**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 (Degree 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 | 0 | 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 |
| **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 |
| 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 |
| **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 | 8 | m | pa |
| 21 | lab-17 | Virusology | 5 | 30 | 30 | 0 | 0 | 0 | 6 | m | pa |
| 22 | lab-16 | Hematology | 5 | 45 | 45 | 0 | 0 | 0 | 7 | m | ag |
| 23 | lab-izb-05 | Elecitive Course 5 | 5 | 30 | 30 | 0 | 0 | 300 | 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 |
| 23v | 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 | 6 | 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-21 | Professional Practice 3 | 6 | 0 | 0 | 0 | 0 | 300 | 5 | m | pa |
| 28 | lab-izb-06 | Elective Course 6 | 6 | 30 | 30 | 0 | 0 | 0 | 5 | e | |
| 28a | lab-izb-06-a | Health Care and Social-Security Legislation | 6 | 30 | 30 | 0 | 0 | 0 | 5 | e | ag |
| 28b | lab-izb-06-b | Research Methodology | 6 | 30 | 30 | 0 | 0 | 0 | 5 | e | p |
| 29 | lab-24 | Degree Paper | 6 | 0 | 0 | 0 | 300 | 0 | 10 | m | p |
| **Total number of classes and ECTS per year:** | | | | **300** | **300** | **300** | **300** | | **60** | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Total number of classes and ECTS per all three years of studies:** | **2.160** | **900** | **180** | | | |

**ALLERGOLOGY**

| | |
|---|---|
| **Study program:** | Professional Medical Laboratory Technologist |
| **Type and level of study**: | undergraduate professional studies |
| **Course:** | **Allergology** |
| **Language of instruction:** | English, 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:**
*Lectures*
Objects, definition and tasks of allergology; respiratory allergy (rhinitis, rhinoconjuctivitis, 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.
*Exercises*
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 andscientific institutions in Serbia in the field of allergology.

**Literature:**
*Literature in Serbian:*
1. Ljajević J., Ljajević M., Dimčić Radovanović Z.: Alergologija i klinička imunologija u Srbiji, Evropski centar za mir i razvoj, Beograd, 2005.
2. Ramić Z., Pravica V., Popadić D.: Priručnik za nastavu iz imunologije, Medicinski fakultet, Beograd, 2020.
3. Dadarno P. Dž., Vitni K.: Alergije, Sezam book, Beograd, 2020.

*Literature in English:*
4. Wesley Burks A., Holgate S. T., O'Hehir R. E., Broide D. H., Bacharier L. B.: Middleton's allergy: principles and practice, Elsevier, Amserdam, 2020.

**Number of classes:**

| **Theoretical lectures** | **Theoretical exercises** | **Professional practice** | **Study research work** (Degree Paper...) | **Other forms of teaching** (individual work with student, projects…) |
|---|---|---|---|---|
| 30 | 30 | 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 | 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:** | English, 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:**

*Lectures*

*Anatomy:* 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.

*Physiology:* Human physiology study; transport through cell membrane; intercellular communication; explicitation 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.

*Exercises*

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. Plasm buffer solution capacity. Coagulation. Discussion and analysis of selected physiological systems.

**Literature:**

*Literature in English:*


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.


*Literature in Serbian:*


5. Stojšić-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 | Study research work | Other forms of teaching |
|---|---|---|---|---|

| | | (professional practice...) | (Degree Paper...) | (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)<br>10 (Physiology) | | |
| Colloquiums | 15 (Anatomy)<br>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:**

.. microorganisms and viruses. Acquisition of basic knowledge necessary for work in microbiology laboratory; getting familiar with disease-causing microorganisms, symptoms and treatment of microbiology diseases, epidemiology and prevention methods, antibiotic resistance acquisition mechanisms and measures aimed at prevention of occurrence of multiresistant 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:**

*Lectures*

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.

*Exercies*

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 laboratora.

**Literature:**

*Literature in Serbian:*


1. Švabić Vlahović M. i sar.: Medicinska bakteriologija, udžbenik, Savremena administracija, Beograd, 2005.
2. Крањчић-Зец И.: Медицинска паразитологија, приручник за практичну наставу, Савремена администрација, Београд, 2000.
3. Suvajdžić Lj.: Priručnik iz mikrobiologije sa vežbama za studente farmacije, Ortomedics, Novi Sad, 2004.
4. Крањчић-Зец И.: Медицинска паразитологија, приручник за практичну наставу, Савремена администрација, Београд, 2000.
5. Gajin S., Gantar M., Petrović O., Matavulj M.: Praktikum iz mikrobiologije za studente biologije,Univerzitet u Novom Sadu, 2002.


*Literature in English:*


6. Tortora G. J., Funke B. R., Case C. L.: Microbiology: An Introduction, Books a la Carte Edition, BenjaminCummings, New York, 2009.
7. Denyer S. P., Hodges N., Gorman S. P. (eds.): Hugo and Russell's Pharmaceutical Microbiology, Willey, New York, 2004.


**Number of classes:**

| **Lectures** | **Exercises** | **Other classes** (professional practice...) | **Study research work** (Degree Paper...) | **Other forms of teaching** (individual work with student, projects…) |
|---|---|---|---|---|
| 60 | 60 | 0 | 0 | 0 |

**Methods of teaching:**

lectures, exercises, case study, demo laboratory exercises, e-learning, practical exercises with anatomical and histology preparations, use of atlas

| **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 | | |

**BASICS OF BIOCHEMISTRY**

| | |
|---|---|
| **Study program:** | Professional Medical Laboratory Technologist |
| **Type and level of study**: | undergraduate professional studies |
| **Course:** | **Basics of Biochemistry** |
| **Language of instruction:** | English, 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:**
*Lectures*
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 prohporylation; 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 exogeneous and endogenous substances; biosynthesis of proteins and nucleic acids, replication, transcription, translation and posttranslational modifications of proteins in human organism.
*Exercies*
Repetition of the acquired knowledge on biomolecules. Structure and function of fibrillar (keratin and collage) 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:**
*Literature in Serbian:*

1. Spasić S., Jelić-Ivanović Z., Spasojević-Kalimanovska V.: Opšta biohemija, udžbenik, Farmaceutski fakultet, Beograd, 2003.
2. Topić A., Stanojević-Bogavac N., Kotur-Stevuljević J.: Laboratorijske vežbe iz opšte biohemije, Farmaceutski fakultet, Beograd, 2009.
3. Stojanović S.: Zbirka zadataka iz hemije, Omega MS Pharmacy, Novi Sad, 2017.
4. Kovačević D.: Biohemija, udžbenik, Savremena administracija, Beograd, 2003.
5. Petrović J., Velimirović S.: Biohemija, udžbenik, Novi Sad, 2002.
6. Mihajlović M.: Biohemija, udžbenik, Naučna knjiga, Beograd, 2000.

*Literature in English:*
7. Rodwell V., Bender D., Botham K., Kennelly P., Anthony P. W.: Harper's Illustrated Biochemistry, textbook, McGraw-Hill Education, New York, 2018.
8. Nelson D. L., Cox M. M.: Lehninger Principles of Biochemistry, Worth Publishers, New York, 2000.


**Number of classes:**

| **Lectures** | **Exercises** | **Other classes** (professional practice...) | **Study research work** (Degree Paper...) | **Other forms of teaching** (individual work with student, projects…) |
|---|---|---|---|---|
| 30 | 30 | 0 | 0 | 0 |

**Methods of teaching:**
lectures, exercises, case study, demo laboratory 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 | | |

**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; fundamentals of parasitology and its relation with the field of immunology.
*Exercies*
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 (CH50 test); tests with radioactive markers: RIA, RIST, RAST; tests with enzyme markers: ELISA, ELISA spot; fluorochromes as markers, immunofluorescence and flow cytofluorometry; 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 Serbian:*
1. Abbas A. K., Lichtman A. H.: Osnovna imunologija - funkcionisanje i poremećaji imunskog sistema, Data status, Beograd, 2007.
2. Arsenović-Ranin N., Stojić-Vukanić Z., Bufan B.: Priručnik za praktičnu nastavu iz imunologije i imunohemije, Farmaceutski fakultet, Beograd, 2007.
*Literature in English:*
3. Basta M. at all: The Complement System; Novel Roles in Health and Disease, Kluver Academic Publishers, Boston, Dordrecht, New York, London, 2004.

