

SYLLABUS

The academic year when the cycle of instruction is commenced 2019-2025 [INT]

Module/course name:	General Chemistry		Module code	LK.3.B.004
Faculty:	Faculty of Medicine MUL			
Major:	Medical			
Specialty:				
Level of study:	I (Bachelor studies) <input type="checkbox"/> II (Master studies) <input type="checkbox"/> Integrated Master studies <input checked="" type="checkbox"/> Doctoral studies <input type="checkbox"/>			
Mode of study:	full-time <input checked="" type="checkbox"/> part-time (extramural) <input checked="" type="checkbox"/>			
Year of study:	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"/>	Semester:	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"/> 9 <input type="checkbox"/> 10 <input type="checkbox"/> 11 <input type="checkbox"/> 12 <input type="checkbox"/>	
Module/course type:	obligatory <input checked="" type="checkbox"/> elective <input type="checkbox"/>			
Language of instruction:	Polish <input type="checkbox"/> English <input checked="" type="checkbox"/>			
Form of education	Hours			
Lecture	6			
Seminar				
Laboratory class	24			
E-learning				
Practical class				
Internship				
Other				
TOTAL				
Student's work input (participation in class, preparation, evaluation, etc.)	Student's hourly workload			
1. In class	30			
2. Student's own work including: 1 Preparation for class 2 Preparation for partials and finals	20			
Summary of the student's workload	50			
ECTS points for module/course	2			
Educational objectives: The aim of the course is to explain the very basic chemical knowledge, which is essential for full understanding of underlying principles of life. During the course, all main classes of organic compounds constituting living organisms and their properties are presented. Moreover, the rules governing behavior of fluids, gases and solids are explained. The most essential chemical calculations are presented, to improve understanding of terms like pH, buffer, concentration or dose.				
The matrix of learning outcomes for module/ subject with reference to verification methods of the intended educational outcomes and forms of instruction:				

Learning outcome code	A student who has obtained a credit for the module/course has the knowledge/skill to:	Methods of verifying the achievement of the intended learning outcomes:	Form of instruction * provide the symbol
B.W1	describes water-electrolyte balance in biological systems;	Partial tests, final test	L, LC
B.W2	describes acid-base equilibrium and buffer action mechanism as well as their significance in systemic homeostasis;	Partial tests, final test	L, LC
B.W4	knows basic reactions of organic and inorganic compounds in water solutions;	Partial tests, final test	L, LC
B.W10	knows the structure of simple organic compounds found in the macroparticles present in cells, intercellular matrix and systemic fluids;	Partial tests, final test	L, LC
B.W11	describes the structure of lipids and polysaccharides and their function in cellular and extracellular structures;	Partial tests, final test	L, LC
B.W12	describes primary, secondary, tertiary and quaternary protein structures, knows posttranslational and functional protein modifications and their significance;	Partial tests, final test	L, LC
B.W13	knows the function of nucleotides in a cell, primary and secondary structures of DNA and RNA and chromatin structure;	Partial tests, final test	L, LC
B.U3	calculates molar and percentage concentration of compounds; computes concentration of substances in single and multi compound isosmotic solutions,	Partial tests, final test	L, LC
B.U4	calculates solubility of inorganic compounds, determines chemical background of solubility or lack of solubility of organic compounds and its practical significance for nutrition and therapy;	Partial tests, final test	L, LC
B.U5	determines solution pH and the effect of pH changes on inorganic and organic compounds;	Partial tests, final test	L, LC
B.U8	makes use of basic laboratory techniques, such as qualitative analysis, titration, calorimetry, pH metry, chromatography, protein and nucleic acid electrophoresis ;	Observation	LC

EXAMPLES OF METHODS VERIFYING THE ACHIEVEMENT OF THE INTENDED LEARNING OUTCOMES:

In terms of knowledge: Oral exam (*non-standardized, standardized, traditional, problem-based*).

Written exam – the student produces/identifies answers)*essay, report; structured short-answer questions /SSQ/; multiple choice questions /MCQ/; multiple response questions /MRQ/; matching test; true/false test; open cloze test*)

In terms of skills: practical exam; Objective Structured Clinical Examination /OSCE/; Mini-CEX (mini – clinical examination); completion of a given assignment; project, presentation.

In terms of social competences:

A reflective essay; an extended observation by a supervisor/tutor; 360-degree assessment (feedback from teachers, peers, patients, other co-workers); self-assessment (portfolio included).

