

Course name:

COURSE NAME (capital letters) CHEMISTRY

ECTS	
Course status	complementary - obligatory
Course final assesement/evaluation of outcomes	exam
Prerequisites	The fundamental knowledge in general and organic chemistry.

Main field of study:

field of study name: VETERINARY MEDICINE

Profile of study	General-academic
The code of studies (education level)	SM
Semester of studies	winter
Language of instruction	English

Course offered by:

Name of faculty offering the course	Faculty of Food Technology
Name of department offering the course	Department of chemistry
Course coordinator	dr Anna Wisła-Świder, prof. UR

Learning outcomes of the course:

Symbol of outcome	Description of learning outcome	Reference to	
		main field of study outcomes	discipline#

KNOWLEDGE – student knows and/or understands:

PPP_W1	Identifies basic types of bonds in molecules and on the basis of them makes conclusions about physicochemical properties of the compounds._W..	PB
PPP_W2	The main chemical processes: solubility, electrolytical dissociation, hydrolysis and the properties of solutions and colloids.		PB
PPP_W3	The structure and properties of inorganic and organic compounds.		PB
PPP_W4	Characterizes the basic reactions of organic and inorganic compounds in aqueous solutions.		PB

SKILLS – student is able to:

PPP_U1	Uses laboratory equipment, perform qualitative and quantitative analysis of investigated inorganic compounds and make reactions of organic compounds._U..	PB
PPP_U2	Performs chemical calculations including stoichiometric calculations, determining the molar concentration and the percentage, determining the pH of acids, bases and buffers.		PB
PPP_U3	Develops data and results of chemical experiments, write reactions and draws conclusions from the results obtained.		PB
PPP_U4	Uses different sources of chemical knowledge.		PB

SOCIAL COMPETENCE- student is ready to:

PPP_K1	Organizes work in a small team to prepare and carry out chemical reactions and analysis._K..	
PPP_K2	Is aware of the dangers in the chemical laboratory.		

PPP_K3	Recognizes the need for continuous improvement of the knowledge and skills.		
PPP_K4	Is ready to use his/her knowledge about chemical processes and laboratory skills in further steps of veterinary education.		

Teaching contents:

Lectures **15** **hours**

Topics of the lectures	<p>The basic laws of chemistry (Avogadro's law, the molar volume of gas, composition and stability of the law of conservation of mass). Stoichiometry of chemical patterns - calculation of the quantitative composition of the compound. Classification of chemical reactions. 2h</p> <p>Periodic table of elements, the relationship of atomic structure with the periodic table. Changes in properties of elements in the periodic table. Electronic configurations of elements. Chemical bonds in molecules and ions (ionic, atomic, atomic polarized, coordination). 2h</p> <p>General principles of solutions - true solutions and colloids, colligative properties, osmotic pressure and its biological significance. Electrolytic dissociation and the ionic product for water, pH, hydrolysis, buffers. Electrolytic dissociation and the ionic product for water, pH, hydrolysis of salts, buffers. 2h</p> <p>Classification of reactions in aqueous solution. Precipitation reactions of sediment (ion recording). Processes of oxidation-reduction. Basics of analytical chemistry. 2h</p> <p>General principles of organic chemistry. Chemical properties of alkanes – free radical chain reaction, cycloalkanes, aromatic alkanes, stereoisomers, nucleophilic substitution reaction, elimination reaction, addition reaction. 2h</p> <p>Organic compounds with one functional group (structure and chemical properties) – alcohols, phenols. Carbonyl compounds. Aldehydes and Ketones. Construction of the carbonyl group. Addition reactions, creating hemiacetals and acetals, condensation. Oxidation and reduction reactions. Nucleophilic addition to carbonyl group. 2h</p> <p>Carboxylic acids and their derivatives. Preparation and properties. Anhydrides and acid chlorides. Esterification as a reversible reaction. Amides. Structure and chemical properties of lipids (triglycerides, fatty acids, complex lipids, cholesterol and its derivatives). 2h</p> <p>Structure and chemical properties of carbohydrates. Structure and chemical properties of amines, and azo compounds. Biologically active amines (sulfa drugs, alkaloids, catecholamines). Principles of amino acids, peptide bond formation, proteins. Structure of nucleotides and nucleic acids. Structure of heterocyclic compounds with one or more heteroatoms (N, O, S). 1h</p>
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Accomplished learning outcomes	<i>symbols of learning outcomes for lecture</i>
Verification methods, rules and criteria of outcome assessment	<p><i>Assessment of the lecture:</i></p> <ul style="list-style-type: none"> • <i>Passing the laboratory is crucial to take the exam of the lecture course;</i> • <i>Passing the written exam covering the material of the lectures presented in the form of problem questions and computational tasks.</i> <p><i>Final assessment: 50% rating from classes + 50% an assessment of credit from the lectures (exam).</i></p>

