



COURSE: GEOTECHNICS

ACADEMIC YEAR: 2017-2018

TYPE OF EDUCATIONAL ACTIVITY: Characterizing Civil and Environmental Engineering

TEACHER: Caterina Di Maio

e-mail: caterina.dimaio@unibas.it

website: <http://www2.unibas.it/dimaio/home.html>

phone: +39 0971 205388

mobile (optional):

Language: ITALIAN (ENGLISH IF PREFERRED BY STUDENTS)

ECTS: 9

n. of hours: 90

Campus: Potenza

Semester: I

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

The course, which is the first one of the homonymous engineering area (GEOTECHNICS), deals with the basic elements of soil mechanical behavior, i.e. the mechanics of granular media.

The main objective of the course is to provide the theoretical tools necessary for the study of the processes of interaction between the works of Civil and Environmental Engineering and the soil on which they are founded or with which they are constructed (dikes, dams), and necessary for the study of the mechanical behaviour of natural or artificial slopes.

The main pursued goals and outcomes are:

Knowledge and understanding: the student must demonstrate knowledge and understanding of the basic elements of: soil mechanics; field and laboratory tests necessary for the physical-chemical characterization of the soils; physico-mathematical modeling of water flow and consolidation processes.

Ability to apply knowledge and understanding: The student must demonstrate ability in: applying the basic knowledge of geotechnical engineering concepts; designing field and laboratory surveys to analyze geotechnical problems; defining theoretical models of soil behaviour; identifying mathematical models able to describe the real processes; calculating the effects of stress variations on soil behavior; indicating the main design methodologies.

Autonomy of judgment: the student must be able to deepen his / her own knowledge as he / she learns, using the knowledge gained as a starting point for achieving increasing maturity and autonomy of judgment.

Communicative Skills: The student must have the ability to explain the geotechnical problems in a simple way, even to non-experienced people, using the correct scientific language.

Learning Skills: The student must be able to study continuously, through the consultation of texts and publications and the attendance of specialized seminars.

PRE-REQUIREMENTS

Students must have acquired and assimilated the basic knowledge provided by the courses of "Mechanics of continuous media" and "Hydraulics" or "Fluid mechanics", and in particular:

- Fundamentals of Continuum Mechanics, particularly stress and strain concepts, constitutive laws, the behaviour of elastic medium, plasticity, failure criteria.
- Fundamentals of hydraulics, equations of water flow through porous media

SYLLABUS

1. Structure, physical and chemical characteristics of soils and their classification (8 hours).
2. Stresses and strains in granular media, total stresses and effective stresses, distribution of effective stress in lithostatic conditions with hydrostatic groundwater (10 hours).
3. Equations of water flow in steady state conditions - stresses in soils interested by water flow - driving forces - subsidence and transport phenomena (20 hours).
4. Drained and undrained conditions induced by changes in stresses – Compressibility and Consolidation of soils - Tests for the determination of compressibility parameters - Calculation of deformation evolution over time (20 hours).
5. Failure Criteria - Active and Passive Limit Equilibrium condition - Experimental determination of the deformability and shear resistance: triaxial tests and direct shear tests (14 hours).
6. Site investigations - Piezometers and Inclinometers – CPT, SPT, etc. (10 hours).
7. Application to Engineering Problems (limit load and settlements of foundations, earth pressures on vertical retaining walls) (8 hours).

TEACHING METHODS

90 hours of: Theoretical lessons, Classroom tutorials, Laboratory tutorials, Project works, Technical visits



EVALUATION METHODS

Written examination or Oral examination, as preferred by the student. In both cases the exam consists of two theoretical questions and one exercise.

TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

Caterina Di Maio provides her own material (<http://www2.unibas.it/dimaio/materiale.html>).

and suggests the following textbooks

R. Lancellotta – Geotecnica – Zanichelli

T.W. Lambe & R.V. Whitman – Meccanica delle Terre – Flaccovio Editore

J. Atkinson – Meccanica delle Terre e delle Fondazioni – McGraw-Hill

INTERACTION WITH STUDENTS

At the beginning of the course, after the description of the course program, aims, and exams procedures, Caterina Di Maio indicates the teaching material (<http://www2.unibas.it/dimaio/materiale.html> website). She collects the list of the students who attend the course (name, surname, telephone number and email address).

The teacher generally receives students on Tuesday from 9 alle14 in her office (School of Engineering, Geotechnical laboratory) but also she can be contacted by e-mail (caterina.dimaio@unibas.it) anytime the students need her help.

EXAMINATION SESSIONS (FORECAST)¹

12/01/18, 02/02/18, 02/03/18, 06/04/18, 04/05/18, 08/06/18, 06/07/18, 20/7/18, 07/09/18, 05/10/18, 9/11/18, 07/12/18

SEMINARS BY EXTERNAL EXPERTS YES

FURTHER INFORMATION

¹Subject to possible changes: check the web site of the Teacher or the Department/School for updates.