**Number of classes:**

| **Lectures** | **Exercises** | **Other classes** (professional practice...) | **Study research work** (Degree Paper...) | **Other forms of teaching** (individual work with student, projects…) |
|---|---|---|---|---|
| 30 | 30 | 0 | 0 | 0 |

**Methods of teaching:**
lectures, exercises, case study, demo laboratory 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 | | |

**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:** | English, 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:**
*Lectures*
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.
*Exercises*
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:**
*Literature in Serbian:*

1. Marčićević Ž., Marošan Z.: Primena informacionih tehnologija, udžbenik, Visoka poslovna škola strukovnih studija, Novi Sad, 2010.
2. Marošan Z., Vesin B.: Primena informacionih tehnologija, praktikum, Visoka poslovna škola strukovnih studija, Novi Sad, 2009.
3. Gerlič I.: Savremene informacione tehnologije u obrazovanju, udžbenik, Nacionalna izdavačka kuća Slovenija, Ljubljana, 2000.
4. Softver HELIANT za rad u zdravstvenoj ustanovi, demo verzija.
5. Bunzel T.: Microsoft Office 2010 Kao od šale, CET, Beograd, 2010.
6. Tasić M., Ćirić M.: Osnovi informatike, udžbenik, Prirodno-matematički fakultet, Niš, 2002.
7. Milošević Z., Bogdanović D.: Statistika i informatika u oblasti medicinskih istraživanja, udžbenik, Medicinski fakultet Univerziteta u Nišu, Niš, 2012.

*Literature in English:*
8. Biheller B. R., Evans J., Pinard T. K., Romer M. R.: Microsoft Office 2007: Introductory Course, textbook, Course Technology, Boston, 2007.


**Number of classes:**

| **Lectures** | **Exercises** | **Other classes** (professional practice...) | **Study research work** (Degree Paper...) | **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 | | |

**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:** | English, 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:**
*Lectures*
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.
*Exercises*
Introduction into laboratory diagnostics; organization of work in the laboratory; types of biological materials; medical waste management; ISO15189 Standard; biological material taking and processing; venouos and capillary blood draw; preanalytical, analytical and postanalytical stage; biochemical analyses; immunochemical analyses; microbiological sample collection and processing; urine analysis.

**Literature:**
*Literature in Serbian:*
1. Ubavić M.: Interpretacija najčešćih laboratorijskih analiza i uticaj lekova na njih, udžbenik, Omega MS Pharmacy, Novi Sad, 2017.
*Literature in English:*
2. Morrow A. S.: Diagnostic and Therapeutic Technic: A Manual of Practical Procedures Employed in Diagnosis and Treatment, Forgotten Books, London, 2019.
3. Shankara S.: Laboratory Manual for Practical Biochemistry, Jaypee Brothers, New Delhi, 2018.
4. Guder W. G.: Samples from the patients to the laboratory-the impact of preanalytical variables on the quality of laboratory results, GIT Verlag, Darmschtate, 2001.
5. Senger R. S.: Laboratory Manual of Biochemistry: Methods and Techniques, NIPA, London, 2014.
6. Marshall W. J., Bangert S. K.: Clinical Chemistry, Mosby, Edinburgh, 2004.

**Number of classes:**

| **Lectures** | **Exercises** | **Other classes** (professional practice...) | **Study research work** (Degree Paper...) | **Other forms of teaching** (individual work with student, projects…) |
|---|---|---|---|---|
| 30 | 30 | 0 | 0 | 0 |

**Methods of teaching:**
Lecturea agains use of different viedo material, exercises, case studies, exercises on dummy, 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 | | |

**BUSINESS COMMUNICATION SKILLS**

| | |
|---|---|
| **Study program:** | Professional Medical Laboratory Technologist |
| **Type and level of study**: | undergraduate professional studies |
| **Course:** | **Business Communication Skills** |
| **Language of instruction:** | English, 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:**
*Lectures*
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.
*Exercises*
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:**
*Literature in Serbian:*
1. Kekuš D.: Komunikacije u profesionalnoj praksi zdravstvenih radnika, udžbenik, Beograd, 2010.
2. Kekuš D.: Modeli integrisanih komunikacija u zdravstvu, udžbenik, Fakultet organizacionih nauka, Beogradu, 2009.
*Literature in English:*
3. Hugman B.: Healthcare Communication, textbook, Pharmaceutical Press, London, 2009.
4. Lloyd M., Bor R., Noble L.: Clinical Communication Skills for Medicine, textbook, Elsevier, New York, 2018.

**Number of classes:**

| **Lectures** | **Exercises** | **Other classes** (professional practice...) | **Study research work** (Degree Paper...) | **Other forms of teaching** (individual work with student, projects…) |
|---|---|---|---|---|
| 30 | 30 | 0 | 0 | 0 |

**Methods of teaching:**
lectures, exercises, work in small groups, exercises in methodic, seminar papers, presentation to the group, method of practical activities of students.

**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:** | English, 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:**
*Lectures*
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.
*Exercises*
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:**
*Literature in Serbian:*
1. Dragović R.: Engleski za zdravstvene radnike, udžbenik, Naučna knjiga, Beograd, 2004.

*Literature in English:*
2. MacLean J.: English in Basic Medical Science, textbook, Oxford University Press, Oxford, 2000.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 Pres, Oxford, 2008.
5. Evans V., Dooley J., Tran T. M.: Career Paths, Medical Book 1, udžbenik, Express Publishing, Berkshire, 2018.

**Number of classes:**

| **Lectures** | **Exercises** | **Other classes** (professional practice...) | **Study research work** (Degree Paper...) | **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 | | |
| Exercieses/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:** | English, 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:**
*Lectures*
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.
*Ecercises*
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:**
*Literature in Serbian:*
1. Menschen A1 KB und Menschen A1 AB, udžbenik (video materijal: http://matifmarin.blogspot.rs/p/menschen-film-stationen-clips.html), Klett Verlag, Stuttgart, 2018.
2. Pude E. A., Specht F.: Menschen, Deutsch als Fremdsprache Kursbuch mit DVD-ROM, udžbenik, Hueber Verlag, Munchen, Deutschland, 2012.
3. Loibl B. et all.: Schritte Plus im Beruf, Kommunikation am Arbeitsplatz, Max Hueber Verlag, Ismaning. Deutschland, 2015.
4. Vučković-Stojanović M.: Uvod u nemački poslovni jezik. Beograd: Savremena administracija, 2005.
5. Becker N., Braunert J.: Alltag, Beruf, Kursbuch+Arbeitsbuch, Max Hueber Verlag, Ismaning, 2009.
6. Becker N., Braunert J., Schlenker W.: Unternehmen Deutsch Grundkurs. Kursbuch, Klett Verlag, Stuttgart, 2005.
7. Becker N., Braunert J.: Unternehmen Deutsch Grundkurs, Arbeitsbuch, KlettVerlag, Stuttgart, 2004.
8. https://www.hueber.de/seite/pg_lernen_lerner_dvd_mns, knjiga i link.
9. https://www.hueber.de/seite/pg_lernen_uebungen_mns, dodatne on line vežbe.

