

SYLLABUS

Rock Engineering and Rock Mechanics 7.5 credits T0013B

Berganläggningsteknik

Course syllabus admitted: Autumn 2023 Sp 1 - Present

**DECISION DATE
2022-02-11**

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Berganläggningsteknik

First cycle, T0013B

Education level	Grade scale	Subject	Subject group (SCB)
First cycle	G U 3 4 5	Berg- och mineralteknik	Mining and Mineral Technology

Main field of study

Civil Engineering

Entry requirements

In order to meet the general entry requirements for first cycle studies you must have successfully completed upper secondary education and documented skills in English language and 30 credits in engineering/science

Selection

The selection is based on 1-165 credits.

Course Aim

During this introductory course, the student will acquire basic skills in rock engineering, and rock mechanics. Below a list of course goals are listed, divided in expected indented learning outcomes (ILO)

After completing this course, the student should be able to:

Knowledge and understanding

1. Understand and describe different excavation methods unit operations for rock excavations.
2. Identify structurally controlled failures in rock slopes and underground rock excavations using spherical projection and engineering descriptions of the rock mass composition
3. Identify circular rock slope failure based on an engineering geology description of the rock mass.

Competence and skills

4. Determine and motivate choice of method and equipment for rock excavation.
5. Determine the safety factor for identified potential structural controlled failure types and assess whether slopes and underground constructions are stable. Be able to give recommendations on how to stabilize an unstable block.
6. Make basic rock quality classifications used in pre-investigations and determine the rock mass quality
7. Explain and discuss the project, both in text and orally, the procedure, assumptions, results, and conclusions.

Judgement and approach

8. Describe different rock facilities. Risks with consequences for the environment.

These skills form the base for all other courses in rock mechanics and rock engineering, at the department.

Contents

This course covers basic rock engineering and rock mechanics such as conventional drill and blast, mechanical excavation methods, basic blasting, loading, hauling and transport, rock reinforcement, shift- and time planning, pre-investigations for rock constructions. The student will get familiar with several underground projects in Sweden. In addition to the skills of rock engineering and rock mechanics, the student will be given the opportunity to practice general skills needed for the future career role. By reaching the course objectives, you will acquire specific knowledge within this discipline, as well as general skills

Regarding specific knowledge within this discipline, the student will:

- Develop basic knowledge in the field of rock engineering and how rock excavations is conducted in practice, to a level that provide capability for fruitful communication with professionals within the rock engineering discipline. Train on how to present basic knowledge and to make critical assessments. Exercise on independent problem-solving and apply theoretical skills on practical problems within the specific discipline. Get insights to some common field methods in soil mechanics. Conduct routine investigations on soil samples.

Regarding general skills, the student will:

- Practice on oral- and written presentations. Develop skills to work independently, and in group. Develop ability to solve problems independently and to compile results. You will also practice on feedback on others' work

Realization

Each course occasion's language and form is stated and appear on the course page on Luleå University of Technology's website.

The course format consists in general of four elements: lectures, project assignments, study visits (or alternatively a specialization assignment) and a written exam.

Lecturers, presentations, and course literature gives the prerequisite to carry out the project assignment. The lectures are given in stages coupled to the project assignment. The assignment is carried as group work and is presented both as a written report and orally. All group members will be participating in the oral presentation. The presentation will be given to another group that will be allowed to object to both the report and the presentation.

The course includes a study visit that links to parts of the course content. During the study visit, the student must actively participate by, for example, taking notes, taking photographs (if permitted), listening and asking relevant questions to those who guide the students during the visit. If the examiner decides that a study visit is canceled for any reason, the study visit is replaced by an specialization assignment that must be reported in writing.

Examination

If there is a decision on special educational support, in accordance with the Guideline Student's rights and obligations at Luleå University of Technology, an adapted or alternative form of examination can be provided. The examination consists of a written exam and additional activities consisting of different aspects of construction in rock and includes work in group and a study visit (or specialization assignment).

- Written exam. Examination: 4p. Grade scale: U,G,3,4,5

Additional activities. 3.5 p. Grade scale: U/G.

- Written report and oral presentation of project assignment
- Completed field study and a written report of the visit or an alternative specific study reported as PM

The grade scale for the entire course is given in grades 3 4 5

The examination form for each goal is presented below. The table below present assessment for the goals respectively

Goals 1-6 and 8 are examined via a written exam. Included in the Written exam with the grading scale G U 3 4 5. Goals 1,4 and 7 are examined via written report and oral presentation. Included in Required assignment with the grading scale G U.

Unauthorized aids during exams and assessments

If a student, by using unauthorized aids, tries to mislead during an exam or when a study performance is to be assessed, disciplinary measures may be taken. The term “unauthorized aids” refers to aids that the teacher has not previously specified as permissible aids and that may assist in solving the examination task. This means that all aids not specified as permissible are prohibited. The Swedish version has interpretative precedence in the event of a conflict.

Transition terms

1000

Course offered by

Department of Civil, Environmental and Natural Resources Engineering

Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0001	Written exam	G U 3 4 5	4	Mandatory	A08	
0002	Required assignment	U G#	3.5	Mandatory	A08	

Study guidance

Study guidance for the course is to be found in our learning platform Canvas before the course starts. Students applying for single subject courses get more information in the Welcome letter. You will find the learning platform via My LTU.

Last revised

by Assistant Director of Undergraduate Studies Eva Gunneriusson, Department of Civil, Environmental and Natural Resources Engineering 2022-02-11

Syllabus established

The plan is established by the Department of Civil and Environmental Engineering 2008-01-22 and is valid from H08.