AF1601 Soil Mechanics and Foundation Engineering 7.5 credits

Geoteknik med grundläggning

This is a translation of the Swedish, legally binding, course syllabus.

Establishment

The official course syllabus is valid from the spring semester 2026 as decided by the Director of First and Second Cycle Education: HS-2025-2235. Date of decision: 2025-09-25.

Grading scale

A, B, C, D, E, FX, F

Education cycle

First cycle

Main field of study

Technology

Specific prerequisites

Completed upper secondary education including proficiency in English.

at least 15 credits from SF1624 Algebra and Geometry and SF1910 Applied Statistics,

and at least 6 credits from AL1302 Geoscience and Geotechnical Engineering or AE1106 Geoscience.

Intended learning outcomes

After completion of course the students should be able to:

- Define and use the basic concepts of Soil Mechanics, e.g. total and effective stress, pore water pressure, shear strength, elastic- and oedometer modulus

- Calculate the initial vertical stresses in a stratum and calculate the additional stresses from loading and from this analyze the oedometer process.

- Given a problem, chose proper soil mechanical model for the design of a construction.

- Analyze and design shallow foundations with respect to settlements and stability.

-Analyze and specify maximum allowed excavation depth and maximum slope inclination with respect to stability, hydraulic failure, and heave.

- Analyze, design and value embankments and slopes with respect to stability.

- Calculate the lateral earth pressures acting on earth retaining walls and sheet pile walls according to Rankine theory.

- Explain the principles for geotechnical risk management of the safety of geotechnical constructions.

- Execute and report a geotechnical routine- and CRS test on clay soil sample.

- Write a geotechnical design memorandum.

Given realistic problems, you will be exercised in modelling and solving problems, alone and as a member of a group. Your writing skills will be exercised from continuous feedback given on all written assignments. Corresponding English terminology will be presented during lecture and in literature.

Course contents

This course encloses

- Basic characteristics
- Laboratory methods
- Effective stress concept
- Shear strength
- Consolidation
- Lateral earth pressure
- Bearing capacity
- Slope stability
- Risk management and dimensioning principles

Examination

- ÖVNA - Exercises, 3.0 credits, grading scale: P, F
- TENA - Examination, 4.5 credits, grading scale: A, B, C, D, E, FX, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

If the course is discontinued, students may request to be examined during the following two academic years.

Other requirements for final grade

Written examination (TENA, 4,5 cr)
Exercises and laboratory work (ÖVNA, 3,0 cr) The written examination settles the grade of the course.

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.