Università degli Studi della Basilicata
Scuola di Ingegneria

COURSE: Applied Geology			
ACADEMIC YEAR: 2019/2020			
TYPE OF EDUCATIONAL ACTIVITY: Characterizing			
TEACHER: Francesco Sdao			
e-mail: francesco.sdao@unibas.it		website: https://sites.google.com/site/sdaofrancesco/	
phone: +39 0971 205092		mobile (optional): ----------	
Language: Italian			
ECTS: 6	n. of hours: 60 lessons : 40 hours practice: 20 hours	Campus: Potenza School: Engineering Program: Civil and Environmental Engineering	Semester: II

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

The course focuses on providing the students with the methodological and applicative aspects and the most important tools and methods of applied geology in order to: study the interference between the geological environment and the anthropic activity; design the civil engineering works (roads, dams, tunnels); use rocks as natural building materials; study the hydrogeological characters of the aquifers; study and the monitor the slope instability.

- Knowledge and Learning skills:

The student has to demonstrate to know adequately: the principal rock families with relative classifications, the rock tectonics (faults and creases), the main geological-technical properties of the rocks, the foundations of the geological-technical survey of rock masses, the hydrogeology and the techniques for studying and monitoring an aquifer, the tools and methods for studying and monitoring the landslide bodies, the basic aspects of the Applied Geology in the construction of civil engineering works, defining the interference between the geological environment and the realization of a civil engineering work.

- Ability to apply knowledge and understanding:

The student must demonstrate to be able to identify and analyze and interpret the main types of stone rocks and loose rocks, interpret the results of geological-technical excavations of rock clumps, analyze and interpret the hydrogeological characters and evaluate the water potential of an aquifer, the landsliding areas by using the main methods and tools of study and monitoring, analyzing and interpreting the thematic cartography. The student has also be able to apply the main geological study methods of the applied geology to major civil engineering works.

- Judgment autonomy:

The student has to be able to properly and independently deepen the knowledge gained in the geological-applicative field, being able, in particular, to assess the interference processes between the geological environment and the anthropic activity, applying the applied geology study methods and identifying the most effective methods and tools for solving geological-applicative problems. Such autonomy of judgment will also be achieved through exercising and laboratory activities

- Communicative skills:

The student has to be able to expose, in a simple and technically appropriate way, the results of his Applied Geology studies, presenting them both to the experts in the geological-applicative sector and to non-experienced people, using proper language and mastery of the arguments.

- Learning ability:

The student has to develop particular autonomous learning abilities through the use of innovative tools and methods (*specialized texts, international scientific publications, ect*) in the field of the Applied Geology, in order to be able to undertake and follow Postgraduate Specialization Courses (Master, Specialist Seminars), PhD programs, or to start an independent professional activity.

PRE-REQUIREMENTS

For efficient understanding of the main topics of Engineering Geology, it is necessary to have acquired and assimilated the basic knowledge provided by the Physics and Chemistry courses.

Università degli Studi della Basilicata
Scuola di Ingegneria

SYLLABUS

1. Introduction to Engineering Geology. The geological cycle of the rocks. Characterization, classification and recognition of the rocks. Igneous, metamorphic and sedimentary rocks. The tectonic deformations of rocks: the faults and folds. Processes and weathering products of the rocks. Geological - technical characteristics of the rocks: physical, hydrogeological and mechanical properties (compressive strength, tensile strenght, flexural strength, shear strength; laceration characteristics of the rocks, etc.). Elements of geological-technical survey of rock masses. Recognition and measurement of the main geological- technical parameters of structural discontinuities. Technical classifications of rocks (25 hours).
2. Introduction to the study of slope instability. Landslides: types, geomorphological features and characteristics of activities. Tools and methods for the study of the landslide area . Tools and methods for the monitoring of a landslide body (10 hours).
3. Elements of applied hydrogeology. The water in the soil. The main laws of underground hydrodynamics. Aquifers: hydrological and hydrodynamic characters. Fractured and porous aquifers. Investigations and hydrogeological tests. Sources: types and hydrogeological characteristics. Study methods of the flow rate hydrographs. The hydrogeological balance of the aquifers. Aquifers vulnerability: assessment methods and study cases (15 hours).
4. Geology applied to the great works of Buildings and Civil Engineering (Roads, Galleries and Dams): geological - technical problems in the different phases of design and study methods (10 hours).

TEACHING METHODS

The course includes 60 hours of lessons and exercises in classroom and in laboratory.

In particular, 40 hours of lessons and 20 hours of guided exercises in classroom and in laboratory are planned. At the end of the course a technical excursion is scheduled.

As regards the exercises and the laboratory activities, students are divided into groups (max 30 students per group). The students will have free access to the lab for further individual exercises.

EVALUATION METHODS

The aim of the exam test is to verify the level of attainment of previously mentioned training objectives.

The exam consists of a written test with some questions concerning all the topics dealt in the course.

One of the questions concerns the macroscopic recognition of a rock. If the latter is insufficient, it is necessary to repeat the test. The duration of the test is scheduled at least in 2,5 hours.

TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

1. PDF notes provided by the teacher during the lessons and available on the e learning site.
2. Textbooks:

- L. Scesi, M. Papini, P. Gattinoni (2001) – Geologia Applicata : il rilevamento geologico tecnico (volumi 1 e 2). Casa Ed Ambrosiana Milano
- M. Civita (2005) – Idrogeologia applicata e ambientale, HOEPLI ed

INTERACTION WITH STUDENTS

At the beginning, after illustrating the course program, the training objectives and the profit testing methods, the teacher provides students the didactic material of the lessons (pdf documents). Simultaneously, he collects a list of students who intend to register for the course, together with name, surname, registration number and e-mail. Timetable of reception: Wednesday from 10:00 to 12:00 and 15:00 – 17:00; Thursday from 8:30 to 10.30 in the professor office.

In addition to weekly reception, the professor is available at all times for a contact with the students by e-mail.

EXAMINATION SESSIONS (FORECAST)[1]

5 February 2020, 19 February 2020, 15 April 2020, 14 May 2020, 8 July 2020, 23 July 2020, 16 September 2020, 21 October 2020, 18 November 2020, 16 December 2020

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

Università degli Studi della Basilicata
Scuola di Ingegneria

SEMINARS BY EXTERNAL EXPERTS	YES X NO □
FURTHER INFORMATION	