Course Unit Descriptor

Study Programme: Agricultural ecology and environmental protection, Phytomedicine

Course Unit Title: Chemistry

Course Unit Code: 3OAG1O01, 3OFM1O01

Name of Lecturer(s): Prof. Boris Popović, PhD; Ass. Prof. Ružica Ždero Pavlović, PhD

Type and Level of Studies: Undergraduate academic studies

Course Status (compulsory/elective): Compulsory

Semester (winter/summer): Winter

Language of instruction: English

Mode of course unit delivery (face-to-face/distance learning): Face-to-face

Number of ECTS Allocated: 7

Prerequisites: None

Course Aims:

Providing the basis for the formation of a certain view of the world, getting to know the most important principles, theories and laws of chemistry, providing theoretical basis for acquiring other skills, mastering specific skills related to the application of theoretical knowledge, the development of creative skills and practical skills necessary for the exercise of the profession.

Learning Outcomes:

After completing the course of chemistry, students will train the application of theoretical and practical knowledge of chemistry both in life and in the acquisition of other knowledge (eg, biochemistry, agrochemistry, microbiology, physiology, etc.). In terms of practical knowledge and skills students will be able to compute in chemistry, handling basic laboratory equipment, perform basic volumetric determinations and basic instrumental measurements. In addition to this, students should be able to continue their studies or to apply their knowledge and understanding of the profession and to convey it to others.

Syllabus:

Theory

Introduction. Basic concepts and laws of chemistry. Chemical formulas and equations. Atomic structure and arrangement of electrons in an atom. The structure of atoms and the periodic table of elements. The structure of the molecule. Electron theory of chemical bonding. The main types of inorganic compounds. Intermolecular interactions and states. Basics of thermochemistry, chemical kinetics and chemical equilibrium. The solutions. Electrolytic dissociation and equilibrium in electrolyte solutions. Acids and bases. Hydrolysis and buffers. Oxidation-reduction processes. The redox potential. Colligative properties. Colloids. Chemical properties of biogenic elements. The most important compounds of biogenic elements and their significance. Structure and classification of organic compounds. Hydrocarbons. Halogen, hydroxy and carbonyl hydrocarbons. Carboxylic acids and carboxylic acid derivatives of biologically important. Amines. Heterocyclic compounds. Carbohydrates. Simple and complex lipids. The peptides and proteins. The nucleic acids. Secondary biomolecules of plants and their significance.

Practice

Methods for separation and purification of substances. The stoichiometry. Quantifying the composition of the solution.

Electrolytic dissociation and pH. Acid-base titration. Permanganometry. Potentiometric titration. Spectrophotometry. Hydrocarbons and for all their reaction. Chemical reactions of individual groups of organic compounds (alcohol, phenol, carbonyl compounds, carboxylic acids and acid derivatives). Chemical reactions of primary biomolecules.

Required Reading:

1. Gorzynski Smith, J. General, Organic & Biological Chemistry. Mc Graw-Hill, New York, 2010.

Weekly Contact Hours:	**Lectures:** 4	**Practical work:** 3

Teaching Methods:

Lectures and students group work

Knowledge Assessment (maximum of 100 points):

Pre-exam obligations	points	**Final exam**	points
Active class participation	3	written exam	55
Test	20	oral exam	
Exercise attendance	2	…….	
colloquium	20		

The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.