Geoengineering and Mineral Based Materials

Basic information of the minor

Code: ENG3056

Extent: Minimun 20 cr

Language: English

Teacher in charge: Mikael Rinne

Target Group: Exchange students and Aalto University master students, especially from Aalto ENG and Aalto CHEM.

Application procedure: To be submitted to the head of the program, prof. Mikael Rinne.

Quotas and restrictions: 10 students. The applicant must have Bachelor degree in a relevant engineering program. Relevant program depends on the course portfolio the student aim to complete.

Prerequisites: Bachelor degree in a relevant engineering program. Please contacft the Professor Mikael Rinne (mikael.rinne@aalto.fi).

Content and structure of the minor

Motivation

Geoengineering is subject which is essential part of the competence for many professionals working in the field of Civil and Mining Engineering. For example, structural engineers need to understand the behavior of the foundation when they are planning buildings, bridges and other demanding structures. Good knowledge of construction methods and structures built in soil and rock is also valuable for professionals in water and road engineering. Also students focusing in Mining or Mineral Resource Engineering will have great benefit of this program.

Intended learning outcomes

After the completion of the course the student

- can describe the basic geological processes and characteristics of soil and rock
- has the basic knowledge of the most commonly used mineral based materials in building technology
- understands the principles of soil and rock behavior and interaction with associated structures
- can make simple design of geotechnical structures
- can describe the basic construction techniques and equipment applied in geoengineering
- recognize the environmental effects of geoengineering and the life time performance of geotechnical structures

Structure of the minor

Code	Name	Credits
Common studies (Compulsory courses)		15
GEO-E1010	Engineering Geology	5
GEO-E1020	Geotechnics	5
GEO-E1040	Rock Excavation	5
Advanced studies, select one to three courses		5-15
Choose so many courses below that the Minor will be at least 20 cr		
GEO-E2010	Advanced Soil Mechanics L	5
CIV-E1010	Building Materials Technology	5
GEO-E3010	Economic Geology and Mineral Economics L	5
CIV-E2030	Experimental Methods in Building Material Technology L	5
GEO-E1050	Finite Element Methods	5

GEO-E2080	Foundation Engineering and Ground Improvement	5
GEO-E3040	Geometric Design of Roads	5
GEO-E2020	Numerical Methods in Geotechnics L	5
GEO-E2090	Project Course in Geoengineering	5
GEO-E2030	Rock Mechanics L	5
GEO-E2040	Rock Construction	5
GEO-E2050	Bituminous Materials and Mixtures	5
GEO-E1030	Structural Design of Roads	5
GEO-E3030	Road Maintenance and Rehabilitation	5

Examples of course packages for some areas of interest

Common studies (15 cr, mandatory)

GEO-E1010 Engineering Geology (5 cr)

GEO-E1020 Geotechnics (5 cr)

GEO-E1040 Rock Excavations (5 cr)

Advanced studies (15 cr , elective)

Select 3 courses from the table below. Suggestions are given according to your area of interest.

Geomaterials	Geotechnical	Highway Engineering	Rock Engineering, Mining and Mineral Resource Engineering
	CIV-E1010 Building Materials Technology		
CIV-E2030 Experimental Methods in Building Materials	GEO-E2010 Advanced Soil Mechanics	GEO-E1030 Structural Design of Roads	GEO-E2030 Rock Mechanics
GEO-E3010 Economic Geology and Mineral Economics	GEO-E2080 Foundation Engineering and Ground Improvement	GEO-E3040 Geometric Design of Roads	GEO-E3010 Economic Geology and Mineral Economics
GEO-E2050 Bituminous Materials and Mixtures	GEO-E1050 Finite Element Method	GEO-E3030 Road Maintenance and Rehabilitation	GEO-E2040 Rock Construction
	GEO-E2090 Project course in Geoengineering		