

SYLLABUS

Rock Mechanics I 7.5 credits Q0038B

Bergmekanik I

Course syllabus admitted: Spring 2018 Sp 3 - Spring 2019 Sp 4

**DECISION DATE
2017-06-16**

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Bergmekanik I

First cycle, Q0038B

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

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 +

Swedish upper secondary school courses Physics 2, Chemistry 1, Mathematics 3c (specifik entry A8).

Or:

Swedish upper secondary school courses Physics B, Chemistry A, Mathematics D (specifik entry 8)

Selection

The selection is based on final school grades or Swedish Scholastic Aptitude Test.

Examiner

Andreas Eitzenberger

Course Aim

The aim of the course is to give you an introduction to the basics of rock mechanics. You will get the knowledge and skills to determine whether shallow situated constructions in rock, such as tunnels on a small depth, slopes and rock foundation, are stable: You will also be able to provide recommendations for measures to achieve stable conditions for situation where that has not been achieved.

Upon completion of the course, you are expected to be able to:

- identify structurally controlled failures for shallow situated constructions in rock (tunnels and slopes) using spherical projection and simplified geological descriptions, and where possible calculate the factor of safety
- carry out field and laboratory work using proven methods to evaluate rock and joint parameters as well as the quality of rock mass
- explain the in situ stresses in the bedrock and the strength of the rock mass
- explain different types of reinforcement elements, propose suitable stability enhancing measures for shallow situated constructions in rock, and calculate the factor of safety for selected reinforcement elements
- in writing and orally explain and discuss your and others' analyzes, results and conclusions

Contents

The course deals with the fundamentals of rock mechanics with focus on the stability of shallow situated constructions in rock, such as tunnels on small depths, slopes and rock foundation. The course covers the following areas:

- Rock as a material - Engineering geology, rock types, intact rock, joints, and rock mass properties.
- Pre-investigation - Rock mass classification, joint mapping, spherical projection, collection and analysis of field data.
- Slope stability - Basic concepts, failure types, application of stereographic projections, kinematic and constitutive conditions, monitoring and stabilization.
- Stresses and strength - In-situ stresses, test methods, mechanical properties of rock, strength
- Reinforcement methods and reinforcement elements - Rock bolts, mesh and shotcrete. Overview of other reinforcement methods.
- Written and oral communication - Report writing and oral presentation. Presentation of engineering work, presentation of field data, etc.

Realization

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

Lectures, field work and project assignments.

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.

Written exam 4 credits, project assignment, written and oral presentation, 2.5 credits, and field work 1 credit.

Remarks

The course overlaps courses Q0010B and Q0023B

Literature. Valid from Autumn 2014 Sp 1

Nordlund E., Rådberg G. & Sjöberg J. (1998). Bergmekanikens grunder. Upplaga 1.5. Luleå tekniska universitet.

Course offered by

Department of Civil, Environmental and Natural Resources Engineering

Items/credits

Number	Type	Credits	Grade
0001	Written exam	4	G U 3 4 5
0003	Project assignments, written and oral presentation	2.5	U G#
0004	Field work	1	U G#

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 2017-06-16

Syllabus established

by Eva Gunneriusson 2014-02-10