



SYLLABUS of the MODULE

General Information

Code		Title	Medical Chemistry
Module type			Obligatory
Faculty			Faculty of Medicine
Field of study			Medicine (KL)
Major			Not applicable
Level of study			II level/ long-cycle (2J)
Mode of study			intramural
Year of study			1
Semester			Winter
ECTS points			3
Types of training			seminars 10 hours, practical classes - 20 hours
Tutor responsible for the module			Prof.dr hab.Joanna Bober
Tutors conducting the subject			Dobrosława Stańkowska-Walczak, PhD,tel.914661644 Patrycja Kłos, PhD: Maria Dąbkowska,PhD. dobrosława.walczak@pum.edu.pl
WWW			https://www.pum.edu.pl/wydzialy/wydzial-lekarski/katedra-biochemii-i-chemii-medycznej/zaklad-chemii-medycznej/information-for-students---english-programm
Language			English

Detailed information

Module objectives		<p>The purpose of teaching medical chemistry is to prepare students to learn and understand the metabolic processes presented in the course of medical studies. Students will become familiar with basic issues of bioinorganic, bioorganic, physical and analytical chemistry. Student will learn approximate relationship between the structure and chemical properties and function of compounds found in living organisms. Teaching begins with a discussion of the chemical bonds stabilizing chemical structure. Then, the properties of water and solutions, as the dominant component of the human body are widely discussed. Particular emphasis is placed on familiarizing students with the basics including calculation, fluid and electrolyte balance and acid-base balance.</p> <p>Other issues of bioinorganic chemistry are associated with the analysis of the mineral composition of the human body, with particular emphasis on the properties of the microelements, trace or toxic elements to living organisms.</p> <p>The main issues of bioorganic chemistry is to present characteristics of the main groups of compounds that are building blocks of living organisms - proteins, lipids, carbohydrates, nucleic acids. Particular emphasis is given to learn the conformation of molecules, which facilitate the understanding of the analysis of biological effects. During the course of the study students will learn the basics of practical work in the chemical laboratory and elements of qualitative, quantitative and instrumental analysis of organic and inorganic compounds.</p>
Prerequisite /essential requirements	Knowledge	Having a knowledge of chemistry at the high school level, the extended program
	Skills	Ability to self-study in a targeted manner
	Competences	Ability to work effectively in a team

Description of the learning outcomes for the subject /module			
Number of learning outcome	Student, who has passed the (subject) Knows /is able to /can:	SYMBOL (referring the standards) EKK	Method of verification of learning outcomes

W01	describes the acid-base equilibrium, and mechanism of buffers and their importance in the systemic homeostasis	K_B.W02	Continuous assessment during the classes
W02	knows and understands the concepts of solubility, osmotic pressure, isotonicity, colloidal solutions and Gibbs-Donnan equilibrium	K_B.W03	
W03	knows the basic reactions of inorganic and organic compounds in aqueous solutions	K_B.W04	
W04	has a basic knowledge of chemical catalysis, kinetics of chemical reactions, molecularity and reaction order. Knows the theory of the effect of temperature on the reaction	K_B.W04	
W05	knows the structure of simple organic compounds present in cells' macromolecules, extracellular matrix and body fluids	K_B.W10	
W06	describes the structure of lipids and polysaccharides and their functions in cellular and extracellular structures	K_B.W11	
W07	knows concepts of oxidation potential of the body and oxidative stress	K_B.W17	
U01	calculates the molar and percentage concentration ; calculates the concentration of the substance in isoosmotic, mono and multiple-component solutions,	K_B.U03	Two writing tests include knowledge from learned materials
U02	determines pH of the solution and the effect of pH changes on inorganic and organic compounds	K_B.U05	
U03	uses basic laboratory techniques such as qualitative analysis, titration, colorimetry, pH-meters, chromatography	K_B.U09	
U04	supports simple measuring instruments and assess the accuracy of measurements	K_B.U10	
U05	use databases, including online, and searches for necessary information using the available tools	K_B.U11	
U06	plans and executes basic scientific research, and is able to interpret the results and draw conclusions	K_B.U14	
K01	is able to take care of their own and other safety	K_K15	
K02	demonstrates the ability to self-	K_K03	

	study in a targeted manner		
K03	able to work in a group	K_K04	

Matrix presenting the learning outcomes of the subject/module in relation to the form of classes

Number of learning outcome	Student, who has passed the (subject) Knows /is able to /can:	Types of training							
		Lecture	Seminar	Laboratory classes	Project work	Clinical classes	Classes	Practical classes	Other
W01	describes the acid-base equilibrium, and mechanism of buffers and their importance in the systemic homeostasis		X	X					
W02	knows and understands the concepts of solubility, osmotic pressure, isotonicity, colloidal solutions and Gibbs-Donnan equilibrium		X	X					
W03	knows the basic reactions of inorganic and organic compounds in aqueous solutions		X	X					
W04	Has basic knowledge of chemical catalysis, kinetics of chemical reactions, molecularity and reaction order. Knows the theory of the effect of temperature on the reaction		X	X					
W05	knows the structure of simple organic compounds present in cells' macromolecules, extracellular matrix and body.		X						
W06	describes the structure of lipids and polysaccharides and their functions in cellular and extracellular structures		X						
W07	knows concepts of oxidation potential of the body and oxidative stress		X						
U01	calculates molar and percentage concentrations calculates the concentration of substances in isoosmotic, single- and multi-component solution		X	X					
U02	determines pH of the solution and the effect of pH changes on inorganic and organic compounds		X	X					
U03	uses basic laboratory techniques such as qualitative analysis,			X					

	titration, colorimetry, pH-meters, chromatography								
U04	supports simple measuring instruments and assess the accuracy of measurements			X					
U05	uses databases, including online, and searches for necessary information using the available tools			X					
U06	plans and executes basic scientific research, and able to interpret the results and draw conclusions			X					
K01	is able to take care of their own and other safety			X					
K02	able to work in a group		X	X					
K03	demonstrates the ability to self-study in a targeted manner		X	X					

Module (subject) contents				
Symbol of teaching programme	Content of teaching programme	References to learning outcomes		
TK01	Water in human organism	W01,02,03,04, U01, K01,03		
TK02	Chemical bondings in chemical organic compounds	W02, W03,W05, K01, K03		
TK03	Acid-base equilibrium	W01, W02, W03, U01, U02, U03, U04, K02, K03		
TK04	Lipids	W05, W06		
TK05	Aminoacids	W05, K01, K02		
TK06	Characteristics of chemical reactions. Kinetics and thermodynamics	W04, U03, U04, U05, U06, K01, K02		
TK07	Carbohydrates	W05, W06, U04, K01, K02		
TK08	Instrumental methods in (bio)chemical analysis	U03, U04, U05, K01, K02		
TK09	Chemistry of free radicals	W07,K03		
TK10	Characteristics of selected elements	W03,W05, K01, K02		
References and educational resources				
1. Bober J., Dołęgowska B., Stańkowska-Walczak D: Chemistry for the First Year Students, PAM, Szczecin 2011				
Student’s workload (balance sheet of ECTS points)				
Form of student’s activity (in-class participation; activeness, produce a report, etc.)		Workload [h]		
		Tutor	Student	Average
activities that require direct participation of tutors			30	

Preparation to the classes		50	
Reading of the indicated/specified literature		25	
Report writing/project making			
Time spent to prepare for the exam		0	
Other			
Student's workload in total			
ECTS points for the subject	3		
Remarks at the end			

Methods of assessment, for example:

E – exam- problem resolving

S – verifying of practical skills

R – report

D – discussion

P – presentation

Others-