Classes **30** **hours**

Topics of the classes	<p>Safety rules in the chemical laboratory. Glassware and basic equipment in the chemical laboratory. Basic laboratory activities. The systematics of inorganic compounds - revision. 2h</p> <p>Chemical reactions - a record response equations, classification of reactions, observations and conclusions. Characteristic reactions for selected ions. Stoichiometric calculations. 4h</p> <p>Calculations of molar and percentage concentrations of a solution. Preparation of aqueous solutions of solids and liquids. 3h</p> <p>Electrolytical dissociation, hydrogen ions concentration and pH values of different types of solutions: acidic, basic, of strong acidic and strong basic salts, of weak basic and strong acidic salts and of strong basic and weak acidic salts; pH indicators. First test. 4h</p>
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Introduction to quantitative analysis. Acid-base titration: determination of the unknown concentration of acidic/basic solution. Redox titration. Examples of calculations in the bulk analysis. 4h

Buffers – preparation of buffer solutions, properties of buffers, buffer capacity. 2nd test. 3h

The most important reactions of hydrocarbons. The most important reactions of alcohols and phenols. The most important reactions of aldehydes and ketones. 5h

The most important reactions of aldehydes and ketones. Carboxylic acids and their derivatives - selected reactions. 3th test. 5h

Accomplished learning outcomes	<i>symbol of learning outcomes for the classes</i>
Verification methods, rules and criteria of outcome assessment	<i>Laboratory credit requirements</i> •compulsory execution and passing all lab exercises required in the course; •passing lab reports of experiments taken ; •Passing the mini-tests provided in the programme of laboratories. <i>Final assessment: 50% rating from classes + 50% an assessment of credit from the lectures (exam).</i>
Seminars	... hours

Topics of the seminars	
Accomplished learning outcomes	<i>symbol of learning outcomes of the seminars</i>
Verification methods, rules and criteria of outcome assessment	<i>together with participation in the final asessment (in %)</i>

References:

Basic	Freeman & Company, New York, 2002 2. Timberlake K.C., <i>General, Organic, and Biological Chemistry, Pearson International Edition 2007 (or later edition)</i> , 3. John C. McMurry, <i>Fundamentals of Organic Chemistry 7th Edition, Cengage Learning Inc., 2011</i>
Supplementary	1. Organic chemistry online: https://www.askthenerd.com/ocol/OCOL.HTM 2. https://2012books.lardbucket.org/books/introduction-to-chemistry-general-organic-and-biological/

Structure of learning outcomes:

Discipline: # (provide appropriate symbol)	PB	ECTS**
Discipline: # (provide appropriate symbol - if the course relates to more than one academic discipline)	...	ECTS**

Structure of student activities:

Contact hours	45	hours	9	ECTS**
including:				
lectures	15*	hours		
classes and seminars	30*	hours		
consultations	...	hours		
participation in research	...	hours		
mandatory traineeships	...	hours		
participation in examinations	2	hours		
e-learning	...	hours	...	ECTS**
student own work	90	hours	3	ECTS**

Syllabus valid from the academic year 2021/2022

* where 10 hours of classes = 1 ECTC (in case of 15 h → 2 ECTS)

** stated with an accuracy to 0.1 ECTS, where 1 ECTS = 25 - 30 hours of classes

academic discipline code: RZ - animal science and fishery, PB - biological sciences, etc.