



## Subject card

Subject name and code	Geotechnics, PG_00042264						
Field of study	Civil Engineering						
Date of commencement of studies	October 2024		Academic year of realisation of subject		2024/2025		
Education level	second-cycle studies		Subject group		Optional subject group		
Mode of study	Full-time studies		Mode of delivery		at the university		
Year of study	1		Language of instruction		Polish		
Semester of study	2		ECTS credits		5.0		
Learning profile	general academic profile		Assessment form		exam		
Conducting unit	Department of Geotechnics, Geology and Marine Civil Engineering -> Faculty of Civil and Environmental Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. inż. Lech Bałachowski				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	45.0	0.0	0.0	30.0	0.0	75
	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	75		5.0		45.0	125
Subject objectives	<p>Knowledge of the latest developments in soil investigation methods in-situ and laboratory together with their application.</p> <p>The use of advanced constitutive models for soils (Cam-clay, Hardening soil).</p>						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_W12] has deep and theoretically firm knowledge about geotechnical investigation, the rules of geotechnical design and engineering geology; knows the complicated processes in soil, techniques of foundations, draining systems, soil strengthening, geosynthetics applications, underground constructions and earthworks		Student is able to estimate the soil susceptibility to liquefaction.		[SW3] Assessment of knowledge contained in written work and projects		
	[K7_U14] is able to plan and to interpret the geotechnical investigations, to analyse the foundation stability; can design direct and deep foundations in complex soil conditions for complicated statical and dynamical loads		Student is able to design shallow and deep foundation using the results of field investigation.		[SU2] Assessment of ability to analyse information		
Subject contents	Shear resistance - general rules concerning the use of different criteria of shear resistance (drained and undrained conditions, dilatancy). Shear modulus in the domain of small and intermediate strain. General theory of consolidation - Biot. Secondary consolidation - creep and relaxation. Earth pressure at different drainage conditions and strain level. Calculation of slope stability. Advanced soil models (Cam-clay, Hardening soil). Direct foundations on elastic or elasto-plastic subgrade. Bearing capacity and settlement of pile foundations according to EC including new piling technologies. The use of limit difference and final element methods in geotechnics. Deep excavations - calculation, static and technology. In-situ soil investigation: pressuremeter, dilatometer, CPTU, seismic tests. Direct design of foundations with in-situ test results.						
Prerequisites and co-requisites	Knowledge of soil mechanics						

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Project	50.0%	50.0%
	Lectures	50.0%	50.0%
Recommended reading	Basic literature	Lee M, Choi S., Kim M and Lee W (2011) Effect of stress history on CPT and DMT results in sand. Engineering Geology, Elsevier, 117, 259-265.  Monaco P, Amoroso S, Marchetti S, Marchetti D, Totani G, Cola S and Simonini P (2014) Overconsolidation and stiffness of Venice lagoon sands and silts from SDMT and CPTU. Journal of Geotechnical and Geoenvironmental Engineering, 140(1) 215-227. DOI: 10.1061/(ASCE)GT.1943-5606.0000965.  Robertson PK (1990) Soil classification using the cone penetration test. Canadian Geotechnical Journal, 27(1): 151-158. doi:10.1139/ t90-014.  Robertson PK (2009) Interpretation of cone penetration tests a unified approach. Canadian Geotechnical Journal, 46(11): 1337-1355. doi: 10.1139/T09-065.	
	Supplementary literature	Journal of Geotechnical and Geoenvironmental Engineering ASCE  Canadian Geotechnical Journal	
	eResources addresses	Adresy na platformie eNauczanie:	
	Example issues/ example questions/ tasks being completed	Interpretation of soil profile and its parameters based on CPTU  Bearing capacity of pile using CPTU test results  Design of deep excavation	
Work placement	Not applicable		