KARTA PRZEDMIOTU

Nazwa przedmiotu: ***Foundation Engineering (BudAB>SI5FOUENG19)***
Name:
Nazwa w języku polskim:
Name in Polish:
Nazwa w jęz. angielskim:
Name in English: ***Foundation Engineering***

Dane dotyczące przedmiotu:
Information on course:

Jednostka oferująca przedmiot: Wydział Budownictwa
Course offered by department: Faculty of Civil Engineering
Przedmiot dla jednostki: Politechnika Śląska
Course for department: Silesian University of Technology

Domyślny typ protokołu dla przedmiotu:
EGZ
Default type of course examination report:
EGZ
Język wykładowy:
polski
Language:
Polish
Strona WWW:
Course homepage:
https://platforma.polsl.pl/rb/course/view.php?id=103
Short description:
The purpose of the course is to learn the site investigation techniques, recognition the subsurface conditions and designing a pad foundation based on ultimate and serviceability limit states (bearing capacity and settlement calculations). Dewatering and groundwater control is also discussed. Laboratory testing of mechanical soil properties and RC pad foundation design are the practical aspects of the course in the 5th semester.
Description:
1) Lectures: 15 hours
detailed programme's content:
FIELD EXPLORATIONS: Investigational programs, Soil boring program, Field measurements of relative density and consistency, Boring logs, Groundwater observations, In situ load tests, Geophysical exploration, Borehole surveying SELECTION OF FOUNDATION TYPE: Adverse subsurface conditions, Cost estimates and final selection SPREAD FOOTINGS AND MAT FOUNDATIONS: Adequate foundation depth, Footing design Mat foundations, Special requirements for mat foundations, Modulus of subgrade reaction for footings and mats, Foundations for towers BEARING-CAPACITY ANALYSIS: Bearing capacity of soils, Shear strength parameters, Methods of analysis, Tension forces, Bearing capacity of rock SETTLEMENT ANALYSES: Settlement problems, Loads causing settlement, Stress computations, Settlement of foundations on clay, Consolidation settlement, Settlement of cohesionless soils, Eliminating, reducing, or coping with settlement DEWATERING AND GROUNDWATER CONTROL: Excavations requiring drainage, Seepage control, Seepage cutoffs, Control of surface waters, Sheet-pile cofferdams, Foundation underdrainage and waterproofing.
teaching methods, including distance learning:
Oral and multimedia presentations including distant learning
form and criteria for semester completion, including retake tests, as well as conditions for admission to the examination:
Exam (with 2 reatkes) - students are required to obtain 50% points; to take part in the exam a student must get credit for the laboratory part, deliver the project and defend it
course organisation and rules of participation in the course, with an indication whether a student's attendance is obligatory:
Lectures are given to all students in a group either in a contact form or as distant learning. Attendance is obligatory and checked on every lecture.
2) Classes: 4 hours
detailed programme's content:
Introduction to pad foundation design. Presentation of all steps in the design: foundation depth, bearing capacity according to Eurocode 7, determination of stress distribution in the subsoil, settlement analysis, reinforcement calculations, drawing.
teaching methods, including distant learning:
Power Point presentation given either in a classroom or as distant learning (Distant Learning Platform, MS Teams, ZOOM)
form and criteria for semester completion, including retake tests, as well as conditions for admission to the examination:
N/A
course organisation and rules of participation in the course, with an indication whether a student's attendance is obligatory:
two meetings with watching the presentation; attendance is obligatory
3) Laboratory: 10 hours
detailed programme's content:
Introduction to laboratory testing of soils (triaxial apparatus, oedometer, shear box) Oedometer test: determination of constrained modulus. Shear box test: determination of cohesion and friction angle.
teaching methods, including distant learning:
Introduction given as Power Point presentation either in a classroom or as distant learning (Distant Learning Platform, MS Teams, ZOOM)
form and criteria for semester completion, including retake tests, as well as conditions for admission to the examination:
Participation in laboratory tests, delivery of reports and passing a colloquium/test
course organisation and rules of participation in the course, with an indication whether a student's attendance is obligatory:
The laboratory classes are conducted in groups accordingly to the resolution of the Senate of SUT. Attendance is obligatory.
4) Project: 16 hours
detailed programme's content:

Pad foundation design: ultimate and serviceability limit states according to EC7, reinforcement determination, drawing.

teaching methods, including distant learning:

Consultations of subsequent parts of the project either in a classroom or as distant learning (Distant Learning Platform, MS Teams, ZOOM)

form and criteria for semester completion, including retake tests, as well as conditions for admission to the examination:

Delivery of the project, defense of the project (answering a few questions about the project and assumed solutions). Positive evaluation (grades over 50%) make a part of admission to the examination

course organisation and rules of participation in the course, with an indication whether a student's attendance is obligatory:

The laboratory classes are conducted in groups accordingly to the resolution of the Senate of SUT. Attendance is obligatory.

Bibliography:

1. Bowles J.E.: Foundation Analysis and Design. MacGraw-Hill Companies Inc., 1997.
2. Das B.M.: Principles of Foundation Engineering. Cengage Learning, 2014.
3. Lambe T.W., Whitman R.V.: Mechanika gruntów (Soil Mechanics). Arkady, Warszawa, 1977.
4. Pisarczyk S.: Mechanika gruntów. OWPW, Warszawa, 2005.
5. Rybak Cz., Puła O., Sarniak W.: Fundamentowanie. DWE, Wrocław, 2001.
6. Sękowski J.: Laboratorium z mechaniki gruntów w zadaniach. Wyd. PŚ., 2000.
7. Wiłun Z.: Zarys geotechniki. WKiŁ, 2003.
8. EN 1997-1: Eurocode 7

Learning outcomes:

Knowledge:
A student knows and understands
K1A_W07 shallow foundation types;
K1A_W07 standards and guidelines for the design of shallow foundations;
K1A_W07 the site investigation techniques and principles of foundation of simple building objects;
K1A_W07 dewatering, drainage and groundwater control principles.

Skills:
A student can
K1A_U04 design a pad foundation;
K1A_U04 determine mechanical parameters of soils;

Assessment methods and assessment criteria:

Prerequisites: positive evaluation of the course Soil Mechanics and Engineering Geology
Lectures - exam
Project - A project is a written elaboration of a solution to an engineering task, usually in the form of calculations and drawings. The student realizes the project independently and consults its stages during the design classes.
Laboratory - report (a written description of the laboratory research) and test
Final grade = Lectures 50% + Project 30% + Laboratory 20%

POSSIBILITY OF TRANSFERRING GRADES:
To transfer partial grades, students should contact the lecturer within the first two weeks of the semester.

The syllabus is valid from the winter semester of the 2025/2026 academic year, and its content is not subject to change during the semester.

Przynależność do grup przedmiotów w cyklach:
Element of course groups in various terms:

Opis grupy przedmiotów Course group description	Cykl pocz. First term	Cykl kon. Last term
2019 Stacjonarne I stopnia sem. 5 ANG (BudAB-S1-2019-sem5) *missing group description in English* (BudAB-S1-2019-sem5)	2021/2022-Z	

Punkty przedmiotu w cyklach:
Course credits in various terms:

<bez przypisanego programu>
<without a specific program>

Typ punktów Type of credits	Liczba Number	Cykl pocz. First term	Cykl kon. Last term
Europejski System Transferu Punktów (ECTS) European Credit Transfer System (ECTS)	4	2021/2022-Z	