboratory Technologist				
Type and level of study: undergraduate professional studies				
Course: Rare Diseases				
Language of instruction: Serbian				
Course status: elective				
Semester: second year, fourth semester				
ECTS: 5				
Requirement: no				
Course objective: The objective of the course is to acquaint students with the concept and types of rare diseases, the ways in which the health system helps patients with rare diseases, as well as the challenges in this area, in Serbia as well as in the other countries.				
Course outcome: After the course, the student should be acquainted with the concept and types of rare diseases, ways in which the health system can help patients with rare diseases, as well as the challenges that arise in this area, both in Serbia and in other countries.				
Course content: <i>Lectures</i> The notion of a rare disease; characteristics of rare diseases in Serbia and worldwide; the list of rare diseases and genes affecting their occurrence; the methodology with data on rare diseases in Serbia; burden born by stationary health-care institutions in Serbia, distribution of rare diseases globally; malignant tumors in children; challenges in fighting rare diseases in Serbia and globally, propositions of measures in Serbia; Zoja's Law; NORBS; the list of orphan drugs in all phases of their development, from European Medicines Agency labeling relating to medicines for treatment of rare diseases to obtaining permit for the European market; "assistance in diagnosis" option as an option of conducting tests according to disease signs and symptoms; recommendations and guidelines in case of urgent medical intervention and anaesthesia; overview of sites specialized in rare diseases in every country through Orphanet; directions of present research in rare diseases. <i>Exercises</i> The notion of a rare disease; characteristics of rare diseases in Serbia and worldwide; Zoja's Law; NORBS – discussion; discussion on rare diseases and challenges faced by patients in Serbia and worldwide.				
Literature: <i>Literature in English:</i> 1. Claudia Gonzaga-Jauregui, James R. Lupski: Genomics of Rare Diseases: Understanding Disease Genetics Using Genomic Approaches, Academic Press, London, 2022. 2. Robert M. Kliegman, Brett J. Bordini: Undiagnosed and Rare Diseases in Critical Care, An Issue of Critical Care Clinics, E-book, 2021. <i>Literature in Serbian:</i> 3. interni material predavača 4. Ministarstvo zdravlja Republike Srbije: Program za retke bolesti u Republici Srbiji za period 2020-2022. godine: https://www.zdravlje.gov.rs/tekst/343045/program-za-retke-bolesti-i-akcioni-plan.php 5. Ministarstvo zdravlja Republike Srbije: Lista retkih bolesti i gena uključenih u njihov nastanak, kao i enciklopedija retkih bolesti i njihova klasifikacija izvedena iz objavljenih stručnih klasifikacija: https://www.orpha.net/consor/cgi-bin/Disease.php?lng=EN 6. Ministarstvo zdravlja Republike Srbije: Popis „orphan“ lekova (lekova siročića), u toku svih faza njihovog razvoja, od oznake Evropske Medinske Agencije koja se odnosi na lekove namenjene lečenju retkih bolesti do dobijanja dozvole za evropsko tržište https://www.orpha.net/consor/cgi-bin/Drugs.php?lng=EN 7. Ministarstvo zdravlja Republike Srbije: Opcija “pomoć pri dijagnozi” omogućava korisnicima pretragu prema znacima i simptomima bolesti https://www.orpha.net/consor/cgi-bin/Disease_HPOTerms.php?lng=EN 8. Ministarstvo zdravlja Republike Srbije: Preporuke i smernice u slučaju hitne medicinske intervencije i anestezije https://www.orpha.net/consor/cgi-bin/Disease_Emergency.php?lng=EN				
Number of classes:				
Theoretical lectures	Theoretical exercises	Professional practice	Study research work	Other forms of teaching (individual work with student, projects...)
30	30	0	0	0
Methods of teaching: interactive classes, demonstration, practical exercises, analysis of examples from practice, case studies, discussion, e-learning.				
Grading (maximum 100 points)				
Pre-Exam commitments	Points	Final Exam	Points	

Lecture attendance	3	Exam	40
Activity	7		
Projects/Seminars	0		
Exercises/professional practice	20		
Colloquiums	30		

