UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Principles of