

SYLLABUS Academic year 2023-2024

Name of a course / module	CHEMISTRY	
Name of a department where course is held	Department of Medical Chemistry	
E-mail of department	zachemog@umb.edu.pl	
Faculty of	Medicine with Division of Dentistry and Division of Medical Education in English	
Name of a field of study	Medicine	
Level of education	Uniform master's degree studies	
Form of study	full time <input checked="" type="checkbox"/>	part time <input type="checkbox"/>
Language of instruction	Polish <input type="checkbox"/>	English <input checked="" type="checkbox"/>
Type of course	obligatory <input checked="" type="checkbox"/>	facultative <input type="checkbox"/>
Year of study / Semester	I <input checked="" type="checkbox"/> II <input type="checkbox"/> III <input type="checkbox"/> IV <input type="checkbox"/> V <input type="checkbox"/> VI <input type="checkbox"/>	1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7 <input type="checkbox"/> 8 <input type="checkbox"/> 10 <input type="checkbox"/> 11 <input type="checkbox"/> 12 <input type="checkbox"/>
Introductory courses with preliminary requirements	Getting credit according to recruitment procedure	
Number of didactic hours with specification of forms of conducting classes	Lectures: 8 Classes: 20 Seminars: 2	
Assumptions and aims of the course	Student should get the knowledge in the field: water-electrolyte and acid-base equilibrium of biological systems in human organism; the properties of real and colloidal solutions; reactions of inorganic compounds and functional groups of organic compounds in water solutions. Student should know how: to determine chemical properties of molecules in relation to their structure; to use chemical calculations to describe phenomena occurring in solutions; to utilize basic laboratory technics and to plan simple experiments.	
Didactic methods	<ul style="list-style-type: none"> - delivering a knowledge in a form of lectures (provided on line in form of webinars on Blackboard educational platform) - consultation (regular – once a week, Wednesdays 12.00 - 13.00 and individual for the request of the students) - discussion - self study - other practical classes (observations, individual experiments). Classes can be provided on line in case of the change of epidemic situation of the country 	
Full name of the person conducting the course	Scientific and teaching staff employed in the Department of Medical Chemistry	
Full name of the person responsible for teaching	dr hab. Iwona Radziejewska	

Symbol and number of learning outcomes according to the teaching standards and other learning outcomes	Description of directional learning outcomes	Form of classes	Verification methods for achieving intended learning outcomes
Knowledge			
B.W1	knows how to describe water-electrolyte equilibrium of biological systems	lectures classes	<u>Summarizing methods:</u> - written final test
B.W2	knows how to describe acid-base equilibrium, buffer action mechanism and its significance for systemic homeostasis	lectures classes seminars	<u>Forming methods:</u> - observation of the student's work - evaluation of the activity in the classroom
B.W3	knows such terms as solubility, osmotic pressure, isotonia, colloidal solution and Gibbs-Donnan equilibrium	lectures classes seminars	- assessment of preparation for classes

B.W4	knows basic inorganic and organic compound reactions in aqueous solution	lectures classes	- discussion in class - partial tests
Skills			
B.U3	calculating molar and percentage concentration of the compounds as well as concentration of substances in single- and multi-component isotonic solutions	Classes seminars	<u>Summarizing methods:</u> - realization of a specific task
B.U5	defining pH of the solution and impact of pH modification on organic and inorganic compounds	classes	<u>Forming methods:</u> - observation of the student's work - evaluation of the activity in the classroom
B.U9	using fundamental laboratory techniques, such as qualitative analysis, titration, pH-metry,	classes	- completion of each activity - discussion in class - partial tests
Social competence			
K1	abide the professional secrecy and patients law	classes	<u>Summarizing methods:</u>
K2	can work in a team of professionals, in multicultural and multiethnic environment	classes	Continuous assessment by teachers (observation)
K4	be aware of his/her own limitations and need to improve their skills continually	classes	<u>Forming methods:</u> - observation of the student's work - discussion in class - opinions of colleagues

ECTS points	2		
Student Workload			
Form of activity		Number of hours to complete the activity	
Classes that require the participation of a teacher			
1.	Realization of the course: lectures (according to the curriculum)		8
2.	Realization of the course: classes (according to the curriculum)		22
3.	Realization of the course: seminars; (according to the curriculum)		
4.	Realization of the course: electives		
5.	Participation in consultation		10
		Total hours:	40
Student self-study			
1.	Preparation for the theoretical and practical classes (realization of projects, documentation, case description etc.)		5
2.	Preparation for tests/credits		5
3.	Preparation for an exam/final test-credit		5
		Total hours:	15