*Literature in English:*
10. Grammatik - Ganz klar Übungsgrammatik A1-B1, uz audio materijal, Hueber Verlag, kratak pregled gramatike sa vežbanjima „Hallo aber Deutsch“.
11. Nikolovski V.: Gramatička vežbanja „Eine kleine Übungsgrammatik“, Zavod za udžbenike i nastavna sredstva, Schritte international 1, Grammatikspiele.
12. www.hueber
13. www.schubert

**Number of classes:**

| **Lectures** | **Exercises** | **Other classes** (professional practice...) | **Study research work** (Degree Paper...) | **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:**
*Lectures*
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.
*Ecercises*
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:**
*Literature in English:*
1. Ahmetagić E.: Organizacija preduzeća, udžbenik, Čikoš holding, Subotica, 2002.
2. Petković M., Janićijević N., Bogićević-Milikić B.: Organizacija, udžbenik, Ekonomski fakultet, Beograd, 2014.
3. Sajfert Z., Pavlović N.: Organizacija, udžbenik, Čikoš grupa, Subotica, 2014.

*Literature in English:*
4. Ivancevich J. M., Konopaske R., Matteson M. T.: Organizational Behavior and Management, McGraw-Hill, New York, 2011.

**Number of classes:**

| **Lectures** | **Exercises** | **Other classes** (professional practice...) | **Study research work** (Degree Paper...) | **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 | | |

**DEGREE PAPER**

| | |
|---|---|
| **Study program:** | Professional Medical Laboratory Technologist |
| **Type and level of study**: | undergraduate professional studies |
| **Course:** | **Degree Paper** |
| **Language of instruction:** | English, Serbian |
| **Course status**: | mandatory |
| **Semester:** | third year, sixth semester |
| **ECTS**: | 10 |
| **Requirement**: | passed all exams in 1st-3rd year |

**Course objective:**

The objective is to train students to apply basic, academic general-education, specialist and specialist-applicative knowledge and methods in solving specific issues within Degree Paper topic. Within the Degree Paper, students, examining the available literature or through work in a health care institution or laboratory, or by statistical data analysis, deal with an issue, its structure and complexity and on the basis of the analyses made draw conclusions on possible ways of its solving. Students are also trained in writing the Degree Paper, presenting it within the set deadline and discuss the Paper with specialists in the relevant area.

**Course outcome:**

On the basis of knowledge and skills acquired in the course of their studies, students are able to do the paper in a health care institution or laboratory or to bibliographically collect specialist literature, write the paper and present it before the relevant board.

**Course content:**

Degree paper presents a specialist or research work of a student in which he/she familiarizes with the research methodology in all areas of importance for health care. The paper topic may be experimental or bibliographical. Upon the conducted research, student prepares his/her degree paper in the form containing the following chapters: introduction, theoretical part, paper methodology, results and discussion, conclusion, abbreviations (optional), enclosures (optional), literature, candidate CV, key documentation information. Paper defense consists of oral presentation of the paper by the student, asking questions by defense board members and student´s answer to those questions.

**Number of classes:**

| **Lectures** | **Exercises** | **Other classes** (professional practice...) | **Study research work** (Degree Paper...) | **Other forms of teaching** (individual work with student, projects…) |
|---|---|---|---|---|
| 0 | 0 | 0 | 300 | 0 |

**Methods of teaching:**

In the course of degree paper writing, mentor gives necessary instructions to the student, directs him/her to relevant literature, assists student in the selection of research methods, in the analysis and processing of the obtained results, in drawing appropriate conclusions etc. Within this part of work on degree paper student has additional consultations with the mentor and, if necessary, with other theachers dealing with matters in the area of degree paper topic as well. If the paper relates to a health care institution, it is necessary to obtain approval of the institution.

**Grading (maximum 100 points)**

Degree Paper grade is a total of points obtained for:

- writing the paper, 20 points;
- paper subject matter, 30 points;
- paper presentation at its defense, 20 points;
- answers to questions of Defense Board members within Degree Paper defense, 30 points (3 x 10, three Board members).

**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:** | English, 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:**
*Lectures*
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.
*Exercises*
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:**
*Literature in Serbian*:
1. Marić J.: Medicinska etika, autorsko izdanje, Beograd, 2008.
2. Lazarević A.: Socijalna medicina, autorsko izdanje, 2005.
3. Zakoni i podzakonska akta Republike Srbije iz oblasti zdravstva.

*Literature in English:*
4. Fregmen B. F.: Medical Law and Ethics, textbook, Prentice Hall, New Jersey, 2011

**Number of classes:**

| **Lectures** | **Exercises** | **Other classes** (professional practice...) | **Study research work** (Degree Paper...) | **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:** | English, 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:**
*Lectures*
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.
*Exercises*
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:**
*Literature in Serbian:*

1. Pavlović A.: Prva pomoć, udžbenik, Obeležja, Beograd, 2007.
2. Pavlović A.: Kardiopulmonalna reanimacija, Obeležja, Beograd, 2007.
3. Newton C. R. H., Khare R. K.: Urgentna medicina, prevod, Besjeda, Banja Luka, 2007.
4. Advanced First Aid, CPR, and AED, American Academy of Orthopaedic Surgeons (AAOS), Jones & Bartlett Learning, 2017.

*Literature in English:*
5. Cydulka R., Cline D., Ma O. J., Fitch M., Joing S., Wang V.: Tintinalli's Emergency Medicine Manual, McGraw-Hill Education, New York, 2017.
6. Hammond B. B., Zimmermann P. G.: Sheehy's Manual of Emergency Care: Sheehy's Manual of Emergency Care, Mosby, London, 2012.
7. Carsten Lott i sar.: Advaced life support course manual, European resuscitation council, textbook, ERC guidelines 2015.


**Number of classes**

| **Lectures** | **Exercises** | **Other classes** (professional practice...) | **Study research work** (Degree Paper...) | **Other forms of teaching** (individual work with student, projects…) |
|---|---|---|---|---|
| 30 | 30 | 0 | 0 | 0 |

**Methods of teaching:**
lectures, exercises, case studies; e-learning, exercies 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 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:** | English, Serbian |
| **Course status**: | elective |
| **Semester:** | third year, sixth semester |
| **ECTS:** | 5 |
| **Requirement**: | no |

**Course objective:**
Acquiring basic knowledge in health care and social-security legislation, knowing the difference between ethical and legal requirements, developing critical thinking in solving ethical or legal dilemmas, understanding national, European and international legal regulations, knowing rights and obligations relating to medical protection, health insurance, as well as knowing rights and obligations of medical service providers, their beneficiaries and third party.

**Courses outcome:**
Students who passed the exam are capable of critical thinking on standards and legal issues, they are aware of the difference between legal and ethical issues, and they acquired knowledge that would help them to critically judge ethical and legal aspects in providing medical services; they are able to apply laws regulating health care sectors, and know rights and obligations of medical care provider, patient and third party.

**Course content**:
*Lectures*
National health care policy, regulations on health care system; Act on Medical Protection, legal and sublegal regulations; Serbian Medical Chamber; medical license, court of honor; European and international regulations in health care system; noncompliance of prescribed principles; legal regulations on specific cases (drug testing, suicide, placebo, euthanasia, physician-patient privilege); ethics in pre-clinical and clinical tests (fundamentals); ethical board.
*Exercises*
Analysis and discussion on case studies (generation and critical assessment of information and data). Problem-based learning (problem-solving with an appropriate explanation of the ethical concept and legal framework). Panel discussions on application of legal principles on current issues (drug testing, suicide, placebo, euthanasia, physician-patient privilege).

