

1.	Subject	MEDICAL CHEMISTRY			
2.	Code	MLD – 116			
3.	Study program:	Three-year professional studies of medical laboratory diagnostics			
4.	Conducted by	UKIM Medical Faculty – Skopje Department of Medical Chemistry			
5.	Degree of education (first or second cycle)	First cycle			
6.	Academic year/semester	First/I	7.	Credits	7.5
8.	Professor	Head of the Department Prof. d-r Svetlana Cekovska All the professors of the Department of Medical Chemistry			
9.	Prerequisite	None			
10.	Goals	<ul style="list-style-type: none"> • Do exercises from the curriculum where stoichiometry is involved • Perform practical exercises from the curriculum and interpret results independently; learn to handle laboratory equipment and chemicals as well • Explain atomic electron configuration, distinguish between elements according to their position in the Periodic table, meaning their electron configuration • Distinguish and explain structure and characteristics of substances according to their state of matter • Define the chemical bonds in a compound; distinguish weak and strong electrolytes and explain the electrolyte solution balance • Define buffers and explain the mechanisms of their activity • Define colloidal dispersion systems • Distinguish and explain what is internal energy, enthalpy, free energy, entropy • Define photochemical reaction • Name, explain and describe the types of organic compounds (alkane, alkene, alkyne, aliphatic carbohydrates, aromatic carbohydrates, haloalkane, alcohols, phenols, ether, aldehydes and ketones, carboxylic acids, substituted carboxylic acids, carboxylic acids derivatives, nitrogen compounds, sulfur compounds, heterocyclic compounds, carbohydrates, proteins, enzymes, lipids, nucleic acids, vitamins, hormones, alkaloid, synthetic organic polymers, types of reactions in organic chemistry) 			
11.	Content summary:	<ul style="list-style-type: none"> • Characteristics of matter. Physical and chemical changes, types of substances • Atom structure and radioactivity • Principle and classification of chemical elements, chemical bonds • Structure and characteristics of chemical compounds. Chemical laws, most important inorganic chemical reactions, characteristics of the elements • Acids and bases, amphoteric electrolytes, pH, buffers • Photochemical reactions. Radiation reactions • Kinetics of chemical reactions: conditions for a chemical reaction, speed of chemical reactions, homogenous and heterogeneous reactions, order and molecularity of reactions, collision theory, energy, entropy of activation. Catalysts, homogenous and heterogeneous catalysis, inhibitors, promoters 			

	<ul style="list-style-type: none"> • Oxidoreductase. Biocatalysts, structure and characteristics of enzymes, kinetics and mechanisms of enzyme reactions, structure and characteristics of bioactive organic micro and macro compounds.. • Structural and constitutional isomers, functional groups and types of organic compounds, hybridization, theory of resonance, MO theory, nucleophilic substitution and addition, electrophilic substitution, polymerization. Structure, physical and chemical characteristics and biochemical importance of acyclic and cyclic compounds, heterocyclic nitrogen, oxygen and sulfur compounds. • Carbohydrates, classification, nomenclature, stoichiometry, characteristics and reactions, monosaccharide, oligosaccharides, polysaccharides, monosaccharide derivatives. Simple and complex lipids. • Peptides and proteins, simple and complex. Nucleic acids, structure and nomenclature of mononucleotides • Vitamins, hormones and alkaloids. • Stoichiometry and appropriate exercise. <p>Practical lessons:</p> <ul style="list-style-type: none"> • Solution preparation and examination of the colligative properties of solutions, volumetry, calculating the solution concentration • Calculation through chemical fractions and formulas • Volumetry (antacid table) • Aspirin synthesis and examination of its clarity • Nomenclature of more important organic compounds important in medicine • Reactions for examining the characteristics of carbohydrates, proteins and lipids 			
12.	Teaching methods: Interactive theoretical lessons, practical lessons, seminars, projects and other activities according to the ECTS criteria			
13.	Total classes:	90		
14.	Organization			
15.	Types of teaching activities	15.1	Lessons: theoretical classes	30
		15.2	Practical lessons	45
			Seminars	15
16.	Other types of activities	16.1	Practice	
		16.2	Self-supporting practice	
		16.3	Learning at home	105
17.	Knowledge assessment		Points	
	17.1	Test	Mid-term exams points 21-35 (min.-max.) 2 written exams (20 and 15 points) total 35 points	
	17.2	Final exam	Oral exam Theoretical part points 18-30 (min.-max.) Practical part* points 9-15 (min.-max.) *doing one exercise independently	
	17.3	Seminars	Preparation of the material for the seminar with interactive participation 5 points	
	17.3	Active participation	Theoretical lessons 51-60% - 1 point	Min. – Max. Points 1 - 3

			61-85% - 2 points 86-100% - 3 points Practical lessons: total points 10 12 lessons: 0.5 points (attendance) + 0.5 points (active participation)
18.	Grading criterion (points/grades)	Up to 59 points	5 (five) F
		From 60 to 68 points	6 (six) E
		From 69 to 76 points	7 (seven) D
		From 77 to 84 points	8 (eight) C
		From 85 to 92 points	9 (nine) B
		From 93 to 100 points	10 (ten) A
19.	Requirements for obtaining a signature and attending the final examination	At least 1 point from attending the theoretical lessons and at least 10 points from the practical lessons	
20.	Language	Macedonian	
21.	Method of evaluating the quality of the lessons	Anonymous student evaluation of the subject, the professors and the collaborators who hold the lessons.	
22.	Literature		
	22.1	Mandatory literature	
		1.	Deniston E., Topping J., Caret R., General, Organic Biochemistry, Project of the Government of The Republic of North Macedonia, Skopje, 2011
		2.	Krstevska Marija, Alabakovska Sonja, Efremova Aaron Snezana, Labudovik Danica, Cekovska Svetlana, General and Organic Chemistry for medical students, UKIM Medical Faculty, Skopje, 2014
		3.	Dzekova Stojkova Slobodanka, Korneti Petraki, Todorova Bojana, Trajkovska Snezana, Biochemistry, Department of Biochemistry, 3 rd edition, Skopje, 2010
		4.	It will be written by the Department members – Practicum of Medical Chemistry for laboratory scientists
	22.2	Additional literature	
		1.	John McMurry, Organic Chemistry, Project of the Government of The Republic of North Macedonia, Skopje, 2009