



Broj: 01-4-TK-6219/20  
Sarajevo, 16. 09. 2020.

Na osnovu članova 50, 52, 55. i 135. Zakona o visokom obrazovanju (Službene novine Kantona Sarajevo 33/17, 35/20), članova 104. i 138. Statuta Univerziteta u Sarajevu, Nastavno-naučno vijeće Medicinskog fakulteta Univerziteta u Sarajevu, na svojoj 11. elektronskoj sjednici, održanoj 16. 09. 2020. godine, donosi

## ODLUKU

### I

Usvajaju se izmjene i dopune Nastavnog plana i programa Integriranog studija „Medicina“ na engleskom jeziku Medicinskog fakulteta Univerziteta u Sarajevu iz 2018. godine, kako je dato u prilogu Odluke.

### II

Prijedlog Odluke dostavlja se Senatu Univerziteta u Sarajevu radi davanja saglasnosti.

#### **Obrazloženje:**

S obzirom na dosadašnje aktivnosti Komisije za reviziju nastavnih planova i programa na Medicinskom fakultetu, koja je formirana na 5. redovnoj sjednici, održanoj 09. 04. 2018. godine, kao i prijedloga izmjena i dopuna nastavnih planova i programa Integriranog studijskog programa „Medicina“ i Integriranog studijskog programa „Medicina“ na engleskom jeziku, na koje je Senat Univerziteta u Sarajevu dao saglasnost 26. 09. 2018. godine, dat je prijedlog da se po isteku trajanja integriranih ciklusa studijskih programa izrade novi prijedlozi nastavnih planova i programa. Na osnovu navedenog imenovana je Komisija za izradu novog prijedloga nastavnog plana i programa integriranih studijskih programa „Medicina“ i „Medicina“ na engleskom jeziku (odlukom broj: 01-4-TK-6310/19 od 26. 09. 2019. godine). Na osnovu dostavljenih materijala katedri i prijedloga Komisije, Nastavno-naučno vijeće je donijelo odluku kao u dispozitivu.

#### **Dostavljeno:**

- ✓ Senat Univerziteta u Sarajevu
- ✓ Grupacija medicinskih nauka UNSA
- ✓ Arhiva Fakulteta
- ✓ Arhiva NNV-a

  
**DEKAN**  
  
**Prof. dr. Semra Čvaljuga**



NASTAVNO NAUČNO VIJEĆE  
PREDSJEDAVAJUĆA  
Prof. dr Semra Čavaljuga

UNIVERZITET U SARAJEVU  
MEDICINSKI FAKULTET  
Broj: 01-4-6037/20  
Datum: 07.09.2020. god.

Predmet: Veza, Odluka Vijeća broj 01-4-TK-6218/20 od 16.09.2020. godine-Odluka o izmjeni i dopuni Nastavnog plana i programa Integriranog studijskog programa „Medicina“ na engleskom jeziku Medicinskog fakulteta Univerziteta u Sarajevu..

Poštovana,

Na osnovu odredbi člana 126. Zakona o visokom obrazovanju i članova 122. i 123 Statuta Univerziteta u Sarajevu u pisanoj formi dajem stručno mišljenje u odnosu na zakonsku uskladenost akta iz predmeta Veza.

Odluku obradila taida nakić.

Odluka se u preambuli temelji na članu 50. (Nastavni planovi i nastavni programi), članu 52. (Izmjene nastavnog plana i programa), članu 55. (Primjena studijskih programa) i člana 135. Zakona o visokom obrazovanju ( Sl. Novine Kantona Sarajevo broj 33/17 i 35/20) te članu 104. (Vijeće fakulteta/akademije- Nadležnosti vijeća fakulteta/akademije) i 138 (Predlaganja i donošenje studijskih programa i njihovih izmjena i dopuna) Statuta Univerziteta u Sarajevu.

Odluka je usaglašena sa relevantnim propisima.

SEKRETAR  
MEDICINSKOG FAKULTETA  
Benjamin Vojniković MA iur.

Dostavljeno:

1. Naslov
2. Arhiva

Code: MFSE 0203	Course title: Medical Biochemistry I and Chemistry
Level: preclinical	Study year: I Semester: II ECTS: 8
Status: obligatory	Total contact hours: 100
Prerequisites:	According to the Study regulation
Lecturers: Module Medical Biochemistry I - Full Professor Sabaheta Hasić MD PhD, Full Professor Radivoj Jadrić MD PhD, Associate Professor Emina Kiseljaković MD PhD, Senior Teaching Assistant Lejla Alić MD, Teaching Assistant Amira Čerimagić MD; Module Chemistry:	
1. Course aims	The overall aim of Medical Chemistry and Medical Biochemistry I Course is to increase understanding of chemical structures and biochemical function of biomolecules, as well as biochemical energetic changes that occur in the body of a healthy human.
2. Course contents	<p>The following topics will be covered within the modules:</p> <p><b>Module Chemistry. Physical and chemical processes in biological systems; The structure and properties of organic biomolecules</b>  Aims:</p> <ul style="list-style-type: none"> <li>• To acquire knowledge of basic principles and laws of physical chemistry.</li> <li>• To acquire knowledge of chemical structure of organic biomolecules and their roles in cellular structures and processes.</li> </ul> <p><b>Module Medical Biochemistry. The importance of inorganic and organic biomolecules of human body; Generation, utilization and storage of metabolic energy in human body</b>  Aims:</p> <ul style="list-style-type: none"> <li>• To acquire knowledge of the importance of inorganic and organic molecules in structures and functions in human organism.</li> <li>• To acquire knowledge of the processes of human body at the molecular level: kinetics of biochemical reactions and its application on biological systems; the ways of energy production and consumption; thermodynamic interactions in metabolism of physiological and pathological conditions.</li> </ul>
3. Learning outcomes (Knowledge, skills and competences)	<p><i>Through the lectures the students will gain following knowledge and competences:</i></p> <ul style="list-style-type: none"> <li>• To understand chemical structure of organic biomolecules and their direct influence on the structure of cells and chemical processes in the cell.</li> <li>• To learn basic principles of physical chemistry</li> <li>• To understand basic physical and chemical principles, metabolic processes and their regulation in the body of a healthy human</li> <li>• To understand the importance of inorganic and organic molecules in the structure and function of the human body</li> <li>• To understand the processes of human body at the molecular level – kinetics of biochemical reactions and its application on biological systems; the ways of energy production and consumption; thermodynamic interactions in metabolism of physiological and pathological conditions.</li> </ul> <p><i>Through the practical laboratory work students will acquire following skills:</i></p> <ul style="list-style-type: none"> <li>• Work in chemical/biochemical laboratory (work with laboratory dishes, chemicals, and human biological material, precautions in the laboratory and first aid)</li> <li>• Measurement and calculations (pipetting, preparation of solutions, defining their concentration, preparation of physiological solutions, precise measurements, stoichiometric computations, SI)</li> </ul>



4. Teaching methods	<ul style="list-style-type: none"> <li>Principles of qualitative and quantitative analysis of organic and inorganic molecules;</li> <li>Electrophoresis and Chromatography in separation, identification and determination of biogenic substances (paper and planar chromatography)</li> </ul> <p>Teaching methods will be organized through classroom/laboratory work and by on-line platforms</p> <p>Lectures: 58 hours (18 hours Chemistry + 40 hours Medical biochemistry 1)</p> <p>Laboratory practical work: 42 hours (12 hours Chemistry + 30 hours Medical biochemistry 1)</p>
5. Method of knowledge assessment and examination	<p>Continuous assessment of knowledge (Midterm examinations) will be carried out through practical exams (colloquiums) and partial exams.</p> <p>Obligatory minimum that should be achieved to pass the test successfully is 55% of points in each form of knowledge assessment. Written test consists of Multiple choice question (MCQ) and/or Extended response questions (ERQ).</p> <p><b>Practical exam (colloquium)</b></p> <p>Continuous knowledge assessment will be carried out with two colloquiums.</p> <ul style="list-style-type: none"> <li>Colloquium 1- Chemistry</li> <li>Colloquium 2- Medical Biochemistry 1</li> </ul> <p><i>Colloquium 1</i> consists of:</p> <ul style="list-style-type: none"> <li>12 MCQ (0.25 points each) – 3.0 points</li> <li>6 problems in a form of chemical reactions and expressions (0.5 point each) = 3 points</li> <li>4 stoichiometric calculation (1.5 points each) = 6 points</li> </ul> <p>Maximal score attained in colloquium 1 is 12 and minimum 6.5 points.</p> <p><i>Colloquium 2</i> consists of:</p> <ul style="list-style-type: none"> <li>24 MCQ (1 point each) – 24 points</li> <li>4 ERQ (1.5 points each) – 6 points</li> </ul> <p>Maximal score attained in colloquium 2 is 30 and minimum 16.5 points.</p> <p>Colloquium 1 is not an obligatory prerequisite for colloquium 2 and vice versa.</p> <p><b>Partial exam</b></p> <p><i>Partial exam 1</i></p> <p>Partial exam 1 comprises topics of Chemistry module in the form of a written test:</p> <ul style="list-style-type: none"> <li>20 MCQ (0.25 points each) – 5 points</li> <li>7 ERQ (1 point each) – 7 points</li> <li>4 ERQ (1.5 points each) – 6 points</li> </ul> <p>Maximal score attained in Partial exam 1 is 18 and minimum 10.</p> <p><i>Partial exam 2</i></p> <p>Partial exam 2 comprises topics of Medical biochemistry module in the form of a written test:</p> <ul style="list-style-type: none"> <li>60 MCQ (0.66 points each) – 40 points</li> </ul> <p>Maximal score attained in Partial exam 2 is 40 and minimum 22 points.</p> <p>Students who have successfully accomplished all of their obligations during the</p>



semester (attendance is within the legal limits) and who have passed all the necessary exams of the course (attained minimum score of 55% in partial exams 1 and 2 and colloquiums 1 and 2) are not required to take Regular exam. Their final grade is reported according to points attained during Continuous knowledge assessment.

#### **Regular examination term**

Student is obliged to take regular exam if minimum points are not attained during midterm exams for both practical and theoretical parts of the course. Previously defined criteria for Midterm examination will be applied to Regular examination term (form of tests, number of question and points).

#### **Re-sit examination term /September examination term**

Previously defined criteria will also be applied to Re-sit and September examination terms.

#### **Grading system and grading points**

Final grade is reported according to points attained during all forms of the knowledge assessment (practical and theoretical exams).<sup>3</sup>

Grade	Total score (points)	Grade description
10 (A)	95-100	Outstanding results without errors or with minor errors
9 (B)	85-94	Above average, with some mistakes
8 (C)	75-84	Average, with noticeable mistakes
7 (D)	65-74	Generally good, but with significant mistakes
6 (E)	55-64	Meets the minimum criteria
5 (F, FX)	<55	Does not meet the minimum criteria

#### **6. Literature**

Required:

1. Jadrić R, Hasić S, Kiseljaković E, Kulo A. Experimental Procedures and Clinical Correlations in Medical Biochemistry 1. Perfecta Sarajevo; 2018
2. Skoog DA, West DM, Holler FJ, Crouch SR. Fundamentals of Analytical Chemistry. 9th ed. Cengage Learning; 2013
3. Murray RF, Botham KM, Kennelly PJ, Rodwell VW: Harper's Illustrated Biochemistry. 28th ed. The McGraw-Hill Companies, Inc; 2009
4. Smith C, Marks AD, Lieberman M. Marks' Basic Medical Biochemistry-A Clinical Approach. 4th ed. Lippincott Williams&Wilkins; 2013

Recommended:

1. Gareth T. Medicinal Chemistry-An Introduction. 2nd ed. Wiley; 2007
2. Kroschwitz JJ, Winkour M. Chemistry. 2nd ed. Mc Graw-Hill, Inc; 1990.

#### **3. Notice**

All forms of lectures and practical laboratory work are mandatory. Class attendance is regulated by the Law of Higher Education of Sarajevo Canton. Student absence should be justified by valid documentation. Lectures and laboratory practical work will be held at the Department of Medical Biochemistry.

Consultation: working days: 1-2 p.m. at the Department of Medical Biochemistry or via e-mail [biohemija@mf.unsa.ba](mailto:biohemija@mf.unsa.ba); [radivoj.jadric@mf.unsa.ba](mailto:radivoj.jadric@mf.unsa.ba)

### COURSE PLAN: Medical Biochemistry 1 and Chemistry

Week	Teaching method and topics	Hours
1	<b>Module: Chemistry</b>	
	<b>Lecture:</b> Molecular basis of living systems: Elemental composition of living organisms; Main bioelements; Chemical bonds present in biomolecules: (ionic bond - ion formation, covalent bonds, coordinate-covalent bond); Biologically significant, chelating complexes; Intermolecular interactions in biological systems and their importance for maintaining the structure and interaction of biological macromolecules: (inter and intra molecular hydrogen bonds, hydrophobic interactions, Van der Waals forces, hydration - a biologically significant form of solvation)	3
	<b>Lecture:</b> Water as a dispersion medium of the organism: Physical - chemical properties of water depending on its structure	1
2	<b>Practical laboratory work:</b> Laboratory work and calculations in chemistry; Introduction and instructions to laboratory work; precautions and first aid; Solutions and processes relating to dissolution and dilution; Different ways of expressing the quantitative ratio of solution components; SI (system of units); Stoichiometric calculations;	3
	<b>Lecture:</b> Disperse systems in relation to the human body: Ionic-molecular disperse systems; Colloidal and coarse dispersion systems	1
	<b>Lecture:</b> Electrolyte solutions: acids, bases, ampholytes, salts	1
	<b>Lecture:</b> Equilibria in disperse systems: water ionization, pH value, water hydrolysis	1
	<b>Lecture:</b> Buffer systems - mechanism of action of biologically significant buffers	1
	<b>Practical laboratory work:</b> Quantitative volumetric analysis: determination of chloride ion concentration by Mohr (precipitation); Stoichiometric calculations: equivalence in chemical reactions;	3
3	<b>Lecture:</b> Colligative properties of disperse systems: Chemical potential, diffusion; Lowering the vapor voltage of the solution; Lowering the freezing point and boiling point of the solution; Osmotic pressure	1
	<b>Lecture:</b> Oxidative-reductive processes: Redox reactions; Quantitative laws of electrolysis; Galvanic elements, cells; Change of free energy in redox processes; Electron transfer processes in biological systems; Electrochemical elements	2
	<b>Lecture:</b> Oxidative-reductive processes: Change of free energy in electron transfer processes in biological systems; Photosynthesis	1
	<b>Practical laboratory work:</b> <i>pH, buffers, hydrolysis - stoichiometric calculations</i>	3



4	<b>Lecture:</b> Properties of carbon atoms; Functional groups; Biochemically significant reactions; isomerism	1
	<b>Lecture:</b> Carboxylic acids: mono and dicarboxylic acids; Substituted carboxylic acids; oxycarboxylic acids; keto carboxylic acids	2
	<b>Lecture:</b> Heterocyclic compounds.	1
	<b>Practical laboratory work:</b> Application of separation techniques in qualitative and quantitative analysis of significant biogenic compounds: paper chromatography; Planar chromatography	3
5	<b>Partial exam I and Colloquium I</b>	2 hours
	<b>Lecture:</b> The role and metabolism of body water amount and distribution; water balance and regulation	2 hours
	<b>Practical laboratory work:</b> Osmosis; diffusion; preparation of physiological solutions	3 hours
6	<b>Lecture:</b> Gas transport biochemistry; homeostasis and regulation processes in the human body; acid-base balance; acidosis and alkalosis; acid-base balance regulation	2 hours
	<b>Lecture:</b> Metabolism of minerals in the human body; general characteristics and macrominerals metabolism	2 hours
	<b>Practical laboratory work:</b> Filtration; Determining the inorganic and organic buffers capacity	3 hours
7	<b>Lecture:</b> Metabolism of trace elements	2 hours
	<b>Lecture:</b> Biochemistry of amino acids classification and properties; biological importance of peptides	2 hours
	<b>Practical laboratory work:</b> Osmotic pressure investigation effects on red blood cells; Adsorption	3 hours
8	<b>Lecture:</b> Protein structures – denaturation and proteolysis; protein classification; simple proteins structure and biomedical significance	2 hours
	<b>Lecture:</b> Complex proteins structure and biomedical significance; chromoproteins-hemoglobin as allosteric protein; glycoproteins, phosphoproteins and lipoproteins	2 hours
	<b>Practical laboratory work:</b> Colloids precipitation; Dialysis	3 hours
9	<b>Lecture:</b> Nucleosides, nucleotides, and nucleic acids - structure and biomedical significance	2 hours
	<b>Lecture:</b> The molecular biology of cancer: Damage to DNA leading to mutations; Oncogenes	2 hours
	<b>Practical laboratory work:</b> Color reactions of proteins and amino acids;	3 hours
10	<b>Lecture:</b> Carbohydrates – structure and biomedical significance of simple and complex molecules; Biomedical significance of homo and heteroglycans	2 hours
	<b>Lecture:</b> Fatty acids – classification and biomedical significance; Fatty acid derivatives; Lipids structure and function in the human body	2 hours
	<b>Practical laboratory work:</b> Fractional precipitation of proteins; Qualitative reactions on simple proteins	3 hours



11	<b>Lecture:</b> Simple and complex lipids - biomedical significance; Triglycerides and cholesterol cholesterol derivatives - biomedical significance	2 hours
	<b>Lecture:</b> Water soluble and fat soluble vitamins; vitamins as coenzymes;	2 hours
	<b>Practical laboratory work:</b> Precipitation reactions of proteins – reversible and irreversible precipitations; Reactions on glycoproteins and fofoproteins	3 hours
12	<b>Lecture:</b> Enzymes as catalysts; The enzyme catalyzed reaction; Mechanism based inhibitors; Enzymes – general properties; Regulation of enzymes activity	2 hours
	<b>Lecture:</b> Classification of enzymes; enzyme activity and units of enzyme activity; isoenzymes; enzymes as diagnostic tools	2 hours
	<b>Practical laboratory work:</b> Electrophoresis; Qualitative reactions of cholesterol; Qualitative reactions of bile acids	3 hours
13	<b>Lecture:</b> Relationship between cell biology and biochemistry; Compartmentation in cells; Transport of molecules across the plasma membrane	2 hours
	<b>Lecture:</b> Oxygen reactive species, lipid peroxidation and antioxidative protection in the human body	2 hours
	<b>Practical laboratory work:</b> Reactions on vitamins; quantitative reaction on alpha-amylase (Wohlgemuth method)	3 hours
14	<b>Lecture:</b> Fuel metabolism dietary components; the fed and fasting state	2 hours
	<b>Lecture:</b> The generation and utilization of metabolic energy; biological oxidation and electron transport chain	2 hours
	<b>Practical laboratory work:</b> Ptyalin activity and thermolability; pepsin activity; urease activity; aldehyde dehydrogenase activity	3 hours
15	<b>Partial exam II and Colloquium II</b>	2 hours
17-18	<b>Regular Examination term</b>	
19 -20	<b>Re-sit Examination term</b>	
September	<b>September Examination term</b>	

Code: <b>MFSE 0302</b>	Course title: <b>Medical Biochemistry 2</b>		
Level: <b>preclinical</b>	Study year: <b>II</b>	Semester: <b>III</b>	ECTS: <b>7</b>
Status: <b>obligatory</b>	Total contact hours: <b>80</b>		
Prerequisites:	<b>According to the study regulation</b>		
Lecturers: Full Professor Sabaheta Hasić MD PhD, Full Professor Radivoj Jadrić MD PhD, Associate Professor Emina Kiseljaković MD PhD, Senior Teaching Assistant Lejla Alić MD, Teaching Assistant Amira Ćerimagić MD			
1. Course aims	Aims of the Medical Biochemistry 2 Course are to acquire: <ul style="list-style-type: none"><li>• knowledge and understanding of metabolic pathways in human organism, their energetic aspects and regulation</li><li>• metabolic and biochemical characteristics of tissues, organs and body fluids</li><li>• knowledge of basic analytical procedures in determination of body fluids constituents and their application in screening and diagnostics.</li></ul>		
2. Course contents	<p>The following topics will be covered within the Modules:</p> <p><b>Module 1. Carbohydrate metabolism</b> Aim: To acquire knowledge of energetic and intermediary metabolism of carbohydrates</p> <p><b>Module 2. Lipid metabolism</b> Aim: To acquire knowledge of energetic and intermediary metabolism of lipids</p> <p><b>Module 3. Amino acids and protein metabolism</b> Aim: To acquire knowledge of metabolic pathways of amino acids, proteins, non-protein nitrogen derivatives, their storage and energetic values</p> <p><b>Module 4. Biochemistry of hormones, interaction of intermediary metabolism</b> Aim: To acquire knowledge of hormone biochemistry and basics of metabolic regulation mechanisms</p> <p><b>Module 5. Metabolic and biochemical specificities of body fluids, tissues and organs</b> Aim: To acquire knowledge of specificities of organs and tissues metabolism, their interaction and composition of body fluids in healthy individuals.</p>		
<ul style="list-style-type: none"><li>• 3. Learning outcomes</li><li>• (Knowledge, skills and competences)</li></ul>	<ul style="list-style-type: none"><li>• <i>Through the lectures the students will gain following knowledge and competences:</i></li><li>• Understand biochemical mechanisms of the occurrence of various diseases through knowledge of metabolic processes, metabolic specificities of tissues and organs, complexity of regulation, importance of cooperation between tissues and organs</li><li>• Determine the composition of body fluids constituents and their importance in differentiation of pathological conditions from physiological.</li><li>• <i>Through the practical laboratory work students will acquire following skills:</i></li><li>• Photometric measurement of different compounds. Construction of a calibration curve</li><li>• Analysis of body fluids constituents</li></ul>		

4. Teaching methods	<ul style="list-style-type: none"><li>• Usage of laboratory equipment</li></ul> Lectures: 47 hours (classroom/on line) Laboratory practical work: 33 hours (laboratory/on line)																								
5. Method of knowledge assessment and examination	<p>Continuous assessment of knowledge (Midterm examination) will be carried out in the classroom/laboratory or on-line through practical exams (colloquiums) and partial exams.</p> <p>During any form of knowledge assessment, the student will attain certain number of points with an obligatory minimum of 55% to pass the test successfully.</p> <p><b>Practical exam (colloquium)</b></p> <p>Laboratory practical work is based on the principle of interactive learning, where the student is obliged to prepare the lectures in advance. Continuous knowledge assessment will be carried out with five colloquiums. Each colloquium consists of 9 MCQ, where 5 correctly answered questions are considered as 55% of correct answers. Maximal score attained in each colloquium is 8.4 and minimum 4.6.</p> <p><b>Partial exam</b></p> <p>Topics contained in five modules will be assessed through two partial exams in the form of test. Each test consists of 50 MCQs. Minimum correctly answered questions needed to pass the test (55%) is 27. First partial exam will be held in ninth week of the semester and will be consisted of modules 1., 2., and 3. Second partial exam will be held in fifteenth week of the semester and will be consisted of modules 4. and 5.</p> <p>Points attained during continuous knowledge assessment in partial exams are:</p> <table><tr><th>Points attained through partial exams</th><th>min</th><th>max</th></tr><tr><td>Test 1 Partial exam 1</td><td>16</td><td>29</td></tr><tr><td>Test 2 Partial exam 2</td><td>16</td><td>29</td></tr><tr><td>Total</td><td>32</td><td>58</td></tr></table> <p>Students who have successfully accomplished all of their obligations during the semester (attendance is within the legal limits) and who have passed all the necessary exams of the course (attained minimum score of 55% in partial exams 1 and 2 and all five colloquiums) are not required to take Regular exam. Their final grade is reported according to points attained during Continuous knowledge assessment.</p> <p>Total points attained during Continuous knowledge assessment in both Practical and Partial exams:</p> <table><tr><th>Total points</th><th>min</th><th>max</th></tr><tr><td>Practical exam</td><td>23</td><td>42</td></tr><tr><td>Test 1+2</td><td>32</td><td>58</td></tr><tr><td>Total</td><td>55</td><td>100</td></tr></table> <p><b>Regular examination term</b></p> <p>Student is obliged to take regular exam in the classroom/laboratory or on-line if</p>	Points attained through partial exams	min	max	Test 1 Partial exam 1	16	29	Test 2 Partial exam 2	16	29	Total	32	58	Total points	min	max	Practical exam	23	42	Test 1+2	32	58	Total	55	100
Points attained through partial exams	min	max																							
Test 1 Partial exam 1	16	29																							
Test 2 Partial exam 2	16	29																							
Total	32	58																							
Total points	min	max																							
Practical exam	23	42																							
Test 1+2	32	58																							
Total	55	100																							



minimum points are not attained during midterm exams for both practical and theoretical parts of the course. Regular exam should be taken also if a student is not satisfied with the grade received on the midterm examination. Practical work will be taken before theoretical examination as obligatory condition for theoretical examination. The student draws a card with one question from the topics of the colloquium that was failed (one card per colloquium). The parts are evaluated as follows:

1. Student describes the assigned topic - 1 point
2. Student describes the significance of the assigned topic - 2 points
3. Student describes appliances, accessories and reagents needed to carry out the reaction - 0,6 points
4. Students describes analytical procedure - 2 points
5. Student is able to perform practical work - 2 points
6. Students is able to interpret the results and reference range - 0,8 points

Minimum points needed to pass the practical exam is 4,6 points per topic. Student who did not meet the minimum criteria for Partial exams during Midterm examination is obliged to take Regular exam. Previously defined criteria for Midterm examination apply to Regular exam as following:

Points attained	min	max
Test 1	16	29
Test 2	16	29
Total	32	58

In order to pass the course it is necessary to attain following sum of points:

Total points	min	max
Practical exam	23	42
Test 1+2	32	58
Total	55	100

#### **Re-sit examination term /September examination term**

Previously defined criteria will be applied also in Re-sit and September examination terms.

#### **Grading system and grading points**

Final grade is reported according to points attained during both forms of the knowledge assessment (practical and theoretical exams).

Grade	Total score (points)	Grade description
10 (A)	95-100	Outstanding results without errors or with minor errors
9 (B)	85-94	Above average, with some mistakes
8 (C)	75-84	Average, with noticeable mistakes
7 (D)	65-74	Generally good, but with significant mistakes
6 (E)	55-64	Meets the minimum criteria
5 (F, FX)	<55	Does not meet the minimum criteria

6. Literature

Required:

	<ol style="list-style-type: none"> <li>1. Hasić S, Kiseljaković E, Jadrić R, Kulo A, Alić L. Experimental Procedures and Clinical Correlations in Medical Biochemistry 2. Perfecta Sarajevo; 2019</li> <li>2. Smith C, Marks AD, Lieberman M. Marks' Basic Medical Biochemistry-A Clinical Approach. 4th ed. Lippincott Williams &amp; Wilkins; 2013</li> </ol> <p>Recommended:</p> <ol style="list-style-type: none"> <li>1. Murray RF, Botham KM, Kennelly PJ, Rodwell VW. Harper's Illustrated Biochemistry. 30th ed. The McGraw-Hill Companies, Inc; 2015</li> </ol>
7. Notice	<p>All forms of lectures and practical laboratory work are mandatory. Student attendance is regulated by the Law of Higher Education of Sarajevo Canton. Student absence should be justified by valid documentation. Lectures and laboratory practical work will be held at the Department of Medical Biochemistry</p> <p>Department: Department of Medical Biochemistry</p> <p>Consultation: working days 1-2 p.m. at the Department or via e-mail <a href="mailto:sabaheta.hasic@mf.unsa.ba">sabaheta.hasic@mf.unsa.ba</a></p>

### COURSE PLAN: MEDICAL BIOCHEMISTRY 2

Week	Teaching method and topics	Hours
1	<b>Lecture:</b> Carbohydrate metabolism – digestion, absorption, and transport of carbohydrates; glycolysis-pyruvate transformation under aerobic and anaerobic conditions – fate of lactate; Tricarboxylic acid (TCA) cycle; respiratory chain – oxidative phosphorylation; energy yield from the TCA cycle and electron transport chain;	3
2	<b>Lecture:</b> Formation and degradation of glycogen. Gluconeogenesis and maintenance of blood glucose level; pentose phosphate pathway; fructose and galactose metabolism; basic concepts in the regulation of fuel metabolism.	3
3	<b>Lecture:</b> Lipid metabolism – digestion and transport of dietary lipids; the activation and oxidation of fatty acids; catabolism of triacylglycerol; Energy yield of beta oxidation and the electron transport chain; alternate route of fatty acid oxidation; <b>Practical:</b> Qualitative test for urine glucose – Benedict's test; anaerobic glycolysis product-lactate acid qualitative test; basics of photometry; determination of serum glucose level by spectrophotometry.	3 3
4	<b>Lecture:</b> Synthesis of fatty acids and triacylglycerol. Synthesis and degradation of the major membrane lipids; lipoprotein metabolism – hyperlipoproteinemia and hypolipoproteinemia; cholesterol metabolism. <b>Practical:</b> Determination of serum triglycerides, total cholesterol and HDL cholesterol by spectrophotometry; calculation of LDL cholesterol using Friedwald formula; atherogenic index calculation; lipoprotein electrophoresis – computer simulation of separation and interpretation.	3 3
5	<b>Lecture:</b> Synthesis of bile salts; regulation of lipid metabolism. Abnormalities of lipid metabolism – metabolism of ketone bodies; protein digestion and amino acid absorption; biological value of protein nutrition and nitrogen balance. Metabolism of amino acid, transamination, deamination, decarboxylation;	3
6	<b>Lecture:</b> Fate of amino acid nitrogen: urea cycle; synthesis and degradation of amino acids – gluconeogenic and ketogenic amino acids; biosynthesis of amino acid-derived compounds. <b>Practical:</b> Qualitative reaction of inorganic, organic sulphate in urine-urinary indican; qualitative reaction of thiocyanate.	3 3
7	<b>Lecture:</b> Porphyrins metabolism – heme synthesis and breakdown; porphyria; heme degradation – structure of heme; bile pigment metabolism. Regulation and abnormalities of protein metabolism – enzymopathies; <b>Practical:</b> Qualitative reactions of bile pigments – urinary bilirubin and urobilinogen; quantitative estimation of serum bilirubin by spectrophotometry.	3 3
8	<b>Lecture:</b> Nucleoproteins-purine and pyrimidine metabolism Uric acid synthesis; abnormalities of purine metabolism; DNA and RNA metabolism – regulation of gene expression; DNA – based information	3



	technologies; protein synthesis.	
	<b>Practical:</b> Analysis of milk – carbohydrate, protein and lipid qualitative reactions.	3
9	<b>Lecture:</b> Biochemistry of hormones – lipid-derived, amino acid – derived and peptide hormones; synthesis, degradation and mechanism of hormone action; Signal molecules – growth factors and eicosanoids; <b>Partial exam I</b>	3 1
	<b>Practical:</b> Qualitative tests for hormones; insulin, epinephrine, tiroxin; determination of total protein amount and albumin in blood; estimation of albumin/globulin ratio.	3
10	<b>Lecture:</b> Biochemistry of blood, erythrocytes and the other blood cells. Biochemistry of blood, blood plasma proteins.	3
	<b>Practical:</b> Principle of blood detection – The Kastle-Meyer's test; Test for occult blood – The Benzidine Reaction; The Fecal Occult Blood Test; Preparation of Haemin Crystals (Teichman Crystals).	3
11	<b>Lecture:</b> Biochemistry of kidney; biochemical aspects of renal function- specificity of kidney metabolism; Laboratory tests of renal function – creatinine, urea, uric acid; the composition of urine;	3
	<b>Practical:</b> Determination of serum chloride and calcium by spectrophotometry; qualitative test for urinary chloride.	3
12	<b>Lecture:</b> Extracellular matrix and connective tissue – fibrous proteins; proteoglycans; structure and function of proteoglycans; abnormalities in proteoglycans' metabolism (mucopolysaccharidosis). bone and adipose tissue metabolism.	3
	<b>Practical:</b> Urine analysis; Qualitative and quantitative reactions for proteins in urine; Qualitative reactions for ketone bodies in urine	3
13	<b>Lecture:</b> Biochemistry of nervous system; metabolism of carbohydrates, lipids and amino acids in the brain; neurotransmitters – mechanism of action, synthesis and degradation; metabolism of glutamine in the brain. Cerebrospinal fluid biochemistry;	3
	<b>Practical:</b> Determination of creatinine, urea and uric acid by spectrophotometry.	3
14	<b>Lecture:</b> Liver metabolism, carbohydrate, lipid and amino acid Excretory liver function-bile salts, cholesterol, bile pigments; liver metabolism- function of liver in detoxification. metabolism.	3
	<b>Practical:</b> Methods of enzyme activity measurement; spectrophotometric determination of serum aspartate aminotransferase and alanine aminotransferase activities;	3
15	<b>Lecture:</b> Metabolism of muscle at rest and during exercise; metabolism of the carbohydrate, lipid and amino acid in muscle cells; fuel utilization in cardiac and skeletal muscle. Mild and moderate intensity, long-term exercise; metabolic effects of training on muscle metabolism.	3
	<b>Partial exam II</b>	1
17 – 18	<b>Regular examination term</b>	

19 – 20	Re-sit examination term
	September examination term


Code: <b>MFSE 0306</b>	Course Title: <b>Despite all - We are Alkaline</b>		
Level: <b>preclinical</b>	Study year: <b>II</b>	Semester: <b>III</b>	ECTS: <b>1</b>
Status: <b>elective</b>	Total contact hours: <b>20</b>		
Prerequisites:	<b>According to the Study regulation</b>		
Lecturers: Full Professor Radivoj Jadrić MD PhD, Full Professor Sabaheta Hasić MD PhD, Associate Professor Emina Kiseljaković MD PhD, Senior Teaching Assistant Lejla Alić MD, Teaching Assistant Amira Ćerimagić MD			
1. Course aim	The aim of the Despite all – We are Alkaline Course is improve knowledge about acid-base homeostatic mechanisms, its disorders and regulation.		
2. Course contents	<p>The following topics will be covered within the Module</p> <p><b>Module 1. Maintaining of body hydrogen ions concentration</b> Aim: To acquire knowledge of pH regulation and buffer system in human organism</p> <p><b>Module 2. Regulation of acid-base balance in certain pathological conditions and interpretation of numerous acid-base balance disorders</b> Aim: To acquire knowledge of acid–base status regulation in certain pathological conditions (uremia, diabetes, etc.)</p> <p><b>Module 3. The analytical procedures used in the assessment of acid-base status</b> Aim: To acquire knowledge of acid–base status evaluation using analytical procedures</p>		
3. Learning outcomes (Knowledge, competences and skills)	<p>Students will acquire knowledge necessary for understanding mechanisms of maintenance, regulation and disorders of acid-base balance in human organism. They will be able to integrate obtained knowledge from Medical biochemistry, with analytical procedures used in clinical practice.</p> <p><i>Through the lectures students will gain following knowledge and competences:</i></p> <ul style="list-style-type: none"><li>– Learn the mechanisms of maintaining body hydrogen ions concentrations within a narrow range as well as importance of buffering systems</li><li>– Discover the principles of acid-base balance regulation in certain pathological conditions (uremia, diabetes mellitus, etc.).</li><li>– Understand principles of laboratory procedures and interpretation of obtained results</li><li>– Evaluation of the ABS in patients</li></ul> <p>Differentiation of primary and secondary changes of acid-base status</p> <p><i>Through the practical laboratory work students will acquire following skills:</i></p> <ul style="list-style-type: none"><li>– Measurement of pH value using instruments (pH meter), test strips, colorimetric</li><li>– Testing buffer systems in vitro and determination of buffer capacity</li><li>– Calculation of pH based on known parameters (conc. <math>\text{HCO}_3^-</math>, <math>\text{pCO}_2</math>)</li></ul>		
4. Teaching methods	Lectures: 10 hours (classroom/on line) Laboratory practical work: 10 hours /laboratory/on line)		



5. Method of knowledge assessment and examination

Continuous assessment of knowledge (Midterm examination) will be carried out through practical exam (colloquium) and partial exam.

During any form of knowledge assessment, the student will attain certain number of points with an obligatory minimum of 55% to pass the test successfully.

**Partial exam**

Topics contained in three modules will be assessed through partial exam in a form of test. Test consists of 30 MCQ. Each correctly answered question receives 2 points. Minimum percentage of correctly answered questions needed to pass the test is 55%.

**Practical exam (colloquium)**

Laboratory practical work will be based on the principle of interactive learning, where the student is obliged to prepare the lectures in advance. Continuous knowledge assessment will be carried out with colloquium. The student draws a card with one question. Each question corresponds to one topic within the practical work (in total five topics). The student writes an essay on the topic from the card where following parts are evaluated:

- Student describes the assigned topic (5 points)
- Student describes the significance of the assigned topic (5 points)
- Student describes appliances needed to carry out the reaction (5 points)
- Student describes accessories needed to carry out the reaction (5 points)
- Student describes reagents needed to carry out the reaction (5 points)
- Students describes analytical procedure (5 points)
- Student is able to perform practical work (5 points)
- Students is able to interpret the results and reference range (5 points)

Minimum points needed to pass the practical exam is 23 points, maximum score is 40 points.

Students who have successfully accomplished all of their obligations during the semester (attendance is within the legal limits) and who have passed all the necessary exams of the course (attained minimum score of 55%) are not required to take Regular exam. Their final grade is reported according to points attained during Continuous knowledge assessment.

**Regular examination term**

Previously defined criteria will be applied also in Regular examination term.

**Re-sit examination term /September examination term**

Previously defined criteria will be applied also in Re-sit and September examination terms.

**Grading system and grading points**

Final grade is reported according to points attained during both forms of the knowledge assessment (practical and theoretical exams).

