



## Subject card

Subject name and code	Geosynthetics in Civil Engineering , PG_00044241						
Field of study	Civil Engineering						
Date of commencement of studies	October 2020	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	4	Language of instruction			Polish		
Semester of study	7	ECTS credits			3.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Geotechnics, Geology and Marine Civil Engineering -> Faculty of Civil and Environmental Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Angelika Duszyńska				
	Teachers		dr inż. Angelika Duszyńska				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	15.0	0.0	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		40.0	75
Subject objectives	Main aim is to familiarize students with the principles of the use of geosynthetics in construction.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_K02] is responsible for reliability of obtained results of research and its interpretation, formulates conclusions and describes results of own work	Student performs calculations for reinforced soil geosynthetics, analyzes the results and interprets them for design purposes.			[SK2] Assessment of progress of work [SK5] Assessment of ability to solve problems that arise in practice		
	[K6_W13] Knows the most popular construction materials and basics of technology of its fabrication	The student knows technology of production and the rules of geosynthetics. Student identifies the types of permeable and impermeable geosynthetic products.			[SW1] Assessment of factual knowledge		
	[K6_W08] knows the codes of modern geotechnical investigations and technologies, knows the principles of foundations and safe design of foundations of typical buildings	The student knows the standards on new geotechnical technologies on the principles of foundation and a safe foundation of earth structures using geosynthetics.			[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge		
	[K6_U12] knows rules of manufacturing and application of building materials, is able to properly choose them; is able to make simple laboratory experiments for judging quality of building materials	The student knows technology of production and the rules of geosynthetics using in construction and environmental engineering. He can select geosynthetics depending on the field and function. He distinguishes the method for determining the properties of geosynthetic products and their durability.			[SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information		
Subject contents	Types of geosynthetics. Applications and functions of geosynthetics in engineering structures. Construction technology for structures with geosynthetics. Tests of the physical, hydraulic and strength characteristics of geosynthetics. Durability - geosynthetics resistance to chemical and microbiological weathering and damage during installation. Selection and dimensioning of products for the soil reinforcement , the drainage, filtration and separation layers and function as barriers. Failure mechanisms and stability analysis of engineering structures with geosynthetics.						

Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	project	60.0%	60.0%
	test	60.0%	40.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> <li>BS 8006:2010. Code of practice for strengthened/reinforced soils and other fills.</li> <li>EBGEO: Recommendations for Design and Analysis of Earth Structures using Geosynthetic Reinforcements, Ernst W. &amp; Sohn Verlag, 2011.</li> </ol>	
	Supplementary literature	<ol style="list-style-type: none"> <li>Holtz R., Christopher B., Berg R.: Geosynthetic Engineering, BiTech Publish Ltd, Canada, 1997.</li> <li>Koerner R.: Design with Geosynthetics, Prentice Hall, USA, 2016</li> </ol>	
	eResources addresses	Adresy na platformie eNauczenie: Geosyntetyki w Budownictwie (Geotechnika sem. 7) -2023/24 - Moodle ID: 28614 <a href="https://enauczenie.pg.edu.pl/moodle/course/view.php?id=28614">https://enauczenie.pg.edu.pl/moodle/course/view.php?id=28614</a>	
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> <li>Types of geosynthetics.</li> <li>The advantages and disadvantages of geosynthetics.</li> <li>Areas of use of geosynthetics.</li> <li>The functions of geosynthetics in construction.</li> <li>What are the standards used for design of soil structures reinforced with geosynthetics?</li> <li>Technology of reinforced soil structure (compare with eg. the traditional retaining wall).</li> <li>Discuss the steps of designing a reinforced soil structures.</li> <li>The mechanisms of failure in reinforced soil structures.</li> <li>How to check the internal stability of reinforced soil?</li> <li>How to check the external stability of reinforced soil?</li> <li>Methods to check the overall stability of of reinforced soil structure?</li> <li>What is the difference between short-term and the long-term strength of geosynthetic?</li> <li>How to determine the length of geosynthetic reinforcement?</li> <li>Criteria for geosynthetics selection for separation layer.</li> <li>Criteria for geosynthetics selection for filtration layer.</li> </ol>		
Work placement	Not applicable		