



## Subject card

Subject name and code	, PG_00057793						
Field of study	Green Technologies						
Date of commencement of studies	October 2022	Academic year of realisation of subject			2023/2024		
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	Faculty of Civil and Environmental Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Maria Przewłócka, doc. PG				
	Teachers						
Lesson types and methods of instruction	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						
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	<p>geology part - the aim is to get acquainted students with inner and external geological processes, especially rocks and mineral forming processes. Acquiring skills in rocks and minerals identification and description and knowledge concerning conditions of groundwater occurrence.</p> <p>hydrology part - the aim is get acquainted students with the following issues: precipitation forming, rainfall measurement; surface runoff, rainfall excess, unit hydrograph, flood wave transformation, open channel flow; basic knowledge about hydraulic structures</p>						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[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	Student interprets hydrogeological profiles and integrates the recognition constructing hydrogeological cross-sections The student is able to interpret and discuss the material presented in the scientific literature regarding hydrological processes.	[SU2] Assessment of ability to analyse information [SU5] Assessment of ability to present the results of task
	[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 calculate the effective rainfall depth and calculate surface runoff using the SCS UH method	[SU2] Assessment of ability to analyse information
	[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 understands and interprets conditions of groundwater occurrence and basic hydrological processes	[SW1] Assessment of factual knowledge
	[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 Student potrafi obliczyć wielkość dopływu wody opadowej do zadanego przekroju w kanale otwartym lub sieci kanalizacji deszczowej	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information

Subject contents	<p>the Earth's structure; geologic time, inner geological processes (volcanism, plutonism, metamorphism), external geological processes (weathering, erosion, mass wasting); plate tectonics theory, basic tectonic structures; the rock cycle;</p> <p>minerals: physical properties, recognition and description of : quartz, feldspars, micas, amphiboles, pyroxenes, olivines, magnetite, hematite, pyrite, galena, calcite, halite, gypsum, limonite</p> <p>rocks: forming, mineral composition, textures, classification; identification and description of rocks:</p> <p>- igneous: granite, rhyolite, pegmatite, diorite, andesite, gabbro, basalt</p> <p>- sedimentary: conglomerate, sandstone, silt, clay, boulder clay, compact limestone, fossiliferous limestone, flint</p> <p>- metamorphic: schists, gneiss, marble, quartzite, serpentinite, granulite</p> <p>Basic information on hydrogeology: groundwater table, gaining and losing streams, porosity, permeability, hydraulic coefficient, Darcy's law; hydrogeological cross-section</p> <p>precipitation forming,</p> <p>rainfall measurement;</p> <p>surface runoff, rainfall excess,</p> <p>unit hydrograph,</p> <p>flood wave transformation,</p> <p>open channel flow; hydraulic structures; tanks</p>														
Prerequisites and co-requisites	basic knowledge on physics and chemistry														
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="456 1312 794 1339">Subject passing criteria</th> <th data-bbox="801 1312 1139 1339">Passing threshold</th> <th data-bbox="1145 1312 1473 1339">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="456 1348 794 1375">hydrology test</td> <td data-bbox="801 1348 1139 1375">60.0%</td> <td data-bbox="1145 1348 1473 1375">50.0%</td> </tr> <tr> <td data-bbox="456 1384 794 1411">hydrogeology exercise</td> <td data-bbox="801 1384 1139 1411">60.0%</td> <td data-bbox="1145 1384 1473 1411">20.0%</td> </tr> <tr> <td data-bbox="456 1420 794 1447">geology test</td> <td data-bbox="801 1420 1139 1447">60.0%</td> <td data-bbox="1145 1420 1473 1447">30.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	hydrology test	60.0%	50.0%	hydrogeology exercise	60.0%	20.0%	geology test	60.0%	30.0%
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Recommended reading	Basic literature	<ul style="list-style-type: none"> <li>• <i>Modern Physical Geology</i> - Thompson &amp; Turk</li> <li>• <i>Understanding Earth</i> Press, Siever, Grotzinger, Jordan</li> <li>• <i>Applied Hydrogeology</i> C.W. Fetter</li> <li>• Chow V. T., Handbook of Applied Hydrology, 1964 Edition (or later) McGraw Hill, Inc.</li> <li>• Mays L. W., Water Resources Engineering, 2005 Edition (or later) John Wiley &amp; Sons, Inc.</li> <li>• Viessman W., Lewis G. L. Introduction to Hydrology, Prentice Hall, 2003 (or later edition)</li> <li>• Henderson, F., M., Open Channel Flow, Prentice Hall, 1966</li> <li>• Kolerski T., Praktyczne aspekty gospodarki wodnej w projektowaniu zbiorników retencyjnych, Wyd. PG, 2014</li> <li>• Mays, L. W. (2010). Water resources engineering. John Wiley &amp; Sons.</li> </ul>													
	Supplementary literature	<ul style="list-style-type: none"> <li>• <i>The Encyclopedia of Applied Geology</i> - Ch. W. Finkl</li> <li>• <i>Environmental Geology Principles and Practise</i> F. G. Bell</li> <li>• <i>Geological Dictionary</i> R. Żyłka</li> <li>• <i>Guide to Rocks and minerals</i> Simon &amp; Schusters</li> <li>• <i>Rocks gems and minerals</i> H. S. Zim and P.R. Shaffer</li> <li>• <i>Physical and Chemical Hydrogeology</i> P.A. Domenico, F.W. Schwartz</li> </ul>													
	eResources addresses	Adresy na platformie eNauczanie:													

Example issues/ example questions/ tasks being completed	What is the mineral composition and the texture of granite.  Charakterize divergent plate boundaries and name geological event occurring there.
Work placement	Not applicable