RESEARCH METHODOLOGY

Study program: Professional Medical Laboratory Technologist				
Type and level of study: undergraduate professional studies				
Course: Research Methodology				
Language of instruction: Serbian				
Course status: elective				
Semester: third year, sixth semester				
ECTS: 5				
Requirement: no				
Course objective: To equip students with the necessary skills for professional, scientific-research, and bibliographic-research work.				
Course outcome: Possession of necessary knowledge that will enable students to engage in professional, scientific-research, and bibliographic-research work.				
Course content: <i>Lectures</i> Importance of scientific work. Difference between scientific and professional work. Stages of professional, scientific-research, and bibliographic-research work. Selection of topic and formulating a hypothesis. Selection of research methodology. Literature review. Methods of citing literature. Experiment. Surveys and processing of survey results, data protection. Statistical data processing. Quality of the sample. Objectivity and subjectivity. Result, discussion and conclusion. Structure and writing of professional and scientific work. Types of professional and scientific papers. Valuation of professional and scientific papers. Ways of professional and scientific paper publishing. Citation. Plagiarism. Protection of data. Methodology for preparing seminar and final papers. <i>Exercises</i> Techniques of collecting, organizing, and studying literature, as well as citing literature according to prescribed standards. Searching selected electronic databases. Processing research results. Graphical representation of data. Mastery of computer programs for writing and formatting texts (Word – MS Office), correct naming of tables, images, charts, and diagrams. Writing professional and scientific papers. Citing literature. Preparing a seminar paper. Principles of preparing a final paper, familiarizing with the procedure for preparing a final paper, simulation of preparing a final paper.				
Literature: <i>Literature in English:</i> 1. Ebel H. F., Bliefert C., Russey W. E.: The art of scientific writing, Wiley-VCH, Verlag GmbH & Co. KGaA, Weinheim, 2004. <i>Literature in Serbian:</i> 2. Milankov V., Jakšić P.: Metodologija naučno-istraživačkog rada u biološkim disciplinama, udžbenik, Prirodno-matematički fakultet, Novi Sad, 2006. 3. Šomođi Š., Novković N., Kraljević-Balalić M., Kajari K.: Uvod u naučni rad, udžbenik, Poljoprivredni fakultet, Novi Sad, 2004.				
Number of classes:				
Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with student, projects...)
30	30	0	0	0
Methods of teaching: lectures, exercises, discussions, e-learning, workshop, seminar paper, public presentation.				
Grading (maximum 100 points)				
Pre-Exam commitments	Points	Final Exam	Points	
Lecture attendance	3	Exam	40	
Activity	7			
Projects/Seminars	0			
Exercises/professional practice	20			
Colloquiums/exam	30			

SPECIALIZED ENGLISH FOR MEDICINE 1

Study program: Professional Medical Laboratory Technologist				
Type and level of study: undergraduate professional studies				
Course: Specialized English for Medicine 1				
Language of instruction: Serbian				
Course status: elective				
Semester: first year, first semester				
ECTS: 5				
Requirement: no				
Course objective: Course objective is familiarization with characteristics of the English language, adoption of phrases and patterns necessary for communication at professional level and adoption of techniques of written and oral expressing in professional communication.				
Course outcome: Students will be able to apply the acquired knowledge in professional communication, create corresponding written forms in accordance with their professional communication and use speech patterns appropriate to a given situation.				
Course content: <i>Lectures</i> Grammar: English alphabet, basic reading and writing rules, greeting, personal pronouns, possessive pronouns, present tenses, gender and number of nouns, colors, interrogative and affirmative sentences; aspects of everyday life in English-speaking countries; prepositions with dative and accusative, the imperative, modal verbs, perfect tenses, clause framework; specialist texts in connection with students' future profession, specialist terminology, examples of commercial, specialist texts from practice; examples of documents students will deal with in practice. <i>Exercises</i> Students practice everyday situation dialogues (giving/understanding orientation instructions, retelling happenings, making plans, scheduling meetings, giving descriptions, reporting etc.); understanding texts on everyday life situations (e. g. advertisements), they expand vocabulary relating to their environment, family, job.				
Literature: <i>Literature in English:</i> 1. Evans V., Dooley J., Tran T. M.: Career Paths, Medical Book 1, udžbenik, Express Publishing, Berkshire, 2018. 2. MacLean J.: English in Basic Medical Science, Oxford University Press, Oxford, 2000. 3. Murphy R.: English Grammar in Use, Cambridge University Press, Cambridge, 2014. 4. McCarthy M., O'Dell F.: English Vocabulary in Use, Cambridge University Press, Cambridge, 2006. 5. Hornby A.S.: Oxford Advanced Learner's Dictionary of Current English, Oxford University Press, Oxford, 2008. <i>Literature in Serbian:</i> 6. Dragović R.: Engleski za zdravstvene radnike, udžbenik, Naučna knjiga, Beograd, 2004.				
Number of classes:				
Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with student, projects...)
30	30	0	0	0
Methods of teaching: lectures, practical exercises, communication, e-learning.				
Grading (maximum 100 points)				
Pre-Exam obligations	Points	Final Exam	Points	
Lecture attendance	3	Exam	30	
Activity	7			
Seminar paper	0			
Exercises/professional practice	40			
Colloquiums	20			