Grade	Total score	Grade description
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		(points)	
	10 (A)	95-100	Outstanding results without errors or with minor errors
	9 (B)	85-94	Above average, with some mistakes
	8 (C)	75-84	Average, with noticeable mistakes
	7 (D)	65-74	Generally good, but with significant mistakes
	6 (E)	55-64	Meets the minimum criteria
	5 (F, FX)	<55	Does not meet the minimum criteria
6. Literature	<p>Required:</p> <ol style="list-style-type: none"> <li>Teaching materials written by Medical Biochemistry personnel.</li> </ol> <p>Recommended:</p> <ol style="list-style-type: none"> <li>Bhagavan NV. Medical Biochemistry. 4th ed. Harcourt/Academic Press; 2002</li> <li>Zilva JF, Pannall PR, Mayne PD. Clinical Chemistry in diagnosis and treatment, 6th ed. CRC Press; 1994</li> </ol>		
7. Notice	<p>All forms of lectures and practical laboratory work are mandatory. Student attendance is regulated by the Law of Higher Education of Sarajevo Canton. Student absence should be justified by valid documentation. Lectures and laboratory practical work will be held at the Department of Medical Biochemistry.</p> <p>Departments: Department of Medical Biochemistry</p> <p>Consultation: working days: 1-2 p.m. at the Department of Medical Biochemistry or via e-mail <a href="mailto:radivoj.jadric@mf.unsa.ba">radivoj.jadric@mf.unsa.ba</a></p>		

COURSE PLAN: Despite all - We are Alkaline

Week	Teaching method and topics	Hours
Day 1	<p><b>Lecture:</b></p> <p>pH and pleomorphism: dysbiosis and pH; nutrition and pH – the way we become "acidic"; pH of dental plaque – significance of carbonic anhydrase</p>	3
	<p><b>Practical laboratory work:</b></p> <p>Titration of buffer systems <i>in vitro</i></p>	2
Day 2	<p><b>Lecture:</b></p> <p>pH buffers in blood – hydrogen carbonate, phosphate/ammoniacal, protein buffer; electrolytes as buffers, buffer-like acting hormones, LDL or fat as buffers; development of latent acidosis, consequences of acidification; elimination of ammonia in different vertebrates</p>	2
	<p><b>Practical laboratory work:</b></p> <p>pH measurement in liquids (colorimetric, pH-meters)</p>	2
Day 3	<p><b>Lecture:</b></p>	

Day 4	Compensation of acid-base status disorder; combined disorders acid-base status. Analytical procedures used to assess acid-base status - Boston approach	2
	<b>Practical laboratory work:</b> pH measurement of saliva and urine using indicator strips; determination of carbonic anhydrase activity.	2
	<b>Lecture:</b> Challenges of pH determination – change of values in saliva and urine; base excess and anion gap	2
	<b>Practical laboratory work:</b> Analysis of acid-base balance disorders	2
Day 5	<b>Partial exam</b>	3
Week 17 18	<b>Regular examination term</b>	
Week 19 20	<b>Re-sit examination term</b>	
September	<b>September examination term</b>	



Code: <b>MFSE 0506</b>	Course title: <b>MOLECULAR MEDICINE</b>
Level: preclinical	Study year: Semester: V ECTS: 2
Status: obligatory	Total contact hours: <b>30</b>
Prerequisites:	<b>According to the Study regulation</b>
Lecturers: Associate Professor Emina Kiseljaković MD PhD, Associate Research Professor Mirela Mačkić-Đurović PhD, Full Professor Sabaheta Hasić MD PhD, Full Professor Radivoj Jadrić MD PhD, Associate Professor Amina Valjevac MD PhD, Senior Teaching Assistant Lejla Alić MD, Teaching Assistant Amira Čerimagić MD	
1. Overall aims	<p>The aims of the Molecular Medicine course are:</p> <ul style="list-style-type: none"> <li>-To provide insight into a molecular basis and mechanism of the diseases development in individuals with risks for certain diseases;</li> <li>- To introduce the students with basic and modern molecular techniques used in molecular laboratories for diagnostic and screening of diseases;</li> </ul>
2. Course contents	<p>The following topics will be covered in the Modules:</p> <p><b>Module 1. Principles of the Medical Genetics</b>  Aim of module is to expand knowledge about nucleic acid structure, gene expression, mechanism of inheritance, and types of genetic changes</p> <p><b>Module 2. Single-gene disorders</b>  Aim of module is to acquire knowledge about monogenic disorder characteristics and identification of responsible gene for diseases. Characteristics and detection of mitochondrial multisystemic disorders will be introduced to students.</p> <p><b>Module 3. Complex diseases</b>  Aim of module is to acquire knowledge about polygenic disorder characteristics and influence of environment and gene interaction on a diseases (diabetes mellitus, arterial hypertension, schizophrenia)</p> <p><b>Module 4. Modern trends in the field of Molecular Medicine</b>  Aim of module is to acquire knowledge about screening for genetic disorders - prenatal, newborn testing, carrier and presymptomatic detection; regenerative medicine and application of stem cell in therapy. Principle and basic molecular techniques used in molecular medicine laboratory will be introduced to student.</p>
3. Learning outcomes (Knowledge, skills and competences)	<p>On successful completion of this course students will be able to:</p> <p>Recognize molecular mechanism necessary to understand occurrence, development, and possible prevention and treatment of certain human diseases</p> <p>Apply acquired knowledge of molecular laboratory techniques and skills necessary in clinical diagnostic testing.</p> <p><i>Through the lectures the students will gain following knowledge and competences:</i></p> <ol style="list-style-type: none"> <li>1. Expand knowledge of the nucleic acids structure and gene expression; process of translating information from gene to protein, the mechanism of inheritance and types of change of genetic material</li> <li>2. Ability to identify gene responsible for the disease, through expression of specific monogenic inherited disorders.</li> <li>3. Identification of characteristic and detection of mitochondrial multisystem diseases.</li> <li>4. Identification of genetics of frequent diseases (diabetes mellitus, hypertension, coronary disease, schizophrenia) and impact of gene-environment interaction on disease development.</li> <li>5. Understand importance of screening for genetic disorders; identification of autosomal recessive disease carriers, presymptomatic testing in</li> </ol>

individuals at risk for dominant autosomal diseases. Knowledge of basic principles and possibilities of the techniques in molecular laboratory

*Through the practical laboratory work students will acquire following skills:*

- isolation, quantifying and analysis of the deoxyribonucleic acid (DNA)
- preparing and conducting following techniques for identification of disease associated polymorphisms:
  - Polymerase Chain Reaction (PCR)
  - restriction fragment length polymorphism-PCR (RFLP-PCR)
  - analysis of PCR products - gel electrophoresis
- recognize the usage of different PCR methods for mutation and polymorphism detection, and gene-expression level
- determination of gene expression products - proteins using:
  - Western blot
  - ELISA (enzyme-linked immunosorbent assay)

4. Teaching methods

Lectures: 12 hours (classroom/on line)

Laboratory practical work: 18 hours (laboratory/on line)

5. Method of knowledge assessment and examination

Continuous assessment of the knowledge and skills (Midterm examination) will be carried out in the classroom/laboratory or on-line through Partial exam and Practical exams (colloquiums)

#### **Practical exam (colloquium)**

Laboratory practical work will be based on the principle of interactive learning, where the student is obliged to prepare the lectures in advance. Continuous knowledge assessment will be carried out with four colloquiums in the form of Multiple choice questions (MCQ). Minimum score needed to pass each colloquium is 7 points (55%) and maximum score is 12.5 points.

#### **Partial exam**

Knowledge acquired in all four modules will be evaluated using written test in the form of MCQ containing 25 questions (maximum 50 points); the minimum score required to pass the test is 27 points (55%).

Students who have successfully accomplished all of their obligations during the semester (attendance is within the legal limits) and who have passed partial exam and four colloquiums are not required to take Regular exam. Their final grade is reported according to points attained during Continuous knowledge assessment.

Total score attained during continuous assessment

	min	max
Colloquiums	28	50
Partial exam	27	50
Total	55	100

#### **Regular examination term**

Student is obliged to take regular exam in the classroom/laboratory or on-line if minimum points are not attained during continuous assessment for both practical and theoretical parts of the course. Regular exam should be taken also if a student is not satisfied with the grade received during continuous assessment. Previously defined criteria for Continuous knowledge assessment apply to Regular examination term.



## COURSE PLAN: Molecular medicine

	Teaching method and topics	Hours
Monday	<b>Lecture:</b> Nucleic acid – structure and role; replication, transcription, translation. Basis of inheritance and mutations.	2
	<b>Lecture:</b> Molecular medicine techniques – basic terms and principles	2
	<b>Practical laboratory work:</b> Basic procedures in molecular laboratory – equipment use, sterility and safety procedures, waste disposals	2
Tuesday	<b>Lecture:</b> Monogenic diseases – (Huntington disease, Cystic fibrosis, Muscular dystrophies, hemophilia); Mitochondrial diseases (MERRF and MELAS).	2
	<b>Practical laboratory work:</b> Salting out procedure for Extracting DNA (human nucleated cells)	2
	<b>Practical laboratory work:</b> Principles and medical application of the Polymerase Chain Reaction (PCR)	4
Wednesday	<b>Lecture:</b> Polygenic and Multifactorial diseases (common diseases – Diabetes mellitus, Hypertension, Coronary artery disease, Schizophrenia)	2
	<b>Practical laboratory work:</b> RFLP (restriction fragment length polymorphism) – technique for genetic variation detection.	2
	<b>Colloquium I + II</b>	
Thursday	<b>Practical laboratory work:</b> Gel electrophoresis for the separation of DNA fragments	2
	<b>Lecture:</b> Screening for Genetic diseases (carrier testing, presymptomatic testing). Prenatal, neonatal screening. Regenerative medicine	2
	<b>Practical laboratory work:</b> Western blot technique for protein analysis	2
Friday	<b>Colloquium III</b>	
	<b>Practical laboratory work:</b> Quantitative protein determination by Enzyme-linked immunosorbent assay (ELISA)	2
	<b>Colloquium IV</b>	2
	<b>Partial exam</b>	2
17.-18. week	<b>Regular examination term</b>	
19.-20. week	<b>Re-sit examination term</b>	
	<b>September examination term</b>	



Practical exam will be taken before theoretical examination as an obligatory condition for theoretical examination.

**Re-sit examination term /September examination term**

Previously defined criteria will also be applied in Re-sit and September examination terms.

**Grading system and grading points**

Final grade is reported according to points attained during both forms of the knowledge assessment (practical and theoretical exams).

Grade	Total score (points)	Grade description
10 (A)	95-100	Outstanding results without errors or with minor errors
9 (B)	85-94	Above average, with some mistakes
8 (C)	75-84	Average, with noticeable mistakes
7 (D)	65-74	Generally good, but with significant mistakes
6 (E)	55-64	Meets the minimum criteria
5 (F, FX)	<55	Does not meet the minimum criteria

**6. Literature**

**Required:**

1. Peter Turnpenny, Sian Ellard. Emery's Elements of Medical Genetics. Elsevier, 15th ed. 2017
2. Molecular Medicine-Handbook written by Medical Biochemistry Department personnel

**Recommended:**

1. Lela Buckingham, Maribeth L. Flaws. Molecular Diagnostics: Fundamentals, Methods and Clinical Applications. F.A. Davis Company. 2008
2. John M Walker, Ralph Rapley. Molecular Biomethods Handbook. Humana Press, a part of Springer Science+Business Media, L.L.C. 2nd ed.2008 ([https://moodle.ufsc.br/pluginfile.php/1376620/mod\\_resource/content/0/7170\\_Molecular%20Biomethods.pdf](https://moodle.ufsc.br/pluginfile.php/1376620/mod_resource/content/0/7170_Molecular%20Biomethods.pdf))

**7. Notice**

Student attendance is regulated by the Law of Higher Education of Sarajevo Canton. Student absence should be justified by valid documentation. Lectures and laboratory practical work will be held at the Center for genetic. Laboratory for Molecular medicine.

Department: Department of Medical Biochemistry

Consultation: working days: 1-2 p.m. at the Department or via e-mail [emina.kiseljakovic@mf.unsa.ba](mailto:emina.kiseljakovic@mf.unsa.ba)

Code: <b>MFSE 0507</b>	Course title: <b>ROLE OF RESPIRATORY CHAIN</b>		
Level:	Study year: <b>III</b>	Semester: <b>V</b>	ECTS: <b>1</b>
Status: elective	Total contact hours: <b>20</b>		
Prerequisites:	<b>According to the Study regulation</b>		
Lecturers: Associate Professor Emina Kiseljaković MD PhD, Full Professor Sabaheta Hasić MD PhD, Full Professor Radivoj Jadrić MD PhD, Senior Teaching Assistant Lejla Alić MD, Teaching Assistant Amira Čerimagić MD			
1. Overall aim	The overall aim of the course is to raise the comprehension about influence of mitochondrial respiratory chain function in maintenance of cellular energy but also in wide variety of the diseases.		
2. Course contents	<p>The following topics will be covered in the Modules:</p> <p><b>Module 1. Cellular respiration phases</b> Aim of the module is to expand knowledge about energy production in the form of adenine triphosphate through aerobic metabolic pathways: glycolysis, Krebs-Citric Cycle and Electron Transport Chain</p> <p><b>Module 2. Respiratory chain functioning</b> Aim of the module is to introduce specific respiratory chain complexes structure, chemiosmotic theory and adenosine triphosphate synthesis to students</p> <p><b>Module 3. Mitochondrial Respiratory chain disorders</b> Aim of the module is to introduce consequences of defective oxidative phosphorylation in mitochondria to students. In addition, specific diagnostic procedures in recognition and detection of mitochondrial, multisystem diseases will be studied.</p>		
3. Learning outcomes (Knowledge, skills and competences)	<p>Student will acquire knowledge about synthesis of ATP and the consequences of energy disturbance in disease. They will be able to recognize the effect of respiratory chain disorders on the organism function. They will understand the involvement of mitochondrial dysfunction in clinically heterogeneous disease processes like neurodegeneration, ischemia, diabetes, cancer, metabolic diseases as well as the aging process.</p> <p><i>Trough the lectures the students will gain following knowledge and competences:</i></p> <ol style="list-style-type: none"><li>1. Expand knowledge of ATP generation during cellular respiration phases</li><li>2. Acquire knowledge of complex morphology and crucial role of respiratory chain in energy production in proper body function</li><li>3. Students will understand the clinical importance of failure of oxidative phosphorylation in mitochondria.</li></ol> <p><i>Trough the seminars students will acquire following skills:</i></p> <ul style="list-style-type: none"><li>– Recognition of complexity of gene encoding mitochondrial respiratory chain proteins</li><li>– Understanding that either the nuclear or the mitochondrial gene defects causes impairment of respiratory chain complexes and ATP depletion. Recognizing diverse spectrum of clinical phenotypes caused by mutation in the nuclear or the mitochondrial genome: Leber hereditary optic neuropathy (LHON), Mitochondrial Encephalomyopathy with Lactic Acidosis and Stroke-like episodes (MELAS), Myoclonic Epilepsy with Ragged-Red Ribers (MERRF), Kearns-Sayre syndrome (KSS) and Chronic Progressive External Ophthalmoplegia (CPEO)</li></ul>		
4. Teaching methods	Lectures: 10 hours (classroom/on line) Seminars: 10 hours (classroom/on line)		



5. Method of knowledge assessment and examination

Continuous assessment of the knowledge and skills (Midterm examination) will be carried out in the classroom/laboratory or on-line through Partial exam and "problem solving" seminars.

**Seminar**

Acquired skills in lectures and in advance prepared presentation of Clinical cases with mitochondrial disorders will be evaluated through 4 seminars. Student will be evaluated according to quality of presentation, contribution and knowledge. In order to pass each seminar, it is necessary to attain minimum of 7 points. Maximal score per seminar is 12,5 points.

**Partial exam**

Knowledge acquired in modules 1., 2., and 3. will be evaluated using written test in the form of Multiple choice question (MCQ) containing 25 questions (maximum 50 points); the minimum level required to pass the test is 27 points (55%).

Students who have successfully accomplished all of their obligations during the semester (attendance is within the legal limits) and who have passed partial exam and four seminars are not required to take Regular exam. Their final grade is reported according to points attained during Continuous knowledge assessment.

Total score attained during continuous assessment

	min	max
Seminar	28	50
Partial exam	27	50
Total	55	100

**Regular examination term**

Student is obliged to take regular exam in the classroom/laboratory or on-line if minimum points are not attained during continuous assessment for both seminar and theoretical parts of the course. Regular exam should be taken also if a student is not satisfied with the grade received during continuous assessment.

Seminar will be taken before, but is not a prerequisite for theoretical exam. Test of acquired skills in seminar will be carried out in form of oral exam for each seminar that student failed (1-4) during continuous assessment. Theoretical exam consists of 25 MCQs.

**Re-sit examination term /September examination term**

Previously defined criteria will be applied also in Re-sit and September examination terms.

**Grading system and grading points**

Final grade is reported according to points attained during both forms of the knowledge assessment (practical and theoretical exams).

Grade	Total score (points)	Grade description
10 (A)	95-100	Outstanding results without errors or with minor errors
9 (B)	85-94	Above average, with some mistakes
8 (C)	75-84	Average, with noticeable mistakes



	7 (D)	65-74	Generally good, but with significant mistakes
	6 (E)	55-64	Meets the minimum criteria
	5 (F, FX)	<55	Does not meet the minimum criteria
6. Literature	Required: 1. Alberts B, Johnson A, Lewis J, Morgan D, Raff M, Roberts K, Walter P. Molecular Biology of the Cell, 6th ed. New York: Garland Science, 2015. 2. Selected research and review articles on the course topics		
7. Notice	Student attendance is regulated by the Law of Higher Education of Sarajevo Canton. Student absence should be justified by valid documentation. Lectures and seminars will be held at the Department of Medical Biochemistry Department: Department of Medical Biochemistry Consultation: working days: 1-2 p.m. at the Department or via e-mail <a href="mailto:emina.kiseljakovic@mf.unsa.ba">emina.kiseljakovic@mf.unsa.ba</a>		

### COURSE PLAN: Role of the respiratory chain

	Teaching method and topics	Hours
Monday	<b>Lecture:</b> Electron transport chain and cellular respiration	2
	<b>Lecture:</b> Respiratory chain complexes – structure and function, Chemiosmotic theory	2
Tuesday	<b>Lecture:</b> Adenosine triphosphate synthesis	2
	<b>Lecture:</b> Causes and consequences of respiratory chain dysfunction	2
Wednesday	<b>Seminar:</b> Genetic defect as a cause of mitochondrial respiratory chain dysfunction. Clinical aspects and molecular genetics testing for diagnosis of mitochondrial diseases	2
	<b>Seminar:</b> Kearns-Sayre Syndrome (KSS) with chronic progressive external ophthalmoplegia – CPEO – causes, clinical, biochemical and morphological characteristics and diagnosis	2
Thursday	<b>Seminar:</b> Mitochondrial Encephalomyopathy Lactic Acidosis and Strokelike Episodes (MELAS) - causes, clinical, biochemical and morphological characteristics and diagnosis	2
	<b>Seminar:</b> Myoclonic Epilepsy and Ragged-Red Fiber Disease (MERRF) - causes, clinical, biochemical and morphological characteristics and diagnosis. Western blot technique for protein analysis	2
Friday	<b>Seminar:</b> Evaluation of gained knowledge, and skills, discussion about diagnosis of patients (problems) and possible therapy and prevention	2
	<b>Partial exam</b>	2
17.-18. week	<b>Regular examination term</b>	
19.-20. week	<b>Re-sit examination term</b>	
	<b>September examination term</b>	

Code: <b>MFSE 1008</b>	Course title: <b>RATIONAL LABORATORY DIAGNOSTICS IN CLINICAL BIOCHEMISTRY</b>		
Level: <b>clinical</b>	Study year: <b>V</b>	Semester: <b>X</b>	ECTS: <b>1</b>
Status: <b>elective</b>	Total contact hours: <b>20</b>		
Prerequisites:	<b>According to the Study regulation</b>		
Lecturers: <b>Full Professor Sabaheta Hasić, MD PhD; Associate Professor Emina Kiseljaković, MD PhD; Full Professor Radivoj Jadrić, MD PhD; Senior Teaching Assistant Lejla Alić, MD; Teaching Assistant Amira Čerimagić, MD</b>			
1. Overall aims	The aim of the “Rational laboratory testing in clinical biochemistry” course is the learning of students how to apply the rational approach to laboratory test ordering in diagnosis, monitoring and outcome of disease.		
2. Course contents	<p>The following topics will be covered during the Modules:</p> <p><b>Module 1. Strategy of rational laboratory testing</b> Strategy of rational laboratory testing based on test selection focused on a specific clinical issue. Guidelines for the diagnosis of hepatobiliary tract and pancreatic disease.</p> <p><b>Module 2. Algorithm based clinical decision for safety reduction of laboratory tests ordering</b> Proposed diagnostic algorithms and guidelines for rational approach to laboratory diagnostics of patients in the emergency department. Guidelines for the classification acid-base balance disorders, diagnosis and monitoring of diabetes, acute coronary syndrome.</p> <p><b>Module 3. Request form in laboratory ordering</b> Laboratory test ordering, need for systematic approach in laboratory ordering, patient preparation before laboratory testing. Guidelines for the renal disease and acute abdominal pain laboratory testing.</p> <p><b>Module 4. Rationalization of laboratory tests ordering in primary health care</b> Guidelines for the laboratory testing in primary health care; Guidelines for the laboratory testing and diagnostics of thyroid disease anemia.</p>		
3. Learning outcomes (Knowledge, skills and competences)	<p>On successful completion of this course students will be able:</p> <ul style="list-style-type: none"><li>– to identify factors contributing to laboratory overutilization</li><li>– to avoid an inappropriate test ordering behavior and application of rational approach to laboratory ordering</li></ul> <p><i>Through the lectures the students will gain following knowledge and competences:</i></p> <p>Student will be competent to make clinical decision by ordering of necessary laboratory tests according to algorithms and guidelines.</p> <p><i>Through the practical laboratory work students will acquire following skills:</i></p> <ul style="list-style-type: none"><li>- to identify relevant symptoms and clinical signs ascertained by examination</li><li>- to make a strategy for performing appropriate laboratory diagnostics and to avoid overutilization</li><li>- to select appropriate sample for laboratory analysis</li><li>- to solve diagnostic algorithms (hepatobiliar and pancreas disease; kidney</li></ul>		



	disease: acute abdomen; acute coronary syndrome; diabetes mellitus and ketoacidosis, anemia and thyroid gland disease)												
4. Teaching methods	Lectures: 10 hours (classroom/on line) Practical work based on problem based learning (PBL): 10 hours (classroom/on line)												
5. Method of knowledge assessment and examination	<p>Continuous assessment of the knowledge and skills (Midterm examination) will be carried out in the classroom/laboratory or on-line through Partial exam and Practical exam.</p> <p>Examination:</p> <ul style="list-style-type: none"><li>-practical work colloquium (4 parts/modules)</li><li>-written test for modules 1, 2, 3 and 4, contains multiple choice questions (MCQ).</li></ul> <p><b>Practical examination</b></p> <p>Practical work will be evaluated for modules 1-4 using 4 Checking lists (Colloquia). Each checking list contains 9 MCQs (15 points); the minimum level required to pass each colloquium is 5 correctly solved MCQs (8.3 points).</p> <p><b>Partial (Theoretical) examinations</b></p> <p>Knowledge will be evaluated using MCQ test containing 20 questions (40 points); the minimum level required to pass is 11 correctly solved MCQs (22 points).</p> <p>Student is not obliged to take regular exam if minimum points are attained during midterm exams for both practical and theoretical parts.</p> <p>Total score attained during midterm examination.</p> <table><tr><td></td><td>min</td><td>max</td></tr><tr><td>Practical exam</td><td>33</td><td>60</td></tr><tr><td>Partial exam</td><td>22</td><td>40</td></tr><tr><td>Total</td><td>55</td><td>100</td></tr></table> <p><b>Regular examination term (Final exam)</b></p> <p>Student is obliged to take regular exam in the classroom/laboratory or on-line if minimum points are not attained during midterm exams for both practical and theoretical parts of the course. Regular exam should be taken also if a student is not satisfied with the grade received on the midterm examination. Practical work will be taken before theoretical examination as obligatory condition for theoretical examination.</p> <p>Student will take colloquium that failed (1-4) during midterm examination (for those who failed all 4 colloquia, integral test will be assigned). The integral test contains 36 MCQs and the minimum level required to pass is 20 correctly solved questions.</p> <p>Theoretical examination will be provided with 20 MCQs test.</p> <p><b>Re-sit examination term /September examination term</b></p> <p>Previously defined criteria will be applied also in Re-sit and September examination terms.</p> <p><b>Grading system and grading points</b></p> <p>Final grade is reported according to points attained during both forms of the knowledge assessment (practical and theoretical exams).</p>		min	max	Practical exam	33	60	Partial exam	22	40	Total	55	100
	min	max											
Practical exam	33	60											
Partial exam	22	40											
Total	55	100											



	<i>Grade</i>	<i>Total score (points)</i>	<i>Grade description</i>
	10 (A)	95-100	Outstanding results without errors or with minor errors
	9 (B)	85-94	Above average, with some mistakes
	8 (C)	75-84	Average, with noticeable mistakes
	7 (D)	65-74	Generally good, but with significant mistakes
	6 (E)	55-64	Meets the minimum criteria
	5 (F, FX)	<55	Does not meet the minimum criteria
6. Literature	Required: 1. Teaching materials written by Medical Biochemistry personnel. Recommended: 1. Gaw A, Cowan RA, Murphy MJ, O'Reilly DSJ, Srivastava R. Clinical Biochemistry. Churchill Livingstone; 2013.		
7. Notice	Student attendance is regulated by the Law of Higher Education of Sarajevo Canton. Student absence should be justified by valid documentation. Lectures and laboratory practical work will be held at the Department of Medical Biochemistry Department: Department of Medical Biochemistry Consultation: working days: 1-2 p.m. at the Department or via e-mail <a href="mailto:sabaheta.hasic@mfl.unsa.ba">sabaheta.hasic@mfl.unsa.ba</a>		

#### **COURSE PLAN: Rational laboratory diagnostics in clinical biochemistry**

<b>Week 15.</b>	<b>Teaching methods and topics</b>	<b>Hours</b>
Tuesday	<b>Lecture:</b> Strategy to promote the rational use of laboratory testing. Laboratory tests: which, why and what do the results mean? Interpretation of laboratory test results-reliability of laboratory tests.	3
	<b>Practical:</b> The rational use of laboratory tests in the diagnosis and management of biliary tract diseases: differentiation of hepatitis types, approach to a patient with elevated serum alkaline phosphatase (AP) in differential diagnosis of liver disease, cholestatic and hepatocellular liver disease differentiation, laboratory diagnosis of viral hepatitis. A case report: obstructive jaundice, liver cirrhosis. Guidelines and recommendations for laboratory analysis in the diagnostics of pancreas disease, approach to a patient with elevated serum amylase and lipase. Case report: acute pancreatitis.	3
Wednesday	<b>Lecture:</b> Reducing unnecessary laboratory testing using diagnostic algorithms. Algorithm-based decision rules to reduce safely laboratory testing. Classification of the emergency laboratory tests. Organ disease laboratory panel.	3
	<b>Practical:</b> The rational use of laboratory tests in the diagnosis and management of acute coronary syndrome. A case report: acute myocardial infarction. Guidelines and recommendations for laboratory analysis and classification of acid-base disorders. The rational use of laboratory tests in the diagnosis and monitoring of diabetes mellitus. Case report: diabetic ketoacidosis.	3

Thursday	<p><b>Lecture:</b> Patients preparation for medical laboratory tests. Laboratory test ordering-parallel and series multiparameter testing, single parameter testing. Laboratory testing in primary and secondary care - laboratory testing assessment in health and disease. The rational use of laboratory testing in primary care.</p>	3
	<p><b>Practical:</b> The rational use of laboratory tests in the diagnosis and management of kidney disease. Guidelines and recommendations for laboratory analysis in ruling out and differentiation of kidney disease. Case report: Nephrotic syndrome. Guidelines and recommendations for rational use of laboratory tests in acute abdominal pain. Case report: acute cholecystitis, renal colic.</p> <p>The rational use of laboratory tests in thyroid gland disease. Case report: Hashimoto's Thyroiditis, Graves disease. Guidelines and recommendations for laboratory analysis of anemias. Case report: iron deficiency and megaloblastic anemias.</p>	3
Friday	<p><b>Midterm examination term</b></p> <ul style="list-style-type: none"> <li>• Practical examination</li> <li>• Partial (Theoretical) examinations</li> </ul>	1
		1
Week 17./18.	<b>Regular examination term (Final exam)</b>	
Week 19.-20.	Re-sit exam	
	<b>September examination term</b>	

Code: <b>MFSE1201</b>		Course title: <b>CLINICAL BIOCHEMISTRY</b>	
Level: <b>clinical</b>	Study year: <b>VI</b>	Semester: <b>XII</b>	ECTS: <b>2</b>
Status: <b>obligatory</b>	Total contact hours: <b>30</b>		
Prerequisites:	<b>According to the study regulation</b>		
Lecturers: <b>Full Professor Radivoj Jadrić, MD PhD; Full Professor Sabaheta Hasić, MD PhD; Associate Professor Emina Kiseljaković, MD PhD; Senior Teaching Assistant Lejla Alić, MD; Assistant Amira Čerimagić, MD</b>			
1. Overall aims	The overall aim of the Clinical Biochemistry Course is to increase knowledge on biochemical analysis selection and interpretation in various clinical conditions.		
2. Course contents	<p>The following topics will be covered within the Modules:</p> <p><b>Module 1. Analytical techniques, instruments and process of automatization</b> Objective: to introduce students to analytical techniques, instruments and automation in a modern biochemistry laboratory.</p> <p><b>Module 2. Laboratory diagnostics in emergencies</b> Objective: to introduce students to categories of urgent laboratory tests.</p> <p><b>Module 3. Laboratory panel in various diseases</b> Objective: to familiarize students with analytical assemblies in the diagnosis of diseases of the cardiovascular, bone and hepatobiliary system.</p> <p><b>Module 4. Biochemical analysis in tumor diagnostics</b> Objective: to introduce students to the basics of tumor diagnostics - the specificity and sensitivity of tumor markers.</p> <p><b>Module 5. Oligoelements in hematological diseases</b> Objective: to familiarize students with the role and significance of changes in the metabolism of iron and copper in the diagnosis of hematological diseases.</p> <p><b>Module 6. Physical examination and chemical analysis of urine</b> Objective: to introduce students to routine urinalysis, with emphasis on physical properties and biochemical composition of urine, and specificities of changes in individual clinical states.</p>		
3. Learning outcomes (Knowledge, skills and competences)	<p>Students will acquire knowledge necessary for understanding principles of laboratory diagnostic methods in clinical biochemistry.</p> <p><i>Through the lectures the students will gain following knowledge and competences:</i></p> <ol style="list-style-type: none"><li>1. Learn how to choose and interpret different biochemical analyses of various clinical conditions including heart and skeletal muscle, liver, bones, and hematological diseases.</li><li>2. Discover importance of analytical and pre-analytical factors that influence laboratory values.</li><li>3. Increase knowledge about reference values of biochemical parameters and influencing factors.</li></ol>		



4. Adopt the principles that different biochemical techniques may yield nonspecific or inconclusive results. Adopt the principles of biochemical analysis profiles for detailed organ system investigations

*Through the practical laboratory work students will acquire **following skills:***

- To select, perform and interpret laboratory tests for liver function assessment
- To select, perform and interpret laboratory tests for myocardial infarction assessment
- To select, perform and interpret laboratory tests for bone remodeling assessment
- To select, perform and interpret laboratory tests in various hematological conditions
- To select, perform and interpret laboratory tests for renal function assessment
- To perform complete analysis of urine
- To recognize the influence of various physiological and seasonal variations on the results of different biochemical tests

#### 4. Teaching methods

Lectures: 10 hours (classroom/on line)  
Practical work: 20 hours (laboratory/on line)

#### 5. Method of knowledge assessment and examination

Continuous assessment of the knowledge and skills (Midterm examination) will be carried out in the classroom/laboratory or on-line through Partial exam and Practical exam.

Examination:

- Practical exam (colloquium) consisted of multiple choice questions (MCQ)
- Partial exam consisted of multiple choice questions (MCQ)

#### **Practical examination**

Practical exam takes up to 60% of maximum points. Assessment of practical knowledge and skills will be carried out through practical exam consisted of 30 MCQ. It is necessary to answer 16 questions correctly in order to pass the test. Each question receives 2 points. Maximum score is 60 points and minimum score is 32.

#### **Partial (Theoretical) examination**

Partial exam takes up to 40% of maximum points. Assessment of theoretical knowledge and skills will be carried out through partial exam consisted of 20 MCQ. It is necessary to answer 11 questions correctly in order to pass the test.

Correct answers (number)	Correct answers (%)	Points
20	100	40
19	95	38
18	90	36
17	85	34
16	80	32

15	75	30
14	70	28
13	65	26
12	60	24
11	55	23

Student is not obliged to take the Regular exam if minimum points are attained during Midterm exam for both practical and theoretical parts.

#### **Regular examination term (Final exam)**

Student is obliged to take regular exam in the classroom/laboratory or on-line if minimum points are not attained during Midterm exams for both practical and theoretical parts of the course. Regular exam should be taken also if a student is not satisfied with the grade received on the Midterm examination. Practical exam will be taken before theoretical exam as obligatory condition for theoretical exam. Student will take the practical exam in the same form as during Midterm examination, i.e. test with 30 MCQ. Student will take the theoretical exam in the same form as during Midterm examination, i.e. test with 20 MCQ. The grading system of is the same as during Midterm examination.

Passed Practical exam during Regular examination term is valid until the end of the ongoing academic year.

#### **Re-sit examination term / September examination term**

Previously defined criteria will be applied also in Re-sit and September examination terms.

#### **Grading system and grading points**

Final grade is reported according to points attained during both forms of the knowledge assessment (practical and theoretical exams).

Grade	Total score (points)	Grade description
10 (A)	95-100	Outstanding results without errors or with minor errors
9 (B)	85-94	Above average, with some mistakes
8 (C)	75-84	Average, with noticeable mistakes
7 (D)	65-74	Generally good, but with significant mistakes
6 (E)	55-64	Meets the minimum criteria
5 (F, FX)	<55	Does not meet the minimum criteria

#### **6. Literature**

Required:

1. Teaching materials written by Medical Biochemistry personnel.

Recommended:

1. Gaw A, Cowan RA, Murphy MJ, O'Reilly DSJ, Srivastava R. Clinical Biochemistry. Churchill Livingstone; 2013.

#### **7. Notice**

Lectures and practices are performed according to implementation plan at the Departement of Biochemistry and Physiology. All parts of course program is obligatory. Fixing absences from classes should be in accordance with legal regulations.

Consultations for the students - every day from 13-14 h.

e-mail address of responsible teacher: [radivoj.jadric@mf.unsa.ba](mailto:radivoj.jadric@mf.unsa.ba)



## COURSE PLAN: CLINICAL BIOCHEMISTRY

Week 1.	Teaching method and topics	Hours
Monday	<p><b>Lecture:</b> General principles of screening; screening for general health status; pre-operative examination; compounds specific for certain organ systems</p> <p><b>Practical work:</b> Laboratory techniques and their procedures, specificities of certain biological specimens (serum, plasma, urine, cerebrospinal liquor, feces, fluids from different body cavities). Laboratory diagnostics in emergency conditions.</p>	<p>3</p> <p>4</p>
Tuesday	<p><b>Lecture:</b> Rules for work in medical-biochemistry laboratory: pre-analytical, analytical and post-analytical factors, specimens to be analyzed, measures and units of measures, analytical techniques, instruments and processes of automatization, quality assurance, methods for determination of compounds in biological specimen, reference range</p> <p><b>Practical work:</b> Hematological laboratory diagnostics analyzers in hematology (work on analyzers and results interpretation). Processes of coagulation and hemostasis. Hematological status (in physiological and pathological conditions).</p>	<p>2</p> <p>4</p>
Wednesday	<p><b>Lecture:</b> Standardization in laboratory diagnostics. Laboratory diagnostics in emergency conditions.</p> <p><b>Practical work:</b> Analytical sets for assessment of myocardial and skeletal musculature function; biochemical diagnostics in bone disorders. Basic laboratory tests for assessment of liver function. Determination of enzyme activity and protein concentration in serum for assessment of cardiomyocyte integrity (CK, troponin, myoglobin, FABP). Determination of enzyme activity for bone tissue: alkaline and acid phosphatase; bone tissues hormones.</p>	<p>2</p> <p>4</p>
Thursday	<p><b>Lecture:</b> Biochemical principles in tumor diagnostics; tumor markers, analytical procedures for determination of tumor markers. Metabolic syndrome. Laboratory test outside laboratory point-of-care testing.</p> <p><b>Practical work:</b> Oligoelements and their importance in hematopoiesis, physiological and pathological conditions; determination of copper in serum by spectrophotometry. Determination of iron and total iron binding capacity (TIBC) in serum by spectrophotometry. Calculation of unsaturated iron binding capacity (UIBC).</p>	<p>3</p> <p>4</p>
Friday	<p><b>Practical work:</b> Standard methods in urinalysis (practical work with specimen, interpretation of results, examples from laboratory practice)</p> <p><b>Midterm examination term</b></p>	<p>2</p> <p>2</p>
Week 17–18	<b>Regular examination term</b>	
Week 19–20	<b>Re-sit examination term</b>	
	<b>September examination term</b>	



Code:MFSE 0405	Course title: <b>BIostatISTICS</b>		
Level: <b>Undergraduate</b>	Study year: <b>Second</b>	Semester: <b>IV</b>	ECTS: <b>3</b>
Status: <b>Core</b>	Total contact hours: <b>30</b>		
Prerequisites:	<b>According to study regulation</b>		
Lecturers: Prof. Semra Čavaljuga, MD, MSc, DSc; assistant professor Enisa Ademović, MD, MSc, DSc, senior assistant Lejla Džananović, MD, MSc, DSc; teaching assistance Džan Ahmed Jesenković, MD			
1. Overall aim	Students should familiarize themselves and master the basic methods in data collection and analysis in medical research. They should master data collection on their own as well as design of simple research in order to better understand scientific literature, as well as proper use of all health-statistics sources. Students should be able to evaluate the appropriateness of statistical and analytical methods and data presentation methods used in medical and other literature.		
2. Course objectives	Students should master the basic elements and application of data collection methods as well as basics of medical research and other basic research methods of data analysis and statistical inference, that are required in further medical education for easier understanding of advanced medical knowledge.		
3. Learning outcomes (Knowledge, skills and competences)	<p>Students should master the following elements:</p> <p><b>1. Introduction to biostatistics (Why biostatistics?)</b> Students will familiarize themselves with roots in biostatistics evolution, aims, methods, definitions and elements in biostatistics as well as the place of statistics and biostatistics in medical theory and practice.</p> <p><b>2. Data collection methods</b></p> <p>2.1 Methods of data collection and organization 2.2 Introduction to sampling methods 2.3 Preparation and questionnaire design</p> <p>Aim of this module is for students to familiarize themselves with organization of statistical research, methods of data collection, data organization (statistical series and types), master basics in sampling methods and questionnaire design, through practical examples.</p> <p><b>3. Statistical data analysis</b></p> <p>3.1 Data presentation using tables and graphs 3.2 Descriptive biostatistics – results interpretation and analysis 3.3 Results representativeness</p> <p>Aim of this module is for students to master basics of adequate data presentation through tables and graphs, as well as methods of descriptive data analysis – frequencies and frequency distribution tables – and results through examples from real medical practice.</p> <p><b>4. Objectives and hypotheses formulation in quantitative research</b> Aim of this module is for students to master adequate objectives formulation, learn what a hypothesis is, and how to formulate one in a simple research.</p> <p><b>5. Objectives and hypothesis testing in quantitative research</b> Aim of this module is for students to master testing of adequately stated research objectives, know what hypothesis testing is and how to test a hypothesis in simple research.</p> <p><b>6. Demographic and vital statistics with measures of disease frequency</b> Aim of this module is for students to know the basics of demographic and vital statistics including their use in medicine.</p> <p><b>7. Data analysis using information technologies / computers</b> Aim of this module is familiarization with basics of data analysis using computer software.</p>		

	<p>Students should master basic elements and methods of data collection as well as basics in medical research and data analysis, needed for understanding of advanced knowledge during further medical education.</p> <p>Students should master the following skills and competencies:</p> <ul style="list-style-type: none"> <li>- Know how to explain the necessity to learn and understand biostatistics in medical theory and practice</li> <li>- Know how to collect data from available sources and own research</li> <li>- Group and code data (when needed)</li> <li>- Master the basics of sampling methods (simple and stratified samples) and how to choose a representative sample</li> <li>- Design a statistically correct and clear table</li> <li>- Choose and design a correct type of graph</li> <li>- Calculate and interpret measures in summary statistics (measures of central tendency)</li> </ul> <p>Every student should know how to:</p> <ul style="list-style-type: none"> <li>- Choose a method and size of a sample and apply a sampling method</li> <li>- Differ between representative and non-representative sample</li> <li>- Design a questionnaire for a specific research</li> <li>- Interpret different types of graphs</li> <li>- Interpret differences and interconnections between measures of central tendency</li> <li>- Differ between types of frequency distribution</li> <li>- Formulate research objectives</li> <li>- Formulate and test research hypotheses</li> <li>- Argue the difference between good and bad data and results presentation</li> </ul> <p>Attitudes a student should master after the completion of this course:</p> <ul style="list-style-type: none"> <li>- Knowing basic biostatistical methods and elements facilitates the understanding of literature data and helps in everyday medical theory and practice</li> <li>- There are representative and non-representative data</li> <li>- Statistically correct tables and graphs give clear notion of the problem, unlike those that are statistically incorrect</li> <li>- Results will be valid only if adequate method of data collecting is applied</li> <li>- Knowing the methodology of calculation and interpretation of measures of central tendency is very useful as well for further medical education</li> <li>- Every research has to have a correctly stated objective(s) and hypotheses</li> <li>- Only research with adequately chosen sample and stated objectives and hypotheses produce scientifically valid and applicable results.</li> </ul>
4. Teaching methods	<p>Every lecture lasts <u>45 minutes</u> and it will be organized <u>in class and/or online</u>. Introductory lectures are of classic – collective type, while others are organized either as a “sandwich” – interactive collective type or individual learning through interactive lecturing. Wherever possible, examples from real life research and biostatistical practice are given.</p> <p>Every <u>lab session</u> lasts <u>45 minutes</u>, exceptionally 90 minutes (with respect to the specific lab session contents ) and it will be organized <u>in class and/or online</u>.</p> <p>They are all designed as interactive, problem oriented and with examples from real life practice. Students should work in small groups of optimally 10 – 15</p>



