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COURSE: Engineering Geology I

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TEACHER: Francesco Sdao

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e-mail: francesco.sdao@unibas.it

website:

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Language: Italian

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ECTS:

n. of hours:

Academic year:

Campus:

Semester:

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#### TOPICS

Aims of Engineering Geology, 2. Tools and methods of Engineering Geology for the reconstruction of the conceptual geological engineering model of the underground; 3. The rocks: characteristics, classification and recognition methods; 4. the tectonics of the rocks. 5. Processes of rock weathering; 6. Tools and methods of the geological engineering survey for the study of the rock masses; 7. Tools and methods for the study and the monitoring of the landslide prone area; 8. Hydrogeology and study of aquifers; 9. Engineering Geology for the study of the great works of engineering (tunnels and dams): geological and technical issues in the different project phases.

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#### TEACHING METHODS (please tick one or more options)

Theoretical lessons

Tutorials in classroom

Tutorials in laboratory

Project works

Technical visits

Other activities (please specify) \_\_\_\_\_

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#### TEXTBOOKS

1. Lectures notes by the teacher

2. L. Scesi, M. Papini, P. Gattinoni ( 2001) – Geologia Applicata : il rilevamento geologico tecnico (vol. 1). Casa Ed Ambrosiana Milano

3. M. Civita (2005) – Idrogeologia applicata e ambientale

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#### ON-LINE EDUCATIONAL MATERIAL

web address: <https://sites.google.com/site/sdaofrancesco/home>

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#### LEARNING OUTCOMES

Acquisition of the basic knowledge of the engineering geology for the purposes of : the design and planning of main civil engineering works (dams, tunnels, roads, etc.); the study and monitoring of the slope instability; hydro-geological and hydrodynamic study of an aquifer, assessment of its groundwater balance and vulnerability to pollution.

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#### REQUIREMENTS

no

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#### EVALUATION METHODS (please tick one or more options)

Intermediate verifications

Written examination

Discussion of a project work

Practical test

Oral examination

Other methods (please specify) \_\_\_\_\_

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#### DETAILED CONTENT

Introduction to Engineering Geology. Tools and methods for the reconstruction of geological engineering conceptual model of the underground. The geological cycle of the rocks. Characterization, classification and identification of the main types of the rocks. The igneous, metamorphic and sedimentary rocks. The tectonic deformations of the rocks: faults and folds. Processes and products of weathering of the rocks. The karstic morphology. Elements of geological engineering survey of the rock masses. Identification and measurement of the main geological-technical parameters of the structural discontinuities. Geomechanical classifications of rock masses. The classification of Bieniawsky. The physical, hydrological and mechanical properties of the rocks; Introduction to the study of the instability of the

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slopes. Landslides: types, geomorphological features and activities. Methods and tools for the study of landslides prone area. Tools and method for monitoring a landslide body. Methods for hazard assessment and spatial risk of landslide. Elements of applied hydrogeology. The water in the soil. Hydrogeological characteristics of the rocks (porosity, permeability, etc.). The main laws of the hydrogeology. Hydrogeology and hydrodynamics features of the aquifers. Hydrogeological characteristics of the porous and fractured aquifers. In situ hydrogeological investigations and tests. The water springs: types and hydrogeological characteristics. Methods of the study of the flow hydrograph. The hydrogeological balance of the aquifers. Vulnerability to pollution of the aquifers: evaluation methods and case studies. Great works of engineering (tunnels, dams, roads): engineering geological problems in various stages of planning and study methods.

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SEMINARS BY EXTERNAL EXPERTS    YES X    NO

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FURTHER INFORMATION

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