

**ERASMUS MUNDUS MASTER PROGRAMME IN SOIL SCIENCE – emiSS**  
**2020-2021 ACADEMIC YEAR - MODULE SYLLABUS**

<b>Name of course:</b>	
<i><b>SOIL MICROBIOLOGY</b></i>	
ECTS	6
Type of Course	<i>Elective</i>
Form of Examination	<i>Written Examination</i>
Prerequisites	<i>Basic knowledge in the soil science, agricultural, forestry, environmental, geology or earth science.</i>

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

<b>The lecturer module:</b>	
The name of faculty	<i>Ondokuz Mayıs Univ. Faculty of Agriculture</i>
The name of department	<i>Soil Science &amp; Plant Nutrition</i>

<b>Educational outcomes:</b>
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**Description of the learning effect**

**KNOWLEDGE - student knows and understands:**

1	<i>Student knows details and current information about soil microorganisms</i>
2	<i>Student knows soil microorganisms and their agricultural contributions in their future professional classes</i>
3	<i>Student knows basic knowledge about the contributions of soil microorganisms on plant production and about the effect of them on physical and chemical properties of soils</i>

**SKILLS - the graduate can**

1	<i>Student obtains the necessary scientific information from literature, databases or other sources</i>
2	<i>Student shows the ability to correctly interpret results and draw conclusions soil microbiological analyses.</i>

<b>SOCIAL COMPETENCES - graduate:</b>	
1	<i>Student shows activity during a discussion on various issues related to soil and agricultural engineering</i>
2	<i>Student has the competence to participate in agricultural research and discuss their results</i>

**Course objectives and content:**

To provide the graduate students to gain the basic knowledge about soil microorganisms and microbial cycles, to teach the basic subjects, fundamental principles and applications of Soil Microbiology and Biochemistry, to provide the information infrastructure about functions and agricultural importance of soil microorganisms.

Soil enzymes (enzymes and their effect mechanisms, enzyme kinetics, factors affecting enzyme activities), carbon cycling in soil (weathering of organic matter and cellulose, hemicellulose, lignin, cutin, inulin, starch, pectin in soil, humus and humification) N cycling (mineralization, nitrification, denitrification, oxidation, reduction reactions, solution of inorganic P), sulfur cycling (mineralization of organic S, assimilation, S oxidation-reduction).

<b>Soil Microbiology</b>		<i>36 hours</i>
Subject of lecture	1	<i>Soil enzymes (enzymes and their effect mechanisms, enzyme kinetics) 3 h</i>
	2	<i>Soil enzymes (factors affecting enzyme activities) 3 h</i>
	3	<i>Carbon cycling in soil (mineralization of organic matter) 3 h</i>
	4	<i>Carbon cycling in soil (degradation of cellulose, hemicellulose, lignin, cutin, inulin, starch and pectin in soil) 3 h</i>
	5	<i>Carbon cycling in soil (humus and humification) 3 h</i>
	6	<i>Nitrogen cycling in soil (mineralization, nitrification) 3 h</i>
	7	<i>Midterm exam</i>
	8	<i>Nitrogen cycling in soil (denitrification, assimilation) 3 h</i>
	9	<i>Nitrogen cycling in soil (fixation) 3 h</i>
	10	<i>Phosphorus cycling in soil (mineralization, assimilation) 3 h</i>
	11	<i>Phosphorus cycling in soil (oxidation- reduction reactions, solution of inorganic P) 3 h</i>
	12	<i>Sulfur cycling in soil (mineralization of organic S, assimilation) 3 h</i>
	13	<i>Sulfur cycling in soil (S oxidation-reduction) 3 h</i>
	14	<i>Final exam</i>
The methods of verification and assessment criteria and principles		<i>For a positive grade, sum of 40% of midterm (100%) and 60% of final (100%) exams should be greater than 60.</i>

**Literature:**



Recommended Textbooks	1- Paul, E.A., 2007. <i>Soil Microbiology and Biochemistry</i> . Academic Press. 2- Paul, E.A., 2007. <i>Soil Microbiology, Ecology and Biochemistry</i> . Academic Press. 3- Buscot, F., Varma, A., 2005. <i>Microorganisms in Soils : Roles in Genesis and Functions</i> . Springer 4- Van Elsas, J.D., Jansson, J.K., Trevors, J.T., 2007. <i>Modern Soil Microbiology</i> . CRC Press.
Complementary	<i>Current publications in scientific journals related to course issues and some course materials supported by lecturer.</i>

**Structure of learning outcomes:**

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

**The structure of student activity:**

<i>Learning Activities</i>	<i>Amount</i>	<i>Time (h)</i>	<i>Total workload (h)</i>
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			
	<b>Total workload (h)</b>		<b>150</b>

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

Name Surname  
 of Lecturer : .....

Sign:.....

Date: .....