	<p>students maximum.</p> <p>In semester, there will be total of:</p> <ul style="list-style-type: none"><li>– 14 hours of lectures;</li><li>– 14 lab sessions / contact with TAs in class and/or online (total of 14 contact hours with TAs) plus 1 hour for individual work on seminar paper</li><li>– 1 hour of seminar paper presentation (for a grade) will be organized in class and/or online</li></ul>														
5. Methods of knowledge assessment and examination	<p>Knowledge assessment will be performed through:</p> <ul style="list-style-type: none"><li>– short tests / quizzes – total of 3 per semester – total of 3 will be organized <u>in class and/or in online</u></li></ul> <p>(Each will have 5 MC questions with 4-5 given answers, lasting 10 minutes max. Will be performed before a start of a lecture. Results will be given in a passed or failed form (+/-), with given a pass with 3 or more correctly answered questions. If a student fails a test, when taking a final exam, he will be given an opportunity to take that test again, if one wants. If a test is passed during the course of lectures, a student will be given a grade 10; if passed later a grade 8 will be given. If a test is not passed at all, a grade 5 will be given.</p> <ul style="list-style-type: none"><li>– written exam based on MCQ methodology with 4-5 given answers on 2/3 of the questions; 1/3 of the questions will be in the essay form or calculation. It will be organized <u>in class and/or online</u> after the completion of lectures.</li><li>– individual work on seminar paper on given topic</li><li>– oral final exam will be organized <u>in class and/or online</u> for students wanting a higher grade or exceptional students.</li></ul> <p>Seminar paper means individual work on and writing of a paper (in groups) on subjects of questionnaire design, statistical analysis of data collected and presentation of results. It is based, in consultation with a lecturer and a TA, on project methodology (i.e. questionnaire design for a specific study with choosing a sample and descriptive analysis or critical review on given material on sampling and questionnaire design) and will be publicly presented before other fellow students.</p> <p>Grading will be performed by points given for every part of the studying activity and knowledge testing during the semester and on the final exam, by the following structure:</p> <table><tr><td>– short tests / quizzes</td><td>30% of the final grade</td></tr><tr><td>– written exam</td><td>40% of the final grade</td></tr><tr><td>– seminar paper and presentation</td><td>20% of the final grade</td></tr><tr><td>– homework</td><td>10% of the final grade</td></tr></table> <p>Final grade will be calculated as a pondered arithmetic mean (i.e. joint arithmetic mean) of all grades given throughout semester.</p> <p>Grading of writing parts of the exam will be performed with respect to rules and regulations of syllabi harmonization of Bologna studying for every single exam term as following:</p> <table><tr><td>Grade</td><td>No of points</td><td>Grade description</td></tr><tr><td>10 (A)</td><td>95-100</td><td>Exceptional with minor errors</td></tr></table>	– short tests / quizzes	30% of the final grade	– written exam	40% of the final grade	– seminar paper and presentation	20% of the final grade	– homework	10% of the final grade	Grade	No of points	Grade description	10 (A)	95-100	Exceptional with minor errors
– short tests / quizzes	30% of the final grade														
– written exam	40% of the final grade														
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– homework	10% of the final grade														
Grade	No of points	Grade description													
10 (A)	95-100	Exceptional with minor errors													



	9 (B)	85-94	Above average with few errors
	8 (C)	75-84	Average, with noticeable errors
	7 (D)	65-74	Good, with significant errors
	6 (E)	55-64	Meets minimal criteria
	5 (F, FX)	< 55	Fails to meet minimal criteria
<p><i>In order to be given a passing final grade, student must obtain a passing grade from all forms of knowledge testing, except short tests / quizzes and homework.</i></p>			
6. Literature	<p><b>Required:</b></p> <ul style="list-style-type: none"> <li>- Course hand-outs</li> <li>- Essex-Sorlie D. Medical Biostatistics and Epidemiology. Appleton and Lange. Connecticut, 1995.</li> </ul> <p><b>Additional:</b></p> <ul style="list-style-type: none"> <li>- Chap TL. Introductory Biostatistics. Wiley-Interscience. New Jersey; 2003</li> <li>- H. Harris and G. Taylor. Medical Statistics Made Easy. Taylor &amp; Francis, 2004.</li> </ul> <p><i>(This literature might be helpful to students who have Bosnian language skills)</i></p> <ul style="list-style-type: none"> <li>- S. Čavaljuga, E. Ademović, L. Džananović. Biostatistika: teoretskeosnovesaprimjerima. Medicinski fakultetUniverziteta u Sarajevu, 2018.</li> <li>- S. Čavaljuga, M. Čavaljuga. Biostatistika Osnovni principiimode. Medicinski fakultetUniverziteta u Sarajevu 2009.</li> </ul>		
7. Remark:	<p><b>It is forbidden to bring unauthorized copies of literature to classes!</b></p> <p>All forms of classes are obligatory. In case a student misses more than 10% of classes (excused or not excused) one is obliged to colloquially pass all the missed lectures and lab session in agreement with TAs and/or lecturer.</p> <p>Failed or missed quizzes can be re-taken on the final exam if a student wishes so.</p> <p>Consultation hours are every day 08.30-10.00 and 13.00-14.30 at the Department <u>and/or online</u> with prior announcement with the Department's Secretary or by email: <a href="mailto:epidemiologija@mf.unsa.ba">epidemiologija@mf.unsa.ba</a>.</p>		

Code: MFSE 0205		Course title: INTRODUCTION TO SCIENTIFIC METHODS 1	
Level: Undergraduate	Study year: I	Semester: II	ECTS: 2
Status: Core	Total contact hours: 30		
Lecturers: Prof Semra Čavaljuga MD MSc DSc; Prof Maida Todić-Rakanović MD MSc DSc; Prof Asija Začiragić MD MSc DSc; Prof. Mirsad Dorić MD MSc DSc; Assistant Prof Lejla Burnazović-Ristić MD MSc DSc; Senior TA Lejla Džananović MD MSc; Senior TA Sanita Maleškić MD			
Prerequisites: According to the study regulations			
1. Overall aim	The aims of this course are the following: <ul style="list-style-type: none"><li>• Introduction to basic principles of scientific research in medicine</li><li>• Educating students on how to properly read and understand scientific papers, as well as how to write and present professional and scientific work</li><li>• Learning and understanding the basics of ethical rules in biomedicine and stepwise approach to planning and implementing biomedical studies.</li></ul>		
2. Purpose of the course	Through this course students should adopt basic knowledge and skills of methods and tools for conduction of research in medicine, being introduced to basic characteristics of study design and basics of interpreting study results. Students will gain basic knowledge for planning and designing a research project in medicine and will be enabled to independently write and present a scientific or professional paper.		
3. Learning outcomes	<p>Through this course, students will acquire the following knowledge:</p> <p><b>Module 1. Science in medicine</b> Foundation of scientific thought and specifics of scientific way of thinking, prerequisites of scientific research. Ethical code in scientific research and publishing, reviewing plagiarism in particular.</p> <p><b>Module 2. Browsing the medical literature and available information online, basics of creating a poster presentation</b> Basic characteristics of medical literature, types of publications in medicine, electronic sources of medical information and assessment of its relevance, browsing medical literature and available information online. Basics of writing professional/scientific paper. Form and content of poster presentation.</p> <p><b>Module 3. Medical research and basics of writing a seminar paper</b> Types of medical research, experimental studies. Introduction to concepts of forming a research sample, hypothesis in a research, and basics of collecting, analyzing and data presentation. Basics of writing a professional/scientific paper. Form and content of a seminar paper.</p> <p><b>Module 4. Presenting scientific or professional paper</b> Methods of presenting results of a research in a form of scientific or professional paper – oral and poster presentation. Basic techniques in creating a presentation. Basics of presentation of biomedical research results.</p> <p>Through this course a student will gain the following skills:</p> <p><i>Skills that students should master after the lectures of this course:</i></p>		



	<ul style="list-style-type: none"> <li>– adequately formulate scientific and medical problems</li> <li>– successfully browse available sources of information and select the most relevant sources</li> <li>– basics of biomedical research design</li> <li>– content, form, and methodology of writing scientific and professional paper / review paper / seminar paper / essay</li> <li>– adequate citing of literature in medical publications</li> <li>– different forms of adequate presentation of research results (oral/poster presentation) and basics of presenting in general.</li> </ul> <p><i>Every student should know how to:</i></p> <ul style="list-style-type: none"> <li>– browse through scientific and professional medical literature</li> <li>– write a seminar paper and create a poster presentation</li> <li>– adequately cite the literature within medical publications</li> <li>– present data and research results.</li> </ul> <p><i>Attitudes a student should master after the completion of this course:</i></p> <ul style="list-style-type: none"> <li>– respecting ethical norms and regulations is significant to biomedical research</li> <li>– critical thinking is necessary in both scientific work and clinical practice</li> <li>– studiousness and comprehensiveness have key roles in planning and implementing research</li> <li>– interdisciplinary approach to scientific research is indispensable</li> <li>– quality of presented data and results is immensely significant for integrity of every biomedical research.</li> </ul>
4. Teaching methods	<ul style="list-style-type: none"> <li>– Lectures: 15 hours will be organized in class and/or online</li> <li>– Seminars: 15 hours will be organized in class and/or online</li> </ul>
5. Methods of knowledge assesment and examination	<p>Through the course, continuous knowledge assessment will be carried out through:</p> <ul style="list-style-type: none"> <li>– Seminar paper – two (2) in total will be organized in class and/or online</li> <li>– Oral exam will be organized in class and/or online</li> </ul> <p>Seminar paper should be written based on individual and group work within a group of students, on topic provided during the course of lectures. Oral exam consists of presenting one of the written seminar papers (of students' choice) and answering teacher's questions regarding the particular topic of the seminar paper / presentation / matter taught through the course of lectures.</p> <p>The final grade is calculated according to points given for every knowledge assessment form:</p> <ul style="list-style-type: none"> <li>- Seminar paper I – 30% of total points</li> <li>- Seminar paper II – 30% of total points</li> <li>- Oral exam – 40% of total points.</li> </ul> <p>The final grade is calculated as a pondered arithmetic mean of all grades given through this course.</p> <p>Grading of writing parts of the exam will be performed with respect to rules and regulations of syllabi harmonization of Bologna studying for every single exam term as following:</p>



	<table><tr><th>Grade</th><th>No of points</th><th>Grade description</th></tr><tr><td>10 (A)</td><td>95-100</td><td>Exceptional with minor errors</td></tr><tr><td>9 (B)</td><td>85-94</td><td>Above average with few errors</td></tr><tr><td>8 (C)</td><td>75-84</td><td>Average, with noticeable errors</td></tr><tr><td>7 (D)</td><td>65-74</td><td>Good, with significant errors</td></tr><tr><td>6 (E)</td><td>55-64</td><td>Meets minimal criteria</td></tr><tr><td>5 (F, FX)</td><td>&lt; 55</td><td>Fails to meet minimal criteria</td></tr></table>	Grade	No of points	Grade description	10 (A)	95-100	Exceptional with minor errors	9 (B)	85-94	Above average with few errors	8 (C)	75-84	Average, with noticeable errors	7 (D)	65-74	Good, with significant errors	6 (E)	55-64	Meets minimal criteria	5 (F, FX)	< 55	Fails to meet minimal criteria
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	<p><u><i>In order to be given a passing final grade, student must obtain a passing grade from all forms of knowledge assessment.</i></u></p>																					
6. Literature	<p><b>Required</b></p> <ul style="list-style-type: none"><li>– Course hand-outs</li><li>– Group of authors. Research and Scientific Work in Medicine. <b>To be published by Faculty of Medicine University of Sarajevo – in preparation.</b></li></ul> <p><b>Extended</b></p> <ul style="list-style-type: none"><li>- Rosenbaum P. Design of Observational Studies. Springer Science Business Media. LLC 2010.</li><li>- Chow SC &amp; Liu JP. Design and analysis of Clinical Trials. J Wiley&amp; Sons Inc. New Jersey. 2004.</li><li>- Piantadosi S. Clinical Trials A Methodologic Perspective. J Wiley&amp; Sons Inc. New Jersey. 2005.</li></ul>																					
7. Remarks	<p>All forms of classes are obligatory. In case a student misses more than 10% of classes (excused or not excused) one is obliged to colloquially pass all the missed lectures and seminars with lecturer(s) in charge.</p> <p>Consultation hours are every day 12.00-14.00 at the Department and/or online with prior announcement with the Secretary of Department of Epidemiology and Biostatistics, or by email: <a href="mailto:epidemiologija@mf.unsa.ba">epidemiologija@mf.unsa.ba</a>.</p>																					

## COURSE PLAN: INTRODUCTION TO SCIENTIFIC METHODS 1

Lesson No.	Teaching method	Contact hours
Lesson 1.	<b>Lecture:</b> History of scientific thought development, medicine and paramedicine. Foundations of scientific thought and specifics of scientific thinking, prerequisites of scientific research.	2
Lesson 2.	<b>Lecture:</b> Ethical code in scientific research and publishing, Etički kodeks u naučnom istraživanju i publiciranju, reviewing plagiarism in particular	2
Lesson 3.	<b>Lecture:</b> Basic characteristics of medical literature, types of medical publications. Browsing medical literature.	2

Lesson 4.	<b>Seminar:</b> Electronic sources of medical information and assessment of its relevance. Browsing medical literature and available information on the internet.	2
Lesson 5.	<b>Lecture:</b> References and quotations in biomedical publications. Styles of referencing.	2
Lesson 6.	<b>Seminar:</b> Structure and writing of review paper. Form and content of poster presentation.	2
Lesson 7.	<b>SEMINAR WORK 1</b>	2
Lesson 8.	<b>Lecture:</b> Types of medical research. Basics of design and methodology of biomedical studies. Types of medical research, experimental studies. Introducing to concepts of forming a research sample, research hypothesis, and basics of collecting, analyzing and presenting data. Basics of writing a professional/scientific paper. Form and content of a seminar paper.	2
Lesson 9.	<b>Lecture:</b> Basics of forming a research sample in biomedical studies. <b>Seminar:</b> Basics of collecting data in biomedical research.	1 1
Lesson 10.	<b>Seminar:</b> Basic elements of analysing collected data and presenting results of a research.	2
Lesson 11.	<b>Seminar:</b> Form and content of a seminar (scientific/professional) paper.	2
Lesson 12.	<b>Lecture:</b> Methods of presenting results of a research as a scientific or professional paper – oral and poster presentation.	2
Lesson 13.	<b>Seminar:</b> Basic techniques in creating a presentation. Basics of presentation of biomedical research results.	2
Lesson 14.	<b>SEMINAR WORK 2</b>	2
Lesson 15.	<b>ORAL EXAM</b>	2



Code:MFSE 0505	Course title: EPIDEMIOLOGY		
Level: Undergraduate	Study year: III	Semester: V	ECTS: 4
Status: Core	Total contact hours: 60		
Prerequisites:	According to study regulation		
Lecturers: Prof. Semra Cavaljuga, MD, MSc, DSc; assistant professor Enisa Ademović, MD, MSc, DSc; senior assistant Lejla Džananović, MD, MSc, DSc; teaching assistance Džan Ahmed Jesenković, MD			
1. Overall aim	Students should familiarize themselves and master the principles and methods used in epidemiology and epidemiological research. They are introduced to basic elements in research, and epidemiological methods which makes it possible to understand etiology factors, modes of transmission and pathogenesis, through studying distribution and disease dynamics in a population. Students should master infectious and chronic diseases prevention and control, as well as basic principles in disaster epidemiology.		
2. Course objectives	The objective of the module is for students to master the basic elements and application of epidemiological principles and methods needed in everyday medical practice as well as in research, causality concepts, and prevention and control of mass communicable / infectious and chronic diseases.		
3. Learning outcomes (Knowledge, skills and competences)	<p>Students should master the following knowledge:</p> <p><b>Module 1. Theory of modern epidemiology</b> Students should master the aims and objectives of epidemiology, its history, basic epidemiological theories and their application in modern biomedical science, as well as epidemiological approach to a disease and basics in infectious and chronic diseases epidemiology.</p> <p><b>Module 2. Measures of disease occurrence and measures of association; bias and confounding</b> Students are introduced to measures of disease frequency (incidence and prevalence), as well as bias and confounding, should learn how to calculate and use them.</p> <p><b>Module 3. Epidemiological methods</b> Students should familiarize themselves and master basics in observational and experimental methods, design of descriptive studies (case report, case series, cross-sectional studies, ecologic – correlation studies), and basic principles of analytic epi methods: case control and cohort studies, as well as screening.</p> <p><b>Module 4. Measures of association and bias; Causality. Epidemiological hypotheses.</b> Students should familiarize themselves with hypotheses in epidemiological research, application of measures of association and bias within analytical epidemiological studies, principles of causality and effect modification, as well as the relation between stating and testing statistical and epidemiological hypotheses and confidence interval choice and application of appropriate measure of association and statistical test to test association hypotheses. Students will be introduced to appropriate computer software application in these processes.</p> <p><b>Module 5. Factors influencing epidemics evolution, spread and self-regulation. Investigating epidemics. Surveillance in public health</b> Students should master factors influencing epidemic evolution, basic principles in epidemic investigation using descriptive methods, as well as basics surveillance elements in public health and infectious diseases, and legislation of registering of infectious diseases in Bosnia and Herzegovina.</p> <p><b>Module 6. Epidemiology of infectious diseases</b> Students should master basics in characteristics and spread of infectious diseases, characteristics of food-borne diseases (alimentary spread); air-borne (respiratory); contact (direct and indirect – sexually and blood-borne</p>		



diseases); zoonosis; hospital infections, as well as specific modes of transmission prevention methods. They will be specifically introduced to intrahospital infections, i.e. infections in health care facilities and prevention methods.

**Module 7. Epidemiology of (mass) chronic diseases**

Students should master models of evolution and risk factors of (mass) chronic diseases, i.e. cancer epidemiology, cardiovascular, diabetes mellitus, genetic epidemiology, disaster epidemiology, and existence and making of (mass) chronic diseases registries.

**Module 8. Basics in infectious/communicable and chronic diseases prevention**

Students should master general (isolation, quarantine) and specific measures (immunization, disinfection, disinfection and deratization) of infectious disease prevention.

**Module 9. Global burden of disease. Vital statistics – mortality standardization**

Students should master basics in mortality standardization and are introduced to calculations in global burden of disease concepts.

Students should master the following skills and competencies:

- Planning, implementing, analyzing and results distribution in epidemiological research.
- Design, implementation, analysis and interpretation of epidemiological research.
- Contribution of epidemiology to all biomedical research.
- Understanding the epidemic process and elements in transmission chains, thinking of their prevention and control.
- Process results of epidemiological research in available computer software.

Every student should know how to:

- Design, implement and analyze small epidemiological studies.
- Critically analyze epidemiological studies, syntheses and reports.
- Apply basic techniques of clinical-epidemiological research, calculate the measures of disease frequency, measures of association, differ between a screening and diagnostic test.
- Communicate the scientific results, formulate objectives in a research and test them.
- Formulate and test research and epidemiological hypotheses using methods of bivariate analysis.
- Basic steps in investigating an epidemic and disease surveillance (infectious and chronic, and injuries).
- Basics of immuno- and sero-prophylaxis of populations of different age groups.
- Basic measures of prevention and control of infectious and chronic diseases, on individual and population level and in health care institutions.
- Current epidemiologic situation in a country and evaluation of potential emergence of new epidemics.
- Present results of own research on a high quality level and argument the difference between good and bad data and results presentation.

Attitudes a student should master after the completion of this course:

- Knowing basic methods and principles in epidemiology helps

	<p>understand results of novel research, as well as everyday medical theory and practice.</p> <ul style="list-style-type: none"> <li>- Epidemiology investigates not only infectious diseases but all mass phenomena and diseases.</li> <li>- Contemporary research in disease causality is alleviated when knowing methods of sample quantification, potential bias and confounding factors analysis.</li> <li>- Application of epidemiological principles and methods made a substantial contribution to human life expectancy extension.</li> <li>- Most infectious and chronic diseases can be prevented both on individual and population level.</li> <li>- It is proved through history that today's population does not get diseases preventable by an effective vaccine.</li> <li>- In case of epidemic emergency, don't panic!</li> </ul>
4. Teaching methods	<p>In semester, there will be total of:</p> <ul style="list-style-type: none"> <li>- 29 hours of lectures,</li> <li>- 29 hours of lab sessions / contact with TAs</li> <li>- 2 hours of seminar classes</li> </ul> <p>Every lecture lasts 2 hours (90 minutes) and it will be organized <u>in class/or online</u>. Introductory lectures are of classic – collective type, while others are organized either as a “sandwich” – interactive collective type or individual learning through interactive lecturing. Wherever possible, examples from real life epidemiological and public health practice are given.</p> <p>If possible, depending on time frame and number of students, most of lectures will be organized as <i>seminar classes</i>, i.e. lecturer working with small groups of students, in order to better understand the lectures (e.g. modules 4, 6, 10). Every lab session lasts 2 hours (90 minutes). It will be organized <u>in class/or online</u>. They are all designed as interactive, problem oriented and with examples from real life practice. Thus, students will work in small groups of 7 students max, interactively, with 20 students max per a large group (in one class).</p> <p>Seminar work will be a terrain work and writing of an individual and group seminar papers (2 papers per student max), as a report of a terrain work. One of the papers, in consultation with a lecturer and a TA, is based on project methodology and will be publicly presented.</p>
5. Methods of knowledge assessment and examination	<p>Knowledge assessment will be performed through:</p> <ul style="list-style-type: none"> <li>- short tests / quizzes – total of 5 per semester. It will be organized <u>in class/or online</u>.</li> </ul> <p>(Each will have 5 MC questions with 4-5 given answers, lasting 10 minutes max. Will be performed before a start of a lecture. Results will be given in a passed or failed form (+/-), with given a pass for 3 or more correctly answered questions. If a student fails a quiz, when taking a final exam, he/she will be given an opportunity to take that quiz again, if one wants.)</p> <ul style="list-style-type: none"> <li>- 1. partial exam on general epidemiology. It will be organized <u>in class/or online</u>. Will have 30 questions max with 1/4 of the questions in the essay form, 1/4 of MCQ calculation questions with 5 given answers (one correct answer), and 1/2 of the MC questions with 4-5 given answers.</li> <li>- 2. partial exam – after the course completion with 30 questions max based on MCQ methodology with 2/3 of MC questions and 1/3 of essay questions</li> <li>- individual work on seminar paper on a given topic in consultation</li> </ul>



	<p>with a lecturer and TAs – total of 2</p> <ul style="list-style-type: none"> <li>– oral final exam will be organized for students wanting a higher grade (students whose pondered arithmetic mean is up to 0.1 smaller than a possible upper/lower grade) or students showing exceptional results during continuous work during a semester (arithmetic mean of a grade of 9 or higher). It will be organized <u>in class/or online</u>.</li> </ul> <p>Grading will be performed by points given for every part of the studying activity and knowledge testing during the semester and on the final exam, by the following structure:</p> <ul style="list-style-type: none"> <li>– short tests / quizzes 10% of the final grade</li> <li>– 1. partial exam 30% of the final grade</li> <li>– 2. partial exam 40% of the final grade</li> <li>– seminar paper and presentation 20% of the final grade</li> </ul> <p>In case a student fails partial exam/s, he/she will be given that test material on a final exam.</p> <p>Final grade will be calculated as a pondered arithmetic mean (i.e. joint arithmetic mean) of all grades given throughout semester.</p> <p>Grading of writing parts of the exam will be performed with respect to rules and regulations of syllabi harmonization of Bologna studying for every single exam term as following:</p> <table border="1"> <thead> <tr> <th>Grade</th><th>No of points</th><th>Grade description</th></tr> </thead> <tbody> <tr> <td>10 (A)</td><td>95-100</td><td>Exceptional with minor errors</td></tr> <tr> <td>9 (B)</td><td>85-94</td><td>Above average with few errors</td></tr> <tr> <td>8 (C)</td><td>75-84</td><td>Average, with noticeable errors</td></tr> <tr> <td>7 (D)</td><td>65-74</td><td>Good, with significant errors</td></tr> <tr> <td>6 (E)</td><td>55-64</td><td>Meets minimal criteria</td></tr> <tr> <td>5 (F, FX)</td><td>&lt; 55</td><td>Fails to meet minimal criteria</td></tr> </tbody> </table> <p><u><i>In order to be given a passing final grade, student must obtain a passing grade from all forms of knowledge testing, except short tests / quizzes.</i></u></p>	Grade	No of points	Grade description	10 (A)	95-100	Exceptional with minor errors	9 (B)	85-94	Above average with few errors	8 (C)	75-84	Average, with noticeable errors	7 (D)	65-74	Good, with significant errors	6 (E)	55-64	Meets minimal criteria	5 (F, FX)	< 55	Fails to meet minimal criteria
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6. Literature	<p>Required:</p> <ul style="list-style-type: none"> <li>○ Course hand-outs</li> <li>○ CDC. Principles of Epidemiology in Public Health Practice (third edition). US Department of Health and Human Services. Atlanta, 2012.</li> <li>○ R. Beaglehole, R. Bonita, T. Kjellstrom: Basic Epidemiology. World Health Organisation Geneva, 1993.</li> <li>○ L. Gordis: Epidemiology. (3rd edition) Elsevier Saunders. 2004.</li> </ul>																					



	<ul style="list-style-type: none"> <li>○ D. Essex-Sorlie: Medical Biostatistics and Epidemiology. Appleton &amp; Lange 1995.</li> <li>○ S. Čavaljuga. Managerial Epidemiology and Zoonosis Application of Managerial Epidemiology in Control Zoonotic Disease in Bosnia and Herzegovina. Zoonosis. Dr. Jacob Lorenzo Morales (Ed.). In Tech. 2012.</li> </ul> <p>Additional:  <i>(This literature might be helpful to students who have Bosnian language skills)</i></p> <ul style="list-style-type: none"> <li>○ S. Čavaljuga: Osnovi moderne epidemiologije: nadzor i istraživanje epidemija – in preparation</li> <li>○ S. Čavaljuga, M. Čavaljuga. Biostatistika: Osnovni principi i metode Medicinski fakultet Univerziteta u Sarajevu, 2009</li> <li>○ Čustović, S. Čavaljuga. Epidemiološki nadzor zdravstvenih ustanova Medicinski fakultet Univerziteta u Tuzli, 2014.</li> <li>○ S. Čavaljuga i saradnici: Praktikum iz epidemiologije – in preparation</li> <li>○ Zakon o zaštiti stanovništva od zaraznih bolesti u FBiH, 2005., Official Gazette 18/05 FBiH, i.e. existing laws and regulations</li> <li>○ Z. Radovanović (editor): Epidemiologija. Prosveta Niš. 2005.</li> <li>○ V. Babuš i suradnici: Epidemiologija. Medicinska naklada Zagreb. 1997.</li> <li>○ V. Babuš: Epidemiološke metode. Medicinska naklada Zagreb, 2000.</li> <li>○ H. Vlajinac, M. Jarebinski (urednici): Epidemiologija. Medicinsk fakultet Univerziteta u Beogradu, Beograd, 2006.</li> </ul>
7. Remark	<p><b>It is forbidden to bring unauthorized copies of literature to classes!</b></p> <p>All forms of classes are obligatory. In case a student misses more than 10% of classes (excused or not excused) one is obliged to colloquially pass all the missed lectures and lab session in agreement with TAs and/or lecturer.</p> <p>Failed or missed quizzes can be re-taken on the final exam if a student wishes so.</p> <p>Consultation hours are every day 08.30-10.00 and 13.00-14.30 at Department and/or online with prior announcement to the Department's Secretary or by email: <a href="mailto:epidemiologija@mf.unsa.ba">epidemiologija@mf.unsa.ba</a>.</p>

Code: <b>MFSE 0409</b>		Course title: <b>INTRODUCTION TO PRACTICAL EPIDEMIOLOGY</b>	
Level: <b>Undergraduate</b>	Study year: <b>II</b>	Semester: <b>IV</b>	ECTS: <b>1</b>
Status: <b>Elective</b>	Total contact hours: <b>20</b>		
Prerequisites:	<b>According to study regulation</b>		
Lecturers: Prof. Semra Čavaljuga, MD, MSc, DSc; assistant professor Enisa Ademović, MD, MSc, DSc, senior assistant Lejla Džananović, MD, MSc, DSc, teaching assistance Džan Ahmed Jesenković, MD			
1. Overall aim	Students should, at the beginning of their medical education, familiarize themselves with practical, field work on epidemiological research. They will master data collection on their own as well as descriptive analysis of simple research in order to better understand scientific literature data. They will master how to perform a practical field research, know a research subject, analyze data collected and present results of own research.		
2. Course objectives	Students will master the elements and methods of field data collection, basics of descriptive data analysis and practical aspects of field research.		
3. Learning outcomes (Knowledge, skills and competences)	Students should master the following knowledge:		
	<p><b>Module 1. Introduction to field / practical epidemiology</b> Students should master the basics of field epidemiologic research, as well as methods, definitions and elements of practical epidemiology and its place in medical theory and practice. They will be presented with basics determinants of physical, biological, demographic, ecological and social-economic effects on population's health and disease.</p> <p><b>Module 2. Field research design</b> Students should master the appropriate choice of descriptive epidemiological study with objectives and hypotheses, basics in literature search and design of a descriptive research.</p> <p><b>Module 3. Practical aspects in descriptive epidemiology</b></p> <p>3.1 Practical data collection with data organization 3.2 Methods of literature search 3.3 Sampling in practice 3.4 Questionnaire design 3.5 Biases/errors, types of bias</p> <p>Students should familiarize themselves with the organization of an epidemiological field research, master the types and methods of data collection, basics of literature search, sampling methods, and questionnaire design on practical examples.</p> <p><b>Module 4. Application of statistical data analysis in field / practical epidemiology</b></p> <p>4.1 Tabular and graphic presentation of data collected and results 4.2 Descriptive data analysis 4.3 Results interpretation and analysis of a chosen study 4.4 Representativeness of results 4.5 Pros and limitations of descriptive studies</p> <p>Students should master the basic elements of correct tabular and graphic presentation of own data, and basic methods of descriptive data and results analysis, through the analysis of a real research.</p> <p><b>Module 5. Data and results presentation</b> Students should master the rules of appropriate data and results presentation.</p>		



	<p>Knowledge a student should master after the completion of this course:</p> <ol style="list-style-type: none"> <li>1. Know how to design a simple practical field research</li> <li>2. Know basics in literature search and how to collect data by own research</li> <li>3. Know basics in sampling methods (simple, stratified) and how to choose a representative sample</li> <li>4. Master methods of descriptive data analysis of simple descriptive research</li> </ol> <p>Students should master the following skills and competencies:</p> <ol style="list-style-type: none"> <li>1. Questionnaire design for a specific study</li> <li>2. Types of descriptive epidemiological studies</li> <li>3. Know differences and relations between specific types of descriptive studies</li> <li>4. Identify basic effects of physical, biological, demographic, ecological and social-economic health and disease determinants in B&amp;H</li> <li>5. Analyze the results of descriptive epidemiological studies.</li> </ol> <p>Attitudes a student should master after the completion of this course:</p> <ol style="list-style-type: none"> <li>1. Knowing basic field epidemiology methods and elements facilitates the understanding of literature data and helps in everyday medical theory and practice</li> <li>2. There are various types of errors / biases in field research which can be avoided.</li> <li>3. Knowing how to choose an appropriate epidemiological study makes study results relevant</li> <li>4. Only field research with appropriate methodology produces scientifically valid and practically applicable results</li> <li>5. Knowing pros and limitations of descriptive epidemiological studies results in appropriate application of descriptive epidemiology in medical practice.</li> </ol>
4. Teaching methods	<p>In semester, there will be total of:</p> <ul style="list-style-type: none"> <li>– 8 hours of lectures, it will be organized in class and/or online;</li> <li>– 6 hours of lab sessions / contact with Tas, it will be organized in class and/or online</li> <li>– 6 hours of seminar classes, it will be organized in class and/or online</li> </ul>
5. Method of knowledge assessment and examination	<p>Grading will be performed by points given for every part of the studying activity and knowledge testing during the semester and on the final exam which be organized <u>in class and/or online</u>, by the following structure:</p> <ul style="list-style-type: none"> <li>– activity during classes 10% of the final grade</li> <li>– seminar paper 60% of the final grade</li> <li>– seminar paper presentation with questions answering during the presentation 30% of the final grade</li> </ul> <p>Final grade will be calculated as a pondered arithmetic mean of all grades given throughout semester (i.e. joint arithmetic mean).</p> <p>Grading of written parts of the exam will be performed with respect to rules and regulations of syllabi harmonization of Bologna studying for every single exam term as following:</p>



	<table><tr><th>Grade</th><th>No of points</th><th>Grade description</th></tr><tr><td>10 (A)</td><td>95-100</td><td>Exceptional with minor errors</td></tr><tr><td>9 (B)</td><td>85-94</td><td>Above average with few errors</td></tr><tr><td>8 (C)</td><td>75-84</td><td>Average, with noticeable errors</td></tr><tr><td>7 (D)</td><td>65-74</td><td>Good, with significant errors</td></tr><tr><td>6 (E)</td><td>55-64</td><td>Meets minimal criteria</td></tr><tr><td>5 (F, FX)</td><td>&lt; 55</td><td>Fails to meet minimal criteria</td></tr></table> <p><u><i>In order to be given a passing final grade, student must obtain a passing grade from all forms of knowledge testing.</i></u></p>	Grade	No of points	Grade description	10 (A)	95-100	Exceptional with minor errors	9 (B)	85-94	Above average with few errors	8 (C)	75-84	Average, with noticeable errors	7 (D)	65-74	Good, with significant errors	6 (E)	55-64	Meets minimal criteria	5 (F, FX)	< 55	Fails to meet minimal criteria
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6. Literature	<p>Required:</p> <ul style="list-style-type: none"><li>- R. Beaglehole, R. Bonita, T. Kjellstrom. Basic Epidemiology. World Health Organisation. Geneva, 1993.</li></ul> <p>Additional:</p> <p><i>(This literature might be helpful to the students who have Bosnian language skills)</i></p> <ul style="list-style-type: none"><li>- Z. Radovanović. Terenska epidemiologija. Medicinski fakultet Univerziteta u Beogradu. 2000.</li><li>- S. Čavaljuga. Osnovi moderne epidemiologije: nadzor i istraživanje epidemija – in preparation</li></ul>																					
7. Remark:	<p><b>It is forbidden to bring unauthorized copies of literature to classes!</b></p> <p>Maximum number of students for this course is 50!</p> <p>Seminar paper must be submitted at least 5 days before the day of presentation, with a Power-Point presentation.</p> <p>Consultation hours are every day 08.30-10.00 and 13.00-14.30 at Department and/or online with prior announcement to the Department's Secretary or by email: epidemiologija@mf.unsa.ba.</p>																					

Code: MFSE 0913		Course title: SCREENING AND EPIDEMIOLOGY OF CHRONIC DISEASES	
Level: undergraduate	Study year: V	Semester: IX	ECTS: 1
Status: elective	Total contact hours: 20 (8+2+10)		
Prerequisites:	According to the Study Regulation		
Lecturers: Prof. Semra Cavaljuga, MD, MSc, DSc; assistant professor Enisa Ademović, MD, MSc, DSC; Senior assistant Lejla Džananović, MD, MSc, DSc; teaching assistant Džan Ahmed Jesenković, MD			
1. Overall aim	Overall aim of this course is mastering with basic concepts and methods in chronic diseases epidemiology, their importance and ways of preventions, early disease detection and risk factors among individuals. Special attention of the course is working on screening methodology, its evaluation methods for better understanding and application in student's future physician's practice. Besides this, objective of this course it that students applying their gained fundamentals on epidemiological methods during the Epidemiology course on the thirds year of study, familiarize themselves with unique application of those methods for key chronic diseases, including cancer, cardiovascular disease, diabetes, and other chronic diseases in order to design and apply a research with proper statistical analysis, presenting and defending their results. The purpose of this course is to provide basic knowledge and skills needed to understand and critically evaluate published research on chronic diseases and skills on choosing and application of an adequate epidemiological method for designing and conducting a research with fulfilling all set objectives to specific research question in improving their chronic disease prevention skill in future practice.		
2. Course contents	<p>During this elective course „Screening and Epidemiology of Chronic Diseases “students will gain the knowledge through following modules:</p> <p><b>Module 1. Introduction to epidemiology of chronic diseases and epidemiological methods</b> The goal of this Module is to provide an introduction to the basics of field of chronic disease epidemiology, measures of disease frequency, most relevant risk factors by population subgroups/clusters, early disease detection and risk factors. Students will, with critically evaluation and analysis of applied epidemiological methods on various published research familiarize themselves with advantages and disadvantages in each, and specifics of their application in chronic disease research. Fundamentals of screening terminology, definitions and principles thought during the course in <i>epidemiology</i> at the third year will be briefly overviewed.</p> <p><b>Module 2. Cardiovascular disease epidemiology – screening and risk assessment methods</b> The goal of this Module is to provide introduction to the field of cardiovascular disease epidemiology (particularly coronary heart diseases and cerebrovascular): frequency and risk factors, trends, etiology hypothesis creation, application of epidemiological methods in researching these diseases specificity, options for risk factors' screening. Introduction to developing cardiovascular disease by risk assessment methods and their application will be done.</p> <p><b>Module 3. Cancer epidemiology and screening</b> The goal of this Module is to provide introduction to the field of cancer epidemiology and prevention, frequency and risk factors, trends, screening</p>		



	<p>programs (breast cancer, colon cancer, cervix cancer). Review and analysis of available research with critical appraisal of a screening program (components: reliability, feasibility, validity, efficiency and effectiveness).</p> <p><b>Module 4. Diabetes epidemiology and screening</b>  This Module is composed of: overviewing of epidemiological characteristics Diabetes Type I and Type II, frequency and risk factors, options for screening of modifiable risk factors, and epidemiology of obesity in childhood. Introduction on specific issues applying epidemiological methods in diabetes researching with risk assessment of diabetes type 2 development with basic application and analysis will be done.</p> <p><b>Module 5. Other major chronic disease epidemiology and screening</b>  Through this Module students will introduce with other major chronic diseases and conditions relevant for health systems, overviewing their epidemiological characteristics, frequency and risk factors: respiratory diseases, rheumatic diseases, traumas and injuries, genetic diseases, Alzheimer's disease, and mental health disorders</p>
<p>3. Learning outcomes (Knowledge, skills and competences)</p>	<p>During this elective course „Screening and epidemiology of chronic diseases “ students will develop the <i>following knowledge, skills and competencies</i>:</p> <ul style="list-style-type: none"> <li>- Fully master measures of chronic disease frequency in population (incidence and prevalence) in these diseases distribution as well as their risk factors by different population subgroups/clusters; master: probability, risk and odds in describing risk factors and particular chronic disease association(s);</li> <li>- Analytical epidemiology methods/studies principles and applications (case-control and cohort); creation of contingency tables; choosing an adequate measure of association; calculation of confidence interval; understanding of measure of effect for certain exposure;</li> <li>- Fully master screening basic terminology and definitions and concept; importance of early detection and risk factors and prevention;</li> <li>- Fully master diagnostic tests intrinsic and extrinsic values' calculation and application.</li> <li>- Interpret strengths and weakness of various designs and methods used in chronic diseases' epidemiological researches through the available epidemiologic literature;</li> <li>- Master reliability, feasibility, validity, efficiency and effectiveness in a screening program,</li> <li>- Develop basic knowledge in understanding of chronic disease multi-factorial causality;</li> <li>- Develop basic knowledge in choosing and application of an appropriate epidemiological method for design and conduct small researches with fulfilling a research question;</li> <li>- Develop basic knowledge in choosing and application of an appropriate risk assessment methods in early identification individual at risk of developing particular chronic diseases (cardiovascular, cancer, diabetes mellitus...)</li> <li>- Gain confidence in communicating epidemiologic information thru presentation of self-design and conducted a small pilot research.</li> </ul>



