

Biotechnical Faculty / CONTINENTAL FRUIT GROWING AND MEDICAL PLANTS / AGROCHEMISTRY

Course:	AGROCHEMISTRY			
Course ID	Course status	Semester	ECTS credits	Lessons (Lessons+Exercises+Laboratory)
2862	Mandatory	2	7	4+0+2
Programs	CONTINENTAL FRUIT GROWING AND MEDICAL PLANTS			
Prerequisites	None			
Aims	Getting to know: Chemistry of biogenic elements in the soil; Chemical and physical properties of fertilizers and their changes in the soil; Plant nutrition - with special emphasis on the soils of Montenegro and the specifics of plant production.			
Learning outcomes	Understand the chemistry of biogenic elements in the soil; Give the instructions to farmers and other interested parties regarding the procedure of taking a soil sample for the purposes of agrochemical analysis; Interpret the results of agrochemical analysis of soil; Understand the changes in nutrient forms from fertilizers in the soil; Calculate the dose of fertilizer based on the results of agrochemical analysis of the soil and the specificity of the crop; Prepare a fertilization plan (time and schedule of fertilization, method of fertilization); Know the principles of economy production and environmental protection.			
Lecturer / Teaching assistant	Ana Topalović, assistant professor; Darko Dubak, MSc			
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 Droigneu-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	Calibration curve; Processing of laboratory data			
VI week lectures	Forms, transformation and availability: Copper; Zinc; Boron; Cobalt; Molybdenum			
VI week exercises	Principles of methods for determining the concentration of secondary elements and microelements in soil			
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	Standard methods for the determination of total nitrogen in single-component and multi-component fertilizers			
X week lectures	Phosphoric fertilizers; Potassium fertilizers; Lime fertilizers (production, properties, application,			

	influence on soil properties)					
X week exercises	Standard methods for the determination of water-soluble, in citric acid and in mineral acids of soluble phosphorus in fertilizers; Standard methods for the determination of total potassium in fertilizer					
XI week lectures	Fertilizers containing microelements; Complex fertilizers (production, properties, application, influence on soil properties)					
XI week exercises	Standard methods for the determination of secondary and micronutrients in fertilizers					
XII week lectures	Organic fertilizers (production, properties, application, influence on soil properties)					
XII week exercises	Determining the quality of peat					
XIII week lectures	Colloquium II; Systems of fertilizer use					
XIII week exercises	Interpretation of results of agrochemical analysis for: soil, plant material and fertilizers					
XIV week lectures	Ameliorative and regular fertilization; Fertigation; Determining of needs for fertilization					
XIV week exercises	Seminary work (topics: soil)					
XV week lectures	Fertilization of orchards and vineyards; Determining doses for ameliorative fertilization; Fertilization of vegetable crops (emphasis on greenhouse production); Professional excursion					
XV week exercises	Seminary work (topics: fertilizer)					
Student workload						
Per week				Per semester		
7 credits x 40/30=9 hours and 20 minuts 4 sat(a) theoretical classes 2 sat(a) practical classes 0 excercises 3 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	By arrangement with students					
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 Sad, 1995. 4. Kim H. Tan. Principles of Soil Chemistry, CRC Press, Boca Raton, 2010. 5. Alloway, Brian J. Heavy Metals in Soils Trace Metals and Metalloids in Soils and their Bioavailability, Springer Science + Business Media, Dordrecht, 2013.					
Examination methods	Attendance at lectures and exercises 5 points; Test I 5 points; Colloquium I 15 points; Test II 5 points; Colloquium II 15 points; Seminary work 5 points; Final exam 50 points. A passing grade is obtained if cumulatively collect at least 50 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