**Literature:**
*Literature in Serbian:*

1. Lazarević A. i sar.: Javno zdravlje, socijalna politika i zdravstvena zaštita, udžbenik, Beograd, Visoka zdravstvena škola strukovnih studija, Beograd, 2016.
2. Aktuelni zakoni i podzakonska akta Republike Srbije iz oblasti zdravstva.
3. Lazarević A.: Socijalna medicina, autorsko izdanje, Beograd, 2015.
4. Simić S. i sar.: Socijalna medicina, udžbenik, Medicinski fakultet, Beograd, 2012.
5. Šolak Z.: Ekomnomika zdravstvene zaštite, Zavod za udžbenike i nastavna sredstva, Beograd 2003.

*Literature in English:*

6. 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.
7. De Gooijer R.: Trends in EU Health Care Systems, Winfried, 2007.
8. Morrisey M. A.: Health Insurance, textbook, Health Administration Press, London, 2007.
9. Beik Janet I.: Health Insurance Today: A Practical Approach, textbook, Saunders, Philadelphia, 2010.


**Number of classes:**

| **Lectures** | **Exercises** | **Other classes** (professional practice...) | **Study research work** (Degree Paper...) | **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**: | 7 |
| **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:**
*Lectures*
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.
*Exercies*
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:**
*Literature in Serbian:*

1. Petrović M., Dopsaj V., Rajić M., Milojević Z.: Laboratorijska hematologija, Farmaceutski fakultet, Beograd, 2002.
2. Dopsaj V., Jelić-Ivanović Z., Marisavljević D., Mitić G., Terzić B., Matić G.: Antikoagulantna terapija – klinički i laboratorijski aspekti, Farmaceutski fakultet, Beograd, 2005.

*Literature in English:*

3. Bain Barbara J.: Blood cell, A practical guide, Blackwell Publishing, New York, 2006.
4. Hoffman R., Benz E., Furie B., Cochen H.: Hematology: Basic principles and practice, Churchill Livingstone, Edinburg, 2005.
5. Lewis S. Mitchell, Bain Barbara J., Bates Imelda: Dacie and Lewis Practical Haematology, Churchill Livingstone, Edinburg, 2001.
6. McKenzie S.: Clinical Laboratory haematology, Pearson, Harlow, 2004.
7. Williams W. J., Beutler E., Erslev A. J., Lichtman: Hematology, McGraw Hill, New York. 2001.


**Number of classes:**

| **Lectures** | **Exercises** | **Other classes** (professional practice...) | **Study research work** (Degree Paper...) | **Other forms of teaching** (individual work with student, projects…) |
|---|---|---|---|---|
| 45 | 45 | 0 | 0 | 0 |

**Methods of teaching:**
lectures, exercises, case study, demo laboratory exercises, 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**: | 6 |
| **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:**
*Lectures*
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 fibrinogenolysis; disseminated intravascular coagulation; anticoagulant therapy and hemostasis screening tests aimed at monitoring hemostasis disorders.
*Exercies*
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:**
*Literature in Serbian:*

1. Marisavljević D. i sar.: Klinička hematologija, udžbenik, Zavod za udžbenike i nastavna sredstva, Beograd, 2012.
2. Petrović M., Dopsaj V., Rajić M., Milojević Z.: Laboratorijska hematologija, Farmaceutski fakultet, Beograd, 2002.
3. Labar B., Hauptmani E. i sar.: Hematologija, udžbenik, Nova školska knjiga, Zagreb, 2007.

*Literature in English:*

4. Goodnight S. H., Hathaway W. E. (eds.): Disorders of Hermostasis and Thrombosis, A Clinical Guide, The McGraw- Hill Companies, New York, 2002.
5. Harmening D. M.: Clinical Hematology and Fundamentals of Hemostasis, F. A. Davis Company, Philadelphia, 2002.
6. Hoffbrand V., Moss P. (eds.): Hoffbrand's Essential Hematology, John Wiley Soons, New York, 2015.
7. Koehane E., Smith L., Walenga J. (eds.): Rodak's Hematology, Clinical Principles and Applications, Elsevier Science, New York, 2015.


**Number of classes:**

| **Lectures** | **Exercises** | **Other classes** (professional practice...) | **Study research work** (Degree Paper...) | **Other forms of teaching** (individual work with student, projects…) |
|---|---|---|---|---|
| 60 | 60 | 0 | 0 | 0 |

**Methods of teaching:**
lectures, exercises, case study, demo laboratory exercises, 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:**
…which makes a morphological basis necessary for understanding all vital processes in the organism with a special focus on the knowledge of types of cells being the central points of pharmacological substance action (muscle cells, nervous cells, boundary cells), metabolic products of cells used as active pharmacology substances (hormones, neurotransmitters) and the cells through which drugs are absorbed, excreted or decomposed (enterocytes, nephrocytes, hepatocytes).

**Course outcome:**
Familiarization with basic micromorphological and functional characteristics of a normal structure of cells, tissues and organs.

**Course content:**
*Lectures*
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.
*Exercies*
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:**
*Literature in Serbian:*

1. Trpinac D.: Histologija za studente farmacije, Kuća štampe, Beograd, 2001.
2. Trpinac D., Obradović M.: Repetitorijum histologije i embriologije, Medicinski fakultet, Beograd, 2005.
3. Trpinac D.: Praktikum za histološke vežbe za studente farmacije, Farmaceutski fakultet, Beograd, 2005.
4. Belić P., Mačvanin Đ., Šarac D.: Nova koža, Medicinski fakultet, Novi Sad, 2000.

*Literature in English:*
5. Mescher A.: Junqueira's Basic Histology, text and atlas, McGraw Hill Professional, New York, 2013.


**Number of classes:**

| **Lectures** | **Exercises** | **Other classes** (professional practice...) | **Study research work** (Degree Paper...) | **Other forms of teaching** (individual work with student, projects…) |
|---|---|---|---|---|
| 30 | 30 | 0 | 0 | 0 |

**Methods of teaching:**
lectures, exercises, case study, demo laboratory exercises, 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 | | |

**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:** | English, 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:**
*Lectures*
Introduction into human resources management; 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.
*Ecercises*
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**:
*Literature in Serbian:*
1. Legetić B.: Principi menadžmenta, udžbenik, Ekonomski fakultet, Subotica, 2007.
2. Marinković Lj: Menadžment u zdravstvenim organizacijama, G.A.D. Beograd, 2001.
3. Mićović P.: Zdravstveni menadžment, Obeležja, Beograd, 2008.
4. Žujić D.: Menadžment ljudskih resursa i kvalitet, Centar za primenjenu psihologiju društva psihologa Srbije, Beograd, 2003.
5. Probbins S., Judge T.: Organizaciono ponašanje, Mate, Zagreb, 2009.
6. Frančesko M.: Kako unaprediti menadžment u preduzeću, Novi Sad, Prometej, 2003.
*Literature in English:*
7. Beik J. I.: Health Insurance Today: A Practical Approach, Saunders, Philadelphia, 2010.
8. Flynn W. J., Mathis R. L., Jackson J. H.: Healthcare Human Resource Management, textbook, Cengage Learning, Boston, 2006.

**Number of classes:**

| **Lectures** | **Exercises** | **Other classes** (professional practice...) | **Study research work** (Degree Paper...) | **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:** | English, 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.

**Course content:**

*Lectures*

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; health care education in the system of scientific disciplines; health: modern concept; health education of the young; factors affecting health; lifestyle; life, health and environment; health promotion and improvement; behavior and changes in behavior; disease prevention; education, counseling and informing; planning, carrying out and evaluation of health care educational interventions in institutions of primary, secondary and tertiary protection; communication, educational and organizational methods and strategies; WHO seven educational principles; 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; pathogenecity and virulence factors, antibiotics, antimycotics and chemotherapeutics, physiological importance of microflora, rapid diagnostic tests and molecular methods in microbiology; general and special virusology: 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.