4. Teaching methods	<p>Lectures are organized as «sandwich» - exchange of collective learning and individual learning through interactive lecturer approach.</p> <p>Every lab session lasts 1 hours (45 minutes). Thus, students will work in small groups of 5-7 students max, they are all designed as interactive, problem oriented and with examples from real life practice.</p> <p>Seminar paper is mandatory. Students will work individually on their paper on predetermined topics. Seminar work will be a terrain work, students will go to the field to conduct a small pilot research and written project research with appropriate statistical analysis of data (with minimum 100 cases/participants in a study divide in two groups in order to adequately be apply learned statistical method of bi-variant analysis)). Two contact hours are planned for this research preparation.</p> <p>This project will be presented publicly to all students at the end of the course.</p> <p>This course has the following contact hours composition:</p> <ul style="list-style-type: none"> <li>- 8 lecture hours (7 lectures by a lecturer and 1 – the last one in a semester for students' papers presentation). It will be organized <u>in class/or online.</u></li> <li>- 10 hours of lab sessions / contact with TA, it will be organized <u>in class/or online.</u></li> <li>- 2 hours for preparation of a paper/seminar</li> </ul>																		
5. Method of knowledge assessment and examination	<p>Knowledge assessment will be performed through:</p> <ul style="list-style-type: none"> <li>- <b>short tests / quizzes</b> – total of 2. It will be organized <u>in class/or online.</u></li> <li>- individual work on <b>seminar paper/project</b> on given topic with consultation with course professor and assistants with presentations <u>in class/or online.</u></li> <li>- <b>written exam based on MCQ methodology</b> with 4-5 given answers on 2/3 of the questions; 1/3 of the questions will be in the essay form or calculation. It will be organized after the completion of lectures. It will be organized <u>in class/or online.</u></li> </ul> <p>Grading will be performed by points given for every part of the studying activity and knowledge testing during the semester and on the Final exam, by the following structure:</p> <table border="0"> <tr> <td>- short tests / quizzes</td><td>20% of the final grade</td></tr> <tr> <td>- written exam</td><td>40% of the final grade</td></tr> <tr> <td>- seminar paper and presentation</td><td>40% of the final grade</td></tr> </table> <p>Grading of writing parts of the exam will be performed with respect to rules and regulations of syllabi harmonization of Bologna studying for every single exam term as following:</p> <table border="0"> <tr> <td>o 95-100% correct answers</td><td>- grade 10</td></tr> <tr> <td>o 85-94% correct answers</td><td>- grade 9</td></tr> <tr> <td>o 75-84% correct answers</td><td>- grade 8</td></tr> <tr> <td>o 65-74% correct answers</td><td>- grade 7</td></tr> <tr> <td>o 55-64% correct answers</td><td>- grade 6</td></tr> <tr> <td>o rest of the students – failing grade</td><td>- grade 5</td></tr> </table> <p><b>Regular final examination term</b></p> <p>Final exam in the regular term is conducted and evaluated according to previously defined methods of knowledge testing.</p> <p>Oral Final exam will be organized for students wanting a higher grade or exceptional students.</p>	- short tests / quizzes	20% of the final grade	- written exam	40% of the final grade	- seminar paper and presentation	40% of the final grade	o 95-100% correct answers	- grade 10	o 85-94% correct answers	- grade 9	o 75-84% correct answers	- grade 8	o 65-74% correct answers	- grade 7	o 55-64% correct answers	- grade 6	o rest of the students – failing grade	- grade 5
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	<p><b>Final exam in the correctional term / September examination term</b> Final exam in the correctional term / September examination term will be held according to the previously determined criteria of the Final exam in the regular term.</p> <p><b>Forming final grade</b> Final grade will be calculated as a pondered arithmetic mean of all grades given throughout semester (i.e. joint arithmetic mean) and on Final exam. <u>In order to be given a passing final grade, student must obtain a passing grade from all forms of knowledge testing.</u></p>
6. Literature	<p><b>Required:</b></p> <ul style="list-style-type: none"> <li>- Course Handouts</li> <li>- Harris RE. Epidemiology of chronic disease: a global perspective. The Ohio State University Medical Centre, USA; 2013.</li> <li>- Raffle EA, Muir Gray JA. Screening: Evidence and Practice. Oxford University, USA; 2007.</li> <li>- Rothman KJ, Greenland S, Lash TJ. Modern epidemiology, third edition. Philadelphia: Lippincott Williams &amp; Wilkins; 2008.</li> </ul> <p><b>Additional:</b> (This literature might be helpful to the students who have Bosnian language skills)</p> <ul style="list-style-type: none"> <li>- Vorko-Jović A, Strnad M, Rudan I. Epidemiologija hroničnih nezaraznih bolesti. Zagreb: Medicinski fakultet; 2007.</li> <li>- Babuš V. Epidemiološke metode. Zagreb; Medicinska naklada; 2000.</li> </ul>
7. Remarks	<p><b>It is forbidden to bring unauthorized copies of literature to classes!</b></p> <p>All forms of classes are obligatory. Exercises can be attended only by students who have a proper uniform. Fixing absences from classes is in accordance with applicable legal regulations. Failed or missed quizzes can be re-taken on the final exam if a student wishes so.</p> <p>Consultation hours are every day 08.30-10.00 and 13.00-14.30 at Department and/or online with prior announcement to the Department's Secretary or by email: epidemiologija@mf.unsa.ba.</p>

## COURSE PLAN: SCREENING AND EPIDEMIOLOGY OF CHRONIC DISEASES

Week 15.	Form of teaching	Hours
Tuesday	<b>Lecture:</b> <ul style="list-style-type: none"> <li>- Introduction to the epidemiology of mass chronic diseases: - risk factors, trends and distribution in different populations and different population groups.</li> <li>- Concept of prevention and specificity of design of epidemiological studies of massive chronic diseases. Basic concepts of screening and diagnostic tests.</li> </ul>	1
	<b>Practical work:</b> <ul style="list-style-type: none"> <li>- Developing measures of association and bias on examples of mass chronic disease studies, using the appropriate statistical software.</li> <li>- Practical calculation of intrinsic and extrinsic values of diagnostic tests and elaboration of the importance of overexposure on examples of screening studies.</li> <li>- The concept and calculation of ROC (Receiver Operating Characteristics) are blamed on the appropriate statistical software.</li> </ul>	3
	<b>Seminar 1:</b> Division of topics and discussions on selected topics of seminar papers	1
Wednesday	<b>Lecture:</b> <ul style="list-style-type: none"> <li>- Epidemiology of cardiovascular diseases and risk factors. Specificity of design of epidemiological studies of cardiovascular diseases (advantages and disadvantages), types and identification of bias. Screening of risk factors.</li> <li>- The concept of risk and methods for assessing the individual risk of cardiovascular disease and their significance.</li> </ul>	2
	<b>Practical work:</b> <ul style="list-style-type: none"> <li>- Practical elaboration of epi method of cardiovascular diseases, advantages and disadvantages of applied methods, identification of bias on the given examples of published research of cardiovascular diseases.</li> <li>- Practical calculation of individual risk of cardiovascular disease by applying appropriate methods.</li> <li>- <b>Short test / quiz</b></li> </ul>	3
Thursday	<b>Lecture:</b> <ul style="list-style-type: none"> <li>- Epidemiology, prevention and control of cancer (lung, breast, cervix, colon, prostate), and identification of risk factors. Screening programs.</li> <li>- Specificity of cancer control and risk factors - registers.</li> </ul>	1
	<b>Lecture:</b>	1



	<ul style="list-style-type: none"> <li>- Epidemiology of diabetes (type I and type II), risk factors and identification of modifying risk factors. Specificity of epi method design in diabetes research. Methods for assessing the individual risk of diabetes.</li> <li>- Epidemiology of childhood obesity.</li> </ul> <p><b>Practical work:</b></p> <ul style="list-style-type: none"> <li>- Practical elaboration of epi method of cancer, advantages and disadvantages of applied methods, identification of bias on the given examples of published research of specific carcinogenic disease.</li> <li>- Practical elaboration of the effectiveness and effectiveness of the screening program on examples of screening studies.</li> </ul> <p><b>Practical work:</b></p> <ul style="list-style-type: none"> <li>- Practical elaboration of epi methods on the given examples of published research of diabetes and risk factors, advantages and disadvantages of applied methods, types and identification of bias.</li> <li>- Practical calculation of individual risk of diabetes by applying appropriate methods. Calculation and limitation of body mass index -ITM (BMI) calculation.</li> </ul> <p>- <b>Short test / quiz</b></p> <p><b>Seminar 2:</b> Discussion and discussion of the topics of seminar papers</p>	<p>1</p> <p>1</p> <p>1</p>
Friday	<p><b>Lecture:</b></p> <ul style="list-style-type: none"> <li>- Introduction to the epidemiology of other mass chronic diseases (respiratory, rheumatoid, trauma and injuries, genetic, Alzheimer's disease and mental health disorders.</li> <li>- Presentation of the best student papers</li> <li>- <b>Written exam</b></li> </ul> <p><b>Practical work:</b></p> <ul style="list-style-type: none"> <li>- Practical elaboration of the epi method on examples of studies of some of the other chronic diseases.</li> <li>- - The term and calculation of years of life corrected in relation to incapacity (Disability Adjusted Life Years-DALY-).</li> </ul>	<p>1</p> <p>1</p> <p>1</p> <p>2</p>
<b>Week 17.-18.</b>	<b>Regular final examination term</b>	
<b>Week 19.-20.</b>	<b>Final exam in the correctional term</b>	
	<b>September examination term</b>	

Code: <b>FMSE 1101</b>		Course title: Family Medicine	
Level: <b>clinical</b>	Study year: VI	Semester: IX	ECTS: 10
Status: <b>obligatory</b>	Total contact hours: 120		
Prerequisites:	<b>According to the Study regulation</b>		
Lecturers: <b>associate professor Zaim Jatić, MD, PhD, associate professor Amira Skopljak, MD, PhD, assistant Nataša Trifunović, MD, MSc, assistant Hasiba Erkočević, MD</b>			
1. Overall aim	Aims of the Family Medicine Course are to acquaint students with: A. The definition of family medicine and the bio-psycho-social approach model to unselected problems with which patients show up B. The organization of family medicine as a part of the primary health care system with all its local particularities C. Health promotion and prevention in the context of family medicine D. The role of family physicians in communities and families E. The most common and most important clinical problems in family medicine F. Integration of previously acquired knowledge and skills with the aim of effectively resolving unselected patient's problems G. The role of family physicians as “gatekeepers” and coordinators of the patient’s health care within the comprehensive health system with the awareness of their own attitudes, capabilities and conditions of the social environment in which they work.		
2. Course contents	The following topics will be covered in the Modules: <b>A. Introduction topics (2)</b> Module 1. Introduction, definitions and organizations of FM Module 2. Holistic approach – the bio-psycho-social model of FM <b>B. Work organization in FM (4)</b> Module 3. The organization and structure of FM Module 4. Medical documentation (workshop as a part of practical training) Module 5. Communication in FM (workshop as a part of practical training) Module 6. Home care and palliative care in FM <b>C. The community, family and family doctor (1)</b> Module 7. Work in the community and with the family/families <b>D. Promotion and Prevention (2)</b> Module 8. Prevention in FM (workshops as a part of practical training) Module 9. Health promotion in FM <b>E. Selected clinical topics in FM (10)</b> Module 10. Infections of the respiratory tract in FM Module 11. Musculoskeletal problems in FM Module 12. Problems of elderly people in FM practice Module 13. Hypertension in FM Module 14. Diabetes mellitus in FM (workshop as a part of practical training) Module 15. Uncomplicated urinary infections Module 16. The most common respiratory diseases Module 17. The most common cardiovascular diseases Module 18. The most common malignant diseases Module 19. The specifics of the health care of adolescents		
3. Learning outcomes (Knowledge, skills and competences)	At the completion of family medicine course, a student will be able to demonstrate knowledge about: - Definition and bio-psycho-social model of FM, - Organization of FM, - Prevention and promotion in FM - Community and family, and - Selected clinical topics (the most common and significant disease in FM).		



During the Family Medicine Course, students will adopt and successfully perform the following skills.

**A. Skills a student should know how to perform effectively (knows how and performs them):**

- Taking a focused medical history
- Focused physical examination (general, head and neck, thorax, abdomen, musculoskeletal, neurological)
- Basic interpretation of ECG
- Communication skills
- Proper drug prescription writing
- Adequate medical documentation (SOAP)
- Using basic instruments and equipment in FM office
- Certifying and managing absence from work (sick leave)
- Reporting infectious diseases
- Proper use of the IT system – opening patients' files, data entry, writing prescriptions, referrals
- Patients' appointment scheduling
- Home visits (organization and execution)
- Dressing the acute and chronic wounds
- Referral for a specialist examination – consultation
- Referral to hospital

**B. Skills a student should be familiar with (know how and when):**

- The use of different diagnostic tests
- Focused psychiatric interview
- Use of ophthalmoscope
- Administration of parenteral therapy (SC, IM, IV)
- Using different questionnaires for disease diagnosis and assessment of disease control
- Telephone conversation with the patient
- Use of oxygenator
- Sterilization of instruments and materials
- Digital rectal examination
- Ear wax removal
- Hearing examination (by whisper and tuning fork)
- Changing urethral catheter in women and men
- Handling infectious waste
- Disposal and destruction of sharp objects

At the completion of family medicine course, a student will gain six core competencies of FM:

- Primary Care Management
- Person-centred Care
- Specific Problem Solving Skills
- Comprehensive Approach
- Community Orientation
- Holistic Approach

At the completion of family medicine course a student will adopt the following attitudes:

- Expressing a positive attitude towards the patient: unreserved support and avoiding condemnation
- Empathic support: the desire to understand the patient's feelings and to respect his/her opinion



	<ul style="list-style-type: none"><li>- Respecting patients: unconditional care, recognizing patient's strengths and capabilities</li><li>- Self-awareness and self-control: knowledge of one's own needs, transfers and counter-transfers</li><li>- Honesty: not playing "the role of a doctor," being appropriate and consistent</li><li>- Reciprocity with patients: accepting the patient as an expert for his/her life, ideal partnership, ideal sharing of responsibilities</li><li>- Teamwork: teamwork with nurses, colleagues, specialists, caregivers, family members and other people who can help in resolving patient's problems</li><li>- Respecting and cooperating with members of the patient's family</li></ul>																				
4. Teaching methods	<b>Lectures</b> – 45 hours <b>Practical exercises</b> in the family doctor's offices – 60 hours <b>Practical exercises</b> with assistants and assistant professors in forms of discussions and workshops in groups of 10 – 15 students – 15 hours																				
5. Method of knowledge assessment and examination	<p>Continuous assessment of the knowledge and skills will be carried out through practical skills colloquium (2) and partial exams (2). Practical skills will be evaluated through 2 mandatory colloquia. Each colloquium contains defined tasks. Methods of evaluation are direct observation and case presentation. The minimum number of points has to be acquired at each colloquium is 55% of the maximal points awarded to that colloquium.</p> <p><b>Colloquium 1</b> A student in front of a preceptor has to show practical skills and explain how they are performing. The maximum number of points is 10.</p> <p><b>Colloquium 2 (Practical Exam)</b> It consists of a written real case from the family medicine practice. The student has to orally explain the case to assistants or teachers. The maximum number of points is 20.</p> <p><b>Partial exams:</b> Within the course, two partial examinations will be organized. The first partial exam includes the examination of the knowledge adopted after modules 1-7. The next types of questions will be used: multi-choice (MCQ), Short Answered (SAQ), Modified Essay (MEQ), Expanded Comparison Questions (EMQ). The student must acquire at least 55% of the points for the exam to be considered as passed. The maximum number of points is 25. The second partial exam includes the knowledge adopted in Modules 8-19. The exam will be organized on the last day of classes. The next types of questions will be used: multiple choice questions (MCQs), Short Answer Questions (SAQs), Modified Essay (MEQ), Extended Comparison Questions (EMQ), Short Answer to Clinical Case Management (SAMPQ), oral. The minimum number of points required to pass the exam is 55%. The maximum numbers of points are 45. Acquired points in all forms of evaluation will be added to make the final mark.</p> <p><b>Examination:</b></p> <table><tr><th>Exam</th><th>Topics</th><th>Type of examination</th><th>Max</th></tr><tr><td>Colloquium 1</td><td>Skills</td><td>Direct observation</td><td>10</td></tr><tr><td>Colloquium 2</td><td>Skills</td><td>Case presentation, oral</td><td>20</td></tr><tr><td>Partial exam 1</td><td>Module 1-7</td><td>MCQ, SAQ, EMQ, MEQ</td><td>25</td></tr><tr><td>Partial exam 2</td><td>Module 8-19</td><td>MCQ, SAQ, EMQ, MEQ, SAMPQ, oral</td><td>45</td></tr></table>	Exam	Topics	Type of examination	Max	Colloquium 1	Skills	Direct observation	10	Colloquium 2	Skills	Case presentation, oral	20	Partial exam 1	Module 1-7	MCQ, SAQ, EMQ, MEQ	25	Partial exam 2	Module 8-19	MCQ, SAQ, EMQ, MEQ, SAMPQ, oral	45
Exam	Topics	Type of examination	Max																		
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Partial exam 2	Module 8-19	MCQ, SAQ, EMQ, MEQ, SAMPQ, oral	45																		

	<table> <tr> <td>Total</td><td>100</td></tr> </table> <p>Students who have achieved more than a minimum number of required points (<math>\geq 55</math>) have not to take the final exam.</p> <p><b>Final exam:</b>  A student who has not achieved enough score in each of the forms of continuous assessment of the knowledge has to take the final exam. The types of questions are the same as those in the second partial exam. The maximal number of points in the final exam is 70.  The pre-requisite for the final examination is a successfully fulfilled the practical part of the exam.  In the case that practice exam is not passed, the student has first to pass the practice exam by getting a test from the practical part that corresponds to the exam that he did not pass during the continuous examination of the acquired skills.  If he passes a complete practice exam, the acquired skills are evaluated through a test that matches the tasks of the first and second colloquia. The student must acquire at least 55% of the points in each test.  The number of points earned is added to the other points in the final score.</p> <p><b>Creating a final grade</b>  The final grade is formed by the aggregation of the points of the applied practical and theoretical part that are translated into the scale rating:  10 (A) - (outstanding success without mistakes or with minor mistakes), 95-100 points;  9 (B) - (above average, with a few mistakes), 85-94 points;  8 (C) - (average, with noticeable mistakes), 75-84 points;  7 (D) - (generally good, but with significant disadvantages), 65-74 points;  6 (E) - (meets the minimum criteria), 55-64 points;  5 (F, FX) - (does not meet the minimum criteria), less than 55% of the points earned.</p> <p><b>Make-up exam:</b>  If the student has not satisfied with the continuous examination of the knowledge and the passing of the final exam, the approach to taking a correctional exam or taking the parts of the exam that has not previously been passed.  A successfully fulfilled practice exam is a prerequisite for taking the theoretical part of the make-up exam. Placement and scoring is the same as the final exam. All passed parts of the exam are recognized until the end of the current academic year</p>	Total	100
Total	100		
6. Literature	<ul style="list-style-type: none"> <li>- Freeman T. McWhinney's Textbook of Family Medicine. 4rd Ed. Oxford: Oxford UP, 2016.</li> <li>- Rakel, Robert E. Textbook of Family Medicine. 9th Ed. Philadelphia: Elsevier/Saunders, 2015.</li> <li>- Teaching materials of Family medicine department</li> <li>- Home page   United States Preventive Services Taskforce [Internet]. Uspreventiveservicestaskforce.org. 2020 [cited 12 July 2020]. Available from: <a href="https://www.uspreventiveservicestaskforce.org/uspstf/">https://www.uspreventiveservicestaskforce.org/uspstf/</a> ESC Clinical Practice Guidelines. European Society of Cardiology. Web. 19 Jan. 2015. <a href="http://www.escardio.org/guidelines">http://www.escardio.org/guidelines</a></li> <li>- Allen, Justin, Bernard Gay, Igor Švab, Harry Crebolder, and Jan Heyrman. "The European Definition of General Practice / Family Medicine." Euract. WONCA Europe, 2005. Web. 19 Jan. 2015. <a href="http://www.woncaeurope.org/sites/default/files/documents/DefinitionEURACTshort%20version.pdf">http://www.woncaeurope.org/sites/default/files/documents/DefinitionEURACTshort version.pdf</a></li> </ul>		



## COURSE PLAN: FAMILY MEDICINE

Week 1	Form of tuition and materials	The number of hours
Monday	<b>Lecture with discussion</b> M1. Introduction, definitions and organizations of FM	2
	<b>Practical exercises</b> E1. Get to know the team and ambulance P/OM	4
Tuesday	<b>Lecture with discussion</b> M 2. Holistic approach — the bio-psycho-social model of FM	3
	<b>Practical exercises</b> E2. A holistic approach and the patient at the Centre of health care	4
Wednesday	<b>Lecture with discussion</b> M3. The organization and structure of FM	3
	<b>Practical exercises</b> E3. Organization and structure of P/OM	4
Thursday	<b>Beforegiving the discussion</b> M4. Medical documentation	3
	<b>Practical exercises</b> V4. Home visits	3
Friday	<b>Workshop</b> M5. Communication in FM	3
	<b>Practical exercises</b> E5. Communication in FM	4
Week 2	Form of tuition and materials	The number of hours
Monday	<b>Lecture with discussion</b> M6. Home care and palliative care in FM	3
	<b>Practical exercises</b> E6. Work in the community and with the family and community	4
Tuesday	<b>Lecture with discussion</b> M7. Work in the community and with the family Partial Exam N 1	2
	<b>Practical exercises</b> E7. Prevention in FM – counselling and immunization	1
Wednesday	<b>Workshop</b> M8. Prevention in FM	4
		3



	<b>Practical exercises</b> E8. Respiratory diseases in P/OM	4
Thursday	<b>Lecture with discussion</b> M9. Health promotion in FM  <b>Practical exercises</b> E9. Musculoskeletal problems in FM	3  4
Friday	<b>Lecture with discussion</b> M10. Infections of the respiratory tract in FM  <b>Practical exercises</b> E10. Problems of the elderly in P/OM	3  4
Week 3	Form of tuition and materials	The number of hours
Monday	<b>Lecture with discussion</b> M11. Musculoskeletal problems in FM  <b>Practical exercises</b> E11. Hypertension in FM <b>Colloquium 1</b>	3  4 1
Tuesday	M12. Problems of elderly people in FM practice  <b>Practical exercises</b> E12. Geriatric evaluation	3  4
Wednesday	<b>Expert workshop</b> M13. Hypertension in FM	3
Thursday	<b>Workshop</b> M14. Diabetes mellitus in FM  <b>Practical exercises</b> E13. Geriatric evaluation	3  4
Friday	<b>Lecture with discussion</b> M15s. Uncomplicated urinary infections M16. The most common respiratory diseases	3
Week 4	Form of tuition and materials	The number of hours
Monday	<b>Lecture with discussion</b> M17. The most common of cardiovascular diseases <b>Practical exercises</b> E14. Uncomplicated urinary infections	3  4
Tuesday	<b>Lecture with discussion</b> M18. The most common malignant diseases	2

	Practical exercises E15. The specifics of health care of adolescents	4
Wednesday	M19. The specifics of the health care of <b>Colloquium 2 (Practical test)</b>	2
Thursday		2
Friday	<b>Partial Exam 2</b>	2
Week 17-20	<b>Final Exam</b>	

### Practical exercise: Family medicine

Level: <b>clinical</b>	Study year: <b>VI</b>	Semester: <b>XI</b>
Status: <b>obligatory</b>	Week: <b>15</b>	Total ours: <b>75</b>
Lecturers:	assistant professor Zaim Jatić, MD, PhD, assistant professor Amira Skopljak, MD, PhD, assistant Nataša Trifunović, MD, MSc, assistant Hasiba Erkočević, MD	
2. Teaching outcomes	<p><b>E1. Introduction to the team and the family medicine clinic</b></p> <p><b>Discussion</b></p> <ul style="list-style-type: none"> <li>- Introduction to the family medicine team and the role of doctors, nursing nurses, and nurses</li> <li>- Tour of the family medicine clinic and introduction to the norms of space and equipment</li> <li>- Getting acquainted with the organization of work in family medicine</li> <li>- Introducing students with basic medical documentation: health record and protocol of patients</li> </ul> <p><b>Learning or renewing skills</b></p> <ul style="list-style-type: none"> <li>- Focused history, writing recipes</li> </ul> <p>Symptom / syndrome</p> <ul style="list-style-type: none"> <li>- Pain in family medicine</li> </ul> <p><b>Work with regular patients</b></p> <ul style="list-style-type: none"> <li>- Writing of recipes, referrals, records in medical records according to the SOAP method of documentation (subjective, objective, assessment, and action (optional data entry into electronic health record))</li> </ul> <p><b>Work between exercises</b></p> <ul style="list-style-type: none"> <li>- Reading the WONCA Europe definitions of family medicine</li> <li>- Reading the Rules on the manner of prescribing and issuing drugs</li> <li>- - Reading the Decision on the list of medicines prescribed and issued at the expense of the funds of the Health Insurance Fund of Sarajevo Canton, as well as the manner of their prescribing and issuing</li> </ul> <p><b>E2. A holistic approach and a patient-centered healthcare</b></p> <p><b>Discussion</b></p> <ul style="list-style-type: none"> <li>- A holistic approach to family medicine and a patient-centered healthcare</li> </ul> <p><b>Learning or renewing skills</b></p> <ul style="list-style-type: none"> <li>- Writing referral letters to specialist consultations and referral for hospital treatment, special consideration in case of emergency - recording of vital parameters, therapy and time of arrival and transportation of the patient</li> <li>- Focused examination of the head and neck (especially emphasis on examination of the mouth and thyroid gland), use of otoscope and the optional use of ophthalmoscope (proper use of instruments)</li> </ul> <p><b>Symptom / syndrome</b></p> <ul style="list-style-type: none"> <li>- A headache - talking with a practitioner practicing on family medicine</li> </ul> <p><b>Work with regular patients:</b></p> <p>Skills: head exam, focused anamnesis, communication skills, hand washing, prescription recipes, referrals, medical records</p> <p><b>Work between exercises:</b></p> <ul style="list-style-type: none"> <li>- Propaedeutics - examination of the head and neck</li> <li>- Preparing tips for people with headaches</li> </ul> <p><b>E3. Organization and structure family medicine</b></p>	



### **Discussion**

- Standards for workspace, equipment, and standards of family medicine teams
- Sick leave: causes, sick leave report, referral to first-level medical committee
- Referral to pension commission

### **Learning or renewing skills**

- Renewal of skill: chest exam

### **Symptom / syndrome**

- Pain in the chest and dyspnea

### **Working with regular patients:**

Writing instructions for urine culture, copro culture, nose swabs, pharynx swabs, wound swabs, focussed anamnesis, communication skills, recipe writing, referrals, medical records (SOAP)

### **Work between exercises:**

- Propaedeutics - examination of the chest
- Emergency medicine: chest pain

## **E4. Home visit**

### **Discussion**

- Home visits: indications, planning, work in the patient's home, meeting with the family

### **Learning or renewing skills**

- Abdominal exam, blood pressure and pulse measurement, optional - im, sc, i.v. injections and infusions

### **Symptom / syndrome**

- Obstipation and diarrhoea

### **Work with regular patients:**

Observation IV injection and infusion (optional exercise), focused history, communication skills, recipe writing, referrals, medical record entry

### **Work between exercises:**

- Propaedeutics - measurement of blood pressure, examination of the abdomen, administration of parenteral therapy

## **E5. Communication in family medicine**

### **Discussion**

- The importance of communication in family medicine - techniques of verbal and non-verbal communication, role play
- Introduction to the specific epidemiology and structure of work in family medicine, the most common disease
- The disease registers in family medicine clinics

### **Learning or renewing skills**

- Referral to specialist consultations and hospital treatment

- Interpretation of ECG findings, optional electrode setting and ECG recording
- Cooperation with social workers

**Symptom / syndrome**

- Elevated temperature

**Work with regular patients:**

Skills: focused history, an exercise of verbal and non-verbal communication techniques, SOAP notes in medical records

**Work between exercises:**

- Reading the Appointment system patients in family medicine clinics
- Propaedeutics: febrile patient

**E6. Work with family and community**

**Discussion**

- Work with family
- Domestic violence - experience in practice

**Learning or renewing skills**

- Achieve a common understanding of the problems, diagnosis, and treatment

**Symptom / syndrome**

- Signs that indicate family violence

**Work with regular patients:**

Focused history, communication skills, writing recipes, referrals, medical records

**Work between exercises:**

- Propaedeutic - Exam of the spinal column
- Emergency Medicine : Cauda equine syndrome

**E7. Prevention in pharmaceuticals - counselling and immunization**

**Discussion**

- Prevention in family medicine: counselling on healthy diet and physical activity
- Immunization (influenza, antitetanus vaccine)
- Screening

**Learning or renewing skills**

- Renewal of skills: anthropometric measurements in the family medicine, calculation of the body mass index

**Symptom / syndrome**

- Metabolic syndrome, dyslipidemia, obesity

**Work with regular patients:**

Skill: calculating body mass index, focussed anamnesis, communication skills, recipe writing, referral, medical record notes

**Work between exercises:**

- Propaedeutics - anthropometric measurements
- Metabolic syndrome and its character
- 

**E8. Respiratory diseases in family medicine**

**Discussion**

- Infections of the respiratory tract
- COPD and asthma in family medicine
- Prevention in family medicine: prevention and treatment of smoking
- The importance of smoking in B&H

**Learning or renewing skills**

- use of peak flow meter, use of inhalers

**Symptom / syndrome**

- Cough and dyspnoea

**Work with regular patients:**

Focused history, chest exam, communication skills, prescription writing, referrals, medical record notes

**Work between exercises:**

- Renewal of propaedeutics - cough and dyspnoea
- Importance of smoking as a risk factor

**E9. Musculoskeletal problems in family medicine****Discussion**

- Musculoskeletal problems in family medicine
- Careful prescribing of NSAD drugs and side effects

**Learning or renewing skills**

- A spinal column exam
- Exam of shoulders, elbows, hands, hips, and knees

**Symptom / syndrome**

- Cervicobrachial and lumbosacral syndrome

**Work with regular patients:**

- Focused history, communication skills, recipe writing, referrals, medical records

**Work between exercises:**

- Propaedeutics - examination of the spinal column, examination of the shoulder, elbow, hand, hip, and knee
- Pain treatment

**E10. Health problems of elderly people in family medicine****Discussion**

- Health problems of elderly people
- Prevention of falling
- Polypragmasia in older people

**Learning or Renewing Skills**

- Geriatric assessment
- Balance test
- "Get up and go" test

**Symptom / syndrome**



- Dementia

**Work with regular patients:**

Focused history, communication skills, writing prescription, referrals, medical record notes

**Work between exercises:**

- Cognitive assessment
- Geriatric assessment

**E11. Hypertension in family medicine**

**Discussion**

- The importance of hypertension
- Treatment of hypertension in family medicine
- Treatment of a newly discovered hypertensive patient
- Referral to the internist and cardiologist

**Learning or renewing skills**

- Assessment of cardiovascular risk
- Use SCORE tables

**Symptom / syndrome**

- Vomiting (children and adults), dehydration assessment

**Work with regular patients:**

Focused history, communication skills, medical records notes, referral of the patient to consultations, prescription writing

**Work between exercises:**

- Propaedeutics - vomiting and dehydration
- European Guide to Evaluation of CV Risks - Systemic COronary Risk Evaluation (SCORE)

**E12. Urinary tract infections in family medicine**

**Discussion**

- Urinary tract infections in practice
- Diagnostic procedures

**Learning or renewing skills**

- Urine analysis - referral and interpretation of findings
- Urine culture - interpretation of findings

**Symptom / syndrome**

- Dysuria
- Renal colic
- Talk about sexual life with patients

**Work with regular patients:**

Focused history, communication skills, writing recipes, referrals, medical records

**Work between exercises:**

- Propaedeutics - dysuria, renal colic

### **E13. Malignant diseases in family medicine**

#### **Discussion**

1. Prevention in family medicine: prevention and early detection of the most common and most significant malignancies
2. Fundamentals and organization of palliative care
3. Use of a visual analog scale of pain

#### **Symptom / syndrome**

- Carcinoma pain
- Anorexia and cachexia

#### **Work with regular patients:**

Focused history, communication skills, writing prescription, referrals, medical record notes

#### **Work between exercises:**

- Propaedeutics - pain anamnesis (carcinoma pain)
- Palliative care

### **E14. The most common cardiovascular disease in family medicine**

#### **Discussion**

- The importance of coronary disease
- The importance of cardiac failure
- The importance of stroke and TIA

#### **Learning or renewing skills**

- ECG - interpretation of findings
- Monitoring of INR in anticoagulation therapy

#### **Symptom / syndrome**

- Localized neurological signs

#### **Work with regular patients:**

Focused history, communication skills, writing prescription, referrals, medical record notes, ECG analysis

#### **Work between exercises:**

- Propaedeutics - neurological examination and examination of arms and legs
- Emergency medicine - myocardial infarction and stroke

### **E15. Specificity of adolescent health care**

#### **Discussion**

- Problems with adolescents in practice
- The most common health problems of adolescents

	<ul style="list-style-type: none"> <li>- Systematic review of adolescents and preventive actives</li> <li>- Out of school</li> <li>- Addiction to adolescents - focus on smoking and alcoholism</li> </ul> <p><b>Learning or renewing skills</b></p> <ul style="list-style-type: none"> <li>- HEADSSS protocol for taking anamnesis</li> <li>- Confidentiality of data</li> <li>- Renewal of skills: counselling on the prevention of sexually transmitted diseases and HIV infections</li> </ul> <p><b>Symptom / syndrome</b></p> <ul style="list-style-type: none"> <li>- Depression in adolescents - screening</li> <li>- A drop in school</li> </ul> <p><b>Work with regular patients:</b></p> <p>Skill: a focused history, communication skills, writing recipes, referrals, medical records</p> <p><b>Work between exercises:</b></p> <ul style="list-style-type: none"> <li>- Propaedeutics - screening of depression</li> <li>- Sexually transmitted diseases (Chlamydia, Human papillomavirus, and Trichomonas vaginalis infection)</li> <li>- Depression in adolescents</li> </ul>
3.Literature	Teaching materials of Family medicine department



Code: <b>MFSE 1115</b>	Course title: <b>COMPLEX PATIENT</b>		
Level: <b>clinical</b>	Study year: VI	Semester: XI	ECTS: 1
Status: <b>elective</b>	Total contact hours: <b>20</b>		
Prerequisites:	<b>According to the Study regulation</b>		
Lecturers: associated professor Zaim Jatić MD, PhD, Assistant Nataša Trifunović, MD MSc, Assistant Hasiba Erkočević, MD			
1. Overall aims	The aims of the Complex Patient course are: 1. Introduce students to the definition and types of complex patients 2. Teach students to solve certain types of complex patients in a team collaboration, with other health care professionals 3. Improvement of the integration of knowledge and skills acquired during their studies at the Faculty of Medicine		
2. Course contents	The following topics will be covered in the Modules: <b>Module 1. Definition and types of complex patients</b> - Definition of a complex patient - Types of complex patients (medical and non-medical) <b>Module 2. Patients with multiple chronic illnesses</b> - An example of health care of complex patient suffering from diabetes, hypertension, dyslipidemia and obesity - Cooperation between the diabetic team to achieve the standard of diabetes mellitus <b>Module 3. Patients with socioeconomic problems</b> - Identifying complex patient with socioeconomic problems - Solving patient socioeconomic problems using the resources of the health system and the community <b>Module 4 Patients complex for cooperation</b> - Identifying disrupted cooperation between patient and doctor - The causes and forms of violent behavior patient - Principles of management of violent patients		
3. Learning outcomes	On successful completion of this course, students will be able to: 1. Knowledge - Know the definition and recognize certain types of complex patients - Know the principles of solving certain types of complex patients - Successfully integrate current knowledge and skills - Use the resources within the health care system and the community in order to solve problems of complex patients - Work in a team with other health professionals - Apply techniques for working with complex patients 2. Through the practical work students will acquire following skills: A. <b>The skills that a student needs to know to perform effectively (knows how and perform)</b> - The recognition of certain types of complex patients; - Team work with other doctors - Use the resources of the local community to help socioeconomic disadvantaged patients - Recognition of all forms of violence by patients - Using verbal techniques for defusing patients - Proper use of non-verbal communication - Search contextual explanation for the patient's emotions and behavior - Understand concept of disease and the patient's own experience of illness (feelings, ideas, functioning, expectations) B. The skills that the student needs to know (know how and when): - BATH supportive techniques		

	<p>- Analytical and organizational skills</p> <p>3. Upon completion of the course, students will adopt the following <b>attitudes</b>:</p> <p><b>Mutual trust</b> - building of mutual confidence with patients and other colleagues</p> <p><b>Caring</b> - caring and a wish to help the patient</p> <p><b>Empathy</b> - show empathy, recognition and understanding of the patient beliefs and emotion</p> <p><b>Respect</b> - expression of respect for the patients</p> <p><b>Collaboration</b> - the ability and wish to work in partnership with patients, colleagues and other people who can help the patient</p> <p><b>Flexibility</b> - the ability to think and make decisions in specific circumstances</p> <p><b>Realism</b> - the knowledge of their own capabilities and resources of the health system and community</p>																												
4. Teaching methods	<p>Lectures and discussion: 12 hours (4 hours presentation+8 hours discussion)</p> <p>Practical work on solving complex patient cases: 8 hours</p>																												
5. Method of knowledge assessment and examination	<p>Continuous assessment of the knowledge and skills will be carried out through partial exams and practical colloquium.</p> <p>Examination:</p> <ul style="list-style-type: none"> <li>- Practical work colloquium (3 parts/module's)</li> <li>- Partial exam (written test and oral) for the module's 1, 2, 3, and 4 consists of MCQ, SAQ, MEQ, EMQ and SAMP questions</li> </ul> <table border="1"> <thead> <tr> <th>Exam</th><th>Type of question</th><th>Topics</th><th>Max points</th></tr> </thead> <tbody> <tr> <td>Colloquium 1</td><td>SAMPQ</td><td>Module 1</td><td>10</td></tr> <tr> <td>Colloquium 2</td><td>SAMPQ</td><td>Module 2</td><td>10</td></tr> <tr> <td>Colloquium 3</td><td>SAMPQ</td><td>Module 3,4</td><td>10</td></tr> <tr> <td>Partial exam 1</td><td>MCQ, SAQ, MEQ, EMQ, SAMPQ, oral</td><td>Module 1, 2,</td><td>35</td></tr> <tr> <td>Partial exam 2</td><td>MCQ, SAQ, MEQ, EMQ, SAMPQ, oral</td><td>Module 3, 4</td><td>35</td></tr> <tr> <td colspan="3">Total</td><td>100</td></tr> </tbody> </table> <p>Students who have achieved more than a minimum number of required points (<math>\geq 55</math>) have not to take the final exam.</p> <p><b>Final exam:</b></p> <p>A student who has not achieved enough score in each of the forms of continuous assessment of the knowledge has to take the final exam. The types of questions are the same as those in the second partial exam. The maximal number of points in the final exam is 70.</p> <p>The pre-requisite for the final examination is a successfully fulfilled the practical part of the exam.</p> <p>In the case that practice exam is not passed, the student has first to pass the practice exam by getting a test from the practical part that corresponds to the exam that he did not pass during the continuous examination of the acquired skills.</p> <p>If he passes a complete practice exam, the acquired skills are evaluated through a test that matches the tasks of the first and second colloquia. The student must acquire at least 55% of the points in each test.</p> <p>The number of points earned is added to the other points in the final score.</p> <p><b>Creating a final grade</b></p> <p>The final grade is formed by the aggregation of the points of the applied practical and theoretical part that are translated into the scale rating:</p>	Exam	Type of question	Topics	Max points	Colloquium 1	SAMPQ	Module 1	10	Colloquium 2	SAMPQ	Module 2	10	Colloquium 3	SAMPQ	Module 3,4	10	Partial exam 1	MCQ, SAQ, MEQ, EMQ, SAMPQ, oral	Module 1, 2,	35	Partial exam 2	MCQ, SAQ, MEQ, EMQ, SAMPQ, oral	Module 3, 4	35	Total			100
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	<p>10 (A) - (outstanding success without mistakes or with minor mistakes), 95-100 points;</p> <p>9 (B) - (above average, with a few mistakes), 85-94 points;</p> <p>8 (C) - (average, with noticeable mistakes), 75-84 points;</p> <p>7 (D) - (generally good, but with significant disadvantages), 65-74 points;</p> <p>6 (E) - (meets the minimum criteria), 55-64 points;</p> <p>5 (F, FX) - (does not meet the minimum criteria), less than 55 points.</p> <p><b>Make-up exam:</b></p> <p>If the student has not satisfied with the continuous examination of the knowledge and the passing of the final exam, the approach to taking a correctional exam or taking the parts of the exam that has not previously been passed.</p> <p>A successfully fulfilled practice exam is a prerequisite for taking the theoretical part of the make-up exam. Placement and scoring is the same as the final exam.</p> <p>All passed parts of the exam are recognized until the end of the current academic year</p>
6. Literature	<ol style="list-style-type: none"> <li>1. Feldman, Mitchell D. Behavioral Medicine a Guide for Clinical Practice. 3rd Ed. New York: McGraw-Hill Medical, 2008. Ch 4. Difficult patient/Difficult situation, Ch 15 Vulnerable patient</li> <li>2. Standards of Medical Care in Diabetes--2014. Diabetes Care 2014;37(Suppl. 1):S14-S80 * Diagnosis and Classification of Diabetes Mellitus. Diabetes Care 2014;37(Suppl. 1):S81-S90</li> <li>3. The 2012 European Guidelines on CVD Prevention in Clinical Practice European Heart Journal (2012) 33, 1635–1701</li> <li>4. Dyslipidaemias (Management of) European Heart Journal (2011) 32, 1769–1818</li> <li>5. Peteet, J., Meyer, F., &amp; Miovic, M. Possibly Impossible Patients: Management of Difficult Behavior in Oncology Outpatients. Journal of Oncology Practice, Jul 2011; 7 (4): 242-246.</li> <li>6. Teaching materials of Family medicine department</li> </ol>
7. Remarks	<p>Attendance at lectures and practical work is compulsory. Students must have a maximum of 20% of absences from classes that must justify valid medical certificate. Lectures and exercises will be held according to the plan in proper amphitheater, Faculty of Medicine Sarajevo</p> <p>Consultations for students every working day with previous announcement of the secretaries of the Department of Family Medicine.</p>



## COURSE PLAN: COMPLEX PATIENT

<b>Week 15.</b>	<b>The form of teaching</b>	<b>Number of hours</b>
Tuesday	<b>Lecture with discussion</b> The M1. The definition of and types of complex patients	3
	<b>Practical exercises</b> V1. Discussion, solving cases from practice	2
Wednesday	<b>Lecture with discussion</b> M2. Patients with multiple chronic diseases Colloquium 1	3
	<b>Practical exercises</b> V2. Discussion, solving cases from practice	2
Thursday	<b>Lecture with discussion</b>	3
	M3. Patients with social problems	
	Colloquium 2	0,5
	Partial exam 2	0,5
Friday	<b>Practical exercises</b>	
	V3. Discussion, solving cases from practice	2
	<b>Lecture with discussion</b>	3
	M4. Patients are complex to the cooperation	
	<b>Practical exercises</b>	
	V4. Discussion, solving cases from practice	2
	Colloquium 2	0,5
	Partial exam 2	0,5
<b>Week 17./18.</b>	<b>Regular examination term</b>	
<b>Week 19.-20.</b>	<b>Remedial exam</b>	
	<b>September examination term</b>	

Code: <b>MFSE 0701</b>	Course title: <b>INTERNAL MEDICINE</b>		
Level: <b>clinical</b>	Study year: <b>IV</b>	Semester: <b>VII</b>	ECTS: <b>27</b>
Status: <b>obligatory</b>	Total contact hours: <b>400</b>		
Prerequisites	<b>According to the study regulations</b>		
Lecturers	<b>Professor Senija Rašić MD PhD, Professor Bakir Mehić MD PhD, Professor Šekib Sokolović MD PhD, Professor Alma Sofo-Hafizović MD PhD, Associate Professor Belma Paralija MD PhD, Associate Professor Amela Dizdarević-Bostandžić MD PhD, Associate Professor Damir Rebić MD PhD, Associate Professor Alen Džubur MD PhD, Assistant Professor Ismana Šurković MD PhD, Assistant Professor Lejla Ibričević-Balić MD PhD, Assistant Professor Amra Puhalo MD PhD, Senior ass. Nadža Zubčević MD PhD, Senior ass. Medžida Rustempašić MD PhD</b>		
1. Overall aim	The overall aim of the Internal Medicine Course is to learn etiology, pathogenesis, clinical presentation, diagnostic procedures and therapeutic modalities of internal medicine diseases.		
2. Course contents	<p>The following topics will be covered within the Modules:</p> <p><b>PULMOLOGY</b></p> <p><b>Module 1. Physiology of lungs in the function of clinical events</b> The aim of the module is to integrate knowledge from anatomy, physiology, pathophysiology and lung function to better understanding clinical events.</p> <p><b>Module 2. Diagnostic and therapeutic procedures in pulmonology</b> The goal of the Module is to introduce a student with diagnostic and therapeutic procedures from pulmonology, as well as with interpretation and analysis of chest X-ray, differential diagnosis, planning of further diagnosis. Case report with discussion.</p> <p><b>Module 3. Asthma, asthma division</b> Students will gain knowledge of bronchial asthma, allergic and non-allergic nature, hypersensitivity of the tracheobronchial system, diagnosis and treatment of asthma according to GINA guidelines.</p> <p><b>Module 4. Chronic Obstructive Pulmonary Disease (COPD), Acute Exacerbations of COPD</b> The aim of the module is to introduce students with COPD, exacerbations of COPD, divisions and management of HOPB according to GOLD guidelines. Case report with discussion.</p> <p><b>Module 5. Bronchiectations, cystic fibrosis (mucoviscidosis)</b> Through this module, students will learn about the origin and significance of bronchiectations, diagnosis and treatment, as well as basic knowledge about mucoviscidosis and its complications on the lungs.</p> <p><b>Module 6. Tumors of lungs and pleura</b> Within this module students will gain knowledge about lung carcinoma, divisions, symptomatology, the way of determining the stage of the disease, diagnosis and treatment. There will also be spoken about malignant pleural mesothelioma, symptomatology, diagnosis and therapy of malignant pleural mesothelioma.</p>		



**Module 7. Non-specific infections of the lower respiratory tract**

The aim of the module is to introduce a student with acute bronchitis, community acquired pneumonia - typical and atypical, intrahospital pneumonia, pneumonia in immunocompromised persons, abscess of the lung.

**Module 8. Tuberculosis**

The aim of the module is to introduce a student with latent tuberculous infection, tuberculosis disease, and complications (lymphogenic and hematogenic spread), way of diagnostics and by implementing a DOTS strategy for treatment of tuberculosis. Tuberculosis resistant forms and the National Program for the Prevention and Treatment of Tuberculosis will be considered.

**Module 9. Acute Respiratory Distress Adult Syndrome (ARDS), pleural inflammation (pleurisy), pneumothorax**

Students will be introduced with pathogenesis and pathophysiology, symptomatology, clinical picture, diagnosis and treatment of ARDS. In addition, the student should acquire knowledge of pathophysiology and diagnosis of pleurisy, pleural effusion. Differential diagnosis and principles for the treatment of pleural effusion, pneumothorax and tension pneumothorax will be considered.

**Module 10. Pulmonary arterial hypertension and chronic pulmonary heart disease**

Students will be introduced with etiology, classification, pathophysiology, methods of diagnosis and treatment of pulmonary arterial hypertension. Students should also be familiar with the etiology, pathophysiology of chronic pulmonary heart disease, diagnosis and treatment of chronic pulmonary heart disease.

**Module 11. Deep Venous Thrombosis (DVT) and Pulmonary Thromboembolic Disease (PTE)**

The module deals with the risk factors and pathophysiology of DVT, PTE and acute pulmonary heart. The clinical picture, diagnostic steps and PTE treatment principles will be considered. Within this module, students will be introduced with the methods of prevention, possible complications of DVT and PTE.

**Module 12. Acute and chronic respiratory insufficiency, oxygen therapy, mechanical ventilation of the lungs**

The module deals with elements of clinical picture and diagnostics of acute and chronic respiratory insufficiency, their division, way of diagnosis and treatment.

**Module 13. Sarcoidosis**

The aim of the module is to familiarize the student with the etiology of sarcoidosis, thoracic and out-thoracic manifestations of the disease, the way of diagnosis, evaluation of the disease activity and the ways of treatment.

**Module 14. Interstitial lung diseases, diffuse illnesses of pulmonary parenchyma**

Within this module, students need to acquire knowledge about idiopathic pulmonary fibrosis, idiopathic interstitial pneumonias, principles of



diagnosis, classification and treatment.

**Module 15. Lung disease caused by dust, toxic gases and vapors**

The module treats lung diseases caused by mineral dusts, organic dusts, (hypersensitivity pneumonitis) and lung damages caused by toxic fumes and gases.

**Module 16. Central sleep apnoea (CSA)**

Within this module, students will be familiar with the pathophysiology, clinical picture, and the diagnosis of CSA. Differential diagnosis of CSA and ways of treating CSA will be considered.

**CARDIOLOGY**

**Module 1. Diagnostic and therapeutic procedures in cardiology**

Students will gain knowledge about diagnostic and therapeutic procedures in cardiology.

**Module 2. Heart failure. Heart transplantation**

The goal of the Module is to introduce a student with a clinical picture of heart failure (acute and chronic left heart failure, right heart failure and global heart failure), differential diagnosis and therapeutic approach in the treatment of heart failure, including heart transplantation.

**Module 3. Coronary heart disease**

The goal of the Module is to introduce a student with acute coronary syndrome, symptoms, diagnosis, STEMI and NSTEMI infarction, pre-hospital and hospital protocol, medication and intervention therapy.

**Module 4. Heart rhythm disorders**

The goal of the Module is to introduce a student with various heart rhythm disorders, their clinical presentation and ECG characteristics, the method of treatment and electrostimulation.

**Module 5. Arterial hypertension**

The goal of the Module is to introduce a student with etiology, clinical division, clinical manifestations, diagnostic and therapeutic procedures in the treatment of hypertension and hypertensive crisis.

**Module 6. Heart defects**

The goal of the Module is to introduce a student with etiopathogenesis, clinical picture and treatment of the most common congenital heart disease and acquired valvular heart defects.

**Module 7. Diseases of the endocardium, myocardium and pericardium**

The goal of the Module is to introduce a student with a clinical picture and treatment of cardiac valve diseases and subvalvular part of the heart caused by the microbes, as well as diseases of the endocarditis of the heart cavities. Within the Module, a student will be introduced with clinical manifestations of pericardial disease, diagnosis, therapy, complications, heart tamponade, intervention in tamponade.

**Module 8. Rheumatic fever. Secondary heart diseases**

The goal of the Module is to introduce a student with etiopathogenesis, clinical picture and rational treatment of inflammatory heart disease, associated with the infection of virulent types of streptococcus, and to introduce a student with a heterogeneous group of myocardial diseases of different etiologies.

#### **Module 9. Urgent conditions in cardiology**

The goal of the Module is to introduce a student with malignant heart rhythm disorders, syncope, cardiogenic shock, heart failure and basic principles of cardiopulmonary resuscitation.

### **ANGIOLOGY**

#### **Module 1. Etiopathogenesis of atherosclerotic disease**

The goal of the Module is to introduce a student with disorders of the arterial vessel endothelial function, a disorder of metabolism of nitric oxide, cholesterol, HDL cholesterol, platelet aggregation and adherence of leukocytes, respectively, in the events leading to atherosclerosis of the blood vessel, and diagnostic measures and therapy to be undertaken.

#### **Module 2. Atherosclerotic disease**

The aim of the module is to introduce students to the incidence, prevalence, morbidity and mortality from atherosclerotic disease, and the impact of multiple risk factors for atherosclerosis, summarizing risk factors, scoring systems prediction of fatal outcome - HeartScore, Framingham Score, New Pooled Cohort Score, as well as the importance of reduction a rapid risk factor on the overall reduction of morbidity and mortality.

#### **Module 3. Diabetic angiopathy**

The goal of the Module is to introduce a student with etiopathogenesis of diabetic angiopathy, sugar metabolism disorders and correlation with hemoglobin A1c, nitric oxide, LDL cholesterol, and the influence of these factors on the development of diabetic angiopathy, disease grading, diagnosis and therapy of diabetic angiopathy.

#### **Module 4. Inflammatory arteries disease. Chronic venous insufficiency**

The aim of the Module is to introduce a student with etiopathogenesis of arterial blood vessel diseases, Morbus Buerger, Morbus Takayasu, Morbus Raynaud, the effect of risk factors on the development of endarteritis, a combination of inflammatory processes on the arteries and associated veins, clinical picture, diagnostic methods, differential diagnosis and therapy. Within of this Module, a student will be introduce with the etiology and pathophysiology of venous insufficiency, CEAP classification, clinical picture, laboratory diagnostics, functional tests, color Doppler diagnostics, CT diagnostics, as well as medical and compressive treatment of chronic venous insufficiency, and treatment of venous ulcers with a hyperbaric chamber.

#### **Module 5. Venous thromboembolism**

The goal of the Module is to introduce a student with etiological causes of deep vein thrombosis, symptoms and signs, clinical picture, physical



examination, risc score, Wells and Geneva score, continuous and color Doppler examination, principles, type and monitoring of anticoagulant therapy, antithrombotic therapy, bleeding in anticoagulant therapy, the prevention of deep vein thrombosis and embolism.

## **GASTROENTEROLOGY AND HEPATOLOGY**

### **Module 1. Diagnostic and therapeutic procedures in gastroenterology**

The goal of the Module is to introduce a student with diagnostic procedures for gastroenterological and hepatologic patients, with the basic therapeutic principles of treating these patients.

### **Module 2. Diseases of esophagus, stomach and duodenum**

The goal of the Module is to introduce a student with the most common disorders of esophagus, stomach and duodenum, and the importance of infection with *Helicobacter pylori*.

### **Module 3. Diseases of the small and large intestine. Inflammatory bowel diseases**

The aim of the module is to introduce students with the most common diseases of the small and large intestine, as well as with inflammatory bowel diseases, their etiopathogenesis, clinical picture, diagnosis, differential diagnosis and therapy.

### **Module 4. Hepatobiliary diseases. Liver transplantation**

The goal of the Module is to introduce a student with the most common liver and biliary system diseases, liver cirrhosis, autoimmune diseases of the liver, liver transplantation and liver disease during pregnancy.

### **Module 5. Pancreatic diseases. Pancreatic transplantation**

This module will evaluate acute and chronic pancreatitis. A student will be informed about basic principles of pancreatic transplantation.

### **Module 6. Premalignant lesions, benign and malignant tumors of the digestive organs. Interventional gastroenterology**

The aim of the module is to familiarize students with precancerous lesions in gastroenterology and cancers of the digestive organs, diagnosis and therapy. In this module, the student will be introduced to the possibilities of gastrointestinal endoscopy and intervention procedures.

### **Module 7. Urgent conditions in gastroenterology**

The goal of the Module is to introduce a student with emergency conditions in gastroenterology.

## **ENDOCRINOLOGY**

### **Module 1. Diabetes. Metabolic disorders, obesity and malnutrition**

The goal of the module is to introduce a student with definition and classification, etiology, pathogenesis, clinical picture and diagnosis and treatment of diabetes, insulin resistance, pre-diabetes and metabolic syndrome, as well as obesity, malnutrition diseases, fat metabolism disorders and atherosclerosis.

### **Module 2. Pituitary and hypothalamus diseases**



The goal of the Module is to introduce a student with clinical picture, diagnosis and treatment of pituitary and hypothalamic diseases (functional and non-functional tumors, inflammation, hypopituitarism, diabetes insipidus, maintenance of osmolarity of body fluids).

### **Module 3. Thyroid and parathyroid gland diseases**

The goal of Module is to learn the function and regulation of thyroid function tests, thyroid diseases (hyper- and hypofunction), thyroiditis, thyroid cancer, and thyroid diseases in pregnancy. Within this Module, the student will be familiar with primary and secondary hyperparathyroidism, hypoparathyroidism, and pseudohypoparathyroidism.

### **Module 4. Adrenal glands diseases. Gonadal diseases**

The goal of the Module is to introduce a student with hyper and hypoaldosteronism, Cushing's syndrome, adrenal insufficiency, pheochromocytoma and adrenal gland hyperplasia. The student will also be familiar with the action of gonadotropin and steroid hormones, hormone-active ovarian tumors, polycystic ovaries, premature puberty, reproductive disorders, gonadal disorders, disrupted menstrual cycles and ovulation, menopause, and male hypogonadism, testicular dysfunction, impotence, male infertility, gynecomastia, testicular tumors.

### **Module 5. Paraneoplastic endocrine syndromes**

The goal of the Module is to introduce a student with paraneoplastic hormone secretion, hypoglycemia, hyperreninism, erythrocytosis, paraneoplastic secretion of peptides not related to endocrine syndrome, neuroendocrine tumors, treatment of advanced breast tumors and prostatic carcinoma, consequences of the treatment of malignant diseases on the endocrine system.

### **Module 6. Emergencies in endocrinology**

The goal of the Module is to introduce a student with emergency conditions in the endocrinology (diabetes ketoacidosis and coma, hyperosmolar hyperglycemic coma, hypoglycemic coma, severe hyponatraemia, acute hypocalcaemia, Addison's cerebral pheochromocytoma crisis, thyrotoxic crisis, chimeric coma, diabetes insipidus).

## **NEPHROLOGY**

### **Module 1. Diagnostic and therapeutic procedures in nephrology**

The goal of the Module is to introduce the student with diagnostic and therapeutic procedures in nephrology.

### **Module 2. Disorders of metabolism of body water, electrolytes and acido-base status**

The goal of the Module is to familiarize the student with maintenance of homeostasis of water, electrolyte and acid-base balance, and correction of their disorders. Within this Module, the student will be familiar with the etiological classification, pathogenetic mechanisms, clinical manifestations, diagnosis and therapy of tubulointerstitial nephropathies.

### **Module 3. Infections and other urinary system diseases**

The goal of the Module is to introduce the student with etiopathogenetic

aspects, clinical picture, diagnosis and treatment of urinary infections, with pathogenesis, evaluation and treatment of kidney and urinary system stones.

#### **Module 4. Tubulointerstitial nephropathy**

Within this Module, the student will be familiar with the etiological classification, pathogenetic mechanisms, clinical manifestations, diagnosis and therapy of tubulointerstitial nephropathies.

#### **Module 5. Glomerulopathies**

The goal of the Module is to introduce the student with the causes and immunopathological classification of glomerulopathies, their symptomatology, diagnostics and principles of treatment.

#### **Module 6. Diabetic nephropathy**

Within this Module, the student will be familiar with diabetic nephropathy as the most common cause of end-stage renal disease, factors involved in the pathogenesis of this glomerulopathy and mechanisms of glomerular injury, as well as renal pathomorphological changes, clinical picture, diagnostic and therapy.

#### **Module 7. Vascular diseases of the kidneys**

The goal of the Module is to introduce a student with the definition and etiopathogenetic division of vascular kidney lesions, type of vascular damage, their clinical presentation, diagnosis, differential diagnosis and therapy.

#### **Module 8. Acute and chronic renal insufficiency**

The goal of the Module is to introduce the student with the etiology and pathophysiology, clinical picture, diagnostic methods and principles for the treatment of acute kidney injury.

#### **Module 9. Chronic renal disease. End stage renal disease**

The goal of the Module is to introduce the student with the etiology and pathophysiology, clinical picture, diagnostic methods and principles for the treatment of chronic renal failure, clinical features of uremic syndrome, methods of active treatment (hemodialysis, peritoneal dialysis and kidney transplantation).

### **HEMATOLOGY**

#### **Module 1. Diagnostic and therapeutic procedures in hematology**

The aim of Module is to introduce student with diagnostic and therapeutic procedures in hematology.

#### **Module 2. Hematopoietic stem cell diseases**

The goal of the Module is to introduce students with epidemiology, etiology, clinical picture, diagnosis and treatment of myelodysplasia, myelodysplasia and myeloproliferation.

#### **Module 3. Erythropoietic diseases and syndromes**

Within this Module, the student will be familiar with the etiology, clinical picture, diagnosis and treatment of anemia and anemia syndrome.



	<p><b>Module 4. Lymphoproliferative diseases</b> The goal of the Module is to introduce students with epidemiology, etiology, clinical picture, diagnosis and treatment of lymphoproliferative disorders. New diagnostic and therapeutic algorithms.</p> <p><b>Module 5. Platelet and coagulation diseases</b> The goal of the Module is to introduce students with etiopathogenesis, clinical picture, diagnosis and treatment of thrombocyte and coagulation diseases.</p> <p><b>Module 6. Transfusion medicine</b> The goal of the Module is to introduce students to the determination of blood groups, their clinical significance, and the treatment of blood products.</p> <p><b>Module 7. Hematopoietic stem cells transplantation</b> The goal of the Module is to introduce to hematopoietic stem cell transplantation as the most modern hematologic treatment methods.</p> <p><b>RHEUMATOLOGY</b></p> <p><b>Module 1. Autoimmune diseases</b> The goal of the module is to introduce a student with inflammatory rheumatic diseases of the autoimmune genesis, clinical picture, diagnostic criteria and therapy (rheumatoid arthritis, systemic lupus erythematosus, antiphospholipid syndrome, dermatomyositis, polyomyositis, scleroderma, vasculitis, M. Behcet, Stel's disease).</p> <p><b>Module 2. Degenerative rheumatic diseases</b> The goal of the Module is to introduce a student with degenerative rheumatic diseases, etiopathogenesis, clinical picture, diagnostic criteria and therapy (arthrosis, spondylosis).</p> <p><b>Module 3. Metabolic bone diseases and infectious arthritis. Osteoarthritis and spondilopathies</b> The aim of the module is to introduce a student with metabolic rheumatic diseases, their etiopathogenesis, clinical picture, diagnostic criteria and therapy (severe arthritis, bacterial septic arthritis, acute rheumatic fever) with spondyloarthropathies, etiopathogenesis, clinical picture, diagnostic criteria and therapy (reactive arthritis, morbus Reiter, spondylitis ankylosans, psoriatic arthritis, enteropathic arthritis), and with etiopathogenesis, clinical picture, diagnostic criteria and treatment of soft structures diseases (fibromyalgia, tendinitis, enthesitis, burzitis).</p>
3. Learning outcomes (knowledge, skills and competences)	<p>Students will acquire knowledge necessary to understand etiology, pathogenesis, clinical symptoms and signs, diagnostic procedures and therapeutic modalities of various internal medicine diseases. The aim in the learning process is to develop problem oriented type of learning and skills from the field of internal medicine and to integrate broad spectrum from different fields of preclinical and clinical medicine.</p> <p>Through the lectures the students will gain following knowledge and competences in every of the above mentioned disciplines:</p>



- Understand internal disease pathways, i.e. etiology and pathogenesis.
- Understand, know and recognize clinical symptoms and signs.
- Know indications and protocols for therapeutic procedures.
- Know the treatment modalities and treatment complications.

Through the practical part in internal medicine the students will acquire following skills and be able to independently perform:

- History taking
- Physical examination and diagnosis setting
- Formulation of complete differential diagnosis
- Decision-making for initial evaluation and management
- Presentation of findings and articulation of prioritized plan
- Ordering and interpretation of appropriate tests to evaluate different organ system function and pathology
- Assessment of need for hospital admission or emergency department referral in the outpatient setting
- Comprehensive medical care of hospitalized patients
- Assessment of the need for referral to specialist for evaluation and management
- Assessment of need for continued hospitalization of inpatients and transition to outpatient care
- Identification of vital parameters
- Oxygen therapy
- Basic life support
- Placement of nasogastric/nasoenteral tube
- Fingerstick blood glucose determination
- Arterial puncture for blood gas analysis
- Arterial blood gas analysis
- Urinary bladder catheterization
- Rectal showers
- Arterial line placement for hemodynamic monitoring
- ECG registration and interpretation
- Interpretation of chest/abdominal X-ray
- Advanced cardiac life support
- Abdominal paracentesis for ascites fluid analysis
- Therapeutic abdominal paracentesis for symptom relief

Through the practical part at different clinics the students will be familiar with the indications and interpretation of the results:

#### PULMOLOGY

- Sputum sampling
- Spirometry
- Bronchoscopy with BAL
- Bronchoscopy with transbronchial biopsy
- Transthoracic US-guided parenchymal needle biopsy

#### CARDIOLOGY

- ECG
- Holter monitoring
- Cardioversion and defibrillation
- Cardiac pacing, temporary
- Cardiac catheterization

- Coronary angiography and ventriculography
- Percutaneous coronary intervention
- Intraaortic balloon pump insertion and management
- Coronary stent placement
- Angioplasty

#### ANGIOLOGY

- Ankle-brachial index
- Vascular function test
- Color –Doppler

#### GASTROENTEROLOGY AND HEPATOLOGY

- Upper GI endoscopy
- Colonoscopy
- Enteroscopy
- Endoscopic biopsy of GI tract
- ERCP with/without biliary stent placement
- Upper endoscopy with banding of esophageal varices
- Transcutaneous liver biopsy

#### ENDOCRINOLOGY

- Plasma growth hormone, IGF-1, ACTH, testosterone (total and free), gonadotropin (LH and FSH) prolactin, aldosterone, C-peptide, anti-thyroglobulin, thyroid antibodies, renin activity measurement
- Serum thyroid hormones t measurement
- Urinary metanephrine, vanillylmandelic acid, catecholamines, 24 hour urine free cortisol measurement
- ACTH- stimulation test
- OGTT
- Dexamethasone suppression test

#### NEPHROLOGY

- Vascular catheter placement (jugular approach) for urgent hemodialysis
- Renal biopsy
- Hemodialysis
- Plasmapheresis
- Peritoneal dialysis

#### HEMATOLOGY

- Peripheral blood smear examination
- Manual differential count
- Bone marrow aspirate and biopsy
- Leukapheresis
- Lymph node FNA versus excisional biopsy
- HLA typization
- Cross matching tests
- Stem cell differentiation and preparation for allogenic transplantation
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#### REUMATHOLOGY

- Arthroscopy
- Microscopic examination for crystals

	<ul style="list-style-type: none"> <li>- Intra - articular injection of corticosteroid</li> <li>- Bursa injection</li> <li>- Trigger point injection</li> </ul>
4. Teaching methods	<p><b>Total hours:</b>  Lectures: 200 hours  Practical work: 200 hours</p> <p><b>Pulmology</b>  Lectures: 36 hours  Practical work: 36 hours</p> <p><b>Cardiology</b>  Lectures: 38 hours  Practical work: 38 hours</p> <p><b>Angiology</b>  Lectures: 20 hours  Practical work: 20 hours</p> <p><b>Gastroenterology and hepatobilliary diseases</b>  Lectures: 32 hours  Practical work: 32 hours</p> <p><b>Endocrinology</b>  Lectures: 32 hours  Practical work: 32 hours</p> <p><b>Nephrology</b>  Lectures: 20 hours  Practical work: 20 hours</p> <p><b>Hematology</b>  Lectures: 20 hours  Practical work: 20 hours</p> <p><b>Rheumatology</b>  Lectures: 10 hours  Practical work: 10 hours</p> <p><b>Block 1.</b> Cardiology, Angiology, Gastroenterology and hepatobilliary diseases  <b>Block 2.</b> Pulmology  <b>Block 3.</b> Nephrology, Hematology, Endocrinology, Rheumatology</p>



<p>5. Method of knowledge assessment and examination</p>	<p>- Continuous knowledge and skills assessment will be carried out through Partial exam from Pulmology and three (3) Practical exams after each block teaching.</p> <p><b>Partial exam from Pulmology</b> contains a total of 20 MCQ questions, each correct answer brings 0.5 points. A minimum of 5.5 points, a maximum of 10 points shall be deemed to be passed the student's examination.</p> <p><b>Practical exam 1:</b> Testing practical knowledge and skills from Pulmology over the issues defined in the check lists. Practical exam 1 will be considered passed if the student wins at least 2.5 points, a maximum of 5 points.</p> <p><b>Practical exam 2:</b> Testing practical knowledge and skills from Cardiology, Angiology, Gastroenterology and hepatobiliary diseases over the issues defined in the check lists (3 check lists). Practical exam 2 will be considered passed if the student wins at least 2.5 points, a maximum of 5 points on each check list (a total of at least 8 points, and maximum 15 points).</p> <p><b>Practical exam 3:</b> Testing practical knowledge and skills from Endocrinology, Nephrology, Hematology and Rheumatology over the issues defined in the check lists (4 check lists). Practical exam 3 will be considered passed if the student wins at least 2.5 points, a maximum of 5 points on each check list (a total of at least 11 points, and maximum 20 points).</p> <p>To access the final exam, the student must have successfully completed Practical exam 1, Practical exam 2 and Practical exam 3. If the student has not passed the Partial exam from Pulmology, that part of the exam must be laid in writing before the final exam.</p> <p><b>Final exam</b></p> <p>Final exam is oral examination of knowledge based on 9 selected exam questions printed on the test card:</p> <ul style="list-style-type: none"> <li>- from the subject area of Cardiology 2 questions</li> <li>- from the subject area Angiologija 1 question</li> <li>- from the subject area Gastroenterology and Hepatology 2 questions</li> <li>- from the subject area Endocrinology 2 questions</li> <li>- from the subject area Nefrology 1 question</li> <li>- from the subject area Hematology 1 question</li> <li>- from the subject area of Reumatology 1 question.</li> </ul> <p>Each answer to the question is scored with a maximum of 5 points. The maximum number of points that the student can obtain at Final exam is 50 points. The student must gain on Final exam at least 28 points to be considered passed the exam.</p> <p>The number of points won through all forms of knowledge testing is translated into the final grade.</p>
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Partial exam from Pulmology: min. 5,5 points max. 10 points  
 Practical exam 1. min. 2,5 points max. 5 points  
 Practical exam 2. min. 8 points max. 15 points  
 Practical exam 3. min. 11 points max. 20 points  
 Final oral examination min. 28 points max. 50 points.

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min. 55 points max. 100 points

#### **Repeated exam and Remedial exam**

Repeated and Remedial exam are conducted according to the previously defined criteria of the Final examination. To access the repeated exam or corrective exam, the student must have successfully completed Practical exam 1, Practical exam 2 and Practical exam 3. If the student has not passed the Partial exam from Pulmology, that part of the exam takes access to an oral final exam.

#### **Forming a final grade**

The total number of points won on all forms of knowledge testing is translated into the final grade as follows:

Rating	Number of points	Description Rating
10 (A)	95-100	remarkable success without mistakes or with minor errors
9 (B)	85-94	above average, with some mistakes
8 (C)	75-84	average, with subtle errors
7 (D)	65-74	generally good, but with significant shortcomings
6 (E)	55- 64	meets the minimum criteria
5 (F,FX)	< 55	does not meet the minimum criteria

6. Literature	<p><b>Recommended:</b></p> <ol style="list-style-type: none"> <li>1. Jameson J, Fauci AS, Kasper DL., Hauser SL, Longo DL, Loscalzo J. Harrison's Principles of Internal Medicine, 20th edition. The McGraw-Hill; 2020.</li> <li>2. Klippel JH, Dieppe PA. Rheumatology, 6th edition. Mosby International; 2014.</li> <li>3. Bonow R (ed). Braunswald's Heart Disease: A Textbook of Cardiovascular Medicine. Philadelphia: Saunders; 2011.</li> <li>4. Rajagopulan S, Dean SM, Mohler ER, Mukhetjee (eds). Manual of Vascular Disease. Philadelphia: Lippincott Williams &amp; Wilkins; 2012.</li> <li>5. Avunduk C. Manual of Gastroenterology: Diagnosis and Therapy. Philadelphia: Lippincott Williams &amp; Wilkins; 2008.</li> </ol> <p><b>Additional</b> (for students with knowledge of Bosnian language):</p> <ol style="list-style-type: none"> <li>1. Rašić S. (ed). Klinička nefrologija. Sarajevo: Medicinski fakulteta UNSA; 2020.</li> <li>2. Mehić B. (ed). Pulmologija. Sarajevo: Respiratorno udruženje u Bosni i Hercegovini; 2016.</li> <li>3. Kes P. (ed). Akutno oštećenje bubrega. Zagreb: Medicinska naklada; 2018.</li> <li>4. Rašić S, Unčanin S. Peritonealna dijaliza. Sarajevo: Medicinski fakultet UNSA; 2011.</li> <li>5. Dilić M. Klinička angiologija: dijagnostika i terapija oboljenja krvnih sudova. Sarajevo: Medicinski fakultet UNSA; 2011.</li> <li>6. Mesihović R. i sar. Gastrointestinalna endoskopija. Sarajevo: SaVart; 2009.</li> </ol>
7. Remark	<p>The exercises can be accessed only by students holding a valid sanitary card.</p> <p>Consultation period for students is any working day pre-reserved with the stuff.</p>



### IMPLEMENTING PLAN OF SUBJECT: INTERNAL MEDICINE

Week	Form of teaching	Number of hours
Week 1.	<b>Lecture:</b> Pulmology	15
	<b>Exercises:</b> Exercise by departments to the advertised schedule.	15
Week 2.	<b>Lecture:</b> Pulmology	15
	<b>Exercises:</b> Exercise by departments to the advertised schedule.	15
Week 3.	<b>Lecture:</b> Pulmology	3
	<b>Exercises:</b> Exercise by departments to the advertised schedule.	3
	<b>Partial exam 1</b>	3
	<b>Practical exam 1</b>	3
	<b>Lecture:</b> Cardiology	9
	<b>Exercises:</b> Exercise by departments to the advertised schedule.	9
Week 4.	<b>Lecture:</b> Cardiology	15
	<b>Exercises:</b> Exercise by departments to the advertised schedule.	15
Week 5.	<b>Lecture:</b> Cardiology	12
	<b>Exercises:</b> Exercise by departments to the advertised schedule.	12
	<b>Lecture:</b> Angiology	3
	<b>Exercises:</b> Exercise by departments to the advertised schedule.	3
Week 6.	<b>Predavanje:</b> Angiology	15
	<b>Predavanje:</b> Vježbe po odjelima prema oglašenom rasporedu.	15
Week 7.	<b>Lecture:</b> Gastroenterology and hepatobilliary diseases	15
	<b>Exercises:</b> Exercise by departments to the advertised schedule.	15
Week 8.	<b>Lecture:</b> Gastroenterology and hepatobilliary diseases	15
	<b>Exercises:</b> Exercise by departments to the advertised schedule.	15
Week 9.	<b>Lecture:</b> Gastroenterology and hepatobilliary diseases	2
	<b>Practical exam 2</b>	4
	<b>Lecture:</b> Rheumatology	9
	<b>Exercises:</b> Exercise by departments to the advertised schedule.	9

	<b>Lecture:</b> Hematology	3
	<b>Exercises:</b> Exercise by departments to the advertised schedule.	3
Week 10.	<b>Lecture:</b> Hematology	15
	<b>Exercises:</b> Exercise by departments to the advertised schedule.	15
Week 11.	<b>Lecture:</b> Nephrology	16
	<b>Exercises:</b> Exercise by departments to the advertised schedule.	14
Week 12.	<b>Lecture:</b> Nephrology	4
	<b>Exercises:</b> Exercise by departments to the advertised schedule.	6
	<b>Lecture:</b> Endocrinology	9
	<b>Exercises:</b> Exercise by departments to the advertised schedule.	9
Week 13.	<b>Lecture:</b> Endocrinology	15
	<b>Exercises:</b> Exercise by departments to the advertised schedule.	12
	<b>Practical exam 3</b>	3
Week 14.	<b>Lecture:</b> Nuclear medicine	15
	<b>Exercises:</b> Exercise by departments to the advertised schedule.	15
Week 15.	<b>Lecture:</b> Elective course	9
	<b>Exercises:</b> Exercise by departments to the advertised schedule.	8
	<b>Partial exam</b>	1
	<b>Practical exam</b>	2
Week 16.	<b>Final exam</b>	
Week 17.-20.	<b>Repeated exam and Remedial exam</b>	

## PLAN AND PROGRAM OF TEACHING IN THE SUBJECT *INTERNAL MEDICINE*

### PLAN: CARDIOLOGY

1th week	The form of teaching	Number of hours
Monday	<p><b>Lecture:</b> Examination methods in cardiology. Contemporary diagnostic and curative methods in cardiology.</p> <p><b>Practical exercises on Clinic:</b>            Taking general and specific cardiac anamnesis. Physical examination of the cardiac patient. Clinical presentation of patients with various cardiac clinical imaging (AMI, AP, right, left and globally heart failure, heart rhythm disorders, valvular acquired and congenital heart defects).            Techniques of examination of the cardiac patient (skin and visible mucous inspection, examination by systems, especially palpation, percussion and auscultation of precordium, examination of the liver and extremities). Non-invasive and invasive cardiological diagnostic procedures, laboratory analyzes. Selection of specific diagnostic methods in relation to the clinical picture of the patient (laboratory findings, RTG heart and lung, ECG, echocardiography, 24h Holter, test load, nuclear cardiology, catheterization of the heart, radiological examination in cardiology).</p>	<p>3</p> <p>3</p>
Tuesday	<p><b>Lecture:</b> Heart failure.</p> <p><b>Practical exercises on Clinic:</b>            Specificity of the anamnesis and clinical examination of the cardiac patient in heart failure. Clinical manifestations of right-sided, left ventricular and global heart failure, ECG, Echocardiographic and radiological methods of heart failure diagnostics. Taking and analyzing specific laboratory findings for heart failure. Differential diagnosis and treatment of individual forms of heart failure. Showing patients with heart failure with specific medical history and physical examination. Clinical manifestations of the disease, diagnosis and treatment.</p>	<p>3</p> <p>3</p>
Wednesday	<p><b>Lecture:</b> Heart defects. Myocardial diseases.</p> <p><b>Practical exercises on Clinic:</b>            The history and the specificity of physical examination of patients with congenital and acquired heart defects. Heart tone and noise in specific valvular changes. X-ray and ECG changes. Specificity of other cardiological and radiological modalities in the diagnosis and therapy of inborn and acquired valvular heart defects. Therapeutic noninvasive and invasive cardiological - cardiovascular treatments.</p>	<p>3</p> <p>3</p>
Thursday	<p><b>Lecture:</b> Infectious endocarditis. (Microbial endocarditis, myocarditis and pericarditis. Introduction to etiopathogenesis, diagnosis and treatment of microbial changes in different cardiac structures.)</p> <p><b>Practical exercises on Clinic:</b>            Taking anamnesis and specific physical examination of patients with microbial endocarditis, myocarditis and pericarditis.            The importance of complications in certain manifestations of microbial cardiac changes. Heart tones and noises in these states. RTG and ECG changes.</p>	<p>3</p> <p>3</p>



	Specificity of other cardiological and radiological modalities in the diagnosis and therapy of microbial endocarditis, myocarditis and pericarditis. Heart tamponade. Therapeutic noninvasive and invasive cardiological - cardiovascular treatments.	
Friday	<p><b>Lecture:</b> Rheumatic fever.</p> <p><b>Practical exercises on Clinic:</b>  Access and specific problems related to a rheumatic fever patient. Methods of recognition, rapid detection, and definitive diagnosis of patients with rheumatic fever. Diagnostic modalities. Laboratory searches. Specificity of radiological and echocardiographic methods for the detection of complications and rheumatic sequelae.  Selection of specific diagnostic methods in relation to the clinical picture of the patient (laboratory findings, heart and lung X-ray, echocardiography, 24hours Holter, load test, nuclear cardiology, catheterization of the heart).</p>	<p>3</p> <p>3</p>
2nd week	The form of teaching	Number of hours
Monday	<p><b>Lecture:</b> Arterial hypertension.</p> <p><b>Practical exercises on Clinic:</b>  Access and special features of anamnestic and physical treatment of patients with arterial hypertension. Methods of measuring blood pressure. Features of correct blood pressure measurement. Diagnostic and laboratory methods in the detection of the degree of hypertension and its complications. Treatments of arterial hypertension, hypertensive crisis and hypertensive encephalopathy.</p>	<p>3</p> <p>3</p>
Tuesday	<p><b>Lecture:</b> Ischemic heart disease. Acute coronary syndrome.</p> <p><b>Practical exercises on Clinic:</b>  Access and specific problems in patients with ACS. The importance of time in the treatment of ACS patients. Methods of recognition, rapid detection, transport and efficient and timely ACS therapy.  The specificity of the anamnesis, clinical examination and diagnostic tools in ACS patients. Understanding the principles and methods of invasive treatment of ACS. View patients with ACS with specific medical history and physical examination. Special features of clinical manifestations of the disease, diagnosis and treatment.</p>	<p>3</p> <p>3</p>
Wednesday	<p><b>Lecture:</b> Heart rhythm disorders. Clinical and ECG presentations, methods of diagnosis and treatment. Electro-stimulation.</p> <p><b>Practical exercises on Clinic:</b>  Presentation and treat patients with various heart rhythm disorders. The importance of timely interruption of rhythm disorders and the relationship between rhythm disorders and patient's life threatening. Dangers in VF, VT, EMD and asystoli. Necessary diagnostic tools for prompt detection of heart rhythm disorders (VF, VT, AV blocks, EMD, Asistolia). The importance of the provisional placement of the artificial heart rhythm and ICD guide. Apply active treatment to these conditions. Cardiopulmonary resuscitation measures.</p>	<p>3</p> <p>3</p>
Thursday	<p><b>Lecture:</b> Urgent conditions in cardiology. Malignant heart rhythm disorders, cardiac arrest, electromechanical dissociation. Cardiopulmonary resuscitation.</p> <p><b>Practical exercises on Clinic:</b>  Access to an endangered patient. Details in the reanimation procedure, modes of</p>	3





	arteriography by Seldinger, CT arteriography, or MR arteriography. Choice and method of treatment of angiologic patients.	
Thursday	<p><b>Lecture:</b> Atherosclerotic disease of arteries. Polyvascular atherosclerotic disease.</p> <p><b>Practical exercises on Clinic:</b> Treatment of patients with polyvascular disease, taking anamnesis and physical examination. Laboratory searches. Analysis of platelets, lipidograms, fibrinogen, glycemia, HbA1c, proteinograms, enzymatic status, a caulogram. Clinical characteristics of diseases of certain vascular systems and gradations of diseases, gradation of multisegmental occlusive disease. Possibilities of Color Doppler diagnostics, and angiographic search. Principles of medication, vasodilators, antiagregants. Principles and indications for intervention treatment. Performing diagnostics.</p>	<p>3</p> <p>3</p>
Friday	<p><b>Lecture:</b> Atherosclerotic disease of the large blood vessels of the neck and upper extremities.</p> <p><b>Practical exercises on Clinic:</b> Taking a history and physical examination of patients with diseases of the carotid system and system of upper extremities. Laboratory searches. Clinical characteristics of diseases of certain vascular systems and disease gradients. Possibilities of Color Doppler Diagnostics, and Angiographic Search. Principles of medication, vasodilators, antiagregants. Principles and Indications for Intervention Treatment. Performing diagnostics.</p>	<p>3</p> <p>3</p>
4th week	The form of teaching	Number of hours
Monday	<p><b>Lecture:</b> Inflammatory diseases of the microvascular and macrovascular system.</p> <p><b>Practical exercises on Clinic:</b> Getting to know the symptoms and signs of the disease that involve the microvascular and macrovascular system. Principles of diagnostics (color Doppler diagnostics, arteriography by Seldinger, CT angiography, CEMRA). Getting acquainted with the possibilities of medication and intervention treatment. Getting acquainted with the possibilities of medication and intervention treatment.</p>	<p>3</p> <p>3</p>
Thursday	<p><b>Lecture:</b> Diabetic microvascular and macrovascular angiopathy. Chronic venous insufficiency.</p> <p><b>Practical exercises on Clinic:</b> Examination of patients with diabetic angiopathy, differentiation of microvascular from macrovascular diabetic angiopathy, presentation of a patient with ischemic changes in diabetic angiopathy, presentation of toilets, and suppression of ischemic changes. Clinical manifestations of diabetic angiopathy, diagnosis and therapy. Anamnesis and physical examination of the venous system of the upper extremities, v. cavae and lower extremities. Laboratory analysis. Clinical characteristics of diseases of certain venous systems and CEAP gradation of venous diseases. Possibilities of Color Doppler Diagnostics, and CT Venography. Principles of medication treatment, venoprotective and anticoagulant therapy. Principles of Compression Therapy. Principles of</p>	<p>4</p> <p>3</p>



	hyperbaric therapy and perform therapy.	
Wednesday	<b>Lecture:</b> Deep vein thrombosis and venous thromboembolism.  <b>Practical exercises on Clinic:</b> Taking history and physical examination of patients with deep venous thrombosis of the venous system of the upper extremities, v. cavae and the lower extremities. Laboratory analysis. Perform a prediction for deep venous thrombosis, identify the risk of a Wells and Geneva score. Analysis of laboratory findings - coagulograms, D-dimers, trombocytes, fibrinogen, proteins, enzyme status, coagulograms. Clinical characteristics of the disease and introduction to the possibilities of Color Doppler diagnostics. Getting to know the principles of anticoagulant treatment, as well as thrombolytic treatment. Getting to know the possible complications. Prevention of embolism. Principles of post-discharge therapy, monitoring of anticoagulant therapy, compressive therapy. Performing diagnostics and patient analysis.	4  3

