



# Pomeranian Medical University in Szczecin

## SYLLABUS of the MODULE Chemistry General Information

Module title: Chemistry	
Module type	Obligatory
Faculty PMU	Faculty of Medicine and Dentistry
Major	<b>Medicine</b>
Level of study	long-cycle (S2J)
Mode of study	full-time studies
Year of studies, semester	I/I
ECTS credits (incl. semester breakdown)	3
Type/s of training	lectures 10h, seminars 5h, laboratories 15h
Form of assessment*	<input checked="" type="checkbox"/> graded assessment: <ul style="list-style-type: none"> <li><input type="checkbox"/> descriptive</li> <li><input checked="" type="checkbox"/> test</li> <li><input checked="" type="checkbox"/> practical</li> <li><input type="checkbox"/> oral</li> </ul> <input type="checkbox"/> non-graded assessment <input type="checkbox"/> final examination <ul style="list-style-type: none"> <li><input type="checkbox"/> descriptive</li> <li><input type="checkbox"/> test</li> <li><input type="checkbox"/> practical</li> <li><input type="checkbox"/> oral</li> </ul>
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Department's/ Clinic's/ Unit's website	<a href="https://www.pum.edu.pl/studia_iii_stopnia/informacje_z_jednostek/wfbmiml/samodzielnarpracownia_farmakokinetyki_i_farmacji_klinicznej/">https://www.pum.edu.pl/studia_iii_stopnia/informacje_z_jednostek/wfbmiml/samodzielnarpracownia_farmakokinetyki_i_farmacji_klinicznej/</a> tel. 91 815 10 16
Language	English

\* replace ☐ into ☒ where applicable

**Detailed information**

<b>Module objectives</b>		<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. Students will learn the approximate relationship between the structure, 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. 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>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-studying in a targeted manner
	Competences	Ability to work effectively in a team

<b>Description of the learning outcomes for the subject /module</b>			
<b>No. of learning outcome</b>	<b>Student, who has passed the (subject) knows /is able to /can:</b>	<b>SYMBOL (referring the standards)</b>	<b>Method of verification of learning outcomes*</b>
W01	knows and understands water and electrolyte management in biological systems	B.W1	W, K
W02	describes the acid-base equilibrium and mechanism of buffers and their importance in the system of homeostasis	B.W2	
W03	knows and understands the concepts of solubility, osmotic pressure, isotonicity, colloidal solutions and Gibbs-Donnan equilibrium	B.W3	
W04	knows the basic reactions of inorganic and organic compounds in aqueous solutions	B.W4	

W05	knows and understands the consequences of exposure of the human body to various chemical and biological agents and the principles of prevention	C.W15	
W06	knows and understands the influence of oxidative stress on cells and its importance in the pathogenesis of diseases and in the aging processes	C.W47	
U01	uses knowledge of the laws of physics to explain the effects of external factors such as temperature, acceleration, pressure, electromagnetic field and ionizing radiation on the body and its elements	B.U1	SL,PS
U02	calculates the molar and percentage concentration and concentration of the substance in isoosmotic, mono and multiple-component solutions	B.U3	
U03	calculates the solubility of inorganic compounds, determines the chemical basis of solubility of organic compounds or its absence and its practical importance for dietetics and therapy	B.U4	
U04	determines pH of the solution and the effect of pH changes on inorganic and organic compounds	B.U5	
U05	uses basic laboratory techniques such as qualitative analysis, titration, colorimetry, pH-meters, chromatography	B.U8	
U06	supports simple measuring instruments and assess the accuracy of measurements	B.U9	
U07	uses database, including internet data, and searches for necessary information using the available tools	B.U10	
K01	notifies and recognizes its own limitations and carries out a self-assessment of the deficit and educational needs	K.5	
K02	uses objective sources of information	K.7	
K03	draws conclusions from own measurements or observations	K.8	

