ERASMUS MUNDUS MASTER PROGRAMME IN SOIL SCIENCE – emiSS

2020-2021 ACADEMIC YEAR - MODULE SYLLABUS

Name of course:	
FERTILIZER TECHNOLOGY	
ECTS	*6*
Type of Course	*Elective*
Form of Examination	*Written Examination*
Prerequisites	*Basic knowledge in the soil science, agricultural, forestry, envirionmental, geology or earth science.*

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

The lecturer module:	
The name of faculty	*Ondokuz Mayıs Univ. Faculty of Agriculture*
The name of department	*Soil Science & Plant Nutrition*

Educational outcomes:	
Description of the learning effect	
KNOWLEDGE - student knows and understands:	
1	*Student knows use reactions and unit operations steps in manufacturing of various fertilizers*
2	*Student knows characterize fertilizers on the basis of different properties*
3	*Student knows identify engineering problems in fertilizer manufacturing*
4	*Student knows handle the fertilizers, select appropriate synthesis fertilizer*
SKILLS - the graduate can	
1	*Student obtains the necessary scientific information from literature, databases or other sources*
2	*Student shows the ability to correctly interpret results and draw conclusions fertilizer science and technology.*

SOCIAL COMPETENCES - graduate:

1	*Student shows activity during a discussion on various issues related to plant nutrition and fertilizer science*
2	*Student has the competence to participate in agricultural research and discuss their results*

Course objectives and content:

To provide the graduate students to gain the basic knowledge about fertilizer science and technology, to teach the basic subjects, fertilizer manufacturing and handling, to provide the information infrastructure about fertilizer application and agricultural importance and environmental impacts.

Synthetic fertilizers are must for producing good crops. Hence it is needed to provide comprehensive and balanced understanding of essential link between chemistry and the synthetic fertilizer industry. It is therefore vital for graduate students to understand for each fertilizer product, its flow diagram for Industry production. For this purpose, students should have skills for arranging treatment, reaction and separation steps in a flow diagram for variety of fertilizers including Nitrogenous fertilizers, Phosphate fertilizer, Potash Fertilizer, Complex fertilizer & mixed fertilizers is essential.

Fertilizer Technology		*36 hours*
Subject of lecture	*1*	*Role of fertilizer in agriculture, Fertilizer feedstocks and raw materials 3 h*
	2	*Acids used for fertilizer production, Ammonia production 3 h*
	3	*Nitrogen fertilizer technology 3 h*
	4	*Phosphate fertilizer technology 3 h*
	5	*Potash fertilizer technology 3 h*
	6	*Complex and mixed fertilizer technology 3 h*
	7	*Midterm exam*
	8	*Secondary nutrient fertilizers 3 h*
	9	*Micronutrient fertilizer manufacturing 3 h*
	10	*Fertilizer legislation and quality control 3 h*
	11	*Fertilizer application 3 h*
	12	*Long-term effects of fertilizer use 3 h*
	13	*Fertilizer and environmental pollution 3 h*
	14	*Final exam*
The methods of verification and assessment criteria and principles		*For a positive grade, sum of 40% of midterm (100%) and 60% of final (100%) exams should be greater than 60.*

Literature:

Recommended Textbooks	1- *Angus J.F., 2012. Fertilizer Science and Technology. In: Meyers R.A. (eds) Encyclopedia of Sustainability Science and Technology. Springer, New York, NY* 2- *Mishra, B., 2011. Fertilizer Technology and management. I.K.International Publishing House Pvt.Ltd. New Delhi, India.* 3- *Reetz Jr. H.F., 2016. Fertilizers and their efficient use. International Fertilizer Industry Association (IFA), Paris, France.*
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 : ..... Sign:..... Date: .....