#### PLAN: GASTROENTEROLOGY AND HEPATOBILLIARY DISEASES

4th week	The form of teaching	Number of hours
Thursday	<b>Lecture:</b> Symptoms, diagnostic procedures, medications.  <b>Practical exercises on Clinic:</b> Getting acquainted with the symptoms and signs of gastrointestinal and hepatic diseases. Exercises at the clinical departments and outpatient department of the Clinic.	3  3
Friday	<b>Lecture:</b> Diseases of the esophagus, stomach and duodenum.  <b>Practical exercises on Clinic:</b> Physical examination of patients with diseases of stomach and / or esophagus. Getting acquainted with laboratory findings. Diagnostic procedures in gastroenterohepatology.	3  3
5th week	The form of teaching	Number of hours
Monday	<b>Lecture:</b> Diseases of the small intestine and colon diseases.  <b>Practical exercises on Clinic:</b> Anamnesis and physical examination of patients with small intestine and colon diseases. Diagnostic procedures. Treatment of the these diseases.	3  3
Thursday	<b>Lecture:</b> Inflammatory bowel diseases.  <b>Practical exercises on Clinic:</b> Getting acquainted with the symptoms and signs of Ulcerative colitis and Crohn's disease. Diagnosis of these diseases. Endoscopic procedures, intestine biopsy. Contemporary therapeutic approach.	3  3

Wednesday	<b>Lecture:</b> Liver diseases and diseases of biliary system.  <b>Practical exercises on Clinic:</b> Introduction to the clinical presentation of patients with viral hepatitis; alcoholic diseases; autoimmune hepatitis; primary biliary cirrhosis; primary sclerosing cholangitis; cirrhosis of the liver and its complications; Review of patients with transplanted liver.	3  3
Thursday	<b>Lecture:</b> Liver cirrhosis and its complications.  <b>Practical exercises on Clinic:</b> Getting to know the symptoms and physical findings of patients with cirrhosis of the liver and its complications; Review of patients with transplanted liver.	3  3
Friday	<b>Lecture:</b> Pancreatic diseases.  <b>Practical exercises on Clinic:</b> Getting to know the symptoms and physical examination of patients with acute and chronic pancreatitis. Making a diagnostic plan. Diagnostic procedures in patients with pancreatitis. Planning the therapeutic and dietary regimens.	3  3
6th week	<b>The form of teaching</b>	<b>Number of hours</b>
Monday	<b>Lecture:</b> Pre-cancerous, tumor of the liver.  <b>Practical exercises on Clinic:</b> Pre-cancerous in gastroenterology; Barrett's esophagus; Gastrointestinal system polyp; Display of colonoscopy, analysis of findings; ultrasound of the liver and abdomen. Team work in medicine: gastroenterologist - abdominal surgeon - anaesthesiologist.	3  3
Thursday	<b>Lecture:</b> Emergency conditions in gastroenterology.  <b>Practical exercises on Clinic:</b> Presentation of patients with acute condition in gastroenterohepatology (acute abdominal pain, gastrointestinal bleeding, acute diarrheal syndrome, ...). Parenteral nutrition; Enteral nutrition. Setting nasogastric tube.	3  3
Wednesday	<b>Lecture:</b> Interventional gastroenterology.  <b>Practical exercises on Clinic:</b> Getting acquainted with the procedures of interventional gastroenterology. Exercises in the interventional department of outpatient clinic diagnostics.	3  3
Thursday	<b>Lecture:</b> Nutrition in gastroenterology.  <b>Practical exam 1</b>	2  4 (K+A+G)



### PLAN: PULMOLOGY

6th week	The form of teaching	Number of hours
Friday	<b>Lecture:</b> Physiology of lungs in the function of clinical events Interpretation of conventional chest X-ray, type of shadows on the lungs	3
	<b>Practical exercises on Clinic:</b> Interpretation of conventional chest X-ray; Spirometry (lung volumes and capacities); Plethysmography (airway resistance, residual volume)	3
7th week	The form of teaching	Number of hours
Monday	<b>Lecture:</b> Asthma	3
	<b>Practical exercises on Clinic:</b> Successful recognition of respiratory symptoms in patients with asthma. Detection of signs of lung diseases by physical examination of the chest organ: inspection, palpation, tactile fremitus, percussion of the chest with the aim determination of boundaries of the lungs and condensations of lung parenchima, and finally auscultation of the lungs. Bronchodilating and bronchoconstricting test, Skin prick tests. Inhalation therapy (MDI spray, inhalers).	3
Thursday	<b>Lecture:</b> Chronic obstructive pulmonary disease (COPD) Acute exacerbation of COPD	3
	<b>Practical exercises on Clinic:</b> Successful recognition of respiratory symptoms in patients with COPD. Detection of signs of lung diseases by physical examination of the chest organ: inspection, palpation, tactile fremitus, percussion of the chest with the aim determination of boundaries of the lungs and condensations of lung parenchima, and finally auscultation of the lungs. Performing spirometry and interpretation of spirometry findings, Inhalation therapy (MDI spray, inhalers).	3
Wednesday	<b>Lecture:</b> Tumors of lungs and pleura	3
	<b>Practical exercises on Clinic:</b> Interpretation of conventional chest X-ray. Successful recognition of respiratory symptoms in patients with lung tumors of lungs and pleura. Giving of sputum on cytological examination. Sputum induction for cytological examination. Bronchoscopy and bronchoscopic biopsies (fluids and tissues). Transthoracic biopsies. Performing chemotherapy of malignant lung tumors.	3
Thursday	<b>Lecture:</b> Non-specific infections of the lower respiratory tract Bronchiectasis	3
	<b>Practical exercises on Clinic:</b> Successful recognition of respiratory symptoms in patients with non-specific infections of the lower respiratory tract. Detection of signs of non-specific infections of the lower respiratory tract by physical examination of the chest organ: inspection, palpation, tactile fremitus, percussion of the chest with the aim determination of condensations of lung parenchima, and finally auscultation of the lungs.	3



	Application of a parenteral treatment (s.c., i.m., i.v. injection - bolus and infusion).	
Friday	<b>Lecture:</b> Tuberculosis  <b>Practical exercises on Clinic:</b> Interpretation of conventional chest X-ray. Successful recognition of respiratory symptoms in patients with lung tuberculosis. Giving of sputum on BK, Sputum induction (bacteriological, mycological and cytological examination). Microbiological diagnostic of tuberculosis (microscopy, culture, MIGIT).	3  3
8th week	<b>The form of teaching</b>	<b>Number of hours</b>
Monday	<b>Lecture:</b> Cystic fibrosis (mucoviscidosis) Pleural inflammation (pleurisy), pneumothorax  <b>Practical exercises on Clinic:</b> Recognition of respiratory symptoms in patients with pleural diseases. Detection of signs of lung diseases by physical examination of the chest organ: inspection, palpation, tactile fremitus, percussion of the chest with the aim determination of boundaries of the lungs and condensations of lung parenchima, and finally auscultation of the lungs. Pleural punction (thoracocentesis). Types of pleura biopsy. Pleurodesis.	3  3
Thursday	<b>Lecture:</b> Pulmonary arterial hypertension and chronic pulmonary heart disease Deep Venous Thrombosis and Pulmonary Thromboembolic Disease (PTE)  <b>Practical exercises on Clinic:</b> Successful recognition of respiratory symptoms in patients with PAH and PTE. Detection of signs of lung diseases by physical examination of the chest organ: inspection, palpation, tactile fremitus, percussion of the chest and auscultation of the lungs. Application of a parenteral treatment (s.c., i.m., i.v. injection - bolus and infusion).	3  3
Wednesday	<b>Lecture:</b> Acute Respiratory Distress Adult Syndrome (ARDS) Acute and chronic respiratory insufficiency, oxygen therapy, mechanical ventilation of the lungs Central sleep apnoea (CSA)  <b>Practical exercises on Clinic:</b> Successful recognition of respiratory symptoms in patients with acute and chronic respiratory insufficiency, ARDS and CSA. Gas analysis of arterial blood. Performing oxygen therapy (mask, nasal catheter). Non-invasive ventilation of respiratory insufficient patients. Invasive ventilation of respiratory insufficient patients .	3  3
Thursday	<b>Lecture:</b> Sarcoidosis Interstitial lung diseases (ILD), diffuse illnesses of lung parenchima  <b>Practical exercises on Clinic:</b> Successful recognition of symptoms in patients with sarcoidosis and other interstitial lung diseases. Transthoracic biopsies. Measurement of transfer factor of lung parenchima. Taking of bronchoalveolar lavage and analysis of bronchoalveolar lavage fluid.	3  3

	Treatment of patients with Interstitial lung diseases.	
Friday	<b>Lecture:</b> Lung disease caused by dust, toxic gases and vapors  <b>Practical exercises on Clinic:</b> Successful recognition of respiratory symptoms in patients with lung diseases caused by dust, toxic gases and vapors. Detection of signs of lung diseases by physical examination of the chest organ: inspection, palpation, tactile fremitus, percussion of the chest with the aim determination of boundaries of the lungs and condensations of lung parenchyma, and finally auscultation of the lungs. Palliative care of pulmonary patients in terminal stage of the disease.	3   3
9th week	The form of teaching	Number of hours
Monday	<b>Practical exam 2</b>  <b>Partial exam 1</b>	3  3

#### PLAN: NEPHROLOGY

9th week	The form of teaching	Number of hours
Tuesday	<b>Lecture:</b> Diagnostic and therapeutic procedures in nephrology  <b>Lecture:</b> Disorders of metabolism of body water, electrolytes and acid-base status.  <b>Lecture:</b> Urinary system infections and nephrolithiasis.	2  2  2
Wednesday	<b>Practical exercises on Clinic:</b> Analysis of laboratory findings and comparisons with clinical findings in patients with different mineral disorders and acid-base status. Introduction to parameters of metabolic acidosis and alkalosis, and respiratory acidosis and alkalosis. Anamnesis and physical findings of patients with hypervolemia and dehydration - clinical consequences. Different hypovolaemic, euvoletic and hypervolemic hyponatremia.  Taking a specific history and physical examination of patients with urinary infections. Laboratory analyzes. Analysis of urine tape and interpretation of the obtained findings. Interpretation of urin culture findings. Presentation of patients with nephrolithiasis. Selection of diagnostic methods (laboratory findings, echosonography and urinary urinary tract, radiographs, i.v. urography) and treatment of patients with nephrolithiasis. Measurement of blood pressure and body weight. Diuretic measurement. Replacement of urinary bag. Replacement of the urinary catheter.	3       3
Thursday	<b>Lecture:</b> Tubulointerstitial nephropathy and urinary tract disorders.  <b>Practical exercises on Clinic:</b> Examination of patients with tubulointerstitial kidney disease. Specificity of the anamnesis and physical examination. Clinical manifestations of the disease, diagnosis and treatment.	2   4



Friday	<b>Lecture:</b> Glomerular clinical-pathological syndromes.	2
	<b>Lecture:</b> Secondary glomerular diseases.	2
	<b>Practical exercises on Clinic:</b> Taking anamnesis and physical examination of patients with glomerular kidney disease. Laboratory analyzes. Analysis of urine and parameters of the functional status of the kidney. Clinical features of individual glomerular disorders and treatment. Getting to know the difference between clinical and laboratory findings of nephrotic and nonfritic syndrome. Immunological tests. Presentation of kidney biopsy.	2
<b>10th week</b>	<b>The form of teaching</b>	<b>Number of hours</b>
Monday	<b>Lecture:</b> Diabetic nephropathy.	2
	<b>Lecture:</b> Vascular diseases of the kidney.	2
	<b>Practical exercises on Clinic:</b> Presentation of patients with vascular renal impairment. Medical history and physical examination, diagnostic procedures, differential diagnosis, therapeutic plan. History and physical examination of patients with diabetic nephropathy. Observation of clinical characteristics of diabetic nephropathy. The tests for early diagnosis of diabetic nephropathy. Assessing the degree of renal impairment on the basis of clinical and laboratory findings. Creating a plan of treatment of diabetic patients with diabetic nephropathy.	2
Tuesday	<b>Lecture:</b> Acute kidney injury (AKI).	2
	<b>Practical exercises on Clinic:</b> Review of patients with acute renal injury, laboratory analysis, diagnostic procedures. Diuretic monitoring. The importance of measuring body weight and blood pressure. Principles of treatment of patients with acute renal failure. Application of active treatment.	3
Wednesday	<b>Lecture:</b> Chronic kidney disease / Chronic renal insufficiency.	2
	<b>Practical exercises on Clinic:</b> Hystory taking and specificity of the physical finding of patients in chronic renal insufficiency. Treatment of chronic kidney disease. Treatment of terminal renal insufficiency by hemodialysis and peritoneal dialysis. Peritoneal dialysis. Inclusion of patients on hemodialysis treatment and presentation of hemodialysis treatment. Screening of ESRD patients for transplantation, examination of the transplanted kidney patient, the way of its examination and monitoring.	3



## PLAN: ENDOCRINOLOGY

10th week	The form of teaching	Number of hours
Thursday	<p><b>Lecture:</b> Clinical aspects of neuroendocrine regulation. Pituitary and hypothalamic diseases.</p> <p><b>Practical exercises on Clinic:</b> Basic skills for taking anamnesis in endocrine patients. The basic skills of the physical examination of the endocrinological patient. Basic diagnostic procedures in endocrinology patients. Diagnostic methods in endocrinology / stimulative and supersessional tests.</p>	<p>3</p> <p>3</p>
Friday	<p><b>Lecture:</b> Diseases of the thyroid gland.</p> <p><b>Practical exercises on Clinic:</b> Discussion of differential diagnosis of endocrinological diseases. Basic therapeutic procedures in endocrinology patients. Diagnosis and treatment of thyroid disease. Showing patients with hyperthyroidism. Display of patients with hypothyroidism.</p>	<p>3</p> <p>3</p>
11th week	The form of teaching	Number of hours
Monday	<p><b>Lecture:</b> Parathyroid gland diseases. Metabolic bone diseases.</p> <p><b>Practical exercises on Clinic:</b> Specificity of work in polyclinics and diagnostic outpatient infirmary, day hospital, endocrinology department and intensive care - metabolic unit. Interpretation of laboratory tests in the evaluation of the endocrine system function.</p>	<p>3</p> <p>3</p>
Tuesday	<p><b>Lecture:</b> Diseases of the adrenal glands.</p> <p><b>Practical exercises on Clinic:</b> Diagnosis and treatment of adrenal gland diseases. Presentation of patients with Cushing's syndrome.</p>	<p>3</p> <p>3</p>
Wednesday	<p><b>Lecture:</b> Emergency conditions in endocrinology.</p> <p><b>Practical exercises on Clinic:</b> Discussion on differential diagnosis and clinical-laboratory signs of emergency conditions in endocrinology (diabetic ketoacidosis, diabetic ketoacidotic coma, hypoglycaemia and hypoglycemic coma, lactic acid coma, hyperosmolar coma, hypothyroid crisis, tyrototoxic crisis, Addison crisis .....), as well principles of urgent treatment of such patients.</p>	<p>3</p> <p>3</p>
Thursday	<p><b>Lecture:</b> Diseases of the sexual glands. Diseases caused by the secretion of hormones from the tissues that are not classical endocrine glands.</p> <p><b>Practical exercises on Clinic:</b> Determination of FG scores of hirsutism. Body weight and height, growth estimation. Setting of hairy, skin pigmentation. Potential problems, menstrual cycle or sterility.</p>	<p>3</p> <p>3</p>

Friday	<b>Lecture:</b> Diabetes mellitus. Acute and chronic complications of diabetes.  <b>Practical exercises on Clinic:</b> Basic skills of taking anamnesis in patients with diabetes. Basic physical examination skills in patients with diabetes. Basic diagnostic procedures in patients with diabetes. Diagnostic methods in diabetology. Discussion of differential diagnosis. Glycemic determination with glucometer, insulin application. Showing patients with type 1 diabetes mellitus and therapeutic dilemma. Illustration of patients with type 2 diabetes mellitus and discussion of diagnostic methods and differential diagnosis of co-morbid diseases. Education of the patient and his family regarding nutrition, treatment methods, prevention of complications in diabetes.	3  3
12th week	The form of teaching	Number of hours
Monday 2018.	<b>Lecture:</b> Paraneoplastic endocrine syndromes. Metabolic diseases (obesity, malnutrition, hyperlipoproteinemia).  <b>Practical exercises on Clinic:</b> Determination of BMI in patients, determining the percentage of body fat, volume of waist and hips. Treatment of diabetes and obesity. Oral therapy of diabetes.	3  3

#### PLAN: HEMATOLOGY

12th week	The form of teaching	Number of hours
Tuesday	<b>Lecture:</b> Specificity of hematopoietic system, hematologic patients and haematological diagnostics.  <b>Practical exercises on Clinic:</b> Repeat basic physical examination skills with an emphasis on the symptoms and signs of hematologic patients. Students are observing aspiration puncture of the bone marrow and bone biopsy.	3  3
Wednesday	<b>Lecture:</b> Diseases of the hematopoietic stem cell.  <b>Practical exercises on Clinic:</b> Repeat physical examination in patients with aplastic anemia, myelodysplasia, myeloproliferative neoplasm and acute myeloid leukemia. Analysis of peripheral blood, bone marrow and lymph node. Cytomorphology, cytochemistry, immunophenotyping, immunohistochemistry and cytogenetics.	3  3



Thursday	<b>Lecture:</b> Diseases of erythropoiesis and syndromes.  <b>Practical exercises on Clinic:</b> Repeat physical examination in patients with anemia syndrome. Analysis of peripheral blood and bone marrow. Basic laboratory findings in the differential diagnosis of anemia syndrome. (Er, Hgb, MCV, MCH, MCHC, Fe / UIBC, TIBC, ferritin, bilirubin, COOMBS, B12, folate, LDH-P, biopsy of the gastric mucosa, bone marrow cytomorphological examination). Reading and understanding of peripheral blood image findings.	3  3
Friday	<b>Lecture:</b> Lymphoproliferative diseases.  <b>Practical exercises on Clinic:</b> Repeat physical examination and diagnostics of acute lymphoblastic leukemia and lymphoma. Familiar with the WHO classification and therapeutic algorithms for the treatment of lymphoproliferative neoplasms. Differential diagnostics of the enlarged lymph node.	3  3
13th week	<b>The form of teaching</b>	<b>Number of hours</b>
Monday	<b>Lecture:</b> Platelet diseases and coagulation diseases.  <b>Practical exercises on Clinic:</b> Repeat physical examination of patients with hemorrhagic syndrome. Hemophilia, diagnosis and treatment. Differential diagnosis of hemorrhagic syndrome.	3  3
Tuesday	<b>Lecture:</b> Transfusion medicine. Transplantation of haematopoietic stem cells.  <b>Practical exercises on Clinic:</b> Determination of blood groups. Adlication of concentrated platelets, partially recombinant erythrocytes, concentrated filtered erythrocytes, full fresh blood, fresh frozen plasma. Getting to know the work of the wholeseparator. Differential diagnosis of hemorrhagic syndrome.	3  3

#### PLAN: RHEUMATOLOGY

13th week	<b>The form of teaching</b>	<b>Number of hours</b>
Wednesday	<b>Lecture:</b> Autoimmune systemic inflammatory rheumatic disease.  <b>Practical exercises on Clinic:</b> Anamnesis and physical examination of the joints. Disease Activity Scale (DAS). Functional Capacity Assessment (HAQ) and Analog Visual Scale (VAS). Interpretation of X-ray joint findings. Anamnesis and physical examination of blood vessels. Interpretation of laboratory findings of blood and urine in vasculitis. Diagnosis of vasculitis.	3  3



Thursday	<b>Lecture:</b> Autoimmune systemic inflammatory rheumatic disease. Degenerative rheumatic diseases.	3
	<b>Practical exercises on Clinic:</b> Exercise for taking anamnesis, performing a physical examination, making a diagnostic plan and planning a therapeutic measure in patients with systemic connective tissue diseases (Systemic Lupus Erythematoses, Antiphospholipid Syndrome, Dermatomyositis, Polymyositis, Scleroderma).	3
Friday	<b>Lecture:</b> Metabolic bone diseases and infectious arthritis. Seronegative spondylopathies. Rheumatic diseases of the connective and soft tissues.	2
	<b>Practical exercises on Clinic:</b> Exercise taking anamnesis, performing a physical examination, making a diagnostic plan and planning therapeutic measures in patients with metabolic bone diseases, infectious arthritis and rheumatic diseases.	1
	<b>Practical exam 3</b>	3
Week 16.	<b>Final exam</b>	
Week 17-20.	<b>Repeated exam and Remedial exam</b>	

Code: MFSE 0704	Course title: IMMUNE AND NEPHROLOGICAL ASPECTS OF KIDNEY TRANSPLANTATION		
Level: clinical	Study year: IV	Semester: VII	ECTS: 1
Status: elective	Total contact hours: 20		
Prerequisites:	According to the study regulation		
Lecturers: Professor Senija Rašić MD PhD; Professor Damir Rebić MD PhD			
1. Overall aim	The aim of Immune and Nephrological Aspects of Kidney Transplantation Course is to gain knowledge about basic nephrology and immunological aspects of kidney transplantation as a method of choice in treatment of end stage renal disease, as well as with possible complications and limitations of this kind of renal replacement therapy.		
2. Course contents	<p>The following topics will be covered within the Modules:</p> <p><b>Module 1. Transplantation immunobiology and immune mechanisms of kidney allograft rejection</b> The goal of the Module is to introduce the student with the structure and function of the HLA antigen, the identification of HLA antigen and anti-HLA antibodies, the effect of HLA matching in kidney transplantation, and the clinical implications of the crossmatching test. Through this module, the student will be acquainted with the effector mechanisms of graft degradation and rejection of the transplanted organ.</p> <p><b>Module 2. Medical aspects of kidney donation, renal transplant candidates</b> The aim of this Module is to introduce the student with the method of evaluating the living donor and its preparation for the donation of the kidney, as well as with the method of determining brain death and treatment and the selection of a cadaveric kidney donor. Through this module, the student will also get acquainted with the selection and method of evaluating the recipient of the kidney.</p> <p><b>Module 3. Immunosuppression in transplantation</b> The aim of this Module is to introduce a student with general principles of immunosuppression in transplantation, a type of immunosuppressive drug and a mechanism of their action.</p> <p><b>Module 4. Early posttransplantation complications</b> The aim of this Module is to introduce a student with complications that can occur early in the postoperative period (first three months).</p> <p><b>Module 5. Long-term posttransplant management and complications</b> The aim of this Module is to introduce a student with late complications and illnesses that can occur in a later post-transplant period.</p> <p><b>Module 6. Infections in kidney transplantation</b> The aim of this Module is to introduce a student with infectious conditions that can occur in patients with a transplanted kidney, the way they are detected and treated.</p>		
3. Learning outcomes (Knowledge, skills and competences)	After completed course the student will acquire basic knowledge about structure and function of major histocompatibility complex (MHC) molecules, impact of human leukocyte antigen (HLA) matching in renal transplantation, effector immune mechanisms of graft destruction, selection and preparation candidates for kidney donation and renal transplant recipients, implementation of		



	<p>immunosuppressive drugs, and also knowledge about possible complications of kidney transplantation and their treatment.</p> <p><i>Through lectures students will acquire following knowledge and competences:</i></p> <ol style="list-style-type: none"> <li>1. Know the basic procedures for evaluation and preparation of renal transplant candidates.</li> <li>2. Know the basic procedures for evaluation and preparation of the donor kidney transplantation.</li> <li>3. Know the foundations action of immunosuppressive drugs.</li> <li>4. Know that the early and late posttransplantation complications may affect graft survival.</li> <li>5. Adopt the attitude that organ donation is the fundamental value of human existence and solidarity in order to save human life and to raise quality of life.</li> </ol> <p><i>Through the practical exercises, students will acquire following skills:</i></p> <ul style="list-style-type: none"> <li>- History taking and physical examination of kidney transplant patient</li> <li>- Estimate of the total daily volume of fluid balance</li> <li>- Analyze changes in the amount of urine output</li> <li>- Interpretation of lab test of urine and renal function in transplant patients</li> <li>- Identification of the adverse effects of immunosuppressive drugs</li> <li>- Recognition of clinical signs of infection in transplant patients</li> </ul>
4. Teaching methods	<p>Lectures: 10 hours</p> <p>Practical exercises: 10 hours</p>
5. Method of knowledge assessment and examination	<ul style="list-style-type: none"> <li>- Written tests in the form of Multiple choice questions (MCQ) tests.</li> <li>- Practical examination</li> </ul> <p>Student's knowledge test will be carried out continuously during classes through the Partial Examination and Practical Exam.</p> <p><b>Partial exam</b> Partial exam consists of a written test with 30 MCQ, and includes the verification of acquired knowledge. Each correct answer to MCQ question carries 2 points, a total of 60 points. To be considered passed Partial exam, student will need to earn at least 33 points. Earned points are added to other points in the final grade. Students who failed the Partial exam, the examinations taken the material on the the Final exam.</p> <p><b>Practical exam</b> The practical exam involves assessing the acquired skills, processed through all modules. Evaluation of acquired skills is performed through the fulfillment of the tasks previously defined in the checklist after attended courses. Each task carries an appropriate number of points. The maximum number of points that a student can win is 40. In order to pass the Practical Exam, the student must score at least 22 points. Number of points is added in forming the final grade.</p> <p><b>Final exam</b> If student failed to pass the partial exam, the examinations material is deposited on the Final exam. Final exam has 30 MCQ, through which a student can earn 60 points. The minimum number of points to pass the exam is 33 points.</p>



	<p>The condition for passing the written part of the Final examination is previously passed the Practical exam.</p> <p>Achieved points are added to other points and together form the final score. The minimum number of points for passing grade is 55.</p> <p><b>Repeated and Remedial exam</b></p> <p>Repeated and Remedial exam take place according to previously defined criteria of the final examination.</p> <p>The total number of points won on all forms of knowledge testing is translated into the final grade as follows:</p> <table><tr><th>Rating</th><th>Number of points</th><th>Description Rating</th></tr><tr><td>10 (A)</td><td>95-100</td><td>remarkable success without mistakes or with minor errors</td></tr><tr><td>9 (B)</td><td>85-94</td><td>above average, with some mistakes</td></tr><tr><td>8 (C)</td><td>75-84</td><td>average, with subtle errors</td></tr><tr><td>7 (D)</td><td>65-74</td><td>generally good, but with significant shortcomings</td></tr><tr><td>6 (E)</td><td>55- 64</td><td>meets the minimum criteria</td></tr><tr><td>5 (F,FX)</td><td>&lt; 55</td><td>does not meet the minimum criteria</td></tr></table>	Rating	Number of points	Description Rating	10 (A)	95-100	remarkable success without mistakes or with minor errors	9 (B)	85-94	above average, with some mistakes	8 (C)	75-84	average, with subtle errors	7 (D)	65-74	generally good, but with significant shortcomings	6 (E)	55- 64	meets the minimum criteria	5 (F,FX)	< 55	does not meet the minimum criteria
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6 (E)	55- 64	meets the minimum criteria																				
5 (F,FX)	< 55	does not meet the minimum criteria																				
6. Literature	<p><b>Recommended:</b></p> <p>1. Danovitch GM. Handbook of Kidney Transplantation (4th ed.). Lippincott Philadelphia: Williams &amp; Wilkins; 2005.</p> <p><b>Additional:</b></p> <p>1. Rašić S. Transplantacija bubrega. U: Rašić S. (ur.) Klinička nefrologija. Sarajevo: Medicinski fakultet UNSA; 2020, st. 473-552.)</p> <p>2. Bašić-Jukić N, Kaštelan Ž. (ur). Transplantacija bubrega. Zagreb: Medicinska naklada; 2016.</p>																					
7. Remark	<p>Exercises take place at the Clinic for Nephrology Clinical Center University of Sarajevo. The number of students per group is between 6 and 8 (optimal 7). Exercises can only be accessed by students who have a valid sanitary booklet. Consultation period for students is any working day from 14-15hours. E-mail of responsible teacher: senija.rasic@mf.unsa.ba</p>																					

**PLAN AND PROGRAM FOR THE SUBJECT  
IMMUNE AND NEPHROLOGICAL ASPECTS OF KIDNEY TRANSPLANTATION**

<b>Week 15.</b>	<b>The form of teaching</b>	<b>Number of hours</b>
Monday	<b>Lecture:</b> Basics of transplantation immunology. The main histocompatibility complex (MHC). Structure and function of HLA antigen, their identification. The influence of HLA matching in kidney transplantation. Anti-HLA antibodies. The clinical significance of the test cross-reactions (crossmatching). Immune mechanisms of rejection of the transplanted kidney (rejection of the allograft).	2
	<b>Exercises:</b> Taking a history and physically examining a transplanted patient. Monitoring of urine output, blood pressure, body weight. Determining the type of immunosuppression.	3
Tuesday	<b>Lecture:</b> Kidney donors in transplantation, selection and preparation. Deceased donor for kidney transplantation (diagnosis of brain death). Choice of a cadaveric kidney donor. Evaluation and preparation of live donors for transplantation. Risks for donation.	2
	<b>Exercises:</b> Taking a blood sample for a laboratory evaluation of renal function and determining the level of calcineurin inhibitors in the blood. Ultrasound examination of the transplanted kidney.	3
Wednesday	<b>Lecture:</b> Immunosuppression in kidney transplantation. Types of immunosuppressant and mechanism of action. Monitor the level of immunosuppressant in the blood. Side effects of immunosuppressive drugs. Early postoperative complications (transplant rejection, delayed graft function, acute tubular necrosis, acute renal failure).	2
	<b>Exercises:</b> Analysis of the protocol for the preparation of the kidney recipient and kidney donor. Discussion with a patient in end stage renal disease about kidney transplantation.	2
Thursday	<b>Lecture:</b> Late complications and diseases in patients with transplanted kidney (recurrent and <i>de novo</i> glomerulonephritis, chronic allograft nephropathy, chronic nephrotoxicity of calcineurin inhibitors, cardiovascular disease ...). Infection in patients with a transplanted kidney.	3
Friday	<b>Lecture: Partial exam</b>	1
	<b>Exercises: Practical exam</b>	2
Week 16.	<b>Final exam</b>	
Week 17.-20.	<b>Repeated and Remedial exam</b>	



**DETAILED COURSE PROGRAM:**  
**BASICS OF CYTOMORPHOLOGY IN HEMATOLOGY (ELECTIVE COURSE)**  
**INTERNAL MEDICINE-FIELD OF HEMATOLOGY**

Code:	Title of course: <b>InternalMedicine – Field of Hematology</b> <b>Elective course:Basics of Cytomorphology in Hematology</b>		
Level: <b>Undergraduate</b>	Year: <b>IV</b>	Semester: <b>VII</b>	ECTS credits: <b>2</b>
Status: <b>Elective</b>			Total hours: <b>20</b>
Responsible lecturer:	<b>Associate ProfessorAlma SofiHafizović and assistant professor Lejla Ibričević Balić</b>		
Preconditions to attend lectures: <b>Passed compulsory courses from 3<sup>rd</sup> year</b>			
1. Course objectives	Familiarizing the students with: <ul style="list-style-type: none"><li>• basic postulates of cytomorphology</li><li>• place and role of cytomorphological diagnostics withhematology diseases.</li></ul>		
2. Purpose of course	After successfully completed course the student will be able to: <ul style="list-style-type: none"><li>• understand the significance and place of cytomorphological diagnostics inhematology</li><li>• perform practically aspirational puncture of bone marrow</li><li>• assist in biopsy of bone</li><li>• correctly interpret the findings of periphery bloodline and bone marrow/myelogram</li><li>• in diagnostic algorithm ofhematology diseases rationally interpret the cytomorphological finding of periphery bloodline and myelogram.</li></ul>		
2.1. Course moduleswith modules objectives	<b>Modules 1.</b> <b>Significance of cytomorphological diagnostics in hematology.Preparation and execution of aspirational puncture of bone marrow and biopsy of bone</b> The objective of this module is familiarizing of students with significance of screening method-cytomorphology,in diagnostics ofhematology diseases as well as familiarizing with the methodology of executing of aspirational puncture of bone marrow and biopsy of bone.  <b>Modules 2.</b> <b>Cytomorphological configuration of periphery bloodline in cases of anaemia.</b> The objective of this module is familiarizing of student with pathological changes in smear of periphery blood in anaemia.  <b>Modules 3.</b> <b>Cytomorphologyfeatures of chronic leukaemia</b> The objective of this module is familiarizing of student with pathological changes in smear of periphery blood and smear of bone marrow in chronic leukaemia.  <b>Modules 4.</b> <b>Cytomorphology features of acute leukaemia</b> The objective of this module is familiarizing of student with pathological changes in smear of periphery blood and smear of bone marrow in acute leukaemia.		



	<p><b>Modules 5.</b>  <b>Cytomorphology features of myelodysplastic syndrome</b></p> <p>The objective of this module is familiarizing of student with pathological changes in smear of periphery blood and smear of bone marrow in myelodysplastic syndrome.</p>
3. Outcomes of learning	<p>Through the lectures of course „Basics of cytomorphology in hematology“ students will master control of the following skills:  <i>Skills which students should have practically perform (knows how and does it):</i></p> <ol style="list-style-type: none"> <li>1. perform/prepare smear of periphery blood</li> <li>2. aspirational puncture of bone marrow</li> <li>3. perform/prepare smear of periphery bone marrow/myelogram</li> <li>4. micro scoping of periphery smear and bone marrow</li> </ol> <p><i>Skills which students should recognize (knows how):</i></p> <ol style="list-style-type: none"> <li>1. Biopsy bone</li> </ol> <p><i>After completed lectures student should adopt the following stands:</i></p> <ul style="list-style-type: none"> <li>- Good medical practitioner must know the significance of cytomorphology in diagnostics of hematology diseases</li> <li>- Adopts the autonomous interpreting of normal and pathological smear of periphery bloodline</li> <li>- Adopts the autonomous interpreting of cytomorphological features of anaemia, leukaemia and myelodysplasia.</li> <li>- Integrate data from anamnesis and physical review with laboratory, radiological findings as well as the cytomorphological immunophenotypic and cytogenetic, which helps doctor in differentiating of individual hematology diseases.</li> </ul> <p>Correct diagnosis determines the type of treatment of hematology patient, whereby decision of doctors may influence further course of disease and quality of life of patient.</p>
4. Methods of learning	<p>Lecture of course „Elective course -Basics of cytomorphology in hematology“ will be conducted through total number of 20 hours:  10 hours lectures for all students  10 hours of practical tutorials in groups of 6 students</p> <p>Methods of lecture performance are as follows:</p> <ul style="list-style-type: none"> <li>- Interactive theoretical and practical lectures</li> <li>- Work in small group</li> <li>- For practical lectures the method „4 steps by Peyton and PBL (problem-based learning)</li> <li>- consultancies</li> </ul> <p>Within the framework of foreseen number of hours, the continuous tests will be performed.</p>
5. Methods of knowledge assessment	<p>The knowledge assessment for the course <b>BASICS OF CITOMORPHOLOGY IN HEMATOLOGY</b> will be performed during the semester.</p> <p><b>Continuous knowledge assessment.</b>  Includes the practical exam and partial exam.</p> <p><b>Practical part of exam:</b>  Practical part of exam includes the evaluation of adopted skills from all</p>

the adopted modules through the fulfilment of tasks already defined in the list of assessment(*check list*).

**After completion of practical lectures, the student will attend a practical part of exam which includes the evaluation of skills acquired through the fulfilment of tasks already defined in the list of assessment(*check list*).**

Each task bears the appropriate number of points. Nevertheless, the performance of aspirational puncture of bone marrow is assessed (0-10)points and assisting in bone biopsy (0-10)points, and 4 tasks in micro scoping (0-5)points. Total number of points which student can achieve within this part of continuous assessment of knowledge is **40**. Student must win is at least 22points in order to consider the practical part of exam as passed. The number of points won is added to other points in forming the final grade.

**Precondition for attending the written part of exam is already passed practical part of exam.**

#### ***Written part of exam/partial***

Written part of exam is the test with 30MCQ questions of knowledge acquired through all the modules. Each correct answer carries 2 points, total of 60 points. In order to consider the exam as passes, it is necessary to win 33points.

The number of points acquired is added to other points in forming the final grade.

#### ***Final exam:***

***If the student has not passed practical and/or partial part of exam during the semester, the parts not passed may be taken at the final exam. Only the students who passed practical exam from this field may attend and sit for the written part of final exam.***

#### ***Forming of final grade***

Total number of points acquired through all the forms of knowledge assessment is rendered into the final grade as follows:

#### **Grade number of pointsdescription of grade**

5(F,FX)	<=54	does not satisfy the minimum of criteria
6(E)	55-64	satisfies the minimum of criteria
7(D)	65-74	generally good, but with significant shortcomings
8(C)	75-84	average, with notable mistakes
9(B)	85-94	above average, with some mistakes
10(A)	95-100	exceptional success with or without or with minor mistakes

#### **Repeat (Make-up) Exam**

If the student has not passed practical or partial part of exam during the semester and at the final exam, the parts not passed may be taken at the repeat exam. Thereby, acquired skills from each part of practical exam which was not passed are evaluated through special assessment lists, where student may win 30 points. In order for practical exam to be considered aspassed, student must win 22 points.