*Exercises*

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:**

*Literature in Serbian:*

1. Novaković B., Grujić V.: Higijena i zdravstveno vaspitanje, udžbenik, Medicinski fakultet, Novi Sad, 2005.
2. Kekuš D.: Zdravstveno vaspitanje, udžbenik, Digital art, Beograd, 2009.
3. Kristoforović-Ilić M.: Higijena sa medicinskom ekologijom, udžbenik, Ortomedics, 2003.
4. 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.

*Literature in English:*

5. Weston D.: Infection Prevention and Control: Theory and Practice for Healthcare Professionals, John Wiley & Sons, New Qork, 2008.
6. Andersen B. M.: Prevention and Control of Infections in Hospitals, textbook, Practice and Theory, Springer, Berlin, 2016.
7. Tortora Gerard J., Funke Berdell R., Case Christine L.: Microbiology: An Introduction, textbook, Books a la Carte Edition, Benjamin Cummings, New York, 2009.

**Number of classes:**

| **Lectures** | **Exercises** | **Other classes** (professional practice...) | **Study research work** (Degree Paper...) | **Other forms of teaching** (individual work with student, projects…) |
|---|---|---|---|---|
| 30 | 30 | 0 | 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 | | |

**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:** | English, Serbian |
| **Course status**: | elective |
| **Semester:** | first year, first semester |
| **ECTS**: | 5 |
| **Requirement**: | no |

**Course objective:**
Course objective is that studnt 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:**
*Lectures*
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.
*Exercies*
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:**
*Literature in Serbian:*

1. Tošović S. i sar.: Bezbedno upravljanje medicinskim otpadom, Nacionalni vodič dobre prakse, Ministarstvo zdravlja RS, Beograd, 2009.
2. Matović V., Đukić M., Antonijević B.: Praktikum iz kliničko-toksikoloških analiza, ur.: Matović V., Paragon, Beograd, 2005.
3. Zakon o upravljanju otpadom, Sl. glasnik RS 36/09.
4. Direktiva o opasnom otpadu 91/689/EES.
5. Okvirna Direktiva o otpadu 75/442/EES.

*Literature in English:*

6. Landrum V. J.: Medical Waste Management and Disposal, Elseiver, London, 2001.


**Number of classes:**

| **Lectures** | **Exercises** | **Other classes** (professional practice...) | **Study research work** (Degree Paper...) | **Other forms of teaching** (individual work with student, projects…) |
|---|---|---|---|---|
| 30 | 30 | 0 | 0 | 0 |

**Methods of teaching:**
lectures, exercises, case study, demo laboratory exercises, 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 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**: | 12 |
| **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:**

*Lectures*

Digestion and absorption of carbohydrartes; 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, α1-antitrypsin, α1-fetoprotein, α1-acidic glycoprotein, α1-antichymotrypsin, haptoglobin, ceruloplasmin, α2-macroglobulin, transferrin, hemopexin, β2-microglobulin, fibrinogen, C-reactive protein, complement, immunoglobulins; disorders in concentration of total proteins: hypoproeinemia 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, cytinuria; 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 artherosclerosis; 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 apoliproiteins; standardization of lipid and lipoprotein determination methods.

*Exercies*

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 phosphovolframate/manganese; lipoprotein electrophoresis; computer simulations; part of exercises is carried out in biochemistry laboratory.

**Literature:**

*Literature in Serbian:*

1. Spasić S., Jelić-Ivanović Z., Spasojević-Kalimanovska V.: Medicinska biohemija, udžbenik, Farmaceutski fakultet,

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

*Literature in English:*

9. Caplan L. A., Pesce J. P., Kazmierzak C. K.: Clinical Chemistry, Mosby, Maryland Heights, Missouri, 2004.

**Number of classes:**

| **Lectures** | **Exercises** | **Other classes** (professional practice...) | **Study research work** (Degree Paper...) | **Other forms of teaching** (individual work with student, projects…) |
|---|---|---|---|---|
| 75 | 75 | 0 | 0 | 0 |

**Methods of teaching:**
lectures, exercises, case study, demo laboratory exercises, 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 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**: | 8 |
| **Requirement**: | Medical Biochemistry 1 |

**Course objective:**

The objectiveof 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.

*Exercies*

Development and application of analytic techniques used in clinical biochemistry for diagnostic purposes, monitoring and detecting disease complications; safety in laboratory and relevant regulations; determination of sodium, potassium and lithium using flame emission photometry and ISE; determination of magnesium using titan yellow colorimetric method; determination of calcium with o-cresolphthlalein; determination of phosphates with ammonium molybdate; analysis of blood gases: determination of *pH*, $pCO_2$ and $pO_2$; computer simulations; part of exercises is carried out in biochemistry laboratory.

**Literature:**

*Literature in Serbian:*


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

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

*Literature in English:*

9. Caplan L. A., Pesce J. P., Kazmierzak C. K.: Clinical Chemistry, Mosby, Maryland Heights, Missouri, 2004.

**Number of classes:**

| **Lectures** | **Exercises** | **Other classes** (professional practice...) | **Study research work** (Degree Paper...) | **Other forms of teaching** (individual work with student, projects…) |
|---|---|---|---|---|
| 45 | 45 | 0 | 0 | 0 |

**Methods of teaching:**
lectures, exercises, case study, demo laboratory exercises, 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:** | English, 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:**
*Lectures*
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 reparation 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-ribolysation, sumoylation, ubiquitination. Cell cycle regulation. Cell proliferation during development and differentiation. Programmed cell death – apoptosis. Basic principles of genetic engineering, application, cloning.
*Exercies*
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:**
*Literature in Serbian:*

1. Diklić V., Kosanović M., Dukić S., Nikoliš J.: Biologija sa humanom genetikom, udžbenik, Grafopan, Beograd, 2001.
2. Kovačević Z. L.: Biohemija i molekularna biologija, udžbenik, Medicinski fakultet, Novi Sad, 2002.
3. Tripeni P., Elard S.: Emerijevi osnovi medicinske genetike, Data Status, Beograd, 2009.
4. Hristić M., Potparević B.: Praktikum iz biologije sa humanom genetikom, Farmaceutski fakultet, Beograd, 2005.
5. Đelić N., Stanimirović Z.: Principi genetike, Elit Medica, Beograd, 2004.

*Literature in English:*

6. Alberts B.: Molecular Biology of the Cell, Garland Science, New York, 2008.
7. Nussbaum R. L., McInnes R. R., Willard H. F.: Genetics in Medicine, Saunders, Philadelphia, 2007.
8. Lodish H., Berk A., Zipursky S. L., Matsudaira P., Baltimore D., Darnell J.: Molecular Cell Biology, W. H. Freeman & Co., New York, 2003.


**Number of classes:**

| **Lectures** | **Exercises** | **Other classes** (professional practice...) | **Study research work** (Degree Paper...) | **Other forms of teaching** (individual work with student, projects…) |
|---|---|---|---|---|
| 45 | 45 | 0 | 0 | 0 |

**Methods of teaching:**

| lectures, exercises, case study, demo laboratory 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 | | |

**MENTAL HYGIENE**

| | |
|---|---|
| **Study program:** | Professional Medical Laboratory Technologist |
| **Type and level of study**: | undergraduate professional studies |
| **Course:** | **Mental Hygiene** |
| **Language of instruction:** | English, 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:**
*Lectures*
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.
*Ecercises*
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:**
*Literature in Serbian:*

1. Simić M., Kovačević K.: Mentalna higijena, udžbenik, autorsko izdanje, Beograd, 2004.
2. Kaličanin P. i sar.: Stres, zdravlje, bolest, udžbenik, Obeležja, Beograd, 2007.
3. Berger D.: Zdravstvena psihologija, Društvo psihologa Srbije, Centar za primarnu psihologiju, Beograd, 2002.
4. Havelka M. i sar..: Zdravstvena psihologija, Naklada Slap, Jastrebarsko, 2002.
5. Nikolić D.: Bolesti zavisnosti, Narodna knjiga-Alfa, Beograd, 2007.
6. Stanković Z., Begović D.: Alkoholizam od prve do poslednje čaše, Kreativni centar, Beograd, 2005.

*Literature in English:*

7. Bell G. E.: The Good Book of Mental Hygiene, Resource Publications, Borston, 2020.
8. Glen A.: Mental Hygiene: How To Change Your Mind, CreateSpace Independent Publishing Platform, London, 2018.
9. Tria G. E., Gaerlan J. E., Limpingco D. A.: Principles of Mental Hygiene, Pantas Publishing & Printing, Roterdam, 2010.


**Number of classes** (per semester):

| **Lectures** | **Exercises** | **Other classes** (professional practice...) | **Study research work** (Degree Paper...) | **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 | | |

**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:** | English, 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:**
*Lectures*
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.
*Exercises*
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**:
*Literature in Serbian*:

1. Ranković-Vasiljević R., Stojanović-Jovanović B., Terzić-Marković D.: Metodika i organizacija zdravstvene nege, Visoka zdravstvena škola strukovnih studija, Beograd, 2015.
2. Milović Lj.: Organizacija zdravstvene nege sa menadžmentom, udžbenik, Naučna knjiga, Beograd, 2004.
3. Tijanić M. i sar.: Zdravstvena nega i savremeno sestrinstvo, Naučna knjiga, Beograd, 2010.

*Literature in English:*

4. Beik Janet I.: Health Insurance Today: A Practical Approach, Saunders, Philadelphia, 2010.
5. 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
6. Morrisey M. A.: Health Insurance, textbook, Health Administration Press, London, 2007.


**Number of classes:**

| **Lectures** | **Exercises** | **Other classes** (professional practice...) | **Study research work** (Degree Paper...) | **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:**
*Lectures*
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.
*Exercies*
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:**
*Literature in Serbian:*
1. Tatić V.: Patologija, udžbenik, Viša medicinska škola, Beograd, 2005.
2. Atanacković M. i sar.: Patologija, udžbenik, Medicinski fakultet Beograd, 2003.

*Literature in English:*
3. Edward C. K., Vinay K., Robbins P., Cotran J.: Review of Pathology, Elsevier Science, London, 2014.
4. Sue E. H., Kathryn L. McC.: Understanding Pathophysiology, Elsevier Science, London, 2016.

**Number of classes:**

| **Lectures** | **Exercises** | **Other classes** (professional practice...) | **Study research work** (Degree Paper...) | **Other forms of teaching** (individual work with student, projects…) |
|---|---|---|---|---|
| 45 | 45 | 0 | 0 | 0 |

**Methods of teaching:**
lectures, exercises, case study, demo laboratory exercises, 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 | | |

**PATHOPHYSIOLOGY**

| | |
|---|---|
| **Study program:** | Professional Medical Laboratory Technologist |
| **Type and level of study**: | undergraduate professional studies |
| **Course:** | **Pathophysiology** |
| **Language of instruction:** | English, Serbian |
| **Subjects status**: | mandatory |
| **Semester:** | second year, third semester |
| **ECTS**: | 10 |
| **Requirement**: | Anatomy and Physiology<br>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:**
*Lectures*
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, artherosclerosis, 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.
*Exercises*
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, artherosclerosis, 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:**
*Literature in Serbian:*

1. Radić S.: Opšta patofiziologija, udžbenik, Medicinski fakultet, Niš, 2012.
2. Beleslin B.: Specijalna patološka fiziologija, Beograd, 2008.
3. Babić Lj., Borota R., Lučić A.: Priručnik praktičnih i seminarskih vežbi iz patološke fiziologije, Medicinski fakultet, Novi Sad, 2007.
4. Ubavić M.: Patološka fiziologija, interne skripte, ICEPS, 2017.
5. Gamulin M., Marušić M., Kovač Z.: Patofiziologija, udžbenik, Medicinska naklada, Zagreb, 2005.
6. Maličević Ž. i sar.: Osnovi patološke fiziologije, udžbenik, Panevropski univerzitet Apeiron, Banja Luka, 2009.
7. Kovač Z., Gamulin S. i sar.: Patofiziologija, Zadaci za problemske seminare, Medicinska naklada, Zagreb, 2006.

*Literature in English:*
8. Huether S. E.: Understanding Pathophysiology, Elsevier, London, 2011.
9. Nolan A.: Pathophysiology: Step By Step Guide for Nursing, textbook, Kindle Edition, London, 2020.
10. Banasik J. L.: Pathophysiology, textbook, Saunders, New York, 2018.


**Number of classes:**

| **Lectures** | **Exercises** | **Other classes** (professional practice...) | **Study research work** (Degree Paper...) | **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** |
| **Language of instruction:** | Serbian |
| **Course status**: | mandatory |
| **Semester:** | Professional practice 1: first year, second semester<br>Professional practice 2: second year, fourth semester<br>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:**

*Literature in Serbian:*

1. literature related to the laboratory method
2. internal documents Teaching bases (statute, regulations ...)

*Literature in English:*

1. literature related to the laboratory method
2. internal documents Teaching bases (statute, regulations ...)

**Number of classes:**

| **Lectures** | **Exercises** | **Other classes** (professional practice...) | **Study research work** (Degree Paper...) | **Other forms of teaching** (individual work with student, projects…) |
|---|---|---|---|---|
| 0 | 0 | 300+300+300 (Professiional practice 1,2,3) | 0 | 0 |

**Methods of teaching:**

practical work in microbiology, medical biochemistry and hematology laboratory.

**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 | | |

**PUBLIC HEALTH**

| | |
|---|---|
| **Study program**: | Professional Medical Laboratory Technologist |
| **Type and level of study**: | undergraduate professional studies |
| **Course:** | **Public Health** |
| **Language of instruction:** | English, Serbian |
| **Course status**: | elective |
| **Semester:** | first year, second semester |
| **ECTS**: | 5 |
| **Requirement:** | no |

**Course objective:**
The objective of the course is to train students to recognize values and determinants, duties of individuals, family, local community and society aimed at health protection, to recognize the role of nurses in health promotion, to familiarize them with the national project of health promotion and prevention of chronic diseases and strategies of European health care policies. The objective of the course is to familiarize students with the principles of healthy, safe and balanced nutrition of healthy and sick persons, with organization and activities in health care education in Serbia and to teach them to implement applicative theory in practice.

**Course outcome:**
Upon the completion of the course students will be able to recognize health-related factors, to recognize the role of therapist in health promotion, to make difference between health care education and health promotion, to practically apply the acquired knowledge.

**Course content:**
*Lectures*
Societal aspects of health; promotion of health and its characteristic; health promotion activities; impact on the health of individual; impact of nutrition on health; national project of promotion of health and chronic diseases; role of therapist in health improvement; 21st Century Health for All Strategy; objectives and purpose of health care education; levels and approaches to health care education; health care education in the process of nursing of the old; forms and methods of work in health care education; devices and equipment; areas of work in health care education; motivation and communication in health care education; teaching methods and its tasks; content of education; organization of lessons and preparation of health care educator for classes; principles of healthy nutrition, guidelines for healthy nutrition; development and definition of social medicine; social care of health; communication in health care; health care policy; social inequalities in health care system and obtaining health protection, levels of health protection; health protection systems globally; criteria for evaluation of socio-medical importance of health issues; marginalized population categories; role of health care institutions and medical professionals in health care system.
*Exercises*
Societal aspects of health. Promotion of health and its characteristics. Health promotion activities. Impact of health on individual. Impact of nutrition on health. Nutrition characteristic for healthy and sick individual. National project of health promotion and prevention of chronic diseases. Role of therapist in health improvement. 21st Century Health for All Strategy. Objectives and purpose of health care education. Levels and approaches in health care education. Health care education in the process of nursing of the old. Forms and methods of work in health care education. Devices and equipment. Areas of work in health care education. Motivation and communication in health care education. Teaching methods and its tasks. Content of education. Organization of lessons and preparation of health care educator for classes. Principles of healthy nutrition; food pyramid; guidelines for healthy nutrition. Development and definition of social medicine. Social care of health. Communication in health care. Health care policy. Social inequalities in health care system and obtaining health protection, levels of health protection. Health protection systems globally. Criteria for evaluation of socio-medical importance of health issues. Marginalized population categories. Role of health care institutions and medical professionals in health care system.

