

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

Name of course:	
<i>ENVIRONMENTAL SOIL QUALITY - DEGRADATION AND RECLAMATION OF THE SOILS</i>	
ECTS	6
Type of Course	<i>Mandatory</i>
Form of Examination	<i>Written Examination</i>
Prerequisites	<i>Soil Science basic course</i>

Field of Study:

Agriculture / Soil Science / Environmental Science

Education profile	<i>Academic</i>
Code of study form and level of education	<i>Master of Science</i>
Academic year/Semester	<i>First year/ Spring Semester</i>
Specialization	<i>Agriculture</i>
Language of education	<i>English</i>

The lecturer module:

The name of faculty	<i>University of Agriculture in Krakow, Faculty of Agriculture and Economics</i>
The name of department	<i>Department of Soil Science and Agrophysic</i>

Educational outcomes:

Description of the learning effect

KNOWLEDGE - student knows and understands:

1	<i>Student knows the relationships that occur in degraded soils in the soil-plant-atmosphere system</i>
2	<i>Student expanded and strengthened knowledge about the transformation of the environment by human, knows the factors causing soil degradation</i>
3	<i>Student knows the indexes used to assess soil quality</i>

SKILLS - the graduate can

1	<i>Student has the ability to analyse and select information, especially from online sources critically</i>
2	<i>Student has the ability to formulate reasonable judgments based on data from different sources</i>
3	<i>Student fluently uses scientific literature in the field of environmental protection, reads and understands complicated scientific texts in English</i>



4	<i>Student can evaluated soil quality</i>
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SOCIAL COMPETENCES - graduate:

1	<i>Student can interact and work in a group, and takes part in the discussion</i>
2	<i>Student is aware of the social role of the master of soil science and responsibility related to decisions taken as part of professional activity based on professionalism, respect for the law, rules of professional ethics and social norms, including responsibility for the quality of the environment and its proper development</i>
3	<i>Student understands the need to learn throughout life, can inspire and organise the learning process of other people</i>

Course objectives and content:

The course aims to learn about the threats that reduce soil quality. The definition, methods and assess the soil quality is described. The transformation of the environment by a human, the factors causing soil degradation are elaborated and the reclamation process is explained.

<i>SOIL QUALITY - DEGRADATION AND RECLAMATION OF THE SOILS</i>		<i>32 hours</i>
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Subject of lecture	1	<i>Soil-related ecosystem services</i>
	2	<i>Land degradation and soil threats</i>
	3	<i>Physical deterioration of soil</i>
	4	<i>Chemical soil degradation</i>
	5	<i>Biological soil degradation</i>
	6	<i>Soil erosion</i>
	7	<i>Concept of biological and chemical soil quality and their interrelations</i>
	8	<i>Advantages and disadvantages of the use of various soil quality indicators</i>
	9	<i>Basic concepts (legal and ecological definition of reclamation),</i>
	10	<i>Legal conditions for reclamation in Europe</i>
	11	<i>Types of transformation of the natural environment caused by industrial activities</i>
	12	<i>The ways of reclamation, soil reclamation techniques</i>
	13	<i>Post-fire treatments to restore soils function</i>
	14	<i>Soil and ecosystem development in post-mining sites</i>
	15	<i>Future perspectives, possible solution</i>
	16	<i>Final exam</i>

The methods of verification and assessment criteria and principles	<i>Written test exam, for passing an examination at least 60% of questions should be answered correctly. The contribution of the evaluation of the lectures in the final grade is 50%.</i>
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<i>SOIL QUALITY - DEGRADATION AND RECLAMATION OF THE SOILS</i>		<i>31 hours</i>
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Subject of classes	1	<i>Case study: a discussion based on the articles given by the teacher: soil quality in the field of environmental pollution</i>
	2	<i>Case study: a discussion based on the articles given by the teacher: soil quality in the field of sustainable agriculture,</i>

3	<i>Case study: a discussion based on the articles given by the teacher: soil quality in the field land use change,</i>
4	<i>Case study: a discussion based on the articles given by the teacher: soil quality in the field and climate change</i>
5	<i>Examples of reclamation (student's presentation) e.g. Bełchatów lignite mine, Szczakowa sand mine, Sokolov, Cottbus, Zasavje etc.</i>
6	<i>Examples of reclamation (student's presentation) e.g. Bełchatów lignite mine, Szczakowa sand mine, Sokolov, Cottbus, Zasavje etc.</i>
7	<i>Examples of reclamation (student's presentation) e.g. Bełchatów lignite mine, Szczakowa sand mine, Sokolov, Cottbus, Zasavje etc.</i>
8	<i>Soil quality assessment in the field</i>
9	<i>Soil quality evaluation based on physical properties part 1</i>
10	<i>Soil quality evaluation based on physical properties part 2</i>
11	<i>Soil quality evaluation based on chemical properties, part 1</i>
12	<i>Soil quality evaluation based on chemical properties, part 2</i>
13	<i>Soil quality evaluation based on biological properties, part1</i>
14	<i>Soil quality evaluation based on biological properties, part 2</i>
15	<i>Discussion – preventing soil degradation</i>

The methods of verification and assessment criteria and principles

Written test exam, for passing an examination at least 60% of questions should be answered correctly. The contribution of the evaluation of the lectures in the final grade is 50%.

SOIL QUALITY - DEGRADATION AND RECLAMATION OF THE SOILS

27 hours

Subject of field classes

Examples of areas covered by remediation - field activities

The methods of verification and assessment criteria and principles

A written field study report

Literature:

Recommended Textbooks

1. Frouz, Jan, ed. *Soil biota and ecosystem development in post mining sites*. CRC Press, 2013,
2. Wirth, Peter, Barbara Černič Mali, and Wolfgang Fischer. *"Post-Mining Regions in Central Europe."* Digital Print Group: Nurnberg, Germany, 2012,
3. Hillel, Daniel. *Soil in the environment: crucible of terrestrial life*. Elsevier, 2007,
4. Nielsen M.N. Winding A. Binnerup S. *Microorganisms as indicators of soil health*. Denmark: National Environmental Search institute, 2002.

Complementary

Publication recommended during classes by teacher

Structure of learning outcomes:

The area of study: soil science, environmental science, agriculture, 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	16	2	32
Participate in midterm exam	1	2	2
Individual study for midterm exam	3	2	6
Individual study for lectures	7	1	7
Laboratory study	15	2	30
Quiz	3	1	3
Field classes	3	9	27
Assignment	11	2	22
Participate in final exam	1	2	2
Individual study for final exam	5	3	15
Literature critical review	5	2	10
Oral exam			
Individual study for problem solution	11	2	22
Consultations	2	1	2
Participate in researches			
Mandatory practices and internships			
	Total workload (h)		180

*ECTS Credits = Total Workload (Hours) / 30 (Hours/1 ECTS) = 180 / 30 = 6 ECTS

Name Surname
 of Lecturer: .Agnieszka Józefowska

Sign:.....

Date: