

FOREST CHEMISTRY

Basic data of the subject	
Academic Unit:	Faculty of Life and Environmental Sciences
Course title:	Forestry and Environmental Sciences
Study program:	Forest chemistry
Level:	Bachelor
Course status:	Obligatory (O)
Study year:	1 year / 2 semester
Number of hours per week:	3 + 2
Credit value – ECTS:	6 ECTS
Time / location:	To be announced
Lecturer:	Prof. Dr. Fatmir Faiku
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Course description:	Chemical and mineralogical composition of soils, Mineralogical composition of clays, Water and air in soil, Circulation of elements in nature, Soil colloids, Acid-base and ion exchange reactions in soil, Types of soils, Calcification and acidification of soil, Air in the soil (composition and properties), Circulation of air in the soil (composition and properties), Capacity of the soil for air, Strategy for soil protection, Soil pollution in Kosovo, Chemical composition of wood, The main chemical composition of wood and the importance of theirs. Lipids, Carbohydrates, Proteins, Enzymes, Photosynthesis, Respiration in plants, Nitrogen cycle, Biosynthesis of amino acids, lignin, cellulose and phenols.
Course objectives:	This course will equip students with the ability to explain how solid soil stages affect the chemical processes of the soil system. Knowing such processes will give students an understanding of what processes dominate the chemical and mineralogical properties of lands and that will help in land repossession, recovery and management decisions. At the same time, students will be introduced to some enzymatic and biochemical mechanisms of plants.

Contribution on student load (must correspond with learning outcomes)			
Activity	Hours	Days/week	Total
Lectures	3	15	45
Exercise theoretical/laboratory	2	15	30
Practice work	-	-	-
Contact with lecturer/consultations	1	5	5
Field exercises	-	-	
Mid-terms, seminars	2	3	6
Homework	3	4	12
Individual time spent studying (at the library or home)	2	10	20
Final preparation for the exam	2	10	20

Learning outcomes:

The main purpose of the course is to transfer to students:

- ✓ Basic knowledge of soil chemistry.
- ✓ Basic knowledge on laboratory methodologies for determining some physico-chemical characteristics of the soil.
- ✓ Basic knowledge on the circulation of elements in nature.
- ✓ Basic knowledge of some enzymatic and biochemical mechanisms of plants.
- ✓ The knowledge gained is useful for a better understanding of other processes and phenomena related to plant physiology and production.
- ✓ To develop sufficient theoretical and practical knowledge.
- ✓ To be independent for laboratory work.

Time spent in evaluation (tests, quiz, final exam)	2	4	8
Projects, presentations, etc.	1	4	4
Total			150 orë (6 ECTS)
Teaching methods:	Lectures, discussions, practical exercises in the lab, consultations, independent projects, homework assignments, colloquia, exams.		
Evaluation methods:	<p>The first evaluation: 20%,</p> <p>The second evaluation: 20%,</p> <p>Seminars or other engagements: 10%,</p> <p>Final exam: 50%,</p> <p>Total: 100%</p>		
Literature			
Basic Literature:	<ol style="list-style-type: none"> 1. M. E. Essington, Soil and Water Chemistry: An integrated approach, 2015. 2. Various Authors, Agricultural Biochemistry, Patron Editore, 2017. 3. Nexhat Daci, Majlinda Daci, Shkenca e mjedisit: Zhvillimi i qëndrueshëm, Prishtinë, Akademia e Shkencave dhe e Arteve e Kosovës, 2014. 		
Additional Literature:	<ol style="list-style-type: none"> 1. Alqi Çullaj, Kimia e mjedisit, Tiranë, 2005. 2. Sabit Dërmaku, Biokimia, Prishtinë, 2007. 3. Materials from the Internet. 		

Designed study plan:		
Week	Lectures	Exercises
<i>First week:</i>	Chemical and mineralogical composition of soils, Mineralogical composition of clays, Characteristics of clays, Composition of clays, Structure, Essential composition of soils, Water and air in soil, Inorganic component in soil.	Determination pH in the soil.

