GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00057793		
Field of study	Green Technologies		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2025/2026
Education level	first-cycle studies	Subject group	Optional subject group
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	2	Language of instruction	English
Semester of study	4	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Geotechnical and Hydraulic Engineering -> Faculty of Civil and Environmental Engineering -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Maria Przewłócka, doc. PG	
	Teachers	dr hab. inż. Katarzyna Weinerowska-Bords dr inż. Maria Przewłócka, doc. PG	

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	0.0	0.0	15.0	30

E-learning hours included: 0.0

eNauczanie source addresses:
Moodle ID: 3684 Geology and Hydrology 2026
https://enauczanie.pg.edu.pl/2025/course/view.php?id=3684

Learning activity and number of study hours

Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours	Self-study	SUM
Number of study hours	30	5.0	15.0	50

Subject objectives

"geology" part: familiarizing students with inner and external geological processes, especially rocks and minerals forming processes; acquiring skills in identification and description of minerals and rocks - igneous, sedimentary and metamorphic; familiarizing students with conditions of groundwater occurrence

hydrology part: familiarizing students with the concept of a catchment and its various types, as well as the processes that determine water runoff from a catchment. Familiarizing students with the impact of urbanization on hydrological processes in a catchment and with methods for quantifying water runoff from a catchment. Acquiring skills to perform simple quantitative estimates in hydrology. Familiarizing students with the role of green and blue infrastructure in cities.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U03] is able to use information and communication technologies relevant to the common tasks of engineering, is able to use known methods and mathematical-physical models to describe and explain phenomena and chemical processes	The student is able to estimate the water flow velocity and water outflow from a catchment using the simplest methods used in hydrology.	[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools
[K6_U05] can formulate and solve engineering tasks analytical methods, simulation as well as experimental, able to apply knowledge of basic physics and mathematics to analyze the results of experiments, is able to analyze and assess existing technical solutions	Student identifies and describes basic minerals and rocks occurring in the Earth's crust. Student assesses groundwater vulnerability on the basis of hydrogeological data	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information
[K6_U01] is able to obtain information from literature, databases and other sources, is able to integrate the information obtained, to make their interpretation, as well as draw conclusions and formulate and justify opinions, take part in the discussion	The student is able to interpret and discuss the material presented in the literature and the basic internet sources regarding hydrological processes	[SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment [SU5] Assessment of ability to present the results of task
[K6_W03] has a basic knowledge of soil, air and water pollutants, design and supervision of environmentally friendly technologies and technologies which do not produce waste, knows technology of cleaning and neutralization of industrial waste and wastewater management, has a basic understanding of the theoretical basis of methods and types of apparatus used in chemical analysis of environmental pollutants	student understands and interprets geological processes influencing the Earth relief and the changes occurring on it's surface. Student uderstands and interprets conditions of groundwater occurrence and basic hydrological processes. The student has basic knowledge of the impact of urbanization on runoff from the catchment area and the role of green-blue infrastructure in shaping runoff from the catchment.	[SW1] Assessment of factual knowledge

Subject contents

Course content – lecture
geology part:

geologic time, the Earth's structure, geological processess, plate tectonic theory, tectonic structures, the rock cycle; minerals - definition, physical properties of minerals, characteristics of chosen minerals; ineous rocks - origin, classification, textures, main rock forming minerals; sedimentary rocks - processess forming sedimentary rocks, classification, textures, main rock forming minerals; metamorphic rocks - metamorphic agents, kinds of metamorphism, textures, main rock forming minerals; groundwater occurrence, zone of aeration, zone of saturation, groundwater level, potentiometric line, groundwater vulnerability..

Hydrology part:

The role of hydrology in engineering. Basic concepts in hydrology. The concept of a catchment. Catchment classification. Specific characteristics of urban catchments. Processes determining the amount of water runoff from a catchment. Water balance in a catchment. The impact of urbanization on water runoff from a catchment. The purpose of calculating water runoff. Catchment characteristics. Parameters defining the physical and geographical features of a catchment. The role of catchment characteristics in environmental engineering. Quantitative estimation of water runoff from a catchment depending on the amount of available information.

Course content – seminar
geology part:

work with minerals, identification and description of minerals; work with igneous, sedimentary and metamorphic rocks - identification and descripyion of the rocks; analysis of different conditions of groundwater occurrence, drawing of hydrogeological cross-sections

hydrology part:

Performing simple hydrological calculations to determine the velocity, time of concentration, and intensity of water runoff from a catchment area. Analyzing and discussing selected specific issues in general hydrology, the impact of urbanization on hydrological processes, and selected methods of adapting cities to climate change (including green roofs, rain gardens, floods, etc.).

Prerequisites and co-requisites

none

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Evaluation of a presentation on a given topic (Hydrology part)	60.0%	25.0%
Evaluation of a theory test (hydrology part)	60.0%	25.0%
Evaluation of minerals and rock recognition with theory test	60.0%	35.0%
Evaluation of drawn hydrogeological cross-section	60.0%	15.0%

Recommended reading

Basic literature

- Modern Physical Geology - Thompson &Turk
- Introduction to Physical Geology Thompso&Turk Understanding Earth Press, Siever, Grotzinger, Jordan
- Applied Hydrogeology C.W. Fetter
- Urban hydrology, Hydraulics and Stormwater Quality, A.O. Akan, R.J. Houghtalen, John Wiley & Sons,2003

Supplementary literature

- *The Encyclopedia of Applied Geology - Ch. W. Finkl*
- *Environmental Geology Principles and Practise F. G. Bell*
- *Geological Dictionary R. Żyłka*
- *Guide to Rocks and minerals Simon & Schusters*
- *Rocks gems and minerals H. S. Zim and P.R. Shaffer*
- *Highway Hydrology. Publ. of US Department of Transportation (2002)*
- *McCuen, R. H.: Hydrological Analysis and Design. Prentice Hall, Englewood Cliffs, New Jersey (2005)*

eResources addresses

Supplementary

https://www.mindat.org/ - description and pictures of all teh IMA approved minerals

Example issues/ example questions/ tasks being completed	Describe the mineralogy and the texture of granite Identify and describe given minerals Draw hydrogeological cross-section on the basis of borehole data Determine the basic hydrological characteristics of a given catchment. Estimate the flow rates and maximum runoff from the catchment.
Practical activites within the subject	Not applicable

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