	<p><b>Precondition for attending the final part of written repeat (make-up) exam is already passed practical part of exam.</b></p> <p>The number of points acquired is added to other points and final grade is thereby concluded.</p>
6. Literature:	<p><b>Compulsory:</b>  <b>1.Stanoje Stefanović, Atlas of Hematology, Medicinska knjiga, Belgrade-Zagreb, 1988; 1-98.</b></p> <p><b>Supplementary: Webb searches</b></p>
7. Note	<p>All forms of lectures are compulsory.  Only with justification the student is allowed to make up the missed tutorials (maximum of up to 20% absences).  Time for consultancies for students is each day from 12 to 14 hours with advance notice to the Secretary of Department for Internal Medicine or to an e-mail: <a href="mailto:mediha.zalihic@mf.unsa.ba">mediha.zalihic@mf.unsa.ba</a></p>

**DETAILED COURSE PROGRAM: BASICS OF CYTOMORPHOLOGY IN HEMATOLOGY  
INTERNAL MEDICINE-FIELD OF HEMATOLOGY**

Monday	<p><b>Lecture:</b>  <b>Place of cytomorphological diagnostics in hematology. Preparation and execution of aspirational puncture of bone marrow and bone biopsy.</b></p>	1 hour
	<p><b>Tutorials: Tutorials by departments pursuant to publicised schedule.</b>  Autonomous performance of aspirational puncture of bone marrow, assisting in performance of biopsy of bone.  The technique of making of the smear of periphery blood and smear of bone marrow.  Myelogram.</p>	1 hour
Tuesday	<p><b>Lecture:</b>  <b>Cytomorphological configuration of periphery bloodline and bone marrow in cases of anaemia</b></p>	2 hours
	<p><b>Tutorials: Tutorials by departments pursuant to publicised schedule.</b>  Cytomorphological configuration of periphery bloodline in anaemia</p>	2 hours



	<p>Cytomorphological configuration of erythrocytes</p> <p>Cytomorphological configuration of granulocytes and mononuclear</p> <p>Cytomorphological configuration of bone marrow in megaloblast anaemia</p>	
Wednesday	<p><b>Lecture:</b></p> <p><b>Cytomorphological features of chronic leukaemia</b></p> <p><b>Tutorial: Tutorials by departments pursuant to publicised schedule.</b></p> <p>Cytomorphological features of chronic leukaemia</p> <p>Cytomorphological features of chronic lymphatic leukaemia</p> <p>Cytomorphological features of chronic myeloid leukaemia</p>	<p>2 hours</p> <p>2 hours</p>
Thursday	<p><b>Lecture:</b></p> <p><b>Cytomorphological diagnostics of acute leukaemia</b></p> <p><b>Tutorials: Tutorials by departments pursuant to publicised schedule.</b></p> <p>Cytomorphological configuration of periphery bloodline and bone marrow in cases of acute myeloid leukaemia</p> <p>Cytomorphological configuration of periphery bloodline and bone marrow in cases of acute lymphoblast leukaemia</p> <p>Cytochemistry.</p>	<p>2 hours</p> <p>2 hours</p>
Friday	<p><b>Lecture:</b></p> <p><b>Cytomorphological features of myeloid-dysplastic syndrome</b></p> <p><b>Tutorials: Tutorials by departments pursuant to publicised schedule.</b></p> <p>Cytomorphological configuration of bone marrow in myeloid-dysplastic syndrome</p> <p>Cytomorphological configuration of periphery bloodline</p> <p>Cytomorphological configuration of bone marrow</p> <p><b>Tutorial: PRACTICAL EXAM</b></p> <p><b>PARTIAL EXAM</b></p>	<p>1 hour</p> <p>1 hour</p> <p>2 hours</p> <p>2 hours</p>
Week 16.	<b>FINAL EXAM</b> and exam for students who have not satisfied at the partial exam	
Week 17-20.	Repeat examination term	
Last week of August and first two weeks of September	<b>AUGUST-SEPTEMBER DEADLINE IN ONE TERM</b>	

*INTERNA MEDICINA  
- HEMATOLOGIJA -*

*DEKANAT MEDICINSKOG FAKULTETA  
UNIVERZITETA U SARAJEVU*

*- Služba za nastavu -*

*PREDMET: Prijedlog izmjena nastavnog plana i programa - hematologija  
Veza broj: 02-3-NŠ-3891/20 od 25.06.2020.*

*Poštovani,*

*U Prilogu Vam dostavljam prijedlog izmjena silabusa: Izvedbeni plan predmeta: Osnovi citomorfologije u hematologiji (izborni predmet) za Integrisani studijski program „Medicina“ na bosanskom i engleskom jeziku.*

*S poštovanjem,*

*Odgovorni nastavnik:*

*Šef Klinike za hematologiju  
Prof. dr Alma Sofo-Hafizović*

Code: <b>MFSE 0504</b>	Course title: <b>Medical Microbiology 1</b>		
Level: <b>preclinical</b>	Study year: <b>III</b>	Semester: <b>V</b>	ETCS: <b>4</b>
Status: <b>obligatory</b>	Total contact hours: <b>60</b>		
Prerequisites :	<b>According to the study regulation</b>		
Lecturers: Associate Professor Sabina Mahmutović Vranić MD PhD, Associate Professor Mufida Aljičević MD PhD, Associate Professor Velma Rebić MD PhD, Assistant Sajra Vincevic-Smajlovic MD			
1. Overall aim	The overall aim of the Medical Microbiology 1 Course is to increase the students' understanding of etiological factors of infectious diseases caused by bacteria as well as their morphology, identification, pathogenesis, basic clinical features, biological samples, therapy basics.		
2. Course contents	The following topics will be covered within the Modules: Module 1: General bacteriology Module 2: Infection and contagious disease Module 3: Etiological factors of bacterial respiratory infections Module 4: Etiological factors of bacterial digestive and urinary infections Module 5: Tuberculosis Module 6: Sporogenous bacteria Module 7: Current issues related to sexually transmitted diseases and zoonoses		
3. Learning outcomes (Knowledge, skills and competences)	<p>Students will gain the knowledge about determining the morphology, structure and role of various microorganisms causing infectious diseases; and will be able to understand importance of applying adequate antiinfective therapy in a timely manner. Through practical work students will gain knowledge to prepare, visualize and analyze different species of microorganisms by using several methods of laboratory work.</p> <p><i>Through the lectures students will gain following knowledge and competences:</i></p> <ol style="list-style-type: none"><li>1. Adequate evaluation of the importance and role of knowledge acquired during the Medical Microbiology 1 course in terms of determining the role of microorganism causing infectious diseases</li><li>2. Types, value and quality of certain biological samples collected in order to isolate and identify the causes of infectious diseases, types of the applied microbiological analyses, further analyses necessary in order to detect causal agents of disease, as well as decision on the choice of antimicrobial therapy</li><li>3. Types, forms and isolates of bacterial respiratory infections</li><li>4. Types, forms and isolates of bacterial digestive and urinary infections</li><li>5. <i>Mycobacterium tuberculosis</i> with its specificities</li><li>6. Specificities of sporogenous bacterias</li><li>7. Types, forms and isolates of sexually transmitted diseases including zoonoses.</li></ol> <p><i>Through the practical laboratory work students will acquire following skills:</i></p> <ul style="list-style-type: none"><li>– Preparation of stained microscope specimen for microscopic detection</li><li>– Analysis of certain macro-morphological features of adult bacterial colonies and make decisions on further steps in the process of isolation and identification of bacterial species</li></ul>		



	<ul style="list-style-type: none"> <li>– Recognition of the enzyme activity of certain bacterial genera and species by testing their biochemical features on adequate solid and liquid nutrient media</li> <li>– Recognition of the possibilities of serological typing of certain bacterial species</li> <li>– Choose the methods of testing the antimicrobial susceptibility and resistance to certain antimicrobials (dilution, diffusion method and E-test, interpretation of obtained test results)</li> <li>– Interpretation of microbiological findings in comparison with clinical status of a patient.</li> </ul>
4. Teaching methods	<ul style="list-style-type: none"> <li>• Lectures: 30 hours</li> <li>• Laboratory practical work: 30 hours</li> </ul>
5. Method of knowledge assessment and examination	Written test in the form of – Multiple Choice Questions (MCQ) test. Continuous knowledge and skills assessment will be carried out through partial exam, written essay and practical laboratory colloquium.
6. Literature	Obligatory: Carroll, K. (2016). <i>Jawetz, Melnick &amp; Adelberg's medical microbiology</i> . 1st ed. New York: McGraw-Hill Education.
7. Remarks:	Student office hours are published in a separate schedule which can be found on the Department's notice-board and on faculty website. Pre-agreed consultations are obligatory, and can be scheduled with the Department's secretary or via e-mail: <a href="mailto:mikrobiologija@mf.unsa.ba">mikrobiologija@mf.unsa.ba</a>

Code: MFSE 0612	Course title: <b>Sexually Transmitted Diseases</b>
Level: <b>preclinical</b>	Study year: <b>III</b> Semester: <b>VI</b> ECTS: <b>1</b>
Status: <b>elective</b>	Total contact hours: 20
Prerequisites:	<b>According to the study regulation</b>
Lecturers:	Associate Professor Sabina Mahmutović Vranić MD PhD, Associate Professor Mufida Aljičević MD PhD, Associate Professor Velma Rebić MD PhD, Assistant Sajra Vincevic-Smajlovic, MD
1.Overall aim	The overall aim of the Sexually Transmitted Diseases Course is to increase the understanding of sexually transmitted diseases.
2.Course contents	<p>The following topics will be covered within the Modules:</p> <p>Module 1. Sexually transmitted diseases and the most prevalent pathogens</p> <p>Module 2. Sexually transmitted diseases and laboratory surveillance</p> <p>Module 3. Human papillomaviruses</p> <p>Module 4. Chlamydial infections</p> <p>Module 5. HIV/AIDS in the world and in B&amp;H-measures of prevention and control</p> <p>Module 6. Who is the risk population for STD/HIV-risk factors?</p>
3.Learning outcomes (Knowledge, skills and competences)	<p>Students will be able to increase understanding of the most prevalent STD pathogens, the principles of early detection, available diagnostics, risk factors, therapeutic approaching to patients, concerning personality, socio-demographic factors of the environment, "core" group, and the stigmatization problem.</p> <p><i>Through the lectures the students will gain the following knowledge:</i></p> <ol style="list-style-type: none"> <li>1. Describe the presented diseases/infections, their epidemiology, prevention and control.</li> <li>2. Know about specimens collection and handling.</li> <li>3. Learn how to improve identification procedures: microscopy detection, cultivation, biochemical identification, and serology.</li> <li>4. Learn how to interpret and report results.</li> <li>5. Identify risk factors and clearly define them.</li> <li>6. Define the risk population for STD/HIV.</li> </ol> <p><i>Through the practical laboratory work students will acquire following skills:</i></p> <ul style="list-style-type: none"> <li>- Specimens sampling and handling</li> <li>- Recognition of risk factors and risk population</li> <li>- Identification of relation among papilloma genotypes and appearance of cervical cancer</li> </ul>
4.Teaching methods	<p>Lectures: 10 hours</p> <p>Laboratory practical work: 10 hours</p>
5.Method of knowledge assessment and examination	- Written test in the form of - Multiple choice questions (MCQ) tests and Extended response questions (ERQ) tests.

	Continuous knowledge and skills assessment will be carried out through Partial exam, Seminars and Practical laboratory Colloquium.
6.Literature	Recommended: 1. Carroll, K. (2016). <i>Jawetz, Melnick &amp; Adelberg's medical microbiology</i> . 1st ed. New York: McGraw-Hill Education.
7. Remarks	Student office hours are published in a separate schedule which can be found on the Department's notice-board and on faculty website. Pre-agreed consultations are obligatory, and can be scheduled with the Department's secretary or via e-mail: <a href="mailto:mikrobiologija@mf.unsa.ba">mikrobiologija@mf.unsa.ba</a>



Code: MFSE 1106	Course title: OCCUPATIONAL MEDICINE		
Level: undergraduate	Study year: VI	Semester: XI	ECTS: 2
Status: obligatory	Total contact hours: 30		
Prerequisites:	According to the Study Regulations		
Lecturers: dr.med.sc.Sanja Brekalo Lazarević, associate professor, mr.sci. dr. Jasmina Bišćević-Tokić, teaching assistant			
1. Overall aim	The objective of the course is to understand the significance and role of occupational medicine in science, clinics, work psychology, ergonomics, worker health care, the risks associated with workplace conditions, work health effects, and the harmful effects originating from the working environment.		
2. Course contents	To enable students to work independently on improving safety and health protection of workers. Preventing injuries at work, occupational diseases and other work-related illnesses.		
3. Learning outcomes (Knowledge, skills and competences)	<p>Throughout the course, students will adopt the following knowledge:</p> <p><b>Module 1. Occupational Psychology</b> The goal of the module is to familiarize the student with the meaning of work in an individual's life, characteristics that determine success in work (competence, skills and knowledge). Nature and the importance of motivation and stress at work.</p> <p><b>Module 2. Occupational Physiology</b> Objective of the module is to familiarize student with the function of an organism related to a specific professional work, methods of testing the functional ability of the respiratory and cardiovascular system in occupational medicine, energy consumption in working professions and the metabolic response to physical load.</p> <p><b>Modul 3. Workplace Protection and Harmfulness</b> Modul aim is to teach the student the purpose of workplace safety and to know which preventive measures must be taken in order prevent the illness/ injury of workers exposed to physical, chemical or biological agents, removal of potentially dangerous factors in the workplace.</p> <p><b>Modul 4. Work-Related Illnesses</b> Through this module students will be introduced with work-related illnesses, which represent a very wide spectrum of illnesses that are in some ways (not always causal), related to the vocation or working conditions and ethyology of multicausal diseases.</p>		

	<p><b>Modul 5. Occupational Diseases</b> Module aim is to acquaint students to the methods of diagnosing professional illness with a special focus on working anamnesis and laboratory examination. Organ and system diseases.</p> <p><b>Modul 6. Factors of Physical Nature</b> Module aim is to teach students how factors of physical nature (noise, vibration, elevated / reduced temperature at the workplace, ionizing and non-ionizing radiation) can lead to workers' disease, and learn what measures can be applied and workplace risk assessment.</p> <p><b>Module 7. Factors Of Chemical Nature</b> Module aim is to give students an idea of how chemical substances can affect the health status of workers, which diseases can appear due to chemical substances and the importance of removing potentially dangerous factors in the workplace.</p> <p><b>Module 8. Factors of Biological Nature</b> Module goal is to teach students which workplace can be a possible source of the disease, the cause can be viruses, bacteria, fungi and parasites, the importance of preventive measures, improvement of working conditions and organization of work.</p> <p><b>Module 9. Work Ability Evaluation</b> Module goal is to introduce students to the assessment of work ability to match the biological properties of the organism with the job requirement and that it aims to preserve the health of employees, preventing disability, the occurrence of occupational diseases and work-related diseases, all as a consequence, increasing the productivity of labor. Legislation in occupational medicine.</p> <p><b>Module 10. Workplace Health Promotion</b> Module goal is to inform students how risky work habits, high levels of stress, and inflexible work arrangements exemplify factors that have a detrimental effect on a healthcare worker. A high level of work absenteeism due to illness is not the only indicator of poor health in the workplace, it is also a sign of low productivity and success - issues that have a direct impact on the well-being of the organization.</p> <p><b>Module 11. Absentism</b> Module goal is to inform the student that absenteeism may be due to illness, accident at work or out of work, care or escorting a sick family member, and absenteeism due to isolation.</p> <p><b>Module 12. Presentism And Work Motivation</b> The goal of the module is to teach the student what is presentism, the importance of knowing the physical and mental state of workers in maintaining work capacity.</p>
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Through the teaching of the "Occupational Medicine" course, students will adopt **following skills**:

*Students need to learn how to perform following skills:*

- *Take correct working history*
- *Apply all methods of physical examination (palpation, percussion, auscultation)*
- *laboratory results interpretation*
- *electrocardiograms interpretation*
- *Chest X-ray interpretation*
- *spirometry interpretation*
- *otoscopy work*
- *audiometry interpretation*
- *vestibulometry interpretation*
- *ergometry performance (stress test)*
- *performance of Stereopsis tests*
- *Distant and near vision*
- *Determination of heavy metals in blood and urine samples (Pb, Mn, Zn, Cd) – AAS*
- *psychoactive substances analysis (methadone, marijuana, cocaine, amphetamine and alcohol in the blood and urine)- GC-MS*
- *noise, vibration, lighting reading on the machines for the working environment hygiene*

After completing the course student will adopt following attitudes:

- *importance and role of occupational medicine*
- *the importance of a proper working ability assessment, the right protection of workers from workplace injuries and legislation in occupational medicine*
- *for independent work a doctor must be able to evaluate the functions of the organism associated with the workplace*
- *the necessity of continuous improvement of the knowledge and quality of their work*



4. Teaching methods	<p>Teaching will be done through:</p> <ul style="list-style-type: none"> <li>- Lectures: 15 hours</li> <li>- Practicals: 15 hours</li> </ul>
5. Methods of knowledge assessment and examination	<p>Continuous examination of knowledge will be carried out within the course of teaching.</p> <p><b>Seminar</b>  During the seminar students' work will be continuously monitored through interactive lectures. Each student will be evaluated at the end of the semester by a grade (score) of 0-10 which will be added to the total number of points before concluding the final grade. In order to pass the seminar part, student must score 6 points at least.</p> <p><b>Practical exam:</b>  Written examination is in the form of a test (MCQ - multiple answers are possible), 30 questions, each correct answer carries 1 point. The maximum number of possible points is 20. In order to pass the exam, the student must have at least 55% of the correct answers, or 11.5 points. The number of gained points is added in forming the final grade.</p> <p>The regularity of attending classes (lectures and exercises) in the semester is a total of 10 points with a tolerance of 3% of absences.</p> <p><b>Partial exam:</b>  The student first takes practical exercises assessment knowledge and skills test. The exam is conducted in the form of a written test (MCQ questions - multiple answers are possible), 20 questions, each correct answer carries 1.0 points. The maximum number of gained points is 20. In order to pass the exam, the student must have at least 55% of the correct answers (11,5 points).</p>

	<p><b>Final exam:</b> During the final exam, the student takes the material that he did not previously pass during the course. Final exam is conducted and evaluated according to the previously defined methods of knowledge testing. Total points of the final test 40 points. In order for the exam to be considered passed, the student must have at least 55% correct answers, ie 22 points</p> <p><b>Re-testing and Repeated examination</b> Re-testing and Make-up examination are conducted according to the previously defined methods of Final examination.</p> <p>The final grade is formed by summing up all the points scored for each form of knowledge testing.</p> <table><tr><th>Rating</th><th>Points</th><th>Description</th></tr><tr><td>10 (A)</td><td>95-100</td><td>remarkable success without errors or with minor errors</td></tr><tr><td>9 (B)</td><td>85-94</td><td>above average, with some errors</td></tr><tr><td>8 (C)</td><td>75-84</td><td>average, with noticeable errors</td></tr><tr><td>7 (D)</td><td>65-74</td><td>generally good, but with significant shortcomings</td></tr><tr><td>6 (E)</td><td>55-64</td><td>meets the minimum criteria</td></tr><tr><td>5 (F, X)</td><td>&lt; 55</td><td>does not meet the minimum criteria</td></tr></table>	Rating	Points	Description	10 (A)	95-100	remarkable success without errors or with minor errors	9 (B)	85-94	above average, with some errors	8 (C)	75-84	average, with noticeable errors	7 (D)	65-74	generally good, but with significant shortcomings	6 (E)	55-64	meets the minimum criteria	5 (F, X)	< 55	does not meet the minimum criteria
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6 (E)	55-64	meets the minimum criteria																				
5 (F, X)	< 55	does not meet the minimum criteria																				
6. Literature	<ul style="list-style-type: none"><li>- McCunney RJ. A practical approach to occupational and environmental medicine 2nd edition. Philadelphia: Lippincott Williams &amp; Wilkins, 2003.</li><li>- McCunney RJ, Rountree PP. Occupational and environmental medicine: self-assessment review. 2nd edition, Philadelphia: Lippincott Williams &amp; Wilkins, 2004. Bove AA.</li></ul>																					
7. Remarks	Pre-agreed consultations are obligatory and can be scheduled with the Institute's secretary.																					

### COURSE PLAN: OCCUPATIONAL MEDICINE

Week	Teaching form and lessons	Hours
Week 1-3	<b>Lectures:</b> Definition, role and importance of Occupational medicine. Tasks and organization of Occupational medicine. Professional damage and preventive inspections. Basic concepts of physiology and psychology of work.	3
	<b>Practice:</b> Work psychology, importance of motivation at work. Physiology of work, fatigue and stress tests. Protection and harmfulness in the workplace. Work-related illnesses.	3
Week 4-6	<b>Lectures:</b> Occupational diseases. Professional traumatism. Work ability assessment. Work-related illnesses. Absentecism and presentism.	3
	<b>Practice:</b> Assessment of working ability, type and character. Recording of working history. Professional traumatism and injuries at work. Personal protective equipment, classification and importance.	3
Week 7-9	<b>Lectures:</b> Introduction to occupational pathology (chemical, physical factors and biological in nature. Occupational diseases. Occupational skin damage. Occupational malignancies.	3
	<b>Practice:</b> Occupational diseases. Occupational skin damage. Occupational malignant diseases. Noise and vibration. Working environment - microclimate, temperature, humidity and air flow velocity, heat indexes. Noise and vibration readout on the devices for work environment hygiene.	3
Week 10-12	<b>Lectures:</b> Occupational diseases of the respiratory tract. Interstitial lung diseases, diseases caused by asbestos, silicosis and pneumoconiosis, hypersensitivity pneumonitis, occupational asthma and bisinosis, tuberculosis as an occupational disease.	3
	<b>Practice:</b> Determination of air pollution, air sampling, determination of gas, vapor, and particulate concentrations. Introduction to the functional diagnostics of the respiratory tract-spirometry. Determination of air pollution, sampling of air, determination of concentration of gases, vapors and particles.	3
Week 13-15	<b>Lectures:</b> Workplace health promotion. Ethics in occupational medicine. Management in occupational medicine. Manifestations of stress at work (mobbing and burnout syndrome).	3
	<b>Practice:</b> Ergonomic workplace evaluation. Assessment of general workplace resources. Stress and workplace satisfaction. Protection and harmfulness of the workplace.	3
Week 16/18	<b>Final exam (regular examination term)</b>	
Week 19/20	<b>Final exam (retesting examination term)</b>	
September	<b>Final exam (September examination exam)</b>	





Code:	Course title: <b>THE BASICS OF POPULATION GENETICS IN MEDICINE</b>		
Level: <b>preclinical</b>	Study year: <b>I</b>	Semester: <b>II</b>	ECTS: 1
Status: <b>elective</b>	Total contact hours: <b>20</b>		
Prerequisites:	<b>According to the Study Regulation</b>		
Lecturer:	Jasmin Mušanović, MSc, PhD, Azra Metović MSc, PhD		
1. Overall aim	Adoption of knowledge and skills in the field of population genetics in medicine, which is necessary for a successful medical studies..		
2. Course contents	<p>Through the teaching of the subject "The Basics of Population Genetics in Medicine" the student will adopt the following knowledge:</p> <p><b>Module 1. Terms in population genetics</b></p> <p>The aim of the module is to adopt and increase the knowledge about basic genetic concepts of population genetics and to increase students' knowledge of the practical and theoretical application of population genetics with an emphasis on the significance of medical research.</p> <p><b>Module 2. Mechanisms that disrupt the genetic equilibrium (balance) of the population</b></p> <p>The aim of the module is to explain mechanisms of gene mutations that cause changes in the frequency of alleles in the population and their impact on diversity within the population as well as mutagenic performance principles. Observe the possible effects of the mutation on the genetic balance through examples of hereditary diseases that occur when the genetic balance is disturbed.</p> <p><b>Module 3. Population Variability</b></p> <p>The goal of the module is to clearly understand the importance of preserving genetic variability in the population.</p>		
3. Learning outcomes (Knowledge, skills and competences)	<p>Students will acquire knowlege needed for analysing allele frequency and their aplication in medicine. They will be introduced to genetic markers, analysis of DNA profile and will be able to give basic advice after seeing the condition of allele frequency in human population.</p> <p><i>Through the lectures students will gain following knowledge and competences:</i></p> <ol style="list-style-type: none"> <li>1. Learn basics terms about Population genetics and better understanding of etiology of variety of illness</li> <li>2. Discover mechanism that leads to mutation of genes and ther effect on human population</li> <li>3. Understand the importance of genetical diversity in human population</li> </ol> <p><i>Through the practical works students will acquire following skills:</i></p> <ul style="list-style-type: none"> <li>- analyze te allelic frequencies,</li> <li>- calculate allele frequencies in the population</li> <li>- determine whether the allele is the wild-type or mutant form</li> <li>- for genetic equilibrium and factor analysis, which is a disturbance of the disease and hereditary diseases,</li> </ul>		

	<ul style="list-style-type: none"> <li>- learn about genetic markers,</li> <li>- analyze the DNA profile (polymorphisms, mutations),</li> <li>- learn to how to give and provide basic genetic advice</li> <li>- phenotype properties of hereditary illness in population</li> </ul>
4. Teaching methods	<p>Lectures: 8 hours Seminar:2 Practical work: 10 hours</p>
5. Method of knowledge assessment and examination	<p>There are two partial exams consisted</p> <p><b>Partial exam 1 consists of a theoretical and a practical part.</b></p> <p><u>On the first partial exam</u> a student can win a maximum of 50 and a minimum of 27,5 points. On the first partial exam from the <b>practical</b> part, a student can win a maximum of 20 and a minimum of 11 points.</p> <p>On the first <b>theoretical</b> part, a student can win a maximum of 30 points and a minimum of 16,5 points.</p> <p><b>Partial exam 2 consists of a practical and theoretical part.</b></p> <p><u>On the second partial exam</u>, a student can win a maximum of 50 and a minimum of 27, 5 points.</p> <p>On the second partial exam from the <b>practical</b> part, a student can win a maximum of 20 and a minimum of 11 points. On the <b>theoretical</b> part, a student can win a maximum of 30 points and a minimum of 16, 5 points.</p> <p>If the student did not meet the partial exam, he / she would take part in the final exam. Scoring (continuous assessment of knowledge) will be done by different methods of assessment (MCQ, essay, student activity, and if necessary oral examination but not mandatory). The professor reserves the right to add up to 5 points due to the student's activities. (the points cannot be added if the exam is not passed)</p>

	Formation of cumulative assessment		
	Rating	Number of points	Description Rating
	10 (A)	95-100	remarkable success without mistakes or with minor errors
	9 (B)	85-94	above average, with some mistakes
	8 (C)	75-84	average, with subtle errors
	7 (D)	65-74	generally good, but with significant shortcomings
	6 (E)	55- 64	meets the minimum criteria
	5 (F.FX)	≤ 55	does not meet the minimum criteria
6. Literature	<b>Obligatory:</b> <ol style="list-style-type: none"> <li>1. Daniel HL, Maryellen R, Genetics: Analysis of Genes and Genomes. 8th Edition. USA. Jones &amp; Bartlett Learning; 2012.</li> <li>2. Bruce A, Alexander DJ, Julian L, David M, Martin R, Keith R, Peter Walter. Molecular Biology of THE CELL. 6<sup>th</sup> edition. USA. Garland Sciences; 2015.</li> </ol> <b>Recommended:</b> <ol style="list-style-type: none"> <li>3. Ricki L. Human Genetics- Concepts and Applications. 10th edition. USA. Mc Graw Hill; 2012.</li> <li>4. HANDOUTS</li> </ol>		

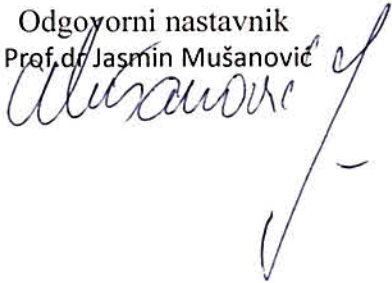


## COURSE PLAN: THE BASICS OF POPULATION GENETICS IN MEDICINE

Weeks	Forms of instruction and materials	Number of classes
Week 1.	<b>Lecture:</b> Historical development of population genetics, definition and explanation of population genetics	1
Week 2.	<b>Lecture:</b> Genetic markers, DNA molecule	1
Week 3.	<b>Practice:</b> Model of DNA molecule, sense and antisense strands of DNA molecule, gene, allelic variants of different populations	2
Week 4.	<b>Lecture:</b> Genetic markers	1
Week 5.	<b>Lecture:</b> Allele frequencies, the importance of knowing allele frequencies, DNA profile in population genetics.	1
Week 6.	<b>Practice:</b> DNA profile in the population analysis, the methods used to create a DNA profile	2
Week 7.	<b>Lecture:</b> The genetic diversity of the population, stable population, Hardy- Weinberg equilibrium, disequilibrium	1
Week 8.	<b>Lecture:</b> Polymorphism and allelic frequencies, factors that disturb the Hardy-Weinberg principle, the nonrandom mating, inbreeding, outbreeding, mutations, genetic drift, migration, natural selection, isolation	1
	<b>Practice:</b> DNA profile (DNA profile –showing polymorphisms in the DNA profile, the importance of polymorphisms, showing mutations in the DNA profile, the impact of mutation to the allelic frequency and balance of the population)	1
Week 9.	<b>Mid-term exam 1 ( Partial exam 1)</b>	1
Week 10.	<b>Lecture:</b> The bottleneck in population genetics, effects on the population	1
Week 11.	<b>Lecture:</b> Hereditary diseases that occur in isolated and local populations	1
Week 12.	<b>Practice:</b> The analysis of allele frequencies in heterogeneous populations - a comparative analysis	2
Week 13.	<b>Seminar:</b> Genetic consequences of isolation of human populations	1

Week 14.	<b>Practice:</b> The analysis of allele frequencies in a small local and isolated populations – a comparative	1
	<b>Seminar:</b> Benefit of genetic variability of human populations	1
Week 15.	<b>Mid-term exam 2 ( Partial exam 2)</b>	1
Week 16.	<b>Final exam</b>	
Weeks 17-20.	<b>Make-up exam</b>	

Odgovorni nastavnik  
Prof. dr. Jasmin Mušanović



Code:	Course title: <b>CELL BIOLOGY AND HUMAN GENETICS</b>		
Level: <b>preclinical</b>	Study year: <b>I</b>	Semester: <b>I</b>	ECTS: <b>7</b>
Status: <b>obligatory</b>	Total contact hours: <b>90</b>		
Prerequisites:	<b>According to the Study Regulation</b>		
Lecturer:	Jasmin Mušanović, MSc, PhD, Azra Metović MSc, PhD		
1. Overall aim	The purpose of the subject is to examine complex events in a human cell, or in the body as a whole, in order to adequately position the role of inheritance in controlling human health.		
2. Course contents	<p>The following topics will be covered during the Modules:</p> <p><b>Module 1: Biology of Cells / Cells</b>          The objective of the module is to give a general outline about cells: formation, structure and function of cells</p> <p><b>Module 2: Molecular genetics of the human genome</b>          The aim of the module is to introduce students with structure, molecular organization and function of genetic material (DNA, genome, genes, chromosomes)</p> <p><b>Module 3: Mechanisms of reproduction</b>          The aim of the module is to introduce students to the methods of reproduction of biological systems</p> <p><b>Module 4: Basics and principles of genetic information flow</b>          The aim of the module is to introduce students with basic genetic mechanisms - Central Dogma of Molecular Biology - CDMB</p> <p><b>Module 5: Cellular and molecular basis of inheritance</b>          The aim of the module is to familiarize student with the legality and the types of biological inheritance of normal and pathological traits</p> <p><b>Module 6: Mutagenesis, carcinogenesis, teratogenesis</b>          The aim of the module is to acquaint student with the causes, types and consequences of hereditary based disorders, reparation possibilities, and the genetic causes of cancerogenesis and teratogenesis</p> <p><b>Module 7: Introduction to Genetics and Biotechnology</b>          The aim of the module is to introduce student with the basic principles of recombinant DNA technology and the possibilities of applying the same into the medicine</p>		
3. Learning outcomes (Knowledge, skills and competences)	<p><i>Through the lectures of Biology and Human Genetics students will gain following knowledge and competences:</i></p> <ul style="list-style-type: none"> <li>- Types of cellular organs, function of cell organelles</li> <li>- Structure, molecular organization and function of genetic material (DNA, RNA, genome, genes, chromosomes)</li> <li>- Types of reproduction of biological systems</li> <li>- Basic genetic mechanisms - central dogma of molecular biology CDMB</li> <li>- Principle and types of biological inheritance</li> <li>- Understand mechanisms of mutation</li> </ul>		



	<ul style="list-style-type: none"> <li>- Types and consequences of hereditary diseases, genetic and epigenetic factors of carcinogenesis and teratogenesis</li> <li>- Basic Principles of Recombinant DNA Technology and Its Applications in Medicine</li> </ul> <p><i>Through the practical work students will acquire following skills:</i></p> <ul style="list-style-type: none"> <li>- Microscopy</li> <li>- Native and permanent slides production</li> <li>- Recognition and differentiation of different phases of mitosis, meiosis and spermatogenesis</li> <li>- Interpretation of human karyotype</li> <li>- Proper reading and interpretation of the human karyogram (normal and pathological)</li> <li>- Explain mechanisms that can lead to a human hereditary disorders</li> <li>- Analysis and explanation of DNA profiles</li> <li>- Explain the basic techniques of molecular genetics in the diagnosis of hereditary diseases</li> <li>- Proper usage of ISCN ( International System for Human Cytogenetic Nomenclature)</li> <li>- Ability to create and explain heredogram (pedigree)</li> </ul>
4. Teaching methods	<p>Lectures 45 hours</p> <p>Practical work: 45 hours</p>
5. Method of knowledge assessment and examination	<p>There are two partial exams consisted</p> <p><b>Partial exam 1 consists of a theoretical and a practical part.</b></p> <p><u>On the first partial exam</u> a student can win a maximum of 50 and a minimum of 27,5 points.</p> <p>On the first partial exam from the <b>practical</b> part, a student can win a maximum of 20 and a minimum of 11 points.</p> <p>On the first <b>theoretical</b> part, a student can win a maximum of 30 points and a minimum of 16, 5 points.</p> <p><b>Partial exam 2 consists of a practical and theoretical part.</b></p> <p><u>On the second partial exam</u>, a student can win a maximum of 50 and a minimum of 27,5 points.</p> <p>On the second partial exam from the <b>practical</b> part, a student can win a maximum of 20 and a minimum of 11 points.</p> <p>On the <b>theoretical</b> part, a student can win a maximum of 30 points and a minimum of 16, 5 points.</p> <p>If the student did not meet the partial exam, he / she would take part in the final exam.</p> <p>Scoring (continuous assessment of knowledge) will be done by different methods of assessment (MCQ, essay, student activity, and if necessary oral examination but not mandatory).</p>

	<p>The professor reserves the right to add up to 5 points due to the student's activities. (the points cannot be added if the exam is not passed)</p> <p>Formation of cumulative assessment</p> <table><tr><th>Rating</th><th>Number of points</th><th>Description Rating</th></tr><tr><td>10 (A)</td><td>95-100</td><td>remarkable success without mistakes or with minor errors</td></tr><tr><td>9 (B)</td><td>85-94</td><td>above average, with some mistakes</td></tr><tr><td>8 (C)</td><td>75-84</td><td>average, with subtle errors</td></tr><tr><td>7 (D)</td><td>65-74</td><td>generally good, but with significant shortcomings</td></tr><tr><td>6 (E)</td><td>55- 64</td><td>meets the minimum criteria</td></tr><tr><td>5 (F.FX)</td><td>&lt; 55</td><td>does not meet the minimum criteria</td></tr></table>	Rating	Number of points	Description Rating	10 (A)	95-100	remarkable success without mistakes or with minor errors	9 (B)	85-94	above average, with some mistakes	8 (C)	75-84	average, with subtle errors	7 (D)	65-74	generally good, but with significant shortcomings	6 (E)	55- 64	meets the minimum criteria	5 (F.FX)	< 55	does not meet the minimum criteria
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## COURSE PLAN: CELL BIOLOGY AND HUMAN GENETICS

Weeks	Form of Instructions and materials	Number of classes
Week 1.	<b>Lectures:</b> Cell. Biology today, Molecular Biology of the cell. The evolution of prokaryotic and eukaryotic cells. Cells as an experimental model. General plan of the cell structure, the chemical structure of the cell. The role of enzymes as biological catalysts. Cell membrane: ultrastructure, universal organization (Singer-Nicolson membrane model) and functions. The cytoskeleton - microfilaments. Intermediate filaments, microtubules. The nucleus, transport into and out from the nucleus, nucleolar envelope, chromatin, Nucleolus (structure and function). Endoplasmic reticulum, golgi apparatus, lysosomes, mitochondria, ribosomes. For all organelles: structure, function, effects due to disturbances of the same.	3
	<b>Practice:</b> Molecular model of DNA molecule. DNA fragments identification.	3
Week 2.	<b>Lectures:</b> The cellular and molecular basis of heredity. DNA as the hereditary material. Types of DNA sequences. The genetic code. Human chromosomes - morphological, chemical and molecular structure. Methods of analysis of chromosomes. Nomenclature of chromosomes. Human genome. Gene and genetic information: structure (introns, exons, promoter, terminator) and functions.	3
	<b>Practice:</b> The microscope and microscopic techniques. The Electron microscope - cell organelles presentations.	3
Week 3.	<b>Lectures:</b> Introduction to Molecular Biology: DNA replication (characteristics, enzymes, importance). The cell cycle: the cell cycle of eukaryotic cells, checkpoints, regulation of the cell cycle. The nucleus and nucleolus during mitosis, phases of mitosis.	3
	<b>Practice:</b> The cell division - mitosis (Slides-root meristem cells of <i>Allium cepa</i> ). Preparing <i>Allium cepa</i> bulbs for mutagenesis.	3



Week 4.	<b>Lectures:</b> Meiosis, gametogenesis: Genetic significance of meiosis. Gametogenesis (spermatogenesis and oogenesis, sperm development, oocyte development, fertilization, embryo, fetus, birth defects). Genetic recombination: - Homologous: synapsis, chiasma, crossing-over - Non-homologous (insertion sequences / transposons). Fertilization. Sex determination and differentiation in people (the role of sex chromosomes).	3
	<b>Practice:</b> Meiosis (permanent slides).	2
	Gametogenesis: Spermatogenesis (permanent slides- <i>Mus musculus</i> testicle), Oogenesis.	2
Week 5.	<b>Lectures:</b> Principles of Medical Genetics: The consequences of meiosis: origin and causes of non-disjunction of homologous chromosomes, chromosome sets in humans. Chromosome aberration: numerical and structural.	3
	<b>Practice:</b> Human karyotype (observing slides - metaphase chromosomes from human peripheral blood lymphocytes). Chromosomes mutation (making temporary slides - observing effects of mutagens in the root cells of <i>Allium cepa</i> )	3
Week 6.	<b>Lectures:</b> Impact of genetics to medicine: human karyotype and karyogram. The importance of genetically caused diseases in humans. Multifactorial disorders. Syndromes and pathological conditions as a result of chromosomal abnormalities (etiology, incidence, characteristics, consequences and risk of manifestation / repetition).	3
	Prenatal and pre-implantation diagnosis of hereditary diseases.	1
	<b>Practice:</b> Human normal and pathological karyogram. Drawing and pasting.	3
Week 7.	<b>Mid-term exam 1 ( Partial exam 1)</b>	3
	<b>Lecture:</b> Biomarkers in human genetics, the use and importance.  Immunogenetics (The immune system and genetics)	2
Week 8.	<b>Lectures:</b> Biosynthesis of cell constituents. The synthesis and processing of RNA – transcription. Molecular basis and principles of the flow of genetic information. Transcription - RNA synthesis (from DNA to RNA): - RNA polymerase enzyme (structure, types, functions) - stages in the process of transcription, - transcription of structural genes - (DNA → mRNA; cod → codon; characteristics), - structure of the mRNA in procariotes and eukaryotes, - processing of primary transcripts, pre- mRNK,	3

	<p>- splicing and alternative redrawing.</p> <p><b>Practice:</b> Occuring mechanism of numerical chromosome aberrations in humans. Primary nondisjunction of autosomes and sex chromosomes. Phenotypic characteristics of syndromes resulting from numerical and structural aberrations of autosomes (exposing students).</p>	3
Week 9.	<p><b>Lectures:</b> Synthesis and processing of proteins: Translation of the genetic information (from DNA to proteins), genetic code. Activation of the amino acid. Initiation, elongation and termination of translation. - function of mRNA, tRNA, rRNA in the process of translation, - typical enzymes and protein factors. Regulation of protein synthesis in procariotes and eukaryotes.</p> <p>Mitochondrial DNA and mitochondrial genome. Extranuclear inheritance of human diseases. Rare genetic diseases</p> <p><b>Practice:</b> Secondary and postzygotic nondisjunction. Phenotypic characteristics of syndromes resulting from numerical aberrations of sex chromosomes (exposing students).</p>	2 2 3
Week 10.	<p><b>Lectures:</b> Mutations; Molecular biology in medicine and system of reparations. Biological variability. - types of genetic mutations and consequences (examples), - mutagenic agents, Mechanisms for reparation: pre-replicative and pos-treplicative reparations.</p> <p><b>Practice:</b> DNA profile in medicine. The basic laws of inheritance. Mendelian inheritance. Diseases caused by changes in the genetic material of man (exposing students).</p>	3 3
Week 11.	<p><b>Lectures:</b> The principles of Medical genetics. Gregor Mendel and the laws of inheritance. Monohybrid inheritance. Basic principles, principles and types of biological inheritance. - chromosome theory of inheritance (gene, loci, alleles, genotype, phenotype, genes distribution and traits, expressiveness and penetrability of genes), - interaction of allelic genes –monogenic inheritance (dominant, recessive, intermediate, pseudoautosomal, codominant - examples). Epigenetics.</p> <p><b>Practice:</b> Models of inheritance - studying family, inheritance of normal and pathological conditions in humans (autosomal, sex-related).</p>	3 3
Week 12.	<p><b>Lectures:</b> Models of inheritance. Interaction of non-allelic genes - polygenic inheritance (additive and complementary polygeny; epistasis). Sex – Chromosome inheritance. Mitochondrial inheritance. Free combination of genes, gene mapping.</p>	3

	<b>Practice:</b> Multiple alleles and polygenic inheritance, linked inheritance. Twins-importance for research in human genetics. Analysis of cytogenetic findings in medicine. Explanation of ISCN.	3
Week 13.	<b>Lectures:</b> Cancer Development genes and cancer. Positional effects and development genes. Tumor genetics: development and causes of occurrence. Proto-oncogenes, oncogenes, tumor suppressor genes. Tumors - cell cycle, apoptosis, the role of telomeres in tumors. Molecular Biology of the prevention and treatment of cancer.  Gene therapy, and potential applications in human genetics.  <b>Practice:</b> Sex chromosome chromatin. Genetic testing of monogenic disorders by methods of medical genetics from sample to findings (explanation of Electrophoresis, PCR, RTPCR, DNA sequencing), (exposing students).	3  1  3
Week 14.	<b>Lectures:</b> DNA technology (genetic engineering) and its application. Principles of genetic engineering. The forms of cloning. Gene banks. Vectors. Ethical principles.  Recombinant DNA technology. Advantages and disadvantages of the recombinant DNA technology.  <b>Practise:</b> Genetics tasks. Creating a heredogram. Genealogy symbols and abbreviation. Observation of Barr bodies from buccal cells of smokers and nonsmokers (native preparations).	2   1  3
Week 15.	<b>Mid – term 2 (Partial exam 2)</b>	3
Week 16.	<b>Final exam</b>	
Weeks 17–20.	<b>Make-up exam</b>	

