

Biotechnical Faculty / PLANT PRODUCTION / AGROCHEMISTRY

Course:	AGROCHEMISTRY			
Course ID	Course status	Semester	ECTS credits	Lessons (Lessons+Exercises+Laboratory)
2862	Mandatory	3	7	4+0+1
Programs	PLANT PRODUCTION			
Prerequisites	None			
Aims	Introduction to chemistry of biogenic elements in soil, chemical and physical properties of fertilizers and their changes in the soil, and plant nutrition – emphasis to soils of Montenegro and the specifics of crop production			
Learning outcomes	After passing this exam, student will be able to: Understand the chemistry of biogenic elements in the soil; Explain to farmers and other interested parties the procedure of soil sampling for agrochemical analysis; Interpret the results of agrochemical analysis of soil; Briefly describe the technology of production, chemical and physical properties of commonly used fertilizers; Describe the procedure of quality control of fertilizers; Understand the changes of nutrient forms from fertilizers in the soil; Calculate doses of fertilizers on the basis of the results of agrochemical analysis of soil and the crop specifics; Prepare fertilization plan (time, schedule and method of fertilization); Know the principles of economical production and environmental protection			
Lecturer / Teaching assistant	Ana Topalovic, PhD, assistant professor; Milena Stojanović, PhD			
Methodology	Lectures, laboratory exercises, independent work, consultations			
Plan and program of work				
Preparing week	Preparation and registration of the semester			
I week lectures	Objective, task, importance and history of agrochemical study; Soil composition; Solid, liquid and gaseous phases of soil			
I week exercises	Demonstration of procedure of soil sampling; Preparation of soil sample for analysis			
II week lectures	Adsorptive capacity of soil; Types of adsorption; Soil reaction; Influence of soil pH on nutrient availability			
II week exercises	Determination of active and potential acidity; Determination of total carbonate by use of Schieblers calcimeter			
III week lectures	Soil macronutrients; Nitrogen (forms and amounts); Fixation, mineralization and losses of nitrogen; Test I			
III week exercises	Determination of active carbonate by Droiuneu-Gallet method; Determination of organic matter/humus by Kotzman method; Determination of total nitrogen by Kjeldahl semi-micro method			
IV week lectures	Phosphorus (forms and amounts); Chemical adsorption of phosphorus; Available phosphorus; Potassium (forms and amounts); Available potassium			
IV week exercises	Determination of available forms of nitrogen; Determination of available phosphorus and potassium by Egner-Riehm method			
V week lectures	Forms, transformation and availability: Calcium; Magnesium; Iron; Sulphur; Manganese			
V week exercises	Preparation of NH ₄ Ac (ammonium acetate) extract for determination of exchangeable Calcium and Magnesium; Preparation of DTPA (diethylene triamine pentaacetic acid) extract for determination of microelements (e.g., Iron, Manganese, Zinc and Copper)			
VI week lectures	Forms, transformation and availability: Copper; Zinc; Boron; Cobalt; Molybdenum			
VI week exercises	Determination of microelements by atomic absorption spectrophotometry			
VII week lectures	Colloquium I; Fertilizers (definition, importance and division)			
VII week exercises	Determination of nutrients in plant material for purpose of crop supply evaluation			
VIII week lectures	Nitrogen fertilizers (nitrate, ammonia, amide and slow-release); Nitrification inhibitors; Test II			
VIII week exercises	Preparation of fertilizer sample for analysis (grinding, sieving); Determination of granulometric composition; Determination of moisture			
IX week lectures	Nitrogen fertilizers (preparation, properties, application, influence on soil properties)			
IX week exercises	Determination of total nitrogen in one- and multicomponent fertilizers			
X week lectures	Phosphoric fertilizers; Potassium fertilizers; Lime fertilizers (production, properties, application,			

	influence on soil properties					
X week exercises	Determination of water soluble, in citric acid and in mineral acids soluble phosphorus					
XI week lectures	Fertilizers with microelements; Complex fertilizers (production, properties, application, influence on soil properties					
XI week exercises	Determination of secondary and micronutrients in various fertilizers					
XII week lectures	Organic fertilizers (production, properties, application, influence on soil properties)					
XII week exercises	Interpretation of results of agrochemical analysis for: soil, plant material and fertilizers					
XIII week lectures	Colloquium II; Systems of fertilizer use					
XIII week exercises	Determination of peat quality					
XIV week lectures	Ameliorative and regular fertilization; Fertigation; Determining of needs for fertilization					
XIV week exercises	Drawing calibration curve, calculation of parameter values by use of analytical data and chemical equations, calculation of fertilizer doses					
XV week lectures	Fertilization of orchards and vineyards; Determining doses for ameliorative fertilization; Fertilization of vegetable crops (emphasis on greenhouse production					
XV week exercises	Test (exercise)					
Student workload						
Per week			Per semester			
7 credits x 40/30=9 hours and 20 minuts 4 sat(a) theoretical classes 1 sat(a) practical classes 0 excercises 4 hour(s) i 20 minuts of independent work, including consultations			Classes and final exam: 9 hour(s) i 20 minuts x 16 =149 hour(s) i 20 minuts Necessary preparation before the beginning of the semester (administration, registration, certification): 9 hour(s) i 20 minuts x 2 =18 hour(s) i 40 minuts Total workload for the subject: 7 x 30=210 hour(s) Additional work for exam preparation in the preparing exam period, including taking the remedial exam from 0 to 30 hours (remaining time from the first two items to the total load for the item) 42 hour(s) i 0 minuts Workload structure: 149 hour(s) i 20 minuts (cources), 18 hour(s) i 40 minuts (preparation), 42 hour(s) i 0 minuts (additional work)			
Student obligations			Attending lectures and exercises			
Consultations						
Literature			1. A. Topalović. Practicum in Agrochemistry - Methods of chemical analysis and data processing. University of Montenegro, Podgorica, 2023. 2. M. Jakovljevic, M. Pantović. Chemistry of Soil and Water, Faculty of Agriculture, Belgrade, 1991. 3. R. Kastori. Protecting of Agricultural System, Novi			
Examination methods			Activity during exercises - 5 points; Activity during lectures - 5 points; Test I - 5 points; Colloquium I - 15 points; Test II - 5 points; Colloquium II -15 points; Test (exercises) - 10 points; Final exam - 40 points.			
Special remarks						
Comment						
Grade:	F	E	D	C	B	A
Number of points	less than 50 points	greater than or equal to 50 points and less than 60 points	greater than or equal to 60 points and less than 70 points	greater than or equal to 70 points and less than 80 points	greater than or equal to 80 points and less than 90 points	greater than or equal to 90 points