



SZKOŁA GŁÓWNA  
GOSPODARSTWA  
WIEJSKIEGO

## Soil and Water Conservation

### Educational subject description sheet

#### Basic information

<b>Field of study</b> Course Offer for exchange students - second cycle studies, including uniform master studies (MA programmes)		<b>Didactic cycle</b> 2024/25
<b>Speciality</b> -		<b>Subject code</b> PWMPWM2S_D.B100000.06317.24
<b>Organizational unit</b> Course Offer for exchange students		<b>Lecture languages</b> english
<b>Study level</b> second cycle studies, including uniform master studies (MA programmes)		<b>Mandatory</b> Elective subjects
<b>Study form</b> full-time studies		<b>Block</b> Basic subjects
<b>Education profile</b> General academic		<b>Disciplines</b>
<b>Coordinator</b>	Andrzej Brandyk	
<b>Teacher</b>	Andrzej Brandyk	
<b>Period</b> Winter semester	<b>Examination</b> Exam	<b>Number of ECTS points</b> 3
	<b>Activities and hours</b> Lecture: 15 Laboratory exercises: 10 Seminar exercises: 5	

## 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, Seminar exercises

## Course advanced

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

Activities	Examination method	Percentage
Lecture	Written exam	60%
Laboratory exercises	Project	30%
Seminar exercises	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.
Seminar exercises	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

Seminar exercises	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> 90
<b>Number of ECTS points</b>	<b>ECTS</b> 3

\* hour means 45 minutes