UNIWERSYTET IM. ADAMA MICKIEWICZA W POZNANIU

Engineering solutions in geohazards

Educational subject description sheet

Basic information

Study programme Geohazards and Climate Change **Speciality** - **Organizational unit** Faculty of Geographical and Geological Sciences **Study level** Second-cycle programme **Study form** Full-time **Education profile** General academic	**Didactic cycle** 2023/24 **Subject code** 07GCCS.24P.02879.23 **Lecture languages** English **Course type** Elective **Block** Basic subjects

Subject coordinator	Daniel Zawal
Lecturer	Daniel Zawal, Jędrzej Wierzbicki, Katarzyna Stefaniak

Period	**Activities and hours**	**Number of ECTS points**
Semester 3	• Lecture: 15, Graded credit	2

Goals

Code	Goal
C1	Presenting knowledge of the basics of geotechnical engineering.
C2	Providing an understanding of the risks arising from the presence of soft soils in the subsoil and scarp slopes and methods of their strengthening.
C3	Demonstrating knowledge regarding foundation methods for buildings and the importance of intermediate foundations.
C4	Presenting the scope of actions to prevent and reduce risks resulting from earthquakes and mining activities.
C5	Showing connections between nature-human interaction and geohazards.

Subject learning outcomes

Code	Outcomes in terms of	Learning outcomes	Examination methods
Knowledge – Student:			
W1	knows geotechnical models and their parameters;	GCC_K2_W01, GCC_K2_W04	Test
W2	knows most valuable laboratory and in situ geotechnical tests;	GCC_K2_W14	Test
W3	knows types of foundations of buildings and structures;	GCC_K2_W01	Test
W4	knows engineering solutions for soft soils and slope stabilization.	GCC_K2_W09	Test
Skills – Student:			
U1	determines which geotechnical tests are most reliable for determining soil parameters;	GCC_K2_U08, GCC_K2_U09, GCC_K2_U10	Test
U2	determines when conditions require the use of intermediate foundations;	GCC_K2_U06, GCC_K2_U13	Test
U3	pre-assesses whether a geohazard is likely to occur under given conditions;	GCC_K2_U01, GCC_K2_U06	Test
U4	determines whether a geohazard has a natural, anthropogenic, or mixed cause.	GCC_K2_U01, GCC_K2_U13	Test
Social competences – Student:			
K1	is ready to aware others of existing geohazards, including those related to interaction along the border between human and nature.	GCC_K2_K02, GCC_K2_K03	Test

Study content

No.	Course content	Subject learning outcomes	Activities
1.	Geotechnical models and their parameters (basic strength-deformation soil models, physical and mechanical parameters of soil).	W1, U1	Lecture

No.	Course content	Subject learning outcomes	Activities
2.	Basics of geotechnical site characterization (characterization of most valuable and often used laboratory and in situ tests).	W2, U1	Lecture
3.	Basics of foundation and geotechnical engineering.	W3, U2	Lecture
4.	Influence of woodland on the buildings and structures.	U4, K1	Lecture
5.	Engineering solutions for soft soils (geosynthetics, building materials, constructions).	W4, U3, K1	Lecture
6.	Engineering solutions for slope stabilization (slope stability analysis, reinforcement constructions).	W4, U3, K1	Lecture
7.	Engineering solutions for earthquake and mining areas (geotechnical problems of earthquake and mining areas, soil liquefaction, monitoring and special solutions for risk reduction).	W4, U3, U4, K1	Lecture

Additional information

Activities	Teaching and learning methods and activities
Lecture	Lecture with a multimedia presentation of selected issues, Conversation lecture, Discussion, Case study, Audio and/or video demonstrations

Activities	Credit conditions
Lecture	Achieving a positive grade from the test (100% of the final grade) Grading scale: very good (5.0) - from 90% of points, good plus (4.5) - from 80% of points, good (4.0) - from 70% of points, sufficient plus (3.5) - from 60% of points, satisfactory (3.0) - from 50% of points, unsatisfactory (2.0) - below 50% of points.

Literature

Obligatory

1. R. Kerry Rowe (Editor), Geotechnical And Geoenvironmental Engineering Handbook Queen's University, Kingston, Ontario, Canada, 2000
2. Braja M. Das, Principles of Geotechnical Engineering Cengage Learning, 7th Edition, Stamford, USA, 2006

Optional

1. Braja M. Das, Advanced Soil Mechanics, Third edition Taylor & Francis, New York, USA, 2008

Calculation of ECTS points

Activities	Activity hours*
Lecture	15

Reading the indicated literature	15
Preparation for the assessment	30
Student workload	**Hours** 60
Number of ECTS points	**ECTS** 2

* academic hour = 45 minutes

Efekty uczenia się dla kierunku

Kod	Treść
GCC_K2_K02	The graduate is ready to identify the influence of environmental processes onto the socio-economic processes, and also influence of anthropogenic activities onto the various components of the natural environment in various timescales
GCC_K2_K03	The graduate is ready to communicate, discuss and argue burning issues, hazards and problems associated with the climate, climate and environment changes for wider, non-scientific audience
GCC_K2_U01	The graduate can vary between natural and anthropogenic causes of climate change and associated environmental changes and geohazards
GCC_K2_U06	The graduate can critically assess the sources of information on climate and environmental change and associated geohazards
GCC_K2_U08	The graduate can apply advanced laboratory methods and techniques used for environmental research
GCC_K2_U09	The graduate can apply advanced fieldwork methods and techniques used for environmental research
GCC_K2_U10	The graduate can apply health and safety rules and regulations in the office, in the laboratory and in the field
GCC_K2_U13	The graduate can use in practice the environmental management principles leading to improvement of quality of life
GCC_K2_W01	The graduate knows and understands thoroughly, the processes operating in the natural environment, their causes, mechanisms, consequences and associated geohazards
GCC_K2_W04	The graduate knows and understands thoroughly, the role of surface and ground water in the natural environment and the anthropogenic influence on their functioning
GCC_K2_W09	The graduate knows and understands thoroughly, relationship between climate and environmental change and necessity of formulation of the adaptation strategies
GCC_K2_W14	The graduate knows and understands thoroughly, laboratory and field health and safety rules and regulations