SPECIALIZED ENGLISH FOR MEDICINE 2

Study program: Professional Medical Laboratory Technologist				
Type and level of study: undergraduate professional studies				
Course: Specialized English for Medicine 2				
Language of instruction: Serbian				
Course status: elective				
Semester: second year, third semester				
ECTS: 5				
Requirement: Specialized English for Medicine 1				
Course objective: Course objective is familiarization with characteristics of the English language, adoption of phrases and patterns necessary for communication at professional level and adoption of techniques of written and oral expressing in professional communication.				
Course outcome: Students will be able to apply the acquired knowledge in professional communication, create corresponding written forms in accordance with their professional communication and use speech patterns appropriate to a given situation.				
Course content: <i>Lectures</i> Grammar: comparison of adjectives; causal clauses, future tense, preterite, conditional sentences, verbs of movement, active and passive voice; aspects of everyday life in English speaking countries: holiday, family life, education, life in city; relative clauses, verbs with prepositions, adjective forming suffixes and prefixes, deepening knowledge on dependent clauses; everyday life, business life and media in English speaking countries; specialist terminology relevant for students' future profession, grammatically and linguistically more complex texts; work material corresponding to everyday practice at work. <i>Exercises</i> Students practice how to express themselves orally and in writing on everyday life topics, such as free time, job, media, fashion, politics; they practice shorter discussions and stating their opinion, asking others on their views and pointing to opposite aspects of different views.				
Literature: <i>Literature in English:</i> 1. Evans V., Dooley J., Tran T. M.: Career Paths, Medical Book 1, udžbenik, Express Publishing, Berkshire, 2018. 2. MacLean J.: English in Basic Medical Science, Oxford University Press, Oxford, 2000. 3. Murphy R.: English Grammar in Use, Cambridge University Press, Cambridge, 2014. 4. McCarthy M., O'Dell F.: English Vocabulary in Use, Cambridge University Press, Cambridge, 2006. 5. Hornby A.S.: Oxford Advanced Learner's Dictionary of Current English, Oxford University Press, Oxford, 2008. <i>Literature in Serbian:</i> 6. Dragović R.: Engleski za zdravstvene radnike, udžbenik, Naučna knjiga, Beograd, 2004.				
Number of classes:				
Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with student, projects...)
30	30	0	0	0
Methods of teaching: lectures, practical exercises, communication, e-learning.				
Grading (maximum 100 points)				
Pre-Exam obligations	Points	Final Exam	Points	
Lecture attendance	3	Exam	30	
Activity	7			
Projects/Seminars	0			
Exercises/professional practice	40			
Colloquiums	20			

SPECIALIZED GERMAN FOR MEDICINE 1

Study program:	Professional Medical Laboratory Technologist
Type and level of study:	undergraduate professional studies
Course:	Specialized German for Medicine 1
Language of instruction:	Serbian
Course status:	elective
Semester:	first year, first semester
ECTS:	5
Requirement:	no

Course objective:

The aim of the course is to improve a range of language knowledge, abilities, and skills, with a particular focus on business, so that students can independently interpret specialized texts, communicate competently in a business context, and write short texts in German on their own.

