ERASMUS MUNDUS MASTER PROGRAMME IN SOIL SCIENCE – emiSS

2020-2021 ACADEMIC YEAR - MODULE SYLLABUS

Name of course:	
SOIL FERTILITY AND FERTILIZATION	
ECTS	*6*
Type of Course	*Compulsory*
Form of Examination	*Written Examination*
Prerequisites	*Basic knowledge in the soil science, agronomy, soil microorganisms, plant phisiology and biochemistry.*

Field of Study:	
Agriculture	
Education profile	*Academic*
Code of study form and level of education	*Master of Science*
Academic year/Semester	*First year/Spring Semester*
Specialization	*Agriculture*
Language of education	*English*

The lecturer module:	
The name of faculty	*Agricultural University BG, Faculty of Agriculture*
The name of department	*Ahrochemistry & Soil Science*

Educational outcomes:	
Description of the learning effect	
KNOWLEDGE - student knows and understands:	
1	*The student knows the main factors affecting soil fertility – organic matter CEC and soil structure.*
2	*Student knows the modern concepts and approaches for management of soil fertility*
3	*Student knows the efficiency of application of macro and micro-fertilizers at different crops – cereals, industrial and permanent crops.*
4	*Student knows the high efficiency fertilizers*
5	*Student knows the peculiarity of materials used for producing substrates in greenhouses and pot plans.*
SKILLS - the graduate can	

1	*Student obtains the necessary scientific information from literature, databases or other sources in order to broaden and deepen their knowledge of study topics.*
2	*Student can recognize the visual symptoms of deficiency and excess of macro and microelements on plants.*
3	*Student can advise farmers for proper application of main types of fertilizers and fertilizers with and high efficiency fertilizers.*
4	*Student will know how to use different materials for preparation of substrates for cultivation facilities (greenhouses) and pot plants*

SOCIAL COMPETENCES - graduate:

1	*Student shows activity during a discussion on various issues related to maintaining of soil fertility at diferent production systems*
2	*Student can organize fertilization of grown crops in their farms and advise farmers about fertilization of crops*
3	*Student can work for state organizations and private companies dealing with fertilization of crops*
4	*Student has the competence to participate in agricultural research connected with soil fertility and fertilizer application and discuss their results*

Course objectives and content:

This course is to acquaint the graduate students with fundamental principals in soils affecting soil fertility – acidity and alkalinity of soil, CEC and AEC, importance of soil organic and soil biota for soil fertility. The students will get aquinted with main types of fertilizers including high efficiency fertilizers and their application at different crops – field crops, permanent crops, vegetables and pastures. Student will know how to produce different substrates for growing of plants.

		Soil Fertility and Fertilization *36 hours*
Subject of lecture	1	*Soil fertility and major factors that influence it – soil organic matter, cation exchange capacity (CEC) and anion exchange capacity (AEC) 3 h*
	2	*Sustainable management of plant mineral nutrition and soil fertility through reasonable fertilization. Modern concepts and approaches 3 h*
	3	*Efficiency with fertilization with macroelements. Basic parameters and indicators for assessing the efficiency of fertilization with nitrogen, phosphorus and potassium 3 h*
	4	*Fertilizing efficiency with macro and microelements depending on soil conditions. The role of foliar fertilization in modern agriculture 3 h*
	5	*High efficiency fertilizers - slow-acting fertilizers, fertilizers with controlled action, stabilized nitrogen and complex fertilizers. Main agrochemical properties and environmental benefits of using these types of fertilizers 3 h*
	6	*Nitrification and urease inhibitors (nitrogen stabilizers and stabilized nitrogen fertilizers) 3 h*
	7	*Midterm exam*
	8	*Control and management of fertilization and mineral nutrition of cereals 3 h*
	9	*Control and management of fertilization and mineral nutrition of industrial crops 3 h*
	10	*Control and management of fertilization and mineral nutrition of fruit crops and vineyards 3 h*
	11	*Soil management in shifting cultivation systems 3 h*

	12	*Substrates for growing plants. Types of substrates and their physical & chemical properties 3 h*
	13	*Fertigation 3 h*
	14	*Final exam*

The methods of verification and assessment criteria and principles	*For a positive grade: student should receive at least grade 4 on midterm exam and for final exams score should be greater than 4 (excellent is 6).*

Literature:	
Recommended Textbooks	1. Bergmann W, 1992. Nutritional disorders of Plants, Gustav Fischer Verlag Jena publisher, 741 p. 2. Brady N. 1984, The nature and properties of soils, Macmillan Publishing Co., Inc. New York, 639 p. 3. Benton Jones, Jr. 2003. Agronomic Handbook, Management of Crops, Soils, and Their Fertility, CRC PRESS, pp 372. 4. Pan Ming Huang, Yuncong Li, Malcolm E. Sumner. 2011. Handbook of Soil Sciences: Properties and Processes, Second Edition, by CRC Press 1442 Pages. 5. Rowell D. Soil Science: Methods and Applications. Longman Group UK, 1994, 350 p.
Complementary	*Current publications in scientific journals related to course issues and some course materials supported by lecturer.*

Structure of learning outcomes:

The area of study: agricultural, soil science, environmental science, natural resources ***6 ECTS****

The structure of student activity:

Learning Activities	***Amount***	***Time (h)***	***Total work-load (h)***
Participate in lecture	*12*	*3*	*36*
Participate in midterm exam	*1*	*2*	*2*
Individual study for midterm exam	*6*	*3*	*18*
Individual study for lectures	*12*	*1*	*12*
Laboratory study	*10*	*2*	*20*
Quiz			
Assignment	*10*	*2*	*20*
Participate in final exam	*1*	*2*	*2*
Individual study for final exam	*6*	*3*	*18*
Literature critical review			
Oral exam			

Individual study for problem solution	*11*	*2*	*22*
Consultations			
Participate in researches			
Mandatory practices and internships			
	Total workload (h)		***150***

*ECTS Credits = Total Workload (Hours) / 25 (Hours/1 ECTS) = 150 / 25 = 6 ECTS

Name Surname
of Lecturer: Ivan Manolov Sign:..... Date: 16.01.2020