Prof. dr Jasmin Mušanović



Code:MFSE0307	Course title: MEDICAL CYTOGENETICS		
Level:	Study year: II	Semester: IV	ECTS: 1
Status: Elective	Total contact hours: 20		
Prerequisites:	<b>According to the Study Regulation</b>		
Lecturers:	Azra Metović, MSc,PhD Jasmin Mušanović, MSc,PhD		
1. Overall aim	The overall aim of the Medical Cytogenetics course is to expand the theoretical knowledge about the constitutive well as acquired chromosomal aberrations, to acquire practical knowledge on techniques of classical and molecular cytogenetics, and possibilities for their applications in the diagnosis, prevention and treatment.		
2.Course contents	<p>The following topics will be covered within the Modules:</p> <p><b>Module 1.</b> Cytogenetics in medical practice</p> <p><b>Module 2.</b> Methods of classical and molecular cytogenetics</p> <p><b>Module 3.</b> Cytogenetics features and clinical manifestations of chromosome aberrations</p> <p><b>Module 4.</b> Genetic information (advice)</p>		
3.Learning outcomes (Knowledge, skills and competences)	<p>Students will acquire knowledge necessary for understanding normal and changed human chromosomes constitution as a determining factor in etiology, manifestation and inheritance of pathological conditions in the human population. They will be able to understand the importance of karyotype analysis in patients with reproductive problems, congenital anomalies and those that are suffering from cancer, as well as importance of respecting ethical standards.</p> <p><b><i>Through the lectures students will gain following knowledge :</i></b></p> <ol style="list-style-type: none"> <li>1. Understanding the importance and portion of chromosome constitution in the etiology, inheritance and manifestation of pathologic conditions in the human population.</li> <li>2. Selection the appropriate cytogenetic research in chromosomopathy diagnostics and to understand how to read formula and where to apply it.</li> <li>3. The risk assessment of physical and chemical mutagenes.</li> <li>4. Appropriate genetic information about a patient.</li> </ol> <p><b><i>Through the practical laboratory work students will acquire following skills:</i></b></p> <ul style="list-style-type: none"> <li>• Establishing a culture of human peripheral blood lymphocytes</li> <li>• Preparation of human karyotype</li> <li>• Identification of normal and aberrant karyotype by microscopic analysis</li> <li>• Identification of chromosomal aberration ( numerical / structural)</li> <li>• Arranging and interpreting of karyogram</li> <li>• Writing the appropriate formula of karyotype</li> </ul>		

	<ul style="list-style-type: none"> <li>Assessment of the risk of manifestation/repeating of certain chromosomopathy</li> <li>Differentiate constitutional and acquired karyotype</li> </ul>
4.Teaching methods	Lectures 10 hours Practical work : 10 hours
5.Method of knowledge assessment and examination	<p>Written tests in the form of - Multiple choice questions - (MCQ) tests and Extended response questions (ERQ) tests.</p> <p>Continuous knowledge and skills assessment will be carried out through Partial exams and Partial Laboratory Colloquium.</p> <p>The professor reserve the right to add up to 5 points due to the student 's activities. ( the points cannot be added if the exam is not passed).</p>
6. Literature	<ol style="list-style-type: none"> <li>Hong Fong L.M. Medical Cytogenetics. Marcel Dekker AG: 2000.</li> <li>ISCN 2013: International System for Human Cytogenetic Nomenclature. KARGER; 2013.</li> <li>Ilbrulj S, Haverić S. Haverić A. Citogenetičke metode - primjena u medicini. Institut za genetičko inženjerstvo i biotehnologiju. Sarajevo ; 2008</li> </ol>

#### **COURSE PLAN:Medical cytogenetics**

<b>Weeks</b>	<b>Form of Instructions and materials</b>	<b>Number of classes</b>
Week 1.	<b>Lecture:</b> Introduction to cytogenetics: historical development of cytogenetics as a science, possibilities and purpose of application in medical practice. Human cytogenetic nomenclature.	2
Week 2.	<b>Exercises:</b> Organization of cytogenetic laboratories and principles of work in it.	1

Week 3.	<p><b>Lecture:</b> Prenatal and postnatal cytogenetic diagnostics of constitutive and acquired chromosome aberrations: indications, patterns, methods and their diagnostic potential.</p> <p>Methods of classical and molecular cytogenetics: FISH (fluorescent in situ hybridisation), CGH (comparative genetic hybridization), SKY (spectral karyotyping), Clinical application and diagnostic potential in the identification and characterization of chromosomal diseases / conditions.</p>	2
Week 4.	<p><b>Exercises:</b> Checking previously accepted skills.</p> <p>Culture and harvest of tissues for chromosome analysis</p>	1
Week 5.	<p><b>Exercises:</b> Microscopic analysis of the karyotype. Metaphase arranged in standard karyotype format and interpretation of the findings</p>	1
Week 6.	<p><b>Exercises:</b> Checking previously accepted skills.</p> <p>Methods of classical cytogenetics and their application: chromosome aberration test, micronucleus test, sister chromatid exchange test.</p>	2
Week 7.	<b>Mid-term exam 1 ( Partial exam 1)</b>	1
Week 8.	<p><b>Lecture:</b> Cytogenetic features and clinical manifestations of common structural and numerical chromosome aberrations (etiology, incidence, characteristics, consequences and risk of repetition, phenotype / genotype correlation.</p>	2
Week 9.	<p><b>Exercises:</b> Checking previously accepted skills.</p> <p>Interphase and metaphase FISH: microscopic analysis and interpretation.</p>	1
Week 10.	<p><b>Exercises:</b> Chromosomal changes in the karyotype of persons with physical and mental disorders.</p>	1
Week 11	<p><b>Exercises:</b> Checking previously accepted skills.</p> <p>Microscopic analysis of karyotype and identification of different aberrations in patients with leukemia</p>	1



Week 12.	<b>Lecture:</b> Reproductive Effects of Balanced Chromosomal Redistribution. Cytogenetics of malignant diseases. Clinical significance of cytogenetic findings in oncology.	2
Week 13.	<b>Lecture:</b> Genetic information ("advice"): indications (to whom and when?) Postulates, goals, significance, phases, risk / exposure assessment, ethical principles.	2
Week 14.	<b>Exercises:</b> Checking previously accepted skills.  Interpretation of specific cytogenetic findings from practice.	2
Week 15.	Final exam (regular term)	1
Weeks. 17/18	Final exam (make-up examination term)	
Weeks 19/20	Final exam (September make-up exam)	
September		

Code: <b>MFSE 0805</b>	Course title: <b>DERMATOVENEROLOGY</b>		
Level: <b>undergraduate</b>	Study year: <b>IV</b>	Semester: <b>VIII</b>	ECTS : <b>5</b>
Status: <b>obligatory</b>	Total contact hours: <b>60</b>		
Prerequisites:	<b>According to the Study Regulation</b>		
Lecturers:	<b>Associate professor Emina Kasumagić-Halilović</b>		
1. Overall aim	<p>The overall aim of Dermatovenerology course is to introduce students with:</p> <ul style="list-style-type: none"> <li>-Etiology, pathogenesis and clinical picture of the most common diseases of the skin and mucous membranes</li> <li>-Tumours of the skin and mucous membranes</li> <li>-Sexually transmitted diseases</li> <li>-Diagnostics of the most common skin diseases and</li> <li>-Therapeutic options in dermatovenereology</li> </ul>		
2. Course contents	<p>The following topics will be covered during the Modules:</p> <p><b>Module 1. Structure and functions of the skin. Skin immunology.</b>  The goal of the module is to introduce students to the structure and functions of the skin, skin immunology, taking a history, terminology of skin lesions, principles of dermatological diagnostics, and basic principles of general, local and physical dermatological therapy.</p> <p><b>Module 2. Skin infections: bacterial, viral, fungal, parasitic.</b>  The goal of the module is to introduce student with skin infection diseases-bacterial, viral, fungal and parasitic infections.</p> <p><b>Module 3. Allergic skin diseases</b>  The goal of the module is to introduce a student with allergic skin diseases: urticaria, angioedema, hypersensitivity to insect bites, anaphylactic shock, drug reactions, dermatitis.</p> <p><b>Module 4. Papulosquamous diseases and erythroderma</b>  The goal of the module is to introduce a student with a erythematosus diseases: psoriasis, parapsoriasis, lichen, erythrodermia.</p> <p><b>Module 5. Inherited disorders</b>  The goal of the module is to introduce a student with hereditary skin diseases: inherited disorders of keratinization and bullous epidermolysis.</p> <p><b>Module 6. Autoimmune diseases</b>  The goal of the module is to introduce a student with autoimmune diseases of the skin: autoimmune bullous dermatoses, scleroderma, lupus erythematosus, dermatomyositis.</p>		

	<p><b>Module 7. Pigmentation disorders, photosensitivity</b> The goal of the module is to introduce a student with skin pigmentation disorders (hyperpigmentation and hypopigmentation) and photosensitivity.</p> <p><b>Module 8. Diseases of skin adnexa</b> The goal of the module is to introduce a student with disorders of skin appendages sebaceous glands, hair and nails).</p> <p><b>Module 9. Skin tumours</b> The goal of the module is to introduce a student with skin tumours (benign skin tumours, precanceroses, malignant skin tumours and lymphomas).</p> <p><b>Module 10. Sexually transmitted diseases</b> The goal of the module is to introduce a student with sexually transmitted diseases.</p>
3. Learning outcomes (Knowledge, skills and competences)	<p>Students will acquire knowledge necessary to recognize, describe, explain and evaluate common symptoms and signs of skin diseases and sexually transmitted diseases. They will be able to manage independently and efficiently all medical emergencies related with skin and to adopt preventive measures at individual and community levels against communicable skin. Students will also be able to teach requisite knowledge and laboratory skills to other medical team members and to critically evaluate and initiate for solving problems relating to skin.</p> <p><i>Through the lectures the students will adopt the following knowledge and competences:</i></p> <ol style="list-style-type: none"> <li>1. Learn structure and function of the skin, skin adnexa, immunology skin, anamnesis of dermatovenereological patients, efflorescence, the basic principles of dermatologic diagnosis and the basic principles of topical, systemic, physical and surgical dermatological therapy.</li> <li>2. Familiar with diseases of the skin caused by external factors infectious nature (bacterial, viral, fungal and parasitic).</li> <li>3. Learn allergic diseases: urticaria, angioedema, hypersensitivity to insect stings, anaphylactic shock, adverse drug reactions and dermatitis.</li> <li>4. Develop a basic understanding of papulosquamous disorders: psoriasis, parapsoriasis, lichen and erythroderma.</li> <li>5. Learn about hereditary skin diseases: hereditary disorders of keratinization and epidermolysis bullosa.</li> <li>6. Learn the basics of autoimmune diseases of the skin: autoimmune bullous diseases (pemphigus and pemphigoid group), scleroderma, erythematosus, dermatomyositis.</li> </ol>



	<p>7. Develop a basic understanding of disorders of skin pigmentation (hyperpigmentation and hypopigmentation) and skin damage caused by ultraviolet radiation.</p> <p>8. Learn about diseases of the skin adnexa (sebaceous glands, hair and nails)</p> <p>9. Learn benign skin tumours, precancerous lesions, malignant skin tumours and lymphomas.</p> <p>10. Know the ways of transmitting, clinical pictures and treatment of venereal disease.</p> <p><i>Through the practical work students will acquire the following skills:</i></p> <ul style="list-style-type: none"> <li>- Take anamnesis</li> <li>- Diagnostic methods in allergology: prick test, intradermal test, patch test, procedures and elimination of exposure test in acute nutritive urticaria.</li> <li>- The diagnostic methods for bacterial diseases: vitropression, test probe, punction and incision of furunculi.</li> <li>- Diagnostic methods in fungal diseases: taking material for native preparation and culture.</li> <li>- Diagnostic methods in parasitic diseases: taking material and interpretation of the results in scabies and Demodex folliculorum.</li> <li>- Autoimmune diseases of the skin: laboratory diagnostic tests at erythematosus, scleroderma, dermatomyositis, autoimmune bullous diseases (Nikolsky's sign, Tzank test, direct and indirect immunofluorescence).</li> <li>- Skin tumours: taking a biopsy and histopathological interpretation, to differentiate pigmented and non-pigmented lesions on dermoscopy.</li> </ul>
4. Teaching methods	<ul style="list-style-type: none"> <li>- Lectures 30 hours</li> <li>- Practical work 30 hours</li> </ul>
5. Methods of knowledge assessment and examination	<p>Continuous knowledge and skills assessment will be carried out through Partial exam 1, Partial exam 2, and Practical exam.</p> <p><b>Partial exam 1</b></p> <p>It covers the assessment of knowledge passed through modules 1, 2, 3, 4 and 5 in the form of an MCQ test with 20 questions and in a form of an oral examination of knowledge based on 3 selected exam questions printed on the test card. Each correct answer to the MCQ question is 1 point, and every correct answer to the question is scored with a maximum of 5 points. The maximum number of points that the student can obtain in the Partial exam 1 is 35 points.</p> <p>The student must gain at least 19 points to be considered passed the partial exam 1. The awarded number of points is added to the other points when forming the final grade.</p>

**Partial exam 2**

It covers the examination of knowledge passed through modules 6, 7, 8, 9 and 10 in the form of an MCQ test with 20 questions and in a form of an oral examination of knowledge based on 3 selected exam questions printed on the test card. Each correct answer to the MCQ question is 1 point, and every correct answer to the question is scored with a maximum of 5 points. The maximum number of points that the student can obtain in the Partial exam 2 is 35 points.

The student must gain at least 19 points to be considered passed the partial exam 2. The awarded number of points is added to the other points when forming the final grade.

**Practical exam**

Practical exam entails assessing the acquired skills during the course (taking anamnesis and local dermatological examination of the patients) processed through all the modules. Evaluation of the adopted skills will be accomplished through the fulfillment of the tasks defined in the checklist. Each task carries the appropriate number of points. The total number of points a student can earn is 30. Practical exam will be considered passed in the student wins at least 17 points. The awarded number of points is added to the other points when forming the final grade.

**Regular final examination term**

On Regular final exam, the student takes the exam that he did not pass during the continuous assessment of the knowledge. A successfully passed practical exam is required to take a written part and oral examination of the Regular final exam.

Regular final exam is conducted and evaluated according to predefined methods of knowledge checking.

**Final Exam in the correctional term / September examination test**

Final exam in the correctional term /September examination term are conducted according to the previously defined criteria of the Regular final exam.

**Forming a final grade**

The total number of points won on all forms of knowledge testing is translated into the final grade as follows:

Rating	Number of points	Description Rating
10 (A)	95-100	remarkable success without mistakes or with minor errors
9 (B)	85-94	above average, with some mistakes
8 (C)	75-84	average, with subtle errors
7 (D)	65 -74	generally good, but with significant shortcomings

	6 (E)            55-64            meets the minimum criteria 5 (F, FX)       < 55            does not meet the minimum criteria
6. Literature	<p><b>Obligatory:</b></p> <ul style="list-style-type: none"> <li>- Goldsmith L, Katz S, Gilchrest B, Paller A, Leffell D, Wolf K, Fitzpatrick TB (editors). Fitzpatrick's Dermatology in General Medicine 8<sup>th</sup> Edition, New York: McGraw-Hill Medical Pub. 2012</li> </ul> <p><b>Additional:</b></p> <ul style="list-style-type: none"> <li>- Burgdorf W, Plewig G, Wolff HH, Landthaler M (Eds) Braun-Falco's Dermatology 3<sup>rd</sup>. Berlin-Heidelberg: Springer, 2009.</li> </ul>
7.Remark	<p>Lectures will be conducted according to the Plan and the curriculum at the Amphitheatres in the Clinical Centre of the University of Sarajevo. All forms of instruction are compulsory. Exercises can be attended only by students who have valid sanitary booklet and proper uniform. Fixing absences from classes is in accordance with applicable legal regulations. Consultation period for students is any working day pre-reserved with Head of Cathedra: emina.kasumagic@mf.unsa.ba</p>



## PLAN OF SUBJECT: DERMATOVENEREOLOGY

Week 13.	Form of teaching	Hours
Monday	<b>Lecture:</b> Introduction to dermatology. Structure and function of the skin. Immunology of the skin. Skin reactions of hypersensitivity. Terminology of skin lesions. Diagnosis and therapy of dermatological diseases-general principles.	3
	<b>Practical work:</b> Terminology of skin lesions. History taking in dermatology. Examining the skin. Practical skin procedures. Basic principles of dermatological diagnostics. Basic principles of dermatological therapy: topical, systemic, surgical and physical therapy.	3
Tuesday	<b>Lecture:</b> Bacterial skin infections-staphylococcal and streptococcal infections, corynebacterial infections, mycobacterial infections. Viral, skin infections-herpes simplex and varicella zoster virus infections, human papillomavirus infections, cutaneous manifestations of human immunodeficiency virus. Fungal skin infections-dermatophytoses and candidiasis. Parasitic infections-scabies and pediculosis. Tropical skin diseases.	3
	<b>Practical work:</b> Introducing students with skin diseases caused by infectious agents: bacterial, viral, fungal and parasitic agents. Demonstration of sampling for bacteriological analysis. The diagnostic methods for bacterial diseases: vitropression, Gram staining and culture of pus or exudates, punctuation and incision of furunculi. Basic principles of viral skin infection. Diagnostic methods in fungal diseases: taking material for native preparation and culture. Diagnostic methods in parasitic diseases: taking material and interpretation of the results in scabies.	3
Wednesday	<b>Lecture:</b> Allergic skin diseases: urticaria, angioedema, serum disease, hypersensitivity to insect bites, anaphylactic shock, adverse drug reactions. Dermatitis: contact allergic and non-allergic dermatitis. Atopic dermatitis.	3
	<b>Practical work:</b> Presentation of patients with allergic skin diseases. Demonstration of allergic testing: prick test, scratch test, intradermal and epicutaneous tests, drug exposure, physical tests.	3
Thursday	<b>Lecture:</b> Papulosquamous diseases: psoriasis, parapsoriasis, lichen group and erythroderma.	3
	<b>Practical work:</b> Presentation of patients with disorders of keratinisation. Presentation of patients with various clinical forms of psoriasis. Demonstrating phenomena related to psoriasis. Demonstrating local therapy in psoriasis.	3
Friday	<b>Lecture:</b> Inherited disorders: keratinization and blistering disorders	3
	<b>Practical work:</b> Presentation of patients with inherited disorders.	3

Monday	<b>Lecture: Partial exam 1</b> <b>Lecture:</b> Pigmentation disorders, photosensitivity <b>Practical work:</b> Presentation of patients with skin pigmentation disorders (hyperpigmentation and hypopigmentation) and photosensitivity.	2 2 2
Tuesday	<b>Lecture:</b> Autoimmune skin diseases: Blistering disorders. Connective tissue diseases. <b>Practical work:</b> Laboratory diagnostic tests at erythematosis, scleroderma, dermatomyositis, autoimmune bullous diseases (Nikolsky's sign, Tzanck test, direct and indirect immunofluorescence)	3 3
Wednesday	<b>Lecture:</b> Diseases of skin adnexa <b>Practical work:</b> Presentation of patients with disorders of skin appendages (sebaceous glands, hair and nails). Demonstration of basic characteristics of trichograms and trichoscopes.	3 3
Thursday	<b>Lecture:</b> Skin tumours. Sexually transmitted diseases. <b>Practical work:</b> Presentation of patients with skin tumours. Demonstration of biopsy and histopathological interpretation in skin tumours. Basic concepts of dermoscopy. Demonstration of sample taking in sexually transmitted disease.	3 3
Friday	<b>Practical exam</b> <b>Partial exam 2</b>	4 2
Week 17.-18.	<b>Regular final examination term</b>	
Week 19.-20	<b>Final exam in the correctional term</b>	
	<b>September examination term</b>	

Code: <b>MFSE 0816</b>	Course title: <b>SKIN INFECTIONS</b>		
Level: <b>undergraduate</b>	Study year: <b>IV</b>	Semester: <b>VIII</b>	ECTS : <b>1</b>
Status: <b>elective</b>	Total contact hours: <b>20</b>		
Prerequisites:	<b>According to the Study Regulation</b>		
Lecturers:	<b>Associate professor Emina Kasumagić-Halilović, Assistant professor Nermina Ovčina-Kurtović</b>		
1. Overall aim	The overall aim of Skin infections course is to gain knowledge about skin infections including bacterial, viral, fungal, parasitic and protozoan infections.		
2. Course contents	<p>The following topics will be covered during the Modules:</p> <p><b>Module 1. Bacterial infections</b> The goal of the module is to introduce a student with bacterial skin infections.</p> <p><b>Module 2. Viral infections</b> The goal of the module is to introduce student with viral skin infections.</p> <p><b>Module 3. Fungal infections</b> The goal of the module is to introduce student with fungal skin infections.</p> <p><b>Module 4. Parasitic infections</b> The goal of the module is to introduce student with parasitic skin infections.</p> <p><b>Module 5. Protozoan infections</b> The goal of the module is to introduce student with protozoan skin infections.</p>		
3. Learning outcomes (Knowledge, skills and competences)	<p><i>Through the lectures the students will adopt the following knowledge and competences:</i></p> <ol style="list-style-type: none"> <li>1. List the bacteria commonly involved in skin infection</li> <li>2. Recognize the clinical features of common bacterial infections</li> <li>3. Recognize rarer bacterial infections such as staphylococcal scaled skin syndrome, toxic shock syndrome, necrotising fasciitis</li> <li>4. Formulate a management plan for a patient with bacterial infection</li> <li>5. Recognize fungal infections of the skin</li> <li>6. Differentiate between fungal and yeast infections of the skin</li> <li>7. Discuss treatments available for fungal infections</li> <li>8. List the main viruses involved in skin disease</li> <li>9. Recognize the clinical features of common viral</li> </ol>		



	<p>infections</p> <p>10. Discuss the treatment available for viral infections</p> <p>11. Recognize the clinical features of scabies and pediculosis</p> <p>12. Recognize the clinical feature of common protozoan infections</p> <p><i>Through the practical work students will acquire the following skills:</i></p> <ul style="list-style-type: none"> <li>- Take anamnesis</li> <li>- The diagnostic methods for bacterial diseases: vitropression, test probe, punctuation and incision of furunculi.</li> <li>- Diagnostic methods in fungal diseases: taking material for native preparation and culture.</li> <li>- Diagnostic methods in parasitic diseases: taking material and interpretation of the results in scabies and Demodex folliculorum.</li> </ul>
4. Teaching methods	<ul style="list-style-type: none"> <li>- Lectures 10 hours</li> <li>- Practical work 10 hours</li> </ul>
5. Methods of knowledge assessment and examination	<p>Continuous knowledge and skills assessment will be carried out through Partial exam and Practical exam.</p> <p><b>Partial exam</b> Partial exam contains a total of 30 MCQ questions, each correct answer brings 2 points. A minimum of 33 points, a maximum of 60 points shall be deemed to be passed the student's examination.</p> <p><b>Practical exam</b> Practical exam is conducted for testing practical knowledge and skills over the issues defined in the check lists. Practical exam will be considered passed if the student wins at least 22 points, a maximum of 40 points.</p> <p><b>Regular final examination term</b> On Regular final exam, the student takes the exam that he did not pass during the continuous assessment of the knowledge. A successfully passed practical exam is required to take a written part of the Regular final exam. Regular final exam is conducted and evaluated according to predefined methods of knowledge checking.</p> <p><b>Final Exam in the correctional term / September examination test</b> Final exam in the correctional term /September examination term are conducted according to the previously defined criteria of the Regular final exam.</p>

	<p><b>Forming a final grade</b> The total number of points won on all forms of knowledge testing is translated into the final grade as follows:</p> <table><tr><th>Rating</th><th>Number of points</th><th>Description</th></tr><tr><td>10 (A)</td><td>95-100</td><td>remarkable success without mistakes or with minor errors</td></tr><tr><td>9 (B)</td><td>85-94</td><td>above average, with some mistakes</td></tr><tr><td>8 (C)</td><td>75-84</td><td>average, with subtle errors</td></tr><tr><td>7 (D)</td><td>65 -74</td><td>generally good, but with significant shortcomings</td></tr><tr><td>6 (E)</td><td>55-64</td><td>meets the minimum criteria</td></tr><tr><td>5 (F, FX)</td><td>&lt; 55</td><td>does not meet the minimum criteria</td></tr></table>	Rating	Number of points	Description	10 (A)	95-100	remarkable success without mistakes or with minor errors	9 (B)	85-94	above average, with some mistakes	8 (C)	75-84	average, with subtle errors	7 (D)	65 -74	generally good, but with significant shortcomings	6 (E)	55-64	meets the minimum criteria	5 (F, FX)	< 55	does not meet the minimum criteria
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5 (F, FX)	< 55	does not meet the minimum criteria																				
6. Literature	<p><b>Obligatory:</b></p> <ul style="list-style-type: none"><li>- Goldsmith L, Katz S, Gilchrest B, Paller A, Leffell D, Wolf K, Fitzpatrick TB (editors). Fitzpatrick's Dermatology in General Medicine 8<sup>th</sup> Edition, New York: McGraw-Hill Medical Pub. 2012</li></ul> <p><b>Additional:</b></p> <ul style="list-style-type: none"><li>- Burgdorf W, Plewig G, Wolff HH, Landthaler M (Eds) Braun-Falco's Dermatology 3<sup>rd</sup> . Berlin-Heidelberg: Springer, 2009.</li></ul>																					
7.Remark	<p>Lectures will be conducted according to the Plan and the curriculum at the Amphitheaters in the Clinical Centre of the University of Sarajevo. All forms of instruction are compulsory. Exercises can be attended only by students who have valid sanitary booklet and proper uniform. Fixing absences from classes is in accordance with applicable legal regulations. Consultation period for students is any working day pre-reserved with Head of Cathedra: emina.kasumagic@mf.unsa.ba</p>																					

## COURSE PLAN: SKIN INFECTIONS

Week 15.	Form of teaching	Hours
Monday	<b>Lecture:</b> Introduction and common dermatological problems-common skin infections. Bacterial skin infections: <i>staphylococcal</i> and <i>streptococcal infections</i> , corynebacterial infections, mycobacterial infections, spirochetal infections.	2
	<b>Practical work:</b> History taking in patients with skin infections. Examining the skin. Demonstration of sampling for bacteriological analysis. The diagnostic methods for bacterial diseases: vitropression, Gram staining and culture of pus or exudates, punctuation and incision of furunculi.	2
Tuesday	<b>Lecture:</b> Viral, skin infections-herpes simplex and varicella zoster virus infections, human papillomavirus infections, cutaneous manifestations of human immunodeficiency virus.	2
	<b>Practical work:</b> Basic principles of diagnosis viral skin infection.	2
Wednesday	<b>Lecture:</b> Fungal skin infections-dermatophytoses and candidiasis. Mould infections. Deep and systemic fungal infections.	2
	<b>Practical work:</b> Diagnostic methods in fungal diseases: taking material for native preparation and culture.	2
Thursday	<b>Lecture:</b> Parasitic infections: scabies, pediculosis, cutaneous larva migrans. Protozoan infections: leishmaniasis.	2
	<b>Practical work:</b> Diagnostic methods in parasitic diseases: taking material and interpretation of the results in scabies.	2
Friday	<b>Practical exam</b>	2
	<b>Partial exam</b>	2



Week 17.-18.	<b>Regular final examination term</b>	
Week 19.-20	<b>Final exam in the correctional term</b>	
	<b>September examination term</b>	

	macrated and digressive skulls.(P)	
Thursday	Sexual dimorphism of the skull. Morphognostic gender labels significant in sex determination of the human skull. Univariate and multivariate influence of certain linear diametres in determination of the gender of the skull. (L)	2
	<p><b>2. Practical and teoretical knowledge assessment</b></p> <p>Spotting of the morphognostic gender signs (expression of frontal et parietal tuber, expression superciliary arch and glabella, supraorbital margin, appearance of orbit and root of the nose, expression of mastoid process and relief of the muscle insertions, size of the teeth and shape of the face) on macrated and digressive skulls.(P)</p>	2
Friday	Application of discriminating of functional of analysis (Hanihara I, Hanihara II, Giles – Eliot). Population oriented determining of the gender of the skull with the help of discriminant functional analysis. (L)	2
	<p>Applying the formula Hanihara I, Hanihara II and Giles – Eliot and their selective points in determining the gender on macrated and digressive skulls. (P)</p> <p><b>3. Practical and teoretical knowlede assessmt</b></p>	2
Week 17 - 18.	<b>Final exam (regular term)</b>	
Week 19 – 20.	<b>Final exam (make – up examination term)</b>	
September	<b>Final exam (September term)</b>	

**COURSE PLAN: ANATOMICALLY-ANTHROPOLOGICAL SIGNIFICANCE OF THE SKULL**

<b>DAY</b>	<b>Theaching methods and materials</b>	<b>Number of hours</b>
Monday	Skull as a whole. Skull asymmetry.Skull standardization based on its asymmetry.Oblique diameters of the skull. Angulation of the skull base. Asymmetry of the internal structures of skull basis. Interactive relations asymmetry of neurocranium and viscerocranium. (L)	2
	Analysis of macerated and digressive skull. Assessment of the type of the skull due to its appearance and configuration of occipital part. Displaying of anteroposition petrosus part of temporal bone, regarding the type and configuration of the observed skull base. Spotting the position of the posterior part of lesser wing of sphenoidal bone according to the skull asymmetry.Analysis of the configuration cranial fossa (anterior,middle and posterior cranial fossa) in the ration to the type of the skull. The application of the cephalometar in measuring of frontooccipital, parietooccipital,temporooccipital and frontoparietal oblique diameter of the skull. (P)	2
Tuesday	Anthropometric points. Linear dimensions of the skull (cranial length, cranial width, cranial height, width of the face, upper facial height, total height of the face, length of the skull base). Standard categories of the head length. Standard categories of the width of head. The significance of their assessment.Gender, population and development anthropological differences. Mutual conditionality of the skull length and width. (L)	2
	<p align="center"><b>1. Practical and teoretical knowledge assessment</b></p> <p>Recognizing of the odd and even anthropmetric points of the skull. Application of the cephalometry and sliding calipers at craniometrical measurements of the skull linear dimensions. Evaluation of the standard categories of cranium length (very short, short, medium length, long, very long) on macerated and digressive skulls. Evaluation of the standard categories of the cranium width(very narrow, narrow, medium, wide, very wide) on macerated and digressive skulls.(P)</p>	2
Wednesday	Cranial capacity. Craniometrical method for the assessment of cranial capacity. The significance of its assessment. Cranial capacity from the prehistoric to the recent times. Evolutionary tendencies: gracilisation and brahiceranisation.Cranial capacity based on gender and population differences. Cephalic index from prehistoric period to the recent times. The declining trend of the skull length from the dolichocephali to the ultrabrahicephali category. The growing tendency of the skull width from dolichocephali category to the ultrabrahicephali category.(L)	2
	Calculation of the cranial capacity by craniometrical method to macerated and digressive skulls. Determination of the standard categories of cephalic index(hyperdolichocephali, dolichocephali, mesocephali, brahicephali, hyperbrahicephali, ultrabrahicephali) by application of cranial method on	2



	<p>based on human skull. Application of discriminatory functional analyses (Hanihara I, Haniharall and Giles – Eliot) on population oriented to gender determination based on human skull.</p> <p>Through the practical work student <b>has to perform practically following skills:</b></p> <ol style="list-style-type: none"> <li>1. Measuring frontooccipital, parietooccipital, temporooccipital and frontoparietal oblique skull diameter in order to perform quantitative assessments of its asymmetry</li> <li>2. Measuring cranial length and width; determine standard category of the length and width of the head</li> <li>3. Measuring cranial length, width and height with applying into cranial capacity calculation method</li> <li>4. Measuring cranial length and width with applying into cranial categorization skull method based on cephalic index</li> <li>5. Measuring eight linear dimensions of the skull (glabella-opisthion; porion – porion; vertex-porion; zygion-zygion; nasion-alveolare; basion-nasion; basion-prosthion and prosthion-nasion), with applying in discriminatory functional analysis by Hanihari I, Hanihari II and Giles–Eliot for gender skull determination</li> </ol>
4. Teaching methods	<p>Lectures: 10 hours</p> <p>Practical work: 10 hours</p>
5. Method of knowledge assessment and examination	<ul style="list-style-type: none"> <li>- Continuous knowledge and skills assessment will be carried out through practical and theoretical evaluation knowledge assessment after each module</li> <li>- Final exam: practical and theoretical evaluation knowledge assessment of the module or modules that has not been positively evaluated in Continuous knowledge and skills assessment</li> </ul>
6. Literature	<p>Obligatory</p> <ul style="list-style-type: none"> <li>- Sarač – Hadžihalilović A. Anatomically – anthropological significance of the skull – English edition (fakulty textbook). Medical faculty University of Sarajevo, 2017. ISBN: 978-9958-608-90-2</li> <li>- Elfaki AA, Sarac – Hadzihalilovic A, Nahir M, Ali QM. The head and neck:Skull in Guide to Practical Anatomy. First Edition . Text book Sudan: Medical faculty of National University – Sudan;2017.ISBN:978-99942-0-252-2</li> <li>- Šljuka S, Sarač – Hadžihalilović A, Mušanović J, Lelo S, Hadžiselimović R. Bioantropološki repetitorij sa praktikumom. Sarajevo: Prirodno – matematički fakultet Univerziteta u Sarajevu; 2020. ISBN: 978 – 9926-453-25-1</li> </ul>
7. Remarks	<p>Student office hours are published in a separate schedule which can be found on the Department's notice –board and on faculty website. Pre– agreed consultations are obligatory, and can be scheduled with the Department's secretary or via e-mail: <a href="mailto:anatomija@mf.unsa.ba">anatomija@mf.unsa.ba</a></p>

Code: MFSE 0108	Course title: Anatomically -Anthropological significance of the skull		
Level: preclinical	Study year: I	Semester: I	ECTS: 1
Status: elective	Total contact hours: 20		
Prerequisites:	According to the Study Regulation		
Lecturers: Associate Professor Aida Sarač – Hadžihalilović, PhD, MD; Master of Science Assistant Zurifa Ajanović, MD			
1. Overall aim	The overall aim of the Anatomically-Anthropological significance of the skull Course is that student gain knowledge of anatomy cranium and new objectives through anthropometric and anthroposcopic approach.		
2. Course contents	<p>The following topics will be covered during Modules:</p> <p>Module1. The application of the medical anthropology in skull categorization on the basis of its asymmetry</p> <p>Module 2. Categorization of the skull on the basis of the standard categories of its length, width, cephalic index and cranial capacity</p> <p>Module 3. Sexual dimorphism of the skull</p>		
3. Learning outcomes (Knowledge, skills and competences)	<p>Student will acquire knowledge which will introduce them with application of the skull categorization on several levels starting with its asymmetry, estimation of its capacity, cephalic index and application of its sexual dimorphism, which is a necessary prerequisite for skull understanding, as the most complex part of the human body skeleton.</p> <p>Through the lecture the students will gain following knowledge and competences:</p> <ol style="list-style-type: none"><li>1. The understanding the anatomically – antropological aspect of skull categorization on the basis of its asymmetry. Introducing with the kyphosis and skull base formation as well as their cause and effect mechanisms. Distinguishing of positive and negative aspects of osteometric and osteoscopic methodsin assessing the type of the skull on the basis of its asymmetry.</li><li>2. The understanding of the importance of the cranial capacity assessment and cephalic index, their gender and population differences. The understanding of the complicated processes of kyphosis skull base and its formation, dominant repercussions in these processes on definite skull categorization basis on standard categories of its length, width and cephalic index, as well as formation of the cranial capacity values. Skull categorization of dolichocephalic toward brachycephalic,from prehistoric to recent times. Two evolutionary tendencies - gracilisation and brahricranisation started in anthropological development.</li><li>3. Learn how to recognition morphognostic gender skull markings and their qualitative assessment. Univariate and multivariate impact of particular linear skull diameters on quantitative assessment of gender</li></ol>		

Br. 967/20

Univerzitet u Sarajevu

Medicinski fakultet

Dekanatu Medicinskog fakulteta

Služba za nastavu i NIR

UNIVERZITET U SARAJEVU  
MEDICINSKI FAKULTET  
Broj: 23-4346/20  
Datum: 13.07.2020. god.

Poštovani,

U skladu s dopisom, br. 02-3-NŠ-3891/20 iz 25.06.2020. godine, želim dostaviti prijedlog izmjena silabusa za predmet „Neurophysiology“ za studijski program „Medicina“ na engleskom jeziku.

Jedina izmjena bi bila da se iz postojeće 13 nedelje (Week 13) prema sadašnjem rasporedu izbriše „Learning and Memory“, s obzirom na to da će pomenuta lekcija u potpunosti biti predavana u 12. sedmici.

S poštovanjem,

13.07.2020

Prof. dr. Orhan Lepara





# COURSE PLAN: NEUROPHYSIOLOGY

Weeks	Form of Instructions and materials	Number of classes
Week 1	<b>Lecture:</b> Organization of the Nervous System, Basic Functions of Synapses	2
	<b>Practical laboratory work:</b> Neuron excitability (CD presentation, A.D.A.M., Interactive Phys lab)	2
Week 2	<b>Lecture:</b> Nurotransmitters and modulators. Neuronal Circuits for Processing Information	2
	<b>Practical laboratory work:</b> Synaptic transmission (CD presentation, A.D.A.M., Interactive Phys lab)	2
Week 3	<b>Lecture:</b> Somatic Sensations: General Organization, the Tactile and Position Senses. Pain, and Thermal Sensations	2
	<b>Practical laboratory work:</b> Examination of tactile receptors Two-point discrimination test Stereognosia Thermoreceptor adaptation test	2
Week 4	<b>Lecture:</b> Autonomic nervous system	2
	<b>Practical laboratory work:</b> Polygraph Tests (BIOPAC)	2
Week 5	<b>Seminar:</b> The Special Senses. The Chemical Senses—Taste and Smell. Optics of Vision.	2
	<b>Practical laboratory work:</b> Colloquium 1	2
Week 6	<b>Lecture:</b> Receptor and Neural Function of the Retina. Central Neurophysiology of Vision.	2
	<b>Practical laboratory work:</b> Testing the taste sensation Testing the smell sensation	2
Week 7	<b>Lecture:</b> The Sense of Hearing.	2
	<b>Practical laboratory work:</b> Sound conduction: Rinne's test, Weber's test Schwabach's test Sound localization test	2
Week 8	<b>Seminar:</b> Partial exam 1	2
	<b>Practical laboratory work:</b> Types of lenses, Visual acuity (VA) test, Perimetry, Color Blindness Test; Test for Astigmatism	2

	<b>Practical laboratory work:</b> Pupillary (light) reflex, Consensual light reflex Protective eye reflex, Corneal reflex, Eye muscles, Mechanical Stimulation of the Eye. Mariotte's experiment	2
Week 10	<b>Lecture:</b> Cortical and Brain Stem Control of Motor Function. Vestibular Sensations and Maintenance of Equilibrium.  <b>Practical laboratory work:</b> Accommodation reflex Scheiner experiment (CD presentation) Range of accommodation Power of accommodation	2  2
Week 11	<b>Lecture:</b> Contributions of the Cerebellum and Basal Ganglia to Overall Motor Control  <b>Practical laboratory work:</b> Colloquium 2	2  2
Week 12	<b>Seminar:</b> The Integrated System for Motor Control. Cerebral Cortex, Intellectual Functions of the Brain, Learning and Memory.  <b>Practical laboratory work:</b> Tendon (deep) reflexes Superficial reflexes Abdominal reflex	2  2
Week 13	<b>Lecture:</b> Learning and Memory Behavioral and Motivational Mechanisms of the Brain—The Limbic System and the Hypothalamus  <b>Practical laboratory work:</b> Testing balance Evaluation of short-term memory capacity	2  2
Week 14	<b>Seminar:</b> States of Brain Activity—Sleep, Brain Waves  <b>Practical laboratory work:</b> EEG registration and analysis (BIOPAC)	2  2
Week 15	<b>Seminar:</b> Partial exam 2  <b>Practical laboratory work:</b> Colloquium 3	2  2
Weeks 17/18	Final exam (regular term)	
WEEKS 19/20	Final exam (Re-sit Examination Term)	
September	Final exam (September Re-sit Examination Term)	