GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Advanced Foundations , PG_00042230
Field of study	Civil Engineering

Date of commencement of studies	February 2024	Academic year of realisation of subject	2023/2024
Education level	second-cycle studies	Subject group	Obligatory subject group in the field of study
			Subject group related to scientific research in the field of study
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	1	Language of instruction	Polish
Semester of study	1	ECTS credits	2.0
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 hab. inż. Adam Krasiński
	Teachers — dr hab. inż. Adam Krasiński / dr inż. Rafał Ossowski

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	15.0	50

Subject objectives	Acquisition of knowledge and skills in the field of construction and design of foundations for advanced and specialized building structures. Understanding modern methods of foundation design using computer methods. Acquisition of the ability to identify significant geotechnical problems. Preparation for independent work as an engineer in execution and design fields.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_W02] knows principles of analysis, design and dimensioning of complex constructions and its elements	Student knows the principles of analysis, construction and dimensioning of complex geotechnical constructions and foundations of building structures.	[SW1] Assessment of factual knowledge
	[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 has expanded and theoretically founded knowledge in the field of soil testing and interpretation of their results, design principles of various geotechnical structures and soil stabilization techniques.	[SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge
	[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 can interpret the results of geotechnical tests and use them in calculating and analyzing of geotechnical constructions and foundations of advanced building objects.	[SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information
	[K7_W03] has knowledge of Continuum Mechanics, knows rules of static analysis, stability and dynamics of complex rod, shell and volume structures, both in linear and basic nonlinear regime	Student knows the basics of soil mechanics; knows the rules of analysis of issues of statics, stability of complex geotechnical structures, knows the mechanisms of soil-structure interaction in the non-linear range.	[SW1] Assessment of factual knowledge
	[K7_W14] knows and applies building codes and obeys the Construction Law; has knowledge on environmetal impact of investment realisation	Student knows and applies building standards and building codes in the field of geotechnics and foundation engineering; has knowledge about the impact of the implementation of construction projects on the soil and water environment.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge

Subject contents	Geotechnical design, geotechnical categories, methods of geotechnical design. Foundations of bridges and viaducts. Modern technologies and the solution of pile foundations. Advanced pile capacity tests. Housings of deep excavations and multi-storey underground of buildings. Raft and piled raft foundations. Foundation of high and heavy industrial buildings. Strengthening the subsoil under construction embankments.
Prerequisites and co-requisites	Completion of courses: - soil mechanics - foundations - general mechanics - technical drawing - fundamentals of general construction, reinforced concrete and steel structures.

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Project	60.0%	50.0%
	Activity during lectures	0.0%	10.0%
	Test from lectures	55.0%	40.0%

Recommended reading	Basic literature	1. Wiłun Z., Zarys geotechniki, WKŁ, Warszawa, 2004 2. Jarominiak A.,: Lekkie konstrukcje oporowe, Warszawa, WKŁ, 2000 3. Gwizdała K., Fundamenty palowe. T1. 2011, T2. 2013, PWN Warszawa
	Supplementary literature	1. Puła O., Rybak C., Sarniak W.: Fundamentowanie. Projektowanie posadowień. DWE, Wrocław 1999 2. Starosolski W., Konstrukcje żelbetowe, T2., PWN, Warszawa 1996 3. Czasopisma: „Inżynieria Morska i Geotechnika", "Geoinżynieria", „Inżynieria i Budownictwo"
	eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	Types of soil conditions and geotechnical categories. Generalized Winkler's ground substrate model. Calculation of foundation slabs on elastic soilbed. Determination of subsidence characteristics of a single pile and pile group The mechanism of the grouting action under the base of bored pile. Mechanism of cooperation of a pile-pile foundation with a ground substrate. The principle of deep excavation wall calculation.
Work placement	Not applicable

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