**Literature:**
*Literature in Serbian:*
1. Lazarević A. i sar.: Javno zdravlje, socijalna politika i zdravstvena zaštita, udžbenik, Beograd, Visoka zdravstvena škola strukovnih studija, Beograd, 2016.
2. Hojer S.: Pristupi i metode u zdravstvenom odgoju, udžbenik, Koledž zdravlja, Ljubljana, 2005.
3. Lazarević A.: Socijalna medicina, autorsko izdanje, Beograd, 2015.
4. Simić S. i sar.: Socijalna medicina, udžbenik, Medicinski fakultet, Beograd, 2012.
*Literature in English:*
5. 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.
6. Schneider M. J.: Introduction to Public Health, textbook, Jones-Barlett learning, New York, 2021
7. Murphy F.: Community Engagement, Organization, and Development for Public Health Practice, Springer Publishing Company, New York, 2004.

**Number of classes:**

| **Lectures** | **Exercises** | **Other classes** (professional practice...) | **Study research work** (Degree Paper...) | **Other forms of teaching** (individual work with |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| | | | | student, projects…) |
| 30 | 30 | 0 | 0 | 0 |
| **Methods of teaching:**<br>lectures, exercises, discussions, problem solving | | | | |
| **Grading (maximum 100 points)** | | | | |
| **Pre-Exam obligations** | | **Points** | **Final Exam** | **Points** |
| Lecture attendance | | 3 | Exame | 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:** | English, Serbian |
| **Course status**: | mandatory |
| **Semester:** | third year, sixth semester |
| **ECTS**: | 5 |
| **Requirement**: | no |

**Courses objective:**
The objective of the course is to familiarize students with basic principles of organization of health care institutions and health care sector, manner of institution management, specific characteristics of decision-making process in health care sector, motivation and team building, features of intra-sectoral communication in health care institutions, human-resource matters and human-resources building, specific features of operating policy and planning strategy, administrative procedures and change management in health care institutions, mandatory and other forms of health insurance.

**Course outcome:**
Students who complete the course are trained to organize medical teams, ensure good communication within a health care institution, efficiently make decisions in situations when there is not enough time and efficiently manage changes; students understand systems of mandatory and other forms of health protection.

**Course content:**
*Lectures*
The role of good communication; the role of managers, difference between commanding and leading; policy and schedule of employment, introduction process, interview and integration of new employee; training; health care institution organization; primary, secondary and tertiary health protection; quality control procedures, importance of the notion of procedure; population protection from infectious diseases; production and trade in drugs – control; production and trade in narcotics – control; ban on the sale of alcoholic beverages, smoking ban, ban on advertising sale of tobacco products – control; chambers of health care practitioners; republic administration bodies in the sphere of environment protection; environmental legislature – control; protection of nature, environment protection, republic administration bodies in the sphere of health care; trade in explosive materials, inflammable substances and gases; medical waste and biological material management – control; inspection supervision; experiences of the EU countries; modern trends; current challenges in health care institutions; safety of medical practitioners, terrorism – control mechanisms.
*Exercises*
Discussion on organization of health care processes, health care institutions and health care insurance. Analysis of practical experience in Serbia and abroad. Analysis of practical examples in the domain of environment protection. Analysis and practical examples in the sphere of ban on smoking and alcohol. Analysis and discussion: environment protection. Analysis and discussion; medical waste and biological material disposal process in the area of health care. Safety of health care professionals, terrorism – discussion.

**Literature**:
*Literature in Serbian:*
1. Канцир Д., Антић З.: Менаџмент квалитета, Београдска пословна школа, Београд, 2013.
2. Legetić B.: Principi menadžmenta, udžbenik, Ekonomski fakultet, Subotica, 2007.
3. Milović Lj.: Organizacija zdravstvene nege sa menadžmentom, udžbenik, Naučna knjiga, Beograd, 2004.
4. Mićović P.: Zdravstveni menadžment, Obeležja, Beograd, 2008.
5. Marinković Lj: Menadžment u zdravstvenim organizacijama, G.A.D. Beograd, 2001.
6. Official Gazette of the Republic of Serbia
*Literature in English:*
7. Spath P.: Applying Quality Management in Healthcare: A Systems Approach, textbook, Health Administration Press, Boston, 2017.
8. Swanwick T., Vaux E.: ABC of Quality Improvement in Healthcare, Villey, New York, 2020.

**Number of classes:**

| **Theoretical lectures** | **Theoretical exercises** | **Professional practice** | **Study research work** (Degree Paper...) | **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:** | English, 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:**
*Lectures*
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 Europen Medicines Agency labeling relating to medicines for treatment of rare diseases to obtaining permit for the European market; "assistance in diagnosis" option as na 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.
*Exercises*
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:**
*Literature in English:*

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.

*Literature in Serbian:*

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** (Degree Paper...) | **Other forms of teaching** (individual work with student, projects…) |
|---|---|---|---|---|
| 30 | 30 | 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 | 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:** | English, Serbian |
| **Course status**: | elective |
| **Semester:** | third year, sixth semester |
| **ECTS**: | 5 |
| **Requirement**: | no |

**Course objective:**
Training in research work.

**Course outcome:**
Possession of knowledge necessary for research work.

**Course content:**
*Lectures*
Importance of scientific work. Difference between scientific and professional work. Stages of research work. Selection of topic. Bibliography. Ways of literature citation. Experiment. Survey and survey results processing, protection of data. Statistical data processing. Quality of the sample. Objectivity and subjectivity. Result and conclusion. Scientific paper structure and writing. Types of scientific paper. Valuation of scientific paper. Ways of scientific paper publishing. Citation. Plagiarism. Protection of data.
*Exercises*
Techniques of collecting, organizing and studying literature. Searching selected databases. Processing of research results. Graphic presentation of data. Writing scientific paper. Literature citation. Drawing up seminar paper.

**Literature:**
*Literature in Serbian:*
1. Milankov V., Jakšić P.: Metodologija naučno-istraživačkog rada u biološkim disciplinama, udžbenik, Prirodno-matematički fakultet, Univerzitet u Novom Sadu, Novi Sad, 2006.
2. Šomođi Š., Novković N., Kraljević-Balalić M., Kajari K.: Uvod u naučni rad, udžbenik, Poljoprivredni fakultet, Univerzitet u Novom Sadu, Novi Sad, 2004.

*Literature in English:*
3. Ebel H. F., Bliefert C., Russey W. E.: The art of scientific writing, Wiley-VCH, Verlag GmbH & Co. KgaA, Weinheim, 2004.

**Number of classes:**

| **Lectures** | **Exercises** | **Other classes** (professional practice...) | **Study research work** (Degree Paper...) | **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:** | English, 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:**
*Lectures*
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.
*Exercises*
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:**
*Literature in Serbian:*
1. Dragović R.: Engleski za zdravstvene radnike, udžbenik, Naučna knjiga, Beograd, 2004.

