

## Course syllabus

binding for the doctoral students of the CUT Doctoral School commencing their studies  
in the academic year 2022/2023

### Information on the course

Name of the course in Polish	Hydrogeoinżynieria – wybrane zagadnienia
Name of the course in English	Hydrogeoengineering – selected problems
Number of the ECTS points	1
Language of instruction	Polish
Category of the course	Elective
Field of education	Engineering and Technology
Discipline of education	Environmental engineering, ,mining and power engineering
Person responsible for the course Contact	Tomisław Gołębiowski, <i>doctor hab.</i> , MSc in Eng. , professor of CUT tgolebiowski@pk.edu.pl

### Type of course, number of hours in the study programme curriculum

Semester	Credit type (G / NG)*	Lecture	Practical class	Laboratory	Computer Laboratory	Project class	Seminar
3	G	15	0	0	0	0	0

\*G – graded credit, NG – non-graded credit

### Course objectives

Code	Objective description
Objective 1	Introduction to the basic problems of hydroengineering i.e. hydrology, hydrogeology, hydraulics, water management, hydraulic engineering
Objective 2	Introduction to the basic problems of geoengineering i.e. geophysics, geodesy, geology, geotechnical engineering, geomechanics

### Learning Outcomes

Code	Description of the learning outcome adjusted to the specific characteristics of the discipline	Learning outcome symbol in the CUT SD	Methods of verification
OUTCOMES RELATED TO KNOWLEDGE			
EUW1	The doctoral student knows and understands – in the extent enabling revision of the existing paradigms – the global scientific achievements encompassing the theoretical foundations as well as general and selected detailed problems specific to the discipline	E_W01	Graded paper
EUW2	The doctoral student knows the major development trends in the discipline in which the education takes place.	E_W02	Graded paper
OUTCOMES RELATED TO SKILLS			

EUU1	The doctoral student is able to use knowledge from various fields of science or art to creatively identify and innovatively solve complex problems or perform research tasks, in particular: - plan the course of the experiment on the defined issue, - select the appropriate statistical program for the experiment.	E_U01	Graded paper
EUU2	The doctoral student is able to perform a critical analysis and evaluation of scientific research results, expert activities and other creative types of work, as well as their contribution to the development of knowledge	E_U02	Graded paper
<b>OUTCOMES RELATED TO SOCIAL COMPETENCES</b>			
EUK1	The doctoral student is able to perform a critical evaluation of the scientific achievements within the discipline	E_K01	Discussion

### Course outline

No.	Contents	Learning outcomes for the course	No. of hours
<b>LECTURE</b>			
W1	Overview of selected, advanced problems in the field of surface waters (hydrology) and groundwater (hydrogeology)	EUW1, EUW2, E_UU1 E_UU2, E_UK1,	2
W2	Overview of selected, advanced problems in the field of hydraulic engineering and hydraulics	EUW1, EUW2, E_UU1 E_UU2, E_UK1,	2
W3	Overview of selected, advanced problems in the field of water management in the light of climate change	EUW1, EUW2, E_UU1 E_UU2, E_UK1,	2
W4	Overview of selected, advanced problems in the field of non-invasive monitoring of hydrotechnical structures (geodesy) and their substrate (geophysics)	EUW1, EUW2, E_UU1 E_UU2, E_UK1,	2
W5	Overview of selected, advanced problems in the field of hydropower	EUW1, EUW2, E_UU1 E_UU2, E_UK1,	2
W6	Overview of selected, advanced problems in the field of interaction between hydrotechnical structures (hydro construction) and their substrate (geology, geotechnics, geomechanics)	EUW1, EUW2, E_UU1 E_UU2, E_UK1,	2
W7	Overview of selected, advanced problems in the field of geomorphology and morphodynamics	EUW1, EUW2, E_UU1 E_UU2, E_UK1,	2
W8	Overview of a comprehensive approach to the problems of hydrogeoengineering	EUW1, EUW2, E_UU1 E_UU2, E_UK1,	1

### The ECTS points statement

WORKING HOURS SETTLEMENT	
Type of activity	Average number of hours (45 min.) dedicated to the completion of an activity type
<b>SCHEDULED CONTACT HOURS WITH THE ACADEMIC TEACHER</b>	
Hours allotted in the syllabus	15
Consultations	1
Examination / course credit assignment	2
<b>HOURS WITHOUT THE PARTICIPATION OF THE ACADEMIC TEACHER</b>	
Independent study of the course contents	8
Preparation of a paper, report, project, presentation, discussion	4
<b>ECTS POINTS STATEMENT</b>	
Total number of hours	30
The ECTS points number	1

### Preliminary requirements

No.	Requirements
1	Basic knowledge of geoengineering and hydroengineering
2	Basic knowledge of mathematics and physics

### Course credit assignment conditions / method of the final grade calculation

No.	Description
<b>COURSE CREDIT ASSIGNMENT CONDITIONS</b>	
1	80% attendance in class.
2	Delivery/ submission of a paper presentation.
<b>METHOD OF THE FINAL GRADE CALCULATION</b>	
Credit assigned on the grounds of a paper presentation	

### Additional information

None
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### The course reading list

1	Bajkiewicz-Grabowska E., 2020. General Hydrology, PWN, Warsaw.
2	Macioszczyk A., 2006. Fundamentals of Applied Hydrogeology, PWN, Warsaw
3	Puzyrewski R., Sawicki J., 2013. Fundamentals of fluid mechanics and hydraulics, PWN, Warsaw.
4	Gondowicz A., 1975. Hydraulic engineering, WSiP, Warsaw.
5	Balcerowicz M., 2020. Water management. Use, approvals and water services, Infor, Warsaw.
6	Czarnecki K., 2015. Contemporary geodesy, PWN, Warsaw.
7	Fajkiewicz Z., 1972. An outline of applied geophysics, Geol., Warsaw.
8	WiFun Z., 2013. An outline of geotechnical engineering, WKiŁ, Warsaw.
9	Majcherczyk T., 2006. Fundamentals of geomechanics. Ed. AGH, Krakow