

Course name:**ENVIRONMENTAL SOIL QUALITY - DEGRADATION AND RECLAMATION OF THE SOILS**

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| ECTS | 6 |
| Course status | complementary- obligatory |
| Course final assesement/evaluation of outcomes | exam / credit / credit unrated |
| Prerequisites | example: passing the subject |

Main field of study:**AGRICULTURE / SOIL SCIENCE / ENVIRONMENTAL SCIENCE**

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|---------------------------------------|-------------------------------|
| Profile of study | General-academic |
| The code of studies (education level) | S/SM (bachelor/master) |
| Semester of studies | winter/summer |
| Language of instruction | English |

Course offered by:

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| Name of faculty offering the course | Faculty of Agriculture and Economics |
| Name of department offering the course | Department of Soil Science and Agrophysic |
| Course coordinator | Agnieszka Józefowska |

Learning outcomes of the course:

| Symbol of outcome | Description of learning outcome | Reference to | |
|-------------------|---------------------------------|------------------------------|-------------|
| | | main field of study outcomes | discipline# |

KNOWLEDGE – student knows and/or understands:

| | | | |
|----------|--|--------------------|----|
| SQDR_W01 | Student knows the relationships that occur in degraded soils in the soil-plant-atmosphere system | OŚ2_W06 RO2_W03 | RR |
| SQDR_W02 | Student expanded and strengthened knowledge about the transformation of the environment by human, knows the factors causing soil degradation | OŚ2_W13 RO2_W12 | RR |
| SQDR_W03 | Student knows the indexes used to assess soil quality | OŚ2_W11 RO2_W07 | RR |

SKILLS – student is able to:

| | | | |
|----------|---|--------------------|----|
| SQDR_U01 | Student has the ability to analyse and select information, especially from online sources critically | RO2_U01 OŚ_U04 | RR |
| SQDR_U02 | Student has the ability to formulate reasonable judgments based on data from different sources | RO2_U02 RO2_U03 | RR |
| SQDR_U03 | Student fluently uses scientific literature in the field of environmental protection, reads and understands complicated scientific texts in English | RO2_U05 OŚ2_U09 | RR |

SOCIAL COMPETENCE- student is ready to:

| | | | |
|----------|--|-------------------|----|
| SQDR_K01 | Student can interact and work in a group, and takes part in the discussion | RO2_K02 OŚ_K01 | RR |
| SQDR_K02 | 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, | RO2_K05 OŚ_K05 | RR |
| SQDR_K03 | Student understands the need to learn throughout life, can inspire and organise the learning process of other people | RO2_K07 OŚ_K04 | RR |

Teaching contents:

| Lectures | | 20 | hours |
|--|---|--|--------------|
| | Soil-related ecosystem services | | |
| | Land degradation and soil threats | | |
| | Physical deterioration of soil | | |
| | Chemical soil degradation | | |
| | Biological soil degradation | | |
| | Soil erosion | | |
| | Concept of biological and chemical soil quality and their interrelations | | |
| | Advantages and disadvantages of the use of various soil quality indicators | | |
| | Basic concepts (legal and ecological definition of reclamation), | | |
| | Legal conditions for reclamation in Europe | | |
| | Types of transformation of the natural environment caused by industrial activities | | |
| | The ways of reclamation, soil reclamation techniques | | |
| | Post-fire treatments to restore soils function | | |
| | Soil and ecosystem development in post-mining sites | | |
| | Future perspectives, possible solution | | |
| Accomplished learning outcomes | <i>SQDR_W01, SQDR_W02, SQDR_W03, SQDR_W04, SQDR_W05, SQDR_K02,</i> | | |
| Verification methods, rules and criteria of outcome assessment | <i>together with participation in the final assesement (in %)</i> | | |
| Classes | | 30 | hours |
| | Case study: a discussion based on the articles given by the teacher: soil quality in the field of environmental pollution | | |
| | Case study: a discussion based on the articles given by the teacher: soil quality in the field of sustainable agriculture, | | |
| | Case study: a discussion based on the articles given by the teacher: soil quality in the field land use change, | | |
| | Case study: a discussion based on the articles given by the teacher: soil quality in the field and climate change | | |
| | Examples of reclamation (student's presentation) e.g. Belchatów lignite mine, Szczakowa sand mine, Sokolov, Cottbus, Zasavje etc. | | |
| Topics of the classes | Soil quality assessment in the field | | |
| | Soil quality evaluation based on physical properties part 1 | | |
| | Soil quality evaluation based on physical properties part 2 | | |
| | Soil quality evaluation based on chemical properties, part 1 | | |
| | Soil quality evaluation based on chemical properties, part 2 | | |
| | Soil quality evaluation based on biological properties, part1 | | |
| | Soil quality evaluation based on biological properties, part 2 | | |
| | Discussion – preventing soil degradation | | |
| | Accomplished learning outcomes | <i>SQDR_W01, SQDR_U01, SQDR_U02, SQDR_U03, SQDR_K01, SQDR_K02, SQDR_K03,</i> | |
| Verification methods, rules and criteria of outcome assessment | <i>Evaluation of individual projects, test, and participation in the discussion. For passing laboratory classes the project should be properly executed. Written test, for passing an examination at least 55% of questions should be answered correctly. The contribution of the evaluation of laboratory classes in the final grade is 40%.</i> | | |
| Field classes | | 10 | hours |

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| Topics of the field classes | Examples of areas covered by remediation - field activities |
| Accomplished learning outcomes | SQDR_W01, SQDR_K01, |
| Verification methods, rules and criteria of outcome assessment | A written field study report |

References:

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|---------------|---|
| Basic | Wirth, Peter, Barbara Černič Mali, and Wolfgang Fischer. "Post-Mining Regions in Central Europe." Digital Print Group: Nurnberg, Germany, 2012, Hillel, Daniel. Soil in the environment: crucible of terrestrial life. Elsevier, 2007, Nielsen M.N. Winding A. Binnerup S. Microorganisms as indicators of soil health. Denmark: National |
| Supplementary | Frouz, Jan, ed. Soil biota and ecosystem development in post mining sites. CRC Press, 2013 Publication recommended during classes by teacher |

Structure of learning outcomes:

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|---|-----|--------|
| soil science, environmental science, agriculture, natural resources | 6 | ECTS** |
| Discipline: # (provide appropriate symbol - if the course relates to more than one academic discipline) | ... | ECTS** |

Structure of student activities:

| | | | | |
|-------------------------------|-----|-------|-----|--------|
| Contact hours | 72 | hours | 2.9 | ECTS** |
| including: | | | | |
| lectures | 20 | hours | | |
| classes and seminars | 40 | hours | | |
| consultations | 10 | hours | | |
| participation in research | ... | hours | | |
| mandatory traineeships | ... | hours | | |
| participation in examinations | 2 | hours | | |
| e-learning | ... | hours | ... | ECTS** |
| student own work | 80 | hours | 3.1 | ECTS** |

Syllabus valid from the academic year 2021/2022

* where 10 hours of classes = 1 ECTC (in case of 15 h → 2 ECTS)

** stated with an accuracy to 0.1 ECTS, where 1 ECTS = 25 - 30 hours of classes

academic discipline code: RR - agriculture and horticulture