



SZKOŁA GŁÓWNA  
GOSPODARSTWA  
WIEJSKIEGO

## Soil and Water Conservation

### Educational subject description sheet

#### Basic information

|  |  |   |                                   |
|--|--|---|-----------------------------------|
| <b>Field of study</b><br>Course Offer for exchange students - second cycle studies, including uniform master studies (MA programmes)<br><b>Speciality</b><br>-<br><b>Organizational unit</b><br>Course Offer for exchange students<br><b>Study level</b><br>second cycle studies, including uniform master studies (MA programmes)<br><b>Study form</b><br>full-time studies<br><b>Education profile</b><br>General academic |  | <b>Didactic cycle</b><br>2024/25<br><b>Subject code</b><br>PWMPWM2S_D.B100000P.06317.24<br><b>Lecture languages</b><br>english<br><b>Mandatory</b><br>Elective subjects<br><b>Block</b><br>Basic subjects<br><b>Disciplines</b> |                                   |
| <b>Coordinator</b>   | Andrzej Brandyk  |   |                                   |
| <b>Teacher</b>   | Andrzej Brandyk  |   |                                   |
| <b>Period</b><br>Winter semester   | <b>Examination</b><br>Exam<br><br><b>Activities and hours</b><br>Lecture: 15<br>Laboratory exercises: 10<br>Ćwiczenia seminaryjne: 5 |   | <b>Number of ECTS points</b><br>3 |

## Goals

| Code | Goal  |
|------|---|
| C1   | The students will know mitigation measures for surface runoff and other dangerous forms of water flow along with soil particles movement and field-scale erosion processes. |
| C2   | The knowledge will be provided on environmental, technical and socio- economic effects of erosion. Factors affecting wind and water erosion. Methods of erosion control.    |
| C3   | The students will become familiar with watershed landuse planning and practical skills on sustainable water management for river valleys' environment protection.           |

## Subject's learning outcomes

| Code  | Outcomes in terms of   | Effects | Examination methods   |
|---|--|---------|-----------------------|
| <b>Knowledge - Student knows and understands:</b> |  |         |                       |
| W1  | basic reasons of soil and water resources degradation and their effects  |         | Written exam          |
| W2  | preventive methods against water and wind erosion, land drainage   |         | Written exam, Project |
| <b>Skills - Student can:</b>                      |  |         |                       |
| U1  | plan and perform means against water and wind erosion as well as to design effective water harvesting solution |         | Report                |
| U2  | elaborate concept of basic methods for water harvesting in urban and rural hydrological systems.               |         | Project, Report       |
| <b>Social competences - Student is ready to:</b>  |  |         |                       |
| K1  | discuss and describe environmental degradation and wise use of soil and water resources                        |         | Written exam, Report  |

## Study content

| No. | Course content  | Subject's learning outcomes | Activities   |
|-----|---|-----------------------------|--|
| 1.  | Changes of landscape and soil degradation. General information about erosion phenomena. Environmental, technical and socio- economic effects of erosion processes.                              | W1, W2                      | Lecture  |
| 2.  | Factors affecting erosion. Methods of water erosion control. Rules of proper watershed management, soil management, drainage -irrigation techniques.  | W2, U1                      | Lecture  |
| 3.  | Water harvesting (aims, methods and problems). Drainage systems functionality and design for environmental protection.  | U1, U2, K1                  | Lecture, Laboratory exercises                        |
| 4.  | Design of open and subsurface drain systems. Project exercises on soil resources protection in various environmental conditions, student's presentation on land and water conservation problems | U1, U2, K1                  | Lecture, Laboratory exercises, Ćwiczenia seminaryjne |

## Course advanced

| Activities            | Methods of conducting classes  |
|-----------------------|--|
| Lecture               | Case study, Discussion, Presentation   |
| Laboratory exercises  | Case study, Presentation, Design method, Teamwork, Observation                                       |
| Ćwiczenia seminaryjne | Laboratory (experiment), learning by experiment, Field measurements, Field observations, Measurement |

| Activities            | Examination method | Percentage |
|-----------------------|--------------------|------------|
| Lecture               | Written exam       | 60%        |
| Laboratory exercises  | Project            | 30%        |
| Ćwiczenia seminaryjne | Report             | 10%        |

| Activities            | Credit conditions  |
|-----------------------|--|
| Lecture               | Proper response to five, general problematic questions on erosion, soil conservation measures, advantages and disadvantages of water harvesting.   |
| Laboratory exercises  | Obtaining correct results of design calculations of water runoff collection and erosion intensity. Conducting proper observations of erosion and water movement processes in the laboratory. |
| Ćwiczenia seminaryjne | Observations and measurements of different erosion parameters in the field, rainfall simulations. Evaluation of soil cover protection measures.  |

## Literature

### Obligatory

1. R.P.C.Morgan, 2005 : Soil erosion and conservation (third edition). National Soil Resources Institute,Cranfield University. Blackwell Publishing.
2. W. Spaan and D.Meindertsma,1996: Soil and water conservation measures.
3. Sustainable Drainage Systems (SuDS) Handbook Arcadis Consulting (UK) Limited -2212959.

### Optional

1. I.D.White, D.N.Mottershead, S.J.Harrison,1992: Environment systems.
2. Armfield SK-M12 simulation model. User manual and operating instructions.
3. Landscape Erosion and Evolution Modeling, editors: Russell S. Harmon, William W. Doe
4. Introduction to Soil Erosion and Landscape Evolution Modeling. William W. Doe and Russell S. Harmon. Colorado State University. U.S. Army Research Laboratory
5. Warren, SD, Mitasova, H, Jourdan, MR, Brown, WM, Johnson, BE, Johnston, DM, Julien, PY, Mitas, L, Molnar, DK, and Watson, CC, 2000, Digital Terrain Modelling and Distributed Soil Erosion Simulation/Measurement for Minimizing Environmental Impacts of Military Training (CS-752): Technical Report, Center for Ecological Management of Military Lands, Colorado State University, Fort Collins, Colorado: 65p.

## Calculation of ECTS points

| Activity form        | Activity hours* |
|----------------------|-----------------|
| Lecture              | 15              |
| Laboratory exercises | 10              |

|  |                    |
|--|--------------------|
| Ćwiczenia seminaryjne                      | 5                  |
| Preparation for exercises                  | 15                 |
| Preparing the project                      | 15                 |
| Preparing a report                         | 10                 |
| Conducting empirical research              | 10                 |
| Self-study on the content covered in class | 10                 |
|  |                    |
| <b>Student workload</b>                    | <b>Hours</b><br>90 |
| <b>Number of ECTS points</b>               | <b>ECTS</b><br>3   |

\* hour means 45 minutes