Course outcome:

The student acquires the vocabulary of general and business language, is aware of the diversity of linguistic means and actively applies them in both general and business contexts; reviews and deepens knowledge across all levels of language structure (phonetics, morphology, syntax, semantics); develops all language skills (reading, listening, writing, speaking); uses acquired knowledge for further independent language learning; develops sociolinguistic and strategic competence; independently uses printed and electronic dictionaries; and masters economic technical terminology through thematic texts and other materials from courses attended during their studies.

Course content:*Lectures:*

Grammar: personal pronouns; present tense; question words (W-Fragen); definite and indefinite articles; modal verbs in the present tense; imperative; possessive pronouns; time prepositions; preterite (sein, haben); polite forms (würde, könnte); comparison of adjectives. Text analysis in German: introductions and self-presentation in various situations, numbers and telling time, daily work-related activities, restaurant situations with business partners, company visits and relationships with business partners, business trips and their organization (booking tickets, accommodation, purchasing appropriate clothing), navigating the city, inviting, canceling, or postponing business meetings. Interpreting data from timetables, road maps, company charts, classified ads, and manufacturers' offers. Selection of texts in accordance with the chosen module – group work.

Exercises:

Practicing grammatical structures of the German language through speaking situations and acquiring specific vocabulary. Developing all language skills (reading, writing, speaking, understanding written and spoken texts). Simulating conversations on covered topics – workshop. Presenting a company, its activities and organization – workshop. Selection of texts in accordance with the chosen module – group work

Literature :*Literature in German:*

1. Pude E. A., Specht F.: Menschen, Deutsch als Fremdsprache Kursbuch mit DVD-ROM, udžbenik, Hueber Verlag, Munchen, 2012.
2. Loibl B. et all.: Schritte Plus im Beruf, Kommunikation am Arbeitsplatz, Max Hueber Verlag, Ismaning, 2015.
3. Becker N., Braunert J.: Alltag, Beruf, Kursbuch+Arbeitsbuch, Max Hueber Verlag, Ismaning, 2009.
4. Becker N., Braunert J., Schlenker W.: Unternehmen Deutsch Grundkurs. Kursbuch, Klett Verlag, Stuttgart, 2005.
5. Becker N., Braunert J.: Unternehmen Deutsch Grundkurs, Arbeitsbuch, KlettVerlag, Stuttgart, 2004.
6. Grammatik - Ganz klar Übungsgrammatik A1-B1, uz audio materijal, Hueber Verlag, 2011.

Number of classes:

Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with student, projects...)
30	30	0	0	0

Methods of teaching:

lectures, practical exercises, communication, e-learning.

Grading (maximum 100 points)

Pre-Exam obligation	Points	Final Exam	Points
Lecture attendance	3	Exam	30
Activity	7		
Projects/Seminars	0		
Exrcises/professional practice	40		
Colloquiums	20		

SPECIALIZED GERMAN FOR MEDICINE 2

Study program: Professional Medical Laboratory Technologist				
Type and level of study: undergraduate professional studies				
Course: Specialized German for Medicine 2				
Language of instruction: Serbian				
Course status: elective				
Semester: second year, third semester				
ECTS: 5				
Requirement: Specialized German for Medicine 1				
Course objective: The objective of the course is the further improvement of language knowledge, abilities, and skills, with a particular focus on business topics, at a higher level compared to Specialized German for Medicine 1 (previous course).				
Course outcome: The student continues to acquire vocabulary of general and business language and actively applies it in both general and business contexts, at a higher level than in Specialized German for Medicine 1 (previous course). The course includes revision and deepening of knowledge across all levels of language structure (phonetics, morphology, syntax, semantics) and further development of the language skills: reading, listening, writing, and speaking. Mastery of professional terminology through theme-based texts that are more complex than those in the previous course.				
Course content: <i>Lectures</i> Grammar at a higher level than in Specialized German Language 1 for Medicine (previous course): personal pronouns in dative and accusative, preterite of modal verbs, perfect tense, prepositions of place and distinction between dative and accusative, irregular comparison of adjectives, word order in subordinate clauses. Analysis of German-language texts that are grammatically and lexically more complex than in the previous course. Selection of texts according to the chosen module – group work. Analysis of business texts in German from real companies. Analysis of business texts from the internet. Analysis of business texts in German from the German press. Listening to news broadcasts (daily news) in German. Presentation of companies and hierarchical structure. Presentation of companies and products. Hotel reservations and appointment scheduling, contacts at congresses, events, meetings, trade fairs. Product promotion. Formulating inquiries, offers, orders, complaints, and written responses to the above. Interpreting job advertisements, writing CVs, résumés, and job applications. <i>Exercises</i> Practice of German grammatical structures covered in theoretical instruction: reading, writing, speaking, understanding written and spoken texts. Selection of texts that are more complex than in the previous course. Simulation of conversations on the covered topics – workshop. Selection of texts according to the chosen module – group work.				
Literature : <i>Literature in German:</i> 1. Pude E. A., Specht F.: Menschen, Deutsch als Fremdsprache Kursbuch mit DVD-ROM, udžbenik, Hueber Verlag, Munchen, 2012. 2. Loibl B. et all.: Schritte Plus im Beruf, Kommunikation am Arbeitsplatz, Max Hueber Verlag, Ismaning, 2015. 3. Becker N., Braunert J.: Alltag, Beruf, Kursbuch+Arbeitsbuch, Max Hueber Verlag, Ismaning, 2009. 4. Becker N., Braunert J., Schlenker W.: Unternehmen Deutsch Grundkurs. Kursbuch, Klett Verlag, Stuttgart, 2005. 5. Becker N., Braunert J.: Unternehmen Deutsch Grundkurs, Arbeitsbuch, KlettVerlag, Stuttgart, 2004. 6. Grammatik - Ganz klar Übungsgrammatik A1-B1, uz audio materijal, Hueber Verlag, 2011.				
Number of classes:				
Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with student, projects...)
30	30	0	0	0
Methods of teaching: lectures, practical exercises, communication, e-learning.				
Grading (maximum 100 points)				
Pre-Exam obligations	Points	Final Exam	Points	
Lecture attendance	3	Exam	30	
Activity	7			
Projects/Seminars	0			
Exercises/professional practice	40			
Colloquiums	20			