<i>Second week:</i>	Organic material in the soil, Nutrients in the soil, Hedhurinates and pollutants in the soil, Circulation of elements in nature, Carbon cycle, Nitrogen cycle, Oxygen cycle, Phosphorus cycle, Sulfur cycle.	Determination of N, S, P etc.
<i>Third week:</i>	Soil colloids, Soil reaction, Acid-base and ion exchange reactions in soil, Soil types, Saline soils, Soil calcification and acidification, Soil air (composition and properties), Soil air circulation (aeration, ventilation).	Determination of chlorides (in HNO ₃) by Volhard method.
<i>Fourth week:</i>	Diffusion, Air capacity of soil, Strategy for soil protection, Soil pollution in Kosovo, Chemical composition of wood.	Determination of some heavy metals in the soil by the SAA method.
<i>Fifth week:</i>	The main chemical constituents of wood and their importance, Cellulose, Lignin, Hemicellulose, Secondary chemical constituents of wood, Physical properties of wood, Factors affecting the chemical composition of wood, Chemical processing of wood.	Determination of some heavy metals in the soil by the SAA method.
<i>Sixth week:</i>	Lipids (Fats), Higher fatty acids, Glycerides, Properties of glycerides, Utilization of glycerides, Phosphoglycerides, Waxes, Sphingolipids, Terpenes, Steroids, Metabolism of fatty acids.	Determining As, Bi, Sb, Sn, Te with hydrure technique.
<i>Seventh week:</i>	Carbohydrates (Sugars), Monosaccharaides, Reactions of monosaccharaides, Cyclic structure of carbohydrates, Glucose (grape sugar), Fructose (fruit sugar), Disaccharides, Sucrose (common sugar), Maltose, Lactose.	Determining As, Bi, Sb, Sn, Te with hydrure technique.
<i>Eighth week:</i>	The first assessment	Extraction of lipids from various medicinal plants.

<i>Ninth week:</i>	Polysaccharides, Starch, Cellulose, Glycogen, Proteins, Amino acids, Physico-chemical properties of amino acids, Isoelectric point (p _i).	Extraction of lipids from various medicinal plants.
<i>Tenth week:</i>	Synthesis of amino acids, Polypeptides and proteins, Primary structure of proteins, Secondary structure of proteins, Tertiary structure of proteins, Quaternary structure of proteins, Classification of proteins, Albumins, Globulin, Glutelins, Histones, Composite proteins – Proteids.	Determination proteins with the Kjeldahl method
<i>Eleventh week:</i>	Nucleic acids, Pyrimidine and purine bases, Nucleosides, Nucleotides, Enzymes, Characteristic properties of catalysts, Chemical nature of enzymes, Coenzymes, Nomenclature and classification of enzymes, Enzymatic kinetics.	Determination proteins with the Kjeldahl method
<i>Twelfth week:</i>	Factors affecting the speed of enzyme action, Use of enzymes, Photosynthesis, Light phase of photosynthesis, Dark phase of photosynthesis, Factors affecting the process of photosynthesis, Photosynthetic efficiency.	Isolation of essential oils from plants by steam distillation.
<i>Thirteenth week:</i>	Glycolysis, Anaerobic fermentation, Krebs cycle (tricarboxylic acid cycle or citric acid cycle), Electron transport chain, Nitrogen cycle, Stages of nitrogen cycle, Nitrogen fixation process, Nitrification, Assimilation, Denitrification, Nitrogen cycle in the marine ecosystem, the importance of the nitrogen cycle.	Isolation of essential oils from plants by steam distillation.
<i>Fourteenth week:</i>	Biosynthesis of amino acids, Biosynthesis of lignin, Biosynthesis of cellulose, Biosynthesis of phenols.	Identification of amino acids.

<i>Fifteenth week:</i>	The second assessment	Identification of peptide bond.
Academic policies and rules of conduct:		
Each student should comply with the policies outlined in the Statute of Uuniversity of Prizren. The student is required to attend regular lectures, exercises and seminars. To behave in conformity with the code of conduct and to comply with the rules of work in research laboratories.		