Course Program for:

AF2611 Geotechnical Engineering, Advanced Course 7,5 p (ETC)

Teachers

Sadek Baker	SB	Lectures and workshops
Anders Beijer	AB	Lectures and workshops
Alireza Ahmadi	AA	Workshops
Magnus Ruin	MR	Lectures
Stefan Larsson	SL	Lectures and examiner

Contacts

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Students Office

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Students Office: room M107A
Open at: Monday-Thursday, 10.00-11.00 and 12.30-13.30.

This course focuses on the application of soil mechanics in analyses and design. The course is problem oriented where you work with a complex geotechnical structure, considering the whole design process. Analytical calculations, for ultimate limit state, are combined with numerical calculations, for consideration of deformations. The course emphasizes the importance of parameter selection in calculations.

Aim and learning objectives

The aim of this course is to give advanced knowledge on analysis and design of geotechnical structures.

After the course, the student should be able to:

- Put knowledge from previous courses into practice.
- Interpret results from geotechnical field investigations and put together into a basic soil profile.
- Produce and motivate input parameters for the design of a sheet-pile wall based on field investigations.
- Produce and motivate input parameters for the design of a sheet-pile wall based on laboratory-tests.
- Simulate and evaluate a laboratory-test using a commercial FEM-software.
- Apply a commercial FEM-software in design of a sheet-pile wall.
- Design a sheet-pile wall with respect to ultimate and serviceability limit state and compile, analyze, and value the results.
- Produce a geotechnical design report including reflections on the results based on the given input parameters and reasonable variability.
- Design, propose, and motivate a basic control program for a sheet-pile wall.

Disposition

The course includes 11x3 hours of lecturing (Le1-Le11) and 11x4 hours of workshops (WS1-11).

One assignment (AS) will be handed out during the course. The assignment is to be solved in groups of 2 students and one written report should be handed in consisting of two parts “Simulation of a triaxial test in Plaxis” and “Laboratory report of Triaxial test”. The assignment is to be handed in through Canvas before a fixed date (see schedule below).

The main focus in the course is on a project work (PRO) that is carried out in groups of 2 students. The result of the project is a *design report* for a sheet pile wall with respect to ultimate and serviceability limit state. This report consists of three parts which should be handed in according to the schedule.

Attendance

Neither lectures, nor workshops are mandatory. However, you are highly recommended to attend all lectures and workshops.

Language

The course will be given in English.

Prerequisites

- An undergraduate course in geotechnical engineering
- Previous knowledge in limit state design of geotechnical structures, especially limit state design of retaining walls for deep excavations.

Literature

- PLAXIS 2D – Manuals; http://www.plaxis.nl/shop/69/info/manuals/
- Suggested reading will be given during the course.
- Other literature will be handed out at lecture or presented on Canvas continuously.

Homepage

The course got its own homepage on Canvas. Make sure that you can access Canvas on https://kth.instructure.com. Information will be presented at Canvas continuously. You are expected to keep yourself updated by looking at Canvas frequently.

Examination

To pass this course you must:

- Complete the three sub-reports (AS; 3.0)
- Complete the Project (PRO; 4.5p)

The three sub-reports are examined by written reports “Soil profile”, “Triaxial test” and “Analytical solution”. The reports will be graded as “Not yet passed” or “Passed”. If your report is graded as “Not yet passed”, you are required to write a supplementary report. Supplementary reports are to be submitted within the time frame of this course.

Project (PRO; 4.5p) is examined by a *design report* of a sheet-pile wall. The *design report* is graded on a scale from A to F. The grade on the *design report* forms the final grade of the course. The instructions and demands for the project are handed out separately. You will be provided instructions for the composition of the *design report* during the course. In addition, the basis for the judgment of grades is handed out separately.

The *design report* will be tested for plagiarism. Read “Policy for handling plagiarism in KTH education” at http://intra.kth.se/en/regelverk/policyer/policy-for-hantering-av-plagiering-inom-kth-s-utbildning-1.61391

The course is a project course and it is not possible to raise the grade after you have got a passed, i.e. it is not possible to “plussa”.

Schedule

Tue	30 Aug	9-12	Le1	V11	Introduction, Project, Design report	AB/SL
		13-17	WS1	Frodo	Geotechnical investigations	SL
Thu	1 Sep	9-12	Le2	V11	Continuum Mechanics	SB
		13-17	WS2	Frodo	Continuum Mechanics	SB, AA
Tue	6 Sep	9-12	Le3	V11	Triaxial test	AB
		13-17	WS3	Frodo	Triaxial test	AB, AA
Thu	8 Sep	9-12	Le4	V11	Analytical solution	SB
		13-17	WS4	Frodo	Analytical solution, Project.	SB, AA
Thu	**8 Sep**	**24:00**			**Deadline Soil profile**	
Thu	15 Sep	9-12	Le5	V21	Introduction Plaxis	SB
		13-17	WS5	XW344	Analytical solution, Project.	SB, AA
Tue	20 Sep	9-12	Le6	V21	Plaxis triaxial	SB
		13-17	WS6	Frodo	Analytical solution, Plaxis triaxial test	SB, AA
Thu	22 Sep	9-12	Le7	V21	Sheet piling	AB
		13-17	WS7	XW344	Analytical solution, Plaxis triaxial test	SB, AA
Thu	**22 Sep**	**24:00**			**Deadline triaxial test**	
Thu	29 Sep	9-12	Le8	Q22	Measurements	MR
		13-17	WS8	Frodo	Project	SB, AA
Tue	4 Oct	9-12	Le9	Q17	Plaxis sheet pile	SB
		13-17	WS9	Frodo	Plaxis modelling sheet pile	SB, AA
Tue	**4 Oct**	**24:00**			**Deadline analytical solution**	
Tue	11 Oct	9-12	Le10	V01	Risk and Safety aspects	AB
		13-17	WS10	Frodo	Project	SB, AA
Thu	13 Oct	9-12	Le11	V01	Project	SB
		13-17	WS11	Frodo	Project	SB, AA
Sun	30 Oct	24:00			**Deadline Project Report**	