

COURSE SYLLABUS

Engineering Geological Survey

2223-1-F7401Q050

Aims

Advanced knowledge of data collection and analysis methods for the physical and hydro-geomechanical characterization of soil and rock masses by surface and sub-surface site investigation.

Contents

Theory and techniques of engineering geological and geomechanical characterisation of soils and rock masses at surface and depth.

Detailed program

Lectures:

1. Engineering geological survey and site investigation: technical standards, investigation planning and project staging; general geological and methodological aspects.
2. Stereographic projection techniques: emispherical projections; plotting, geometrical and statistical analysis of orientation data; applications to engineering geology and rock mechanics.
3. Rock mass characterization: rock mass behaviours; strength and deformability of intact rock, discontinuities and rock masses; field discontinuity surveys using areal and scanline sampling; applications of remote survey techniques (e.g. TDP, TLS); measures of fracture orientation, density/intensity, persistence and strength; rock mass classification schemes (RMR, Q, GSI); hydro-mechanical properties of rock masses, Hoek-Brown approach; complex rock masses.

4. Engineering geological characterization of soils: criteria and tests for field identification and description, technical classification using laboratory or field data (USCS).
5. Geological and geotechnical site investigations: work planning; borehole drilling (techniques, equipment, procedures), drilling fluids, borehole support and stabilization, oriented boreholes; geotechnical sampling methods (source of disturbance, sampling techniques and tools); geological, geotechnical and geomechanical borehole logging.
6. In situ testing: applicability, advantages and limitations; SPT and dynamic penetration tests, cone penetration tests, field vane test, flat dilatometer and pressuremeter tests, pore pressure measurement.

Lab work:

Stereographic projections, engineering classification of soils, geological and geotechnical core logging, analysis of site investigation data.

Field work:

Rock mass characterization, geomechanical core logging, site investigation.

Prerequisites

Safety in the Field course

Teaching form

- Lectures, 28 hours (4 credits)
- Exercises, 12 hours (1 credit)
- Fieldwork, 10 hours (1 credit)

Textbook and teaching resource

Teacher's lecture notes and supplementary material

Semester

1st semester

Assessment method

Oral examination including a discussion of technical report assignments on laboratory and field work, theory (3 questions) and an exercise on the application of stereographic techniques.

Office hours

On appointment

Sustainable Development Goals

QUALITY EDUCATION | INDUSTRY, INNOVATION AND INFRASTRUCTURE
