GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Geotechnics, PG_00042264		
Field of study	Civil Engineering		
Date of commencement of studies	February 2023	Academic year of realisation of subject	2023/2024
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	prof. dr hab. inż. Lech Bałachowski dr hab. inż. Marcin Cudny dr inż. Jakub Konkol	

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

Knowledge of the latest developments in soil investigation methods in-situ and laboratory together with their application.

The use of advanced constitutive models for soils (Cam-clay, Hardening soil).

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_U14] is able to plan and to interpret the geotechnical investigatons, to analyse the foundation stability; can design direct and deep foundations in complex soil conditions for complcated 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
[K7_W12] has deep and theoreticaly firm knowledge about geotechnical investigation, the rules of geotechnical design and engineering geology; knows the complcated 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

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