UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Applied Geotechnical Engineering

2425-1-F7401Q055

Aims

The main goal of the course consists in giving specific knowledge to the engineering geology to deal with geotechnical engineering problem. The basic conceps acquire during the engineering geology course will be apply to boundary value problems of geotechnical engineering using simplified methods and more complex numerical methods.

Contents

The course intent to deal with geotechinical engineering problems applying the concepts of Engineering Geology

Detailed program

Introduction to the continuum mechanics for geomaterials

Theoretical references on the definition of tensor quantities, vector sums, Mohr plan

The geotechnical problem: how to describe it with a system of differential equations

- The principle of effective stress

- Equilibrium equations

- Compatibility equations

- The constitutive law

- The Bernoulli definition

- The Darcy law

- The continuity equation

Particular cases of the geotechnical problem and of the fluid soil interaction: soil above all, stillness, stationary regime, transitory regime.

Overview of a numerical solution of the geotechnical problem

Short-term and long-term analysis and related constitutive links and failure criteria.

Analysis of geotechnical works

Methods of calculating the soil pressures on retaining walls. Stability analysis of gravity and shelf support walls. Methods of verification of diaphram wall.

Limit analysis for geotechnical engineering. Calculation of the bearing capacity of shallow foundations subject to different loading conditions. Bearing capacity of deep foundations on piles and piling.

Analysis of translational slides (limit equilibrium methods). Stability analysis of slope with rotational mechanism. Stability of slopes and excavation fronts.

Notes to current codes

Introduction to numerical modeling methods for geotechnical problems. Methods of finite elements and discrete elements.

Numerical applications to geotechnical problems; in particular stability analysis of slopes, support works and excavations.

Prerequisites

Matematics, Physics, Engineering Geology

Teaching form

a) 11 two-hour lectures, in person, Delivered Didactics (tot. 22 hours)

b) 18 two-hour practical classes (tutorials), in person, Interactive Teaching (tot. 36 hours)

Textbook and teaching resource

Reference Book

Nova Roberto (2002) , Fondamenti di Meccanica delle Terre, Mc Graw Hill

Nova Roberto (2008). Meccanica delle Costruzioni Geotecniche. Città Studi, Milano

Craig's Soil Mechanics 8th Edition

and additional material supplied from the teacher

Semester

2?? Semester

Assessment method

1) Written test: PROBLEMS (questions that require the analysis of a complex phenomenon and its rationalization through the composition of several principles)

3) Oral exam: INTERVIEW ON THE TOPICS PERFORMED IN THE LESSON

Sufficiency is required in all 2 assessment methods

Office hours

Monday from 16.00 to 18.00

Sustainable Development Goals

AFFORDABLE AND CLEAN ENERGY | RESPONSIBLE CONSUMPTION AND PRODUCTION | CLIMATE ACTION | LIFE BELOW WATER | LIFE ON LAND