Rock Mass Mechanics and Rock Engineering

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Module number	Credits	Workload	Semester[s]	Duration	Group size
SE-CO-24	6 CP	180 h	2. Sem.	1 Semester[s]	no limitation

Courses	Contact hours	Self-study	Frequency
a) Rock Mass Mechanics	a) 2 WLH (30 h)	a) 40 h	a) each summer
b) Rock Engineering	b) 2 WLH (30 h)	b) 40 h	b) each summer
c) Rock Mechanical Lab Training		c) 10 h	c) each summer

Module coordinator and lecturer(s)

Prof. Dr. Tobias Backers

a) Dr. Mandy Duda

b) Dr. Mandy Duda

c) Dr. Mandy Duda

Admission requirements

Learning outcome, core skills

As a field of geomechanics, rock mass mechanics deals with the description of the rheological properties and associated material models of rock and discontinuities; through integration, the deformation behaviour of rock mass (= rock + discontinuities) can be evaluated in response to changes in thermal, hydraulic or mechanical boundary conditions. Understanding the thermos-hydro-mechanical behaviour of rock mass forms the basis for its use as a structural or material resource.

Rock engineering deals with structural measures in rock mass. The structural engineering measures include excavation, stabilization, extraction, foundations, and the creation of cavities. Based on the fundamentals of rock mass mechanics, the principles of rock engineering are discussed.

Laboratory experiments to describe and classify rock and rock mass will be conducted

Participants are familiar with the fundamentals of rheology, the mechanical behaviour of rocks and discontinuities, rock mass classification and mechanical properties of rock mass. They know and understand the typical characteristic properties in terms of their significance and magnitude and how there are derived from laboratory experiments. Furthermore, they deepen their knowledge of geomechanical principles and interrelations. Participants are also familiar with the basics of constructing and securing rock structures considering the properties of rock and discontinuities as a mechanical system.

Contents

a)

Deformation and failure of rock; introduction to laboratory experiments; deformation and failure of discontinuities; rock mass classifications; deformation and failure of rock mass; excavation, stabilization, characteristics of slopes, foundations, tunnels, and mines; approaches for geotechnical/geomechanical monitoring.

b)

see above

c)

see above

Educational form / Language

a) Lecture with tutorial / English b) Lecture with tutorial / English c) Laboratory / English
Examination methods • Written exam 'Rock Mass Mechanics and Rock Engineering' (90 min., Part of modul grade 100 %)
Requirements for the award of credit points • Passed final written examination
Module applicability • M.Sc. Susbsurface Engineering • M.Sc. Geosciences
Weight of the mark for the final score Percentage of total grade [%] = 6 * 100 * FAK / DIV FAK: The weighting factors can be taken from the table of contents. DIV: The values can be taken from the table of contents.
Further Information Relevant specialized literature will be presented at the beginning of each course. Brady B, Brown E. 2006. Rock Mechanics for underground mining. Springer Science