Course content: (use keywords referring to the content of each class following the intended learning outcomes):

Lectures:

1. Introduction to chemistry. Elements and symbols. The periodic table. The atom. Atomic number and mass number. Isotopes and atomic mass. Electron energy levels. Trends in periodic properties. Octet rule and ions. Ionic compounds. Naming and writing ionic formulas. Polyatomic ions. Covalent compounds and names. Electronegativity and bond polarity. Shapes and polarity of molecules. Attractive forces in compounds.

2. Organic compounds. Alkanes. Alkanes with substituents. Properties of alkanes. Functional groups. Alkenes and alkynes. Cis-trans isomers. Addition reactions. Polymers of alkenes. Aromatic compounds.
3. Alcohols, thiols and ethers. Properties of alcohols and ethers. Reactions of alcohols and thiols. Aldehydes and ketones. Properties of aldehydes and ketones. Chiral molecules. Carboxylic acids. Properties of carboxylic acids. Esters. Amines. Amides.

Laboratory class:

1. General chemistry. Introduction to chemistry. Mole, molarity, solution concentration, solution preparation. pH of solutions containing strong and weak acid and bases. Hydrolysis and buffers.
2. Natural Radioactivity. Nuclear Equations. Radiation Measurement. Half-Life of a Radioisotope. Medical Applications Using Radioactivity. Nuclear Fission and Fusion.
3. Gases. Properties of Gases. Gas Pressure. Pressure and Volume (Boyle's Law). Temperature and Volume (Charles's Law). Temperature and Pressure (Gay-Lussac's Law). The Combined Gas Law. Volume and Moles (Avogadro's Law). Partial Pressures (Dalton's Law).
4. Simple functional groups. Amines, alcohols, ethers, epoxides, aldehydes and ketones.
5. Complex functional groups. Carboxylic acids. Carboxylic acids derivatives, Fats. Nitriles.
6. Lipids. Structure, classification and biological functions of lipids. Waxes. Glycerides. Soaps and detergents. Phospholipids.
7. Carbohydrates. Fisher and Haworth projections. Chair conformation. Reactions of monosaccharides. Disaccharides. Glycosidic bonds. Polysaccharides.
8. Amino acids, peptides and proteins. Heterocyclic compounds. Nucleic acids.

Obligatory literature for lecture and labs:

1. Timberlake, K. C. An introduction to general, organic, and biological chemistry. Pearson Prentice Hall, 2012

Complementary literature for lecture and labs:

1. Wade, L.G. Jr. Organic Chemistry. Pearson Prentice Hall, 2006

Requirements for didactic aids (e.g. laboratory, multimedia projector, others...)

Multimedia projector, laboratory equipment – reagents, glassware. 3D models of organic molecules

Conditions for obtaining a credit for the subject:

50 points to gain during the course:

20 points – lecture-based test

20 points – seminar-based test

7 points – mini-quizzes (short tests during seminars)

3 points – lecture attendance

45-50 – very good (5.0)

40-44 – more than good (4.5)

35-40 – good (4.0)

30-35 – quite good (3.5)

25-30 – sufficient (3.0)

Below 25 – insufficient (2.0)

Retakes

If a student does not get a passing grade, two retake exams are possible based on lectures and seminars. A student needs to get minimum of 10 points from 20 points to pass. The maximum possible grade is good (10 – 13 – sufficient, 3.0; 13 – 16 – quite good, 3.5; 16 – 20 – good, 4.0).

Rules and regulations

1. Only excused absences are allowed. Skipping the class without a legitimate excuse means the student will be not be allowed to continue the course.
2. Legitimate excuse (doctor note, dean note, etc.) must be delivered no longer after one week.
3. If a student cannot attend a lecture or seminar test then he/she is allowed to attend it other time provided a student has legitimate excuse for his/her absence. All students who missed it must agree to one term and one term only will be allowed.
4. Students caught cheating will be expelled immediately and receive mark 2.0
7. Students can only be 5 minutes late for lectures or seminars.
8. The course consists of one semester. The credits are given for:
 - test involving the lectures (20 points)
 - test involving the seminars (20 points)
 - mini-quizzes (7 points)
 - lecture attendance (3 points)

The maximum number of points is 50. In order to pass the course a student need at least 25 points.

The name and address of the department/clinic where the course is taught (module/course); contact details (phone number/ email address):

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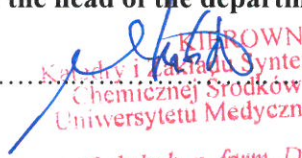
Names of the author/authors of this syllabus:

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Names of the teacher/teachers conducting classes:

Agnieszka Kaczor
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Signature of the head of the department/clinic


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Date of submission: