

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

Name of course:	
<i>ADVANCED SOIL PHYSICS</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>

Field of Study:	
<i>Agriculture</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>

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

Educational outcomes:

Description of the learning effect

KNOWLEDGE - student knows and understands:

1	<i>Student knows the use of soil physical processes for engineering and agricultural purposes</i>
2	<i>Student knows the mathematical evaluation of relationships among solid liquid gas phases of soils</i>
3	<i>Student knows the flow in different geometric systems under saturated and unsaturated conditions</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 physical analyses.</i>

SOCIAL COMPETENCES - graduate:

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:

This course is to acquaint the graduate students with fundamental concepts of advanced soil physics.

Relationships among solid, liquid and gas phases, total potential of soil water, water flow in planar, radial and spherical symmetries, heat transport in soil system, saturated and unsaturated flow, solutions for some flow problems.

Advanced Soil Physics

36 hours

Subject of lecture	1	<i>Solid, liquid and gas phases in soil, texture and structure 3 h</i>
	2	<i>Mass volume relationships in soil 3 h</i>
	3	<i>Water retention and total potential of water in soil 3 h</i>
	4	<i>Relationships between matric potential and volumetric water content 3 h</i>
	5	<i>Hysteresis and effecting factors 3 h</i>
	6	<i>Darcy Law, and water flow in saturated soil 3 h</i>
	7	<i>Midterm exam</i>
	8	<i>Water flow in unsaturated soil, diffusivity 3 h</i>
	9	<i>Water flow in planar symmetry, horizontal and vertical flows 3 h</i>
	10	<i>Water flow in radial and spherical symmetries 3 h</i>
	11	<i>The effects of heat and microbiological factors on water flow in soil 3 h</i>
	12	<i>Soil thermal properties 3 h</i>
	13	<i>Heat flow in soil 3 h</i>
	14	<i>Final exam</i>

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- Hillel, D. 2004. <i>Introduction to Environmental Soil Physics</i> . Elsevier, Academic Press Inc. New York. 2- Hanks, R.J. and Ashcroft, G.L. 1980. <i>Applied Soil Physics</i> . Springer, New York. 3- Miyazaki, T. 2006. <i>Water Flow in Soil</i> . Taylor & Francis. New York. 4- Hillel, D. 1982. <i>Introduction to Soil Physics</i> . Academic Press Inc. California.
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 work-load (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			
	Total workload (h)		150

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

Name Surname
 of Lecturer :

Sign:.....

Date: