Faculty of Technology and Science
Construction Engineering

Syllabus

Course Approval
The syllabus was approved by the Faculty Board of Technology and Science on 21 April 2008, and is valid from the Spring semester of 2008 at Karlstad University.

Course Code: BYGC13
Engineering Design: Geotechnical Engineering, 7.5 ECTS Credits
(Geokonstruktion, 7.5 Swedish credit points)
Degree Level: Bachelor
Progression Level: C

Language of Instruction
Swedish

Prerequisites
Mathematics 15 ECTS cr., Structural Mechanics 7.5 ECTS cr., Strength of Material for Building Construction 7.5 ECTS cr., Design project 7.5 ECTS cr. or equivalent.

Major Field of Study
Building Technology

Learning Outcomes

The course is an elective in the third year of the Building and Construction Engineering programme. The aim is that students acquire basic knowledge of soil types and their geotechnical properties, skills in performing elementary calculations in accordance with codes and standard practice, and understanding of the specific problems involved in the geotechnical field.

For a Pass grade (3), students should be able to:
- give an account of the composition, occurrence and geotechnical properties of the most common soil types,
- perform calculations for simple cases related to all the course themes within specified parameters,
- give an account of the theories and principles of calculation related to all the course themes,
- apply the calculation methods and partial coefficients of the building codes.

For a grade of Distinction (4 or 5), students should, in addition to the requirements above, be able to:
- analyse problems with open premises and make reasonable assumptions,
- demonstrate understanding of theories by being able to interpret and analyse information to solve a problem,
- demonstrate ability to solve complex problems which require different calculations, choice of method and relevant controls,
- give an account of sampling, testing and analysis methods.

Content and Form of Instruction

The course is structured around five themes which are all concluded by a written exam at the Pass grade level. Instruction is in the form of lectures, exercises and laboratory work. Students who aspire to a higher grade are

encouraged to carry out a project and/or a hand-in assignment as part of the assessment.

The course covers the following themes:
- Basic geology - primarily soil types and geotechnical properties, geological maps and sampling and analysis methods. Soil mechanics, stress analysis, total, effective and shearing stress, pore pressure, deformation properties, method of coefficient application to geotechnology, the impact of ground water.

- Subsidence - deformation calculation of friction soil and cohesion soil, ground water problems in connection with constructions.
- Bearing capacity - for friction and cohesion soil in terms of the Terzaghi bearing capacity equation for continuous and rectangular footing with centric and excentric load.
- Lateral earth pressure - active and passive thrust, sheeting, retaining walls, slope stability (not calculation).
- Piling - driven piles in friction and choesive soil, calculation of individual piles bearing capacity, pile groups with vertical and slanting piles, settlement calculation for pile groups.

Reading List

See separate document.

Examination

Examination for the Pass grade (3) is continuous throughout the course. For a grade of Distinction (4 or 5), students sit a written exam at the end of the course and submit projects and/or assignments.

Grades

One of the grades 5 (Distinction), 4 (Some Distinction), 3 Pass , or Fail (U), is awarded in the examination of the course.

Quality Assurance

Follow-up relating to learning conditions and goal-fulfilment takes place both during and upon completion of the course in order to ensure continuous improvement. Course assessment is based on student views and experiences as reported in written course evaluations and/or group discussions. Students will be informed of the result of the evaluation and of the measures to be taken.

Course Certificate

A course certificate will be provided upon request.

Additional Information

Students who enrolled before 1 July 2007 will complete their studies in accordance with the requirements of the earlier admission. Upon completion students may request degree and course certificates to be issued under the current ordinance if they meet its requirements.

The local regulations for studies at the Bachelor's and Master's levels at Karlstad University, ref. C2007/368, stipulate the obligations and rights of students and staff.

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