Course contents:	
Learning outcomes (symbol and number)	Topics
<p>1. B.W1 - describe water-electrolyte equilibrium of biological systems</p> <p>2. B.W2 - describe acid-base equilibrium, buffer action mechanism and its significance for systemic homeostasis</p> <p>3. B.W3 - knows such terms as solubility, osmotic pressure, isotonia, colloidal solution and Gibbs-Donnan equilibrium</p> <p>4. B.W4 - knows basic inorganic and organic compound reactions in aqueous solution</p> <p>5. B. W4 - knows basic inorganic and organic compound reactions in aqueous solution</p> <p>6. B.U3 - calculating molar and percentage concentration of the compounds as well as concentration of substances in single- and multi-component isotonic solutions</p> <p>7. B.U5 - defining pH of the solution and impact of pH modification on organic and inorganic compounds</p> <p>8. B.U9 - using fundamental laboratory techniques, such as qualitative analysis, titration, pH-metry</p>	<p><u>Lectures:</u></p> <p>Properties of water and its biological importance. Main ions of body fluids. Buffer mixtures – a mechanism of pH stabilization, buffer capacity. A role of physiological buffers in maintaining of a stable pH of physiological fluids. Alkacymetry as an example of titration analysis – alkacymetric indicators, titration curves.</p> <p>Solutions – types of solutions, solubility, types of expression of solution concentration. Colloidal solutions. Lyophobic and lyophilic colloids. Colligative properties of solutions. Diffusion and osmosis, osmotic and oncotic pressure. Gibbs-Donnan equilibrium.</p> <p>Selected organic compounds with biological importance. Carboxylic acids, carbohydrates. Isomerism and derivatives of simple carbohydrates. Aromatic and heterocyclic compounds, drugs and macromolecules.</p> <p>Oxygen free radicals - formation and structure, harmful effect on proteins, unsaturated fatty acids and DNA. Defensive mechanisms of human body.</p> <p><u>Classes:</u></p> <p>Characteristic reactions of biologically important ions.</p> <p>Determination of functional groups in organic compounds (carbohydrates, carboxylic acids, fats, aromatic and heterocyclic compounds).</p> <p>Solutions and their properties – preparation of solutions with specific molar and percent concentrations, converting of concentrations; lyophilic and lyophobic colloids preparations, examination of protective properties of lyophilic colloids; observation of creation of osmotic pressure of the solution</p> <p>Buffer solutions – buffers preparations and their pH determination using indicators and pH-meter. Determination of the influence of buffer dilution on pH and buffer capacity. Assigning of dissociation degree and dissociation constant of electrolytes.</p> <p>Alkacymetry as an example of titration analysis – quantitative determination of weak and strong acid.</p> <p><u>Seminars:</u></p> <p>Calculations concerning buffers, concentrations of physiological solutions, colligative properties of the solutions and Donnan's equilibrium</p>

Obligatory textbook:

1. Timberlake K. C. "General, organic and biological chemistry"

Optional textbook:

2. Bresnick S. "High-yield general chemistry"

Criteria for assessing the achieved learning outcomes and the form and conditions for receiving credit:

Students are obliged to attend all lectures, classes and seminars. Absences should be excused as soon as possible. In case of illness, a doctor's leave should be presented; any other absences should be confirmed by the dean or proper authorities. Excused absences should be made up in a fixed time. The consequence of unexcused absences is lack for credit at Chemistry.

To get credit of the whole course students should pass all the classes and a final test. The condition to get credit from classes and to be admitted to the final test is obtaining 30 points. In case of less than 30 points, students may not get credit at Chemistry.

The conditions of passing the class:

- a) performing experiments with showing an understanding of a sense of carried procedures;
- b) writing a report from practical part of the class;
- c) credit from a written partial class test.

During classes students can get the following number of points:

- written partial class test 9 points
- performing experiments 3 points

maximum possible number of points	12 points/one class
	60 points/all classes

Students who obtain totally at least 48 points (but not less than 5 points from individual written class test) can be relieved from the final test (they get credit at whole Chemistry course).

The final test includes subjects from lectures and classes. The condition to get credit at the final test is obtaining 60 % of maximum number of points.

14.09.2023 dr hab. Iwona Radziejewska

.....
(date and signature of the person preparing the syllabus)

14.09.2023 dr hab. Anna Galicka

.....
(date and signature of the Head of the
Department where the course is held)

and

dr hab. Iwona Radziejewska

.....
(course coordinator)