*Literature in English:*
2. MacLean J.: English in Basic Medical Science, Oxford University Press, Oxford, 2000.
3. Turner S. Y., Sefika K.: Medical English for International Doctors and Nurses: How to communicate with your patients and colleagues effectively in English, textbook, Kindle Edition, London, 2015.
4. Murphy R.: English Grammar in Use, Cambridge University Press, Cambridge, 2014.
5. McCarthy M., O'Dell F.: English Vocabulary in Use, Cambridge University Press, Cambridge, 2006.
1. Hornby A.S.: Oxford Advanced Learner's Dictionary of Current English, Oxford University Pres, Oxford, 2008.

**Number of classes:**

| **Lectures** | **Exercises** | **Other classes** (professional practice...) | **Study research work** (Degree Paper...) | **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:** | English, 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:**
*Lectures*
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.
*Exercises*
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:**
*Literature in Serbian:*
1. Dragović R.: Engleski za zdravstvene radnike, udžbenik, Naučna knjiga, Beograd, 2004.

*Literature in English:*
2. MacLean J.: English in Basic Medical Science, Oxford University Press, Oxford, 2000.
3. Turner S. Y., Sefika K.: Medical English for International Doctors and Nurses: How to communicate with your patients and colleagues effectively in English, textbook, Kindle Edition, London, 2015.
4. Murphy R.: English Grammar in Use, Cambridge University Press, Cambridge, 2014.
5. McCarthy M., O'Dell F.: English Vocabulary in Use, Cambridge University Press, Cambridge, 2006.
6. Hornby A.S.: Oxford Advanced Learner's Dictionary of Current English, Oxford University Pres, Oxford, 2008.

**Number of classes:**

| **Lectures** | **Exercises** | **Other classes** (professional practice...) | **Study research work** (Degree Paper...) | **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:** | English, Serbian |
| **Course status**: | elective |
| **Semester:** | first year, first 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:**
*Lectures*
Grammar: German 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 German-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.
*Exercises*
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:**
*Literature in Serbian:*
1. Menschen A1 KB und Menschen A1 AB, udžbenik (video materijal: http://matifmarin.blogspot.rs/p/menschen-film-stationen-clips.html), Klett Verlag, Stuttgart, 2018.
2. Nikolovski V.: Gramatička vežbanja „Eine kleine Übungsgrammatik“, Zavod za udžbenike i nastavna sredstva, Schritte international 1, Grammatikspiele.

*Literature in English:*
3. Pude E. A., Specht F.: Menschen, Deutsch als Fremdsprache Kursbuch mit DVD-ROM, udžbenik, Hueber Verlag, Munchen, Deutschland, 2012.
4. Loibl B. et all.: Schritte Plus im Beruf, Kommunikation am Arbeitsplatz, Max Hueber Verlag, Ismaning. Deutschland, 2015.
5. Becker N., Braunert J.: Alltag, Beruf, Kursbuch+Arbeitsbuch, Max Hueber Verlag, Ismaning, 2009.
6. Becker N., Braunert J., Schlenker W.: Unternehmen Deutsch Grundkurs. Kursbuch, Klett Verlag, Stuttgart, 2005.
7. Becker N., Braunert J.: Unternehmen Deutsch Grundkurs, Arbeitsbuch, KlettVerlag, Stuttgart, 2004.
8. https://www.hueber.de/seite/pg_lernen_lerner_dvd_mns, knjiga i link.
9. https://www.hueber.de/seite/pg_lernen_uebungen_mns, dodatne on line vežbe.
10. Grammatik - Ganz klar Übungsgrammatik A1-B1, uz audio materijal, Hueber Verlag, kratak pregled gramatike sa vežbanjima „Hallo aber Deutsch“.
11. www.schubert.

**Number of classes:**

| **Lectures** | **Exercises** | **Other classes** (professional practice...) | **Study research work** (Degree Paper...) | **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:** | English, Serbian |
| **Course status**: | elective |
| **Semester:** | second year, third semester |
| **ECTS**: | 5 |
| **Requirement:** | Specialized German 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:**
*Lectures*
Grammar: comparison of adjectives; causal clauses, future tense, preterite, conditional sentences, verbs of movement, active and passive voice; aspects of everyday life in German-speaking countries: holiday, family life, education, life in the city; relative clauses, verbs with prepositions, adjective forming suffixes and prefixes, deepening knowledge on dependent cluases; everyday life, business life and media in English speaking countries; specialist terminology relevant for students´ future profession, grammatically and linguistically more complex texts; work matrial corresponding to everday practice at work.
*Exercises*
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:**
*Literature in Serbian:*
1. Menschen A1 KB und Menschen A1 AB, udžbenik (video materijal: http://matifmarin.blogspot.rs/p/menschen-film-stationen-clips.html), Klett Verlag, Stuttgart, 2018.
2. Nikolovski V.: Gramatička vežbanja „Eine kleine Übungsgrammatik“, Zavod za udžbenike i nastavna sredstva, Schritte international 1, Grammatikspiele.

*Literature in English:*
3. Pude E. A., Specht F.: Menschen, Deutsch als Fremdsprache Kursbuch mit DVD-ROM, udžbenik, Hueber Verlag, Munchen, Deutschland, 2012.
4. Loibl B. et all.: Schritte Plus im Beruf, Kommunikation am Arbeitsplatz, Max Hueber Verlag, Ismaning. Deutschland, 2015.
5. Becker N., Braunert J.: Alltag, Beruf, Kursbuch+Arbeitsbuch, Max Hueber Verlag, Ismaning, 2009.
6. Becker N., Braunert J., Schlenker W.: Unternehmen Deutsch Grundkurs. Kursbuch, Klett Verlag, Stuttgart, 2005.
7. Becker N., Braunert J.: Unternehmen Deutsch Grundkurs, Arbeitsbuch, KlettVerlag, Stuttgart, 2004.
8. https://www.hueber.de/seite/pg_lernen_lerner_dvd_mns, knjiga i link.
9. https://www.hueber.de/seite/pg_lernen_uebungen_mns, dodatne on line vežbe.
10. Grammatik - Ganz klar Übungsgrammatik A1-B1, uz audio materijal, Hueber Verlag, kratak pregled gramatike sa vežbanjima „Hallo aber Deutsch“.
11. www.schubert.

**Number of classes:**

| Lectures | Exercises | Other classes (professional practice...) | Study research work (Degree Paper...) | 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 | | |

**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**: | 6 |
| **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:**
*Lectures*
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: *Picornaviridae*, *Togaviridae*, *Orthomyxoviridae*, *Paramyxoviridae*, *Rhabdoviridae*, *Flaviviridae*, *Retroviridae*, *Herpesviridae, Papillomaviridae*, *Poxviridae*. Hepatitis viruses; COVID-19.
*Exercies*
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:**
*Literature in Serbian:*

1. Jovanović T., Marković Lj. (ur.): Virusologija, udžbenik, Libri Medicorum, Medicinski fakultet, Beograd, 2008.
2. Marković Lj. i sar.: Virusologija, udžbenik, Medicinski fakultet Beograd, Beograd, 2008.
3. Budimčić M.: Priručnik za virusologiju, Visoka zdravstvena škola, Beograd, 2016.
4. Kalenić S. i sar..: Medicinska mikrobiologija, Medicinska naklada, Zagreb, 2013.
5. Jawetz M. A.: Medicinska mikrobiologija, Savremena administracija, Beograd, 2004.

*Literature in English:*
6. Strauss Ellen, Strauss James: Viruses and Human Disease, Elsevier, New York, 2007.


**Number of classes:**

| **Lectures** | **Exercises** | **Other classes** (professional practice...) | **Study research work** (Degree Paper...) | **Other forms of teaching** (individual work with student, projects…) |
|---|---|---|---|---|
| 30 | 30 | 0 | 0 | 0 |

**Methods of teaching:**
lectures, exercises, case study, demo laboratory exercises, 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 | | |