Table presenting LEARNING OUTCOMES in relation to the form of classes								
No. of learning outcome	Learning outcomes	Type of training						
		Lecture	Seminar	Practical	Clinical classes	Simulations	E-learning	Other...
W01	B.W1	x	x	x				
W02	B.W2	x	x	x				
W03	B.W3	x	x	x				
W04	B.W4	x	x	x				
W05	C.W15	x		x				
W06	C.W47	x	x					
U01	B.U1			x				
U02	B.U3			x				
U03	B.U4			x				
U04	B.U5			x				
U05	B.U8			x				
U06	B.U9			x				
U07	B.U10			x				
K01	K.5		x	x				
K02	K.7			x				
K03	K.8			x				

Table presenting TEACHING PROGRAMME			
No. of a teaching programme	Teaching programme	No. of hours	References to learning outcomes
<b>Winter semester</b>			
<b>Lectures</b>			
TK01	Ionic compounds	1	W04, W05, K01, K02
TK02	Water in human organism. Osmotic pressure.	2	W01, W03, K02
TK03	Molecular compounds-chemical bonds	2	W04, W05, K01, K02
TK04	Acid-base balance	2	W02, W03, U03, U04, U05, K01, K02
TK05	Chemical reactions: rates and equilibrium	2	W04, K01, K02
TK06	Free radical and antioxidants in medicine	1	W05 W06, U07, K01, K02
<b>Seminars</b>			
TK01	Matter and measurements	1	W04, W05, U03, U04, U05, K01, K02
TK02	Computational tasks: calculations of various type of concentration	3	W02, W03, U02, U03, U04, K01, K02
TK03	Homogenous mixture: solutions and colloids	1	W01, W02, W03, U03, K01, K02
<b>Practical classes</b>			
TK01	Complex compounds properties. Determination of calcium concentration.	3	W04, U05, K01, K02, K03
TK02	Analysis of selected ions	3	W04, U05, K01, K02, K03

TK03	Determination of the buffer capacity of solutions treated with strong bases and acids	3	W02, W03, U03, U04, U05, U06, U07, K01, K02, K03
TK04	Donnan's equilibrium and colloids properties.	3	W01, W02, W03, U01, U03, U04, U07 K01, K02, K03
TK05	Kinetics of saccharose hydrolysis.	3	W04, U05, U06, U07, K01, K02, K03

Booklist	
<b>Obligatory literature:</b>	
1. <i>Fundamentals of General, Organic, and Biological Chemistry</i> , J.McMurry, D.S. Ballantine, C.A. Hoeger, V.E. Peterson, publ. Pearson Education Limited.	
<b>Access by a website:</b> <a href="https://login.pearson.com/v1/piapi/piui/signin?client_id=dN4bOBG0sGO9c9HADrifwQeqma5vjREy&amp;okurl=https:%2F%2Fmycourses.pearson.com%2Fcourse-home&amp;siteid=8313">https://login.pearson.com/v1/piapi/piui/signin?client_id=dN4bOBG0sGO9c9HADrifwQeqma5vjREy&amp;okurl=https:%2F%2Fmycourses.pearson.com%2Fcourse-home&amp;siteid=8313</a>	
<b>Supplementary literature:</b>	
1. <i>Chemistry: The Study of Matter and its Changes</i> , J.E. Brady	
2. <i>Handbook of Chemistry for Students Faculty of Medicine and Faculty of Dentistry</i> , I. Kałnik-Prastowska, publ. Wrocław Medical University	

Student's workload	
Form of student's activity (in-class participation; activeness, produce a report, etc.)	Student's workload [h]
	In the teacher's opinion
Contact hours with the tutor	20
Time spent on preparation to seminars/ practical classess	10
Time spent on reading recommended literature	10
Time spent on writing report/making project	5
Time spent on preparing to colloquium/ entry test	20
Time spent on preparing to exam	-
Other .....	-
Student's workload in total	65
<b>ECTS credits for the subject (in total)</b>	3
Remarks	

\* Selected examples of methods of assessment:

EP – written examination

EU –oral examination

ET – test examination

EPR – practical examination

K – colloquium

R – report

S – practical skills assessment

RZĆ – practical classes report, incl. discussion on results  
O –student's active participation and attitude assessment  
SL –lab report  
SP – case study  
PS - assessment of student's ability to work independently  
W – entry test  
PM – multimedial presentation  
other...