UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Principles of Earth Sciences

2627-1-E3202Q012

Aims

The course aims to provide Environmental Science and Technology students, who are approaching geological topics for the first time, with:

- knowledge and understanding of the basic principles of the discipline as they relate to the Earth's lithosphere and hydrosphere;
- the ability to apply this knowledge and understanding to recognize and classify major geological phenomena; to express complex scientific concepts simply, with proper language and conceptual relevance; and through direct learning, through the use of practical workshops on cartographic and petrographic aspects. Specifically, the cartography workshop will equip students with the ability to read and use topographic maps and teach the construction of some basic cartographic elements; the Petrography workshop will provide students with the ability to distinguish between minerals and rocks, and to recognize and classify the main types of igneous, sedimentary, and metamorphic rocks, connecting them to their formation processes.

By the end of the course, students should have acquired

- independent judgment that allows them to recognize and interpret the main geological phenomena related to endogenous and exogenous phenomena;
- communication skills that allow them to appropriately describe the topics studied using the appropriate specific vocabulary;
- learning skills that allow them to consult the literature on the topics covered and independently integrate the acquired knowledge with knowledge from other environmental science disciplines.

Contents

The course presents Geology in the broadest sense of the term, as a Science that studies the planet Earth with

reference to its composition, its structure and configuration, its surface and the processes that operate on it. The course identifies the main geological aspects present in the lithosphere and hydrosphere.

LESSONS

Earth's shape, mass and size. - Earth's Interior - Elements of tectonic and main types of dislocations - Earthquakes and volcanoes - Stratigraphic and chronological units -Major structural units of the Earth’s surface -Elements of Italian geology - Using the compass and introduction to the geological maps - exercise on the reconstruction of geological sections - Continental hydrosphere - - The water cycle and water balance - Physical and hydraulic characteristics of rivers and lakes - Basic elements of aquifers, groundwater and drinking water

LABORATORY OF CARTOGRAPHY

LABORATORY OF MINERALS AND ROCKS

Detailed program

Earth's shape and size – Mass and density - Earth's Interior. - Earthquakes and volcanoes. - Inner core, outer core, mantle and crust (continental and oceanic). Stratigraphic units. Relative and absolute ages. Fundamentals of plate tectonic and basic types of plate boundaries and motion. Folds, faults. Major structural units of the Earth’s surface: oceanic basins, divergent and convergent boundaries, oceanic ridges, continental fracture systems, folding zones. - Elements of Italian geology -Use of the compass and basic elements for reading geological maps - exercise on the reconstruction of geological sections - Continental hydrosphere. Hydrological cycle and water balance. Rivers, fluxes in river beds and basins. Lakes: origin, physical, hydrological, hydrodynamic characteristics. Basic elements of aquifers and groundwater: structure, hydraulic levels, porosity and hydraulic conductivity, velocity - Characteristics of drinking water.

LABORATORY OF CARTOGRAPHY
Fundamentals of cartography (datum systems, map projections, Italian cartography) and map elements (Coordinates of given points on a map in different systems, topographic profile construction, gradient calculation, identification of drainage basins).

LABORATORY OF MINERALS AND ROCKS
Minerals: structure, formation, classification and properties. Rocks: the rock cycle, rock-forming environment and types of rocks (igneous, sedimentary and metamorphic rocks). Methods for the identification and classification of rock samples.

Prerequisites

None.

Teaching form

Teaching is divided into the following teaching modules:

- 32 lessons, 2-hour lessons that alternate delivered didactics and interactive teaching (8 cfu)

- Cartography laboratory - 6 meetings of 2/4 hours (2 cfu) in interactive teaching
- Petrography laboratory - 6 meetings of 2/4 hours (2 cfu) in interactive teaching

Interactive teaching is developed using Moodle tools such as quizzes, forums, wooclap, kahoot, shared whiteboards.

Textbook and teaching resource

Text - CAPIRE LA TERRA Terza edizione italiana condotta sulla settima edizione americana, Grotzinger J., Jordan T.H., Zanichelli, 2016.

Teacher resources, available at the link https://elearning.unimib.it/course/view.php?id=36394:

- slides presented in the classroom
- in-depth video material
- work and worksheets for the laboratories
- self-paced training quiz

Semester

First semester

Assessment method

The exam allows to evaluate the preparation reached in terms of theoretical and practical knowledge of the topics covered during the lessons and the laboratories.

The skills provided during the lectures are evaluated in a written exam, with open questions (which weigh 60% of the written) and closed (which account for the remaining 40%) concerning the main topics covered in class. The laboratories, on the other hand, envisage a final practical test of cartography and rock recognition.

The vote is expressed in thirtieths, as weighted average of the writing and of the two laboratory tests.

At the student's request it is possible to take an additional oral exam if the minimum grade of 18/30 is reached in the written exam.

Office hours

By appointment via email

Sustainable Development Goals

QUALITY EDUCATION