

Discipline	<i>AGROCHEMISTRY</i> code: 15 winter semester			
Specialty	AGRONOMY			
ECTS credits: 6	Form of assessment: Exam			
Lecturer	Assoc. prof. Albena Ivanova, PhD Room: NUK 317a Phone: +359 52 385 725 E-mail: a.ivanova@tu-varna.bg			
Department	PLANT PRODUCTION			
Faculty	<i>FACULTY OF MECHANICAL ENGINEERING AND TECHNOLOGIES</i>			
Learning objectives:				
Annotation:				
<p>The main subject matter of Agrochemistry is the study of the relationships between plants, soil and nutrients (from the soil reserves and the fertilizers), the properties of fertilizers and their impact on soil and plants, agrochemical soil melioration, methods of conserving and enhancing soil fertility. Agrochemistry is closely related to many other sciences. Specifically, for the training course, Agrochemistry is interrelated to disciplines already studied such as Chemistry, Soil Science, Physiology and Microbiology.</p> <p>Students will learn about plant nutrition – the nutrient intake characteristics, the conditions for their intake, as well as the need of nutrients during the different phases of plant development. They will study soil as a source of nutrients and the importance of individual elements in yield formation. They will acquire knowledge about the types of fertilizers and how they are produced, the changes occurring in the different soil types as a result of mineral or organic fertilizers application. They will study the procedures and facilities for soil melioration, as well as conservation and enhancement of soil fertility.</p> <p>As Agrochemistry is the basis of the scientific application of the fertilization methods, the student will acquire knowledge about the environmental aspects of mineral fertilization and plant nutrition.</p>				
CONTENTS:				
Training Area			Hours lectures	Hours seminar exercises

Subject and method of agrochemistry. History and directions of agrochemistry. Status of chemicalization in Bulgarian agriculture.	2	
Plant nutrition - nutrients for plants; absorption of nutrients and assimilation; dynamics of intake of nutrients in plants; environmental factors affecting plant nutrition.	2	
Soil as a nutrient medium for plants - physicochemical properties, soil phases, pH, sorption capacity; stocks and forms of nutrients in the soil; dynamics of nutrients in soils, factors determining their assimilation for plants.	2	
Nutrition and fertilization of plants with nitrogen - physiological functions of nitrogen; forms of nitrogen in the soil and assimilation; nitrogen fertilizers; nitrogen balance.	2	
Feeding and fertilizing plants with sulfur - physiological functions of sulfur; sulfur food for plants; soil sulfur; sulfur-containing fertilizers.	2	
Nutrition and fertilization of plants with phosphorus - physiological functions of phosphorus; soil phosphorus stocks and dynamics; phosphorus fertilizers; phosphorus balance.	2	
Feeding and fertilizing plants with potassium - physiological functions of potassium; forms and dynamics of potassium in soil; potassium fertilizers; potassium balance.	2	
Nutrition and fertilization of plants with magnesium - physiological functions of magnesium; forms and dynamics of magnesium in soils; magnesium fertilizers.	2	
Feeding and fertilizing plants with calcium - physiological functions of calcium; soil as a source of calcium; calcium fertilizers and ameliorants; liming of acidic soils.	2	
Nutrition and fertilization of plants with sodium - physiological functions of sodium; soil sodium; sodium containing fertilizers.	2	
Feeding and fertilizing plants with trace elements - iron, manganese, zinc, copper, molybdenum, boron, chlorine, silicon, cobalt, vanadium. Toxic elements - iodine, bromine, fluorine, aluminum, nickel, chromium, selenium, lead, cadmium.	1	
Complex and bacterial fertilizers.	1	
Organic fertilization - manure, liquid fertilizer, composts, biochar, green manure, etc.	1	
Determining the norms for fertilizing field crops. Use of the balance and mathematical methods to determine the fertilizer rate.	1	
Specificity of fertilizing field crops.	1	

Specificity of fertilizing vegetable crops.	1	
Specifics of fertilizing vineyards, perennials and forests.	1	
Organization of fertilizing - storage, methods, terms and techniques for applying fertilizers; fertilization system in crop rotation. Agrochemical service to agriculture.	1	
Fertilization and quality of agricultural production - quality as a function of the production system; quality as a function of nutrient supply; food quality and human and animal health.	1	
Balance of nutritional elements in the farm.	1	
Sampling for agrochemical analysis. Representative sample. Calculations in titrimetric and spectrophotometric analysis.		2
Determination of active soil acidity. Measurement of pH.		2
Determination of harmful soil acidity (sum of exchangeable hydrogen and aluminum). Exchangeable soil acidity.		2
Determination of content of calcium and magnesium ions in soil extract.		2
Determination of ammonium and nitrate nitrogen in the soil.		3
Extraction of mobile phosphates in the soil and quantitative determination of their content.		3
Extraction and determination of potassium in soils.		3
Classification of fertilizers. Qualitative reactions for the recognition of mineral fertilizers.		2
Nitrogen fertilizers. Analysis of nitrogen in fertilizers.		2
Phosphorous fertilizers. Analysis of water-soluble diphosphorus pentoxide in granular TSP.		3
Phosphorous fertilizers. Analysis of total diphosphorus pentoxide in MAP and DAP.		2
Analysis of free acidity and alkalinity in fertilizers.		2
Potassium fertilizers. Determination of potassium content in potash fertilizers.		3
<b>TOTAL: 60 h</b>	<b>30</b>	<b>30</b>