
COURSE: Environmental Geology

ACADEMIC YEAR: 2018-2019

TYPE OF EDUCATIONAL ACTIVITY: Other

TEACHER: Prof. Mario Bentivenga

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Language: **English**

ECTS: 6 (n.4 lessons and
n. 2tutorials/practice)n. of hours: 56 (32 lessons
and 24 tutorials/practice)Campus: **Potenza**
Department of Science
Program: **Geosciences and**
Georesources (LM-74).Semester: I°
(date)
**01/10/2019, 20/12/
20/01/2020**

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

The Environmental Geology course aims to give students the necessary tools for an understanding of the main exogenous and endogenous processes regulating the evolution of the earth's surface. The interactions between Man and environment will particularly be emphasized. The laboratory exercises, during which the students will read topographic and geothematic maps, added to educational field excursions, will help the comprehension of the environmental dynamics acting in Basilicata and in the neighbouring regions. The main objective of the course is to provide to the students the basic knowledge on how to deal with environmental geological issues and how to provide the appropriate solutions.

The main knowledge provided will be:

- basic geological knowledge needed to deal with environmental problems;
- the knowledge of the tools that allow to quickly solve, in a more precise manner, environmental issues;
- at the end of the course the student must be able to plan the territory by means appropriate Environmental Geology techniques.

The main skills, ability to apply the learned knowledge, will be:

- to provide a detailed geological and geomorphological analysis of the territory;
- to identify all the environment problems of the study area;
- to figure out what might be the consequences of the realization of man-made works.
- to evaluate the analytical methods and practical applications, developed during the course, to independently sort out the geological and environmental problems that affecting the territory;
- to develop communication and social skills in a professional environment, with interlocutors more or less specialists, through exercises conducted on practical cases, during which there is the opportunity for dialogue among students, as a working group, relatively the solutions developed.

Knowledge and understanding:

The student must demonstrate the knowledge and ability to understand the issues concerning the geology, geomorphology and environmental consequences due to the realization of man-made works. The student must be able to organize and processes the data from the statistical point of view using appropriate software;

Skill to apply knowledge and understanding:

The student must demonstrate the ability to identify and take appropriate recovery Pollution techniques;

Independently judgment skills:

The student must be able to autonomously assess the geological and environmental issues in order to identify the main relevant methodologies in order to solve it. After following the course, students should be able to formulate considerations on analytical methods and practical applications, learned during the course, to deal independently problems encountered.

Communication skills:

The student must have the ability to compile, in a simple way even understandable for a non-specialist audience, a correctly written report using the most appropriate technical language. In the case of exercises on real cases, an exchange of ideas among students as working group is expected, at the aim to provide the best solutions. The final goal is to promote professional communication and interpersonal skills with more or less specialist partners.

Learning capacity:

- *The student must be able to update his knowledge, through the consultation of literature, text books and technical manuals, related to professional geologist and related matters.*

PRE-REQUIREMENTS*Students should know:*

- mathematics;
 - chemistry;
 - geochemistry;
 - physics;
 - geomorphology.
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SYLLABUS**Man and environment, legislative aspects, development of slopes, natural hazards and not:***The Environmental Geology course will address issues concerning the interaction between man and environment. In particular, it will be examined*

the effects of mankind on the environment, the need of an efficient territorial planning, and the European, national and regional laws ruling environmental matters.. Much attention will be paid to the dynamics of the slopes, rivers and coastlines. Numerous examples concerning the gravitational evolution of the slopes, the issues related to excavation works in the riverbeds and the restoring the beaches subject to heavy erosion will be taken into account. As concerning the natural hazards, seismicity, volcanic risk, floods and landslides will be study in detail. In particular, the causes leading to these criticalities (1 ECTS of lectures) will be studied.

Exploitation of natural resources, construction of major infrastructure projects:

The Environmental Geology course includes the study of the quarries with particular emphasis to the environmental and economical aspect. Definitions, classifications, and details about the different methodologies used for their cultivation will be provided. Several cases of quarry exploitation concerning quarries in rocks, loose rocks, etc. will be shown. In addition, the methods and techniques used for environmental restoration of quarries located in various situations (hills, mountains, plains, etc.), the recovery of waste deposits from mining activities and the restoration of the mining area will be described. Examples of quarries utilizing different methods of extraction and cases about the recovery of abandoned quarries will be illustrated. Among the works that may generate great impact on the environment dams, tunnels and roads will be described to point out the environmental problems arising (1 ECTS of lectures).

surface and ground water, sources of pollution and landfills:

The course intends to tackle the problem of both surface and underground water pollution. During the course geo-environmental issues regarding oil wells drilling and the first treatment in the oil treatment facilities will be examined. Problems concerning landfill typologies, the geological conditions of the landfill sites, and the associated environmental problems will be examined. Examples of major public works and their impact on the environment will be described (1 ECTS of lectures).

Environmental Impact Assessment (EIA) and Strategic Environmental Assessment (SEA):

During the course, the Environmental Impact Assessment (EIA) and the Strategic Environmental Assessment (SEA) will be discussed. EIA is designed for resource management, to deal with pollution and natural risks, imposing the choices made on the territory (urban, industrial, agricultural, etc.) as an environmental policy instrument. SEA is a procedure which aims integrating environmental considerations into the plans and programs and precedes the EIA. (1 ECTS of lectures).

Cartography and educational excursions:

The course include the reading and the realization of thematic maps by means of aerial photographs, relating to flights carried out in different years, remote sensing images and field survey. The field trips will be carried out in areas affected by environmental problems or potentially vulnerable (2 ECTS of exercises).

TEACHING METHODS

The course includes 56 hours of classroom teaching with lessons and exercises divided in: 32 hours of frontal lesson and 24 hours of exercises.

The course is organized as follows:

- lectures about different subjects of the course (32 hours);
- guided numerical exercises (24 hours);

individual exercise, assigned to each student, on a geological practical consequence,, accompanied by literature search, numerical processing and a written report, shared and discussed with the student working groups (to be carried out during the hours of individual study of student, with review by the teacher during the hours of reception).

EVALUATION METHODS

The aim of the examination is to test the level of achievement of the previously mentioned educational goals. The exam is divided into 2 parts, a written and an oral exam that may also take place on the same day.

The student passes the exam if achieves a mark of not less than 18/30.

TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

Notes provided by the teacher during the course.

Text / reference:

Edward A. Keller (1992) Environmental Geology, Macmillan Publishing Company

B. Martinis (2000) Geologia ambientale. UTET. ISBN 88-02-04177-6

Fred G. Bell (2004) Geologia ambientale teoria e pratica. ISBN 88-08-09185-6

A. Vallario - Frane e Territorio - Ed. Liguori

M. Civita (2009) Idrogeologia applicata e ambientale. Casa Editrice Ambrosiana. ISBN 88-408-1297-0

further information

P. Canuti, U. Crescenti & V. Francani (2012) Geologia Applicata all'Ambiente. Casa Editrice Ambrosiana. ISBN 978-88-408-1402-5

G. Gisotti & F. Zarlenga (2004) Geologia ambientale: principi e metodi. Dario Flaccovio Editore. ISBN 88-7758-507-2

G. Gisotti (2008) Le cave: recupero e pianificazione ambientale. Dario Flaccovio Editore. ISBN 978-88-7758-679-7

P. Cagnoli (2010) VAS - Valutazione Ambientale Strategica. Fondamenti teorici e tecniche operative. Dario Flaccovio Editore. ISBN 978-88-579-0046-9

- Specific topics can be found on textbooks suggested by the teacher, from time to time, during the course.

INTERACTION WITH STUDENTS

After describing the objectives, the program and the methods of verification, the teacher during the course will provide to the students the educational material.

Office hours: from Monday to Friday 9:30 to 13:30 in the teacher office.

In addition to the weekly reception hours, the teacher is anytime available through his e-mail or phone. E-mail: mario.bentivenga@unibas.it, phone: 0971205834, mobile: 3204370976.

EXAMINATION SESSIONS (FORECAST)¹

I Session: 11.02.2020, 10.03.2020 II Session: 14.04.2020, 12.05.2020, 16.06.2020, 21.07.2020 III Session: 22.09.2020, 20.10.2020, 24.11.2020, 15.12.2020

SEMINARS BY EXTERNAL EXPERTS YES X NO

FURTHER INFORMATION

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