

Study Programme: Organic Agriculture, Field and vegetable crops, Fitomedicine, Fruit growing and viticulture
Course Unit Title: Chemistry
Course Unit Code: 19.FTM001
Name of Lecturer(s): Prof. Boris Popović, Ass. Prof. Ružica Ždero Pavlović, Assistant Ph.D. Bojana Blagojević
Type and Level of Studies: Undergraduate Academic Degree
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: 6
Prerequisites: None
<p>Course Aims:</p> <p>Providing the basis for 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.</p>
<p>Learning Outcomes:</p> <p>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.</p>
<p>Syllabus:</p> <p><i>Theory</i></p> <p>The structure of atoms and molecules and the periodic table of elements. Electronic configuration of atoms and the periodic table of elements. Chemical bonds and intermolecular forces. Thermochemistry and chemical kinetics. Heat effect of chemical reactions. Chemical reaction rates and law of mass action. Chemical equilibrium and factors that affect chemical equilibrium. The solutions. Solubility and solubility product constants. Colligative properties of solutions. Osmosis and dialysis. Electrolytic dissociation. Acids and bases. Hydrolysis and buffers. pH value. Classification of dispersed system. Colloids. The biogenic elements. Chemical properties of biogenic elements and compounds. The importance of some biogenic elements in plants. Biogeochemical cycles. Mineral fertilizers. Organic chemistry. Structure and classification of organic compounds. Functional groups. Classification of hydrocarbons. Types of organic reactions. Chemical signals – pheromones and allelochemicals. Organochlorine compounds and organochlorine pesticides. Organic compounds with oxygen. Oxidation-reduction processes in organic chemistry and biochemistry. Alcohols, phenols, aldehydes, ketones and carboxylic acids. Substituted carboxylic acids and carboxylic acid derivatives. Plant hormones. Biomimetics- Pesticides with hormone action. Organic compounds with nitrogen. Classification of organic compounds with nitrogen. Classification of amines and properties amine. The basic character of organic compounds with nitrogen. The most important heterocyclic compounds and their importance. Biomolecules. Classification of biomolecules. Carbohydrates. Fatty acids, lipids, oils, and soaps. Phospholipids. Biological membranes. The amino-acids and proteins. Nucleosides, nucleotides and ATP. The nucleic acids.</p> <p><i>Practice</i></p> <p>1. Laboratory equipment and methods for separation of substances. 2. Mole-mass calculations. Calculations in chemistry. 3. Measuring the mass and volume. Dissolving and quantifying the composition of the solution. 4. The solution calculations. Dilution. 5. Preparing the solution of known quantitative composition. 6. Acids and bases (pH and stoichiometric calculations). 7. Acidimetry –</p>

Determination of NaOH with standard solution of HCl. 8. Redox reactions. 9. Permanganometry – Determination of Fe(II) ion with standard solution of KMnO₄. 10. Hydrocarbons (nomenclature and chemical reaction). 11. Organic compounds with oxygen. 12. Organic compounds with nitrogen, carbohydrates and lipids.

Required Reading:

1. Б. М. Поповић, Д. Штајнер, Р. Ждеро Павловић, Б. Благојевић, Н. Мићић: Практикум из хемије са теоријским основама и збирком питања и задатака, Пољопривредни факултет, Нови Сад, 2008.
2. 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		written exam	60
Practical work		oral exam	If necessary
Preliminary exam(s)	40	
Seminar(s)			

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