TRANSFUSIOLOGY

Study program:	Professional Medical Laboratory Technologist
Type and level of study:	undergraduate professional studies
Course:	Transfusiology
Language of instruction:	Serbian
Course status:	mandatory
Semester:	third year, sixth semester
ECTS:	5
Requirement:	no
Course objective:	Acquisition of knowledge about the basic principles of modern , the principles of blood donation and educational–motivational work in the field of blood donation, donor selection and blood collection, production, testing, and storage of blood products, as well as their clinical application. Transfusion laboratory diagnostics and its importance in the quality control of blood products and the safety of their clinical use. The place and role of transfusiology in transplantation medicine and its connection with other branches of medicine.
Course outcome:	Students will acquire the necessary knowledge in all areas of transfusiology: working on the motivation of blood donation, selection of voluntary donors, examination of voluntary blood donors (VBDs) and blood collection, special forms of voluntary blood donation; tests that must be performed on donor blood samples according to legal regulations in order to ensure safe transfusion (determination of ABO blood group and RhD antigen, detection of irregular antibodies, and detection of markers of transfusion-transmissible diseases: hepatitis B and C, HIV, and syphilis); modern methods of separating blood constituents from a unit of blood and national principles of clinical use of blood products, storage and preservation of blood products; familiarization with pre-transfusion testing necessary for the distribution of blood products; familiarization with risks and adverse reactions during and after the administration of blood components; familiarization with techniques of modern transfusion laboratory diagnostics and the basics of transplantation transfusiology, prenatal protection of pregnant women, and immunohematological monitoring of transfused patients.
Course content:	<i>Lectures</i> History of transfusiology. Basic concepts in transfusiology and its tasks. Relationship with other branches of medicine. Organization of the transfusion service. Ethical aspects of transfusiology. Legal regulations. Blood donation: principles, organization in our country and worldwide, conditions for blood donation and contraindications. Donor selection, laboratory and medical examination, blood collection, and complications after donation. Blood preservation, packaging, anticoagulants and optimal additive solutions, changes in preserved blood. Special forms of blood donation and complications in donation: autologous blood and apheresis procedures (plasmapheresis, cytappheresis). Genetics and immunological foundations in transfusiology: polymorphism of blood groups; erythrocyte membrane; blood group antigens and antibodies; antigen-antibody reaction, agglutination, hemolysis, immune response in transfusiology. Complement system and its significance in transfusion practice. ABO blood group system: antigens, antibodies, their role in transfusiology, anthropology, and forensic medicine. Rhesus blood group system: antigens, antibodies, role and significance in transfusiology and hemolytic disease of the newborn (HDN). Other erythrocyte blood group systems: MNSs, P, Kell, Kidd, Duffy, Lewis, Lutheran and their significance. HLA system: genetics, structure, antigens and antibodies, role and significance in blood transfusion, tissue and organ transplantation, anthropology, and association with diseases. Platelet antigens, antiplatelet antibodies and their clinical significance. Leukocyte antigens, antileukocyte antibodies and their clinical significance. Place, role, and significance of transfusiology in transplantation medicine. Basic laboratory testing in transfusiology (perinatal, immunohematological). Basic principles of selective/targeted transfusion and production of blood products, storage, transport of blood, labeling and standardization of products. Selection of blood for transfusion, compatibility tests. Transfusion of red blood cell products: types, preservation, selection for transfusion and application. Platelet transfusion: physiological basis, preparation and preservation, therapeutic use. Fresh frozen plasma and plasma-derived drugs: different forms of plasma, human coagulation factors, albumins, immunoglobulins, their preparation and therapeutic indications. Cryopreservation of blood cells; blood substitutes. Risks in transfusion therapy. Adverse effects of chemotherapy and reactions to transfusion therapy. Quality and safety in transfusiology; Good Manufacturing Practice and Good Laboratory Practice in transfusiology. Laboratory testing for transfusion-transmissible markers: post-transfusion hepatitis B and C, HIV, and syphilis. Transfusion therapy in pediatrics. Transfusion therapy in surgery. Transfusion therapy in obstetrics and gynecology. Therapeutic apheresis procedures. <i>Exercies</i> Familiarization with the principles of blood donation, anamnesis/questionnaire, hemoglobin screening, examination of voluntary blood donors (VBD), venipuncture, management of collapse, plasmapheresis and cytappheresis procedures; autologous transfusion. Immunology and serology of blood groups: various techniques for determining blood groups of the ABO system. Determination of Rh system antigens, Rh antigen variants (weak and partial D); significance of Rh system antibodies, post-transfusion reactions and sensitization in pregnancy, immunological characteristics of HDN. Determination of antigens of other erythrocyte blood group systems: MNSs, P, Kell, Duffy, Kidd, Lewis, Lutheran. HLA system: antigens, antibodies, testing methods. Modern laboratory techniques in the field of transfusiology. Preparation of blood products: erythrocytes, platelets, leukocytes, fresh frozen plasma, cryoprecipitate; labeling, preservation, standardization, quality control. Pre-transfusion testing

and selection of blood for transfusion. Genetics and immunological foundations in transfusiology: direct and indirect Coombs test, cold agglutinins, antiplatelet and antileukocyte antibodies. Testing for transfusion-transmissible disease markers: hepatitis B and C, HIV, and syphilis – methods and interpretation of results, testing algorithm.

Literature:

Literature in English:

1. Murphy M. F., Pamphilon D. H., Heddle N. M.: Practical Transfusiology, John Wiley Sons, New York, 2013.
2. McCullough J.: Transfusiology, Wiley-Blackwell, New York, 2021.
3. Simon T. L., Gehrie E. A., McCullough J., Roback J. D., Snyder E. L.: Rossi's Principles of Transfusiology, Wiley, New York, 2021.

Literature in Serbian:

4. Kovač M., Balint B., Bogdanović G.: Bazična i klinička transfuziologija, Planeta print, Beograd, 2020.
5. Grgičević D. i sar.: Transfuzijska medicina u kliničkoj praksi, Medicinska naklada, Zagreb, 2006.
6. Gligorović V., Balint B. i sar.: Klinička transfuziologija, Zavod za udžbenike i nastavna sredstva, Beograd, 2008.
7. Balint B., Trkuljić M. i sar.: Osnovi transfuziologije, Čigoja štampa, Beograd, 2002.
8. Balint B. i sar.: Transfuziologija, Zavod za udžbenike i nastavna sredstva, Beograd, 2004.
9. Jovanović Srzentić S., Venjković D.: Imunobiološki i klinički značaj krvnih grupa, Intranet Communication, Beograd, 2009.
10. Ministarstvo zdravlja Republike Srbije: Nacionalni vodiči za kliničku primenu krvi, Službeni glasnik, Beograd, 2005.

Number of classes:

Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with student, projects...)
30	30	0	0	0

Methods of teaching:

lectures, exercises, case study, discussion, e-learning.

Grading (maximum 100 points)

Pre-Exam obligation	Points	Final Exam	Points
Lecture attendance	3	Exam	30
Activity	7		
Projects/Seminars	0		
Exercises/professional practice	30		
Colloquiums	30		

VIRUSOLOGY

Study program: Professional Medical Laboratory Technologist				
Type and level of study: undergraduate professional studies				
Course: Virusology				
Language of instruction: Serbian				
Course status: mandatory				
Semester: third year, fifth semester				
ECTS: 4				
Requirement: no				
Course objective: Acquisition of knowledge on viruses as infectious agents and recognition of their impact on health of people, as well as knowledge on techniques of virological diagnosis.				
Course outcome: Possession of theory knowledge in the field of virusology and capability of application virological diagnosis in practice.				
Course content: <i>Lectures</i> Structure and characteristics of viruses; pathogenesis of viral infections; virus-cell relationship, interferons, immunity in viral infections; the impact of physical and chemical agents on viruses; antiviral drugs; classification of viruses; main types of viruses: <i>Picornaviridae</i> , <i>Togaviridae</i> , <i>Orthomyxoviridae</i> , <i>Paramyxoviridae</i> , <i>Rhabdoviridae</i> , <i>Flaviviridae</i> , <i>Retroviridae</i> , <i>Herpesviridae</i> , <i>Papillomaviridae</i> , <i>Poxviridae</i> . Hepatitis viruses; COVID-19. <i>Exercises</i> Organization of work in virology laboratory; laboratory diagnosis of viral infections; material taking and sending for testing; material processing in virology tests; virology techniques; tissue cultures, the cell; cultivation of the chick embryo; serological virology techniques; RVK, IF, IIF, immunoenzymatic test; ELISA, application of a new serological technique.				
Literature: <i>Literature in English:</i> 1. Strauss Ellen, Strauss James: Viruses and Human Disease, Elsevier, New York, 2007. <i>Literature in Serbian:</i> 2. Jovanović T., Marković Lj. (ur.): Virusologija, udžbenik, Libri Medicorum, Medicinski fakultet, Beograd, 2008. 3. Marković Lj. i sar.: Virusologija, udžbenik, Medicinski fakultet Beograd, Beograd, 2008. 4. Budimčić M.: Priručnik za virusologiju, Visoka zdravstvena škola, Beograd, 2016. 5. Kalenić S. i sar.: Medicinska mikrobiologija, Medicinska naklada, Zagreb, 2013. 6. Jawetz M. A.: Medicinska mikrobiologija, Savremena administracija, Beograd, 2004. 7. Savić B., Mitrović S., Jovanović T.: Medicinska mikrobiologija, Medicinski fakultet, Beograd, 2019.				
Number of classes:				
Lectures	Exercises	Other classes (professional practice...)	Study research work	Other forms of teaching (individual work with student, projects...)
30	30	0	0	0
Methods of teaching: interactive classes, demonstration, practical exercises, analysis of practical examples, case study, discussion, e-learning.				
Grading (maximum 100 points)				
Pre-Exam obligation	Points	Final Exam	Points	
Lecture attendance	3	Exam	30	
Activity	7			
Projects/Seminars	0			
Exercises/professional practice	30			
Colloquiums	30			