



# AF1601 Soil Mechanics and Foundation Engineering 7.5 credits

## Geoteknik med grundläggning

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

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

## Establishment

Course syllabus for AF1601 valid from Spring 2010

## Grading scale

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

## Education cycle

First cycle

## Main field of study

Technology

## Specific prerequisites

For students not registered on a KTH programme:

Completed upper secondary education including documented proficiency in Swedish corresponding to Swedish B and English corresponding to English A. AE1102 Geology and Geot-

Technical Eng. 6.0 credits, AF1002 Buildings and Civil Eng. Structures. 7.5 credits, SG1801 Structural Mechanics, Basic Course 7.5 credits or equivalent.

For students registered on a KTH programme:

AE1102 Geology and Geotechnical Eng. 6.0 credits, AF1002 Buildings and Civil Eng. Structures. 7.5 credits, SG1801 Structural Mechanics, Basic Course 7.5 credits.

## Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

## 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.
- Given a problem, choose 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 and Coulomb theories.
- 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

## Disposition

Lectures, Workshops and one Laboratory experiment. Three Exercises and one Laboratory are to be solved and presented in written memorandums. This is done in groups of four members. You are responsible yourself for your own learning, compulsory presence is only required for the laboratory experiment.

## Course literature

Braja M. Das "Principles of Geotechnical Engineering", Sixth Edition.

## Examination

- TEN1 - Examination, 3.0 credits, grading scale: A, B, C, D, E, FX, F
- ÖVN1 - Exercises, 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.

TEN1 Examination, 3.0 credits, grade scale: A-F

ÖVN1 Exercises, 4,5 credits, grade scale: P,F

## Other requirements for final grade

Written examination (TEN1; 3 cr)

Exercises and laboratory work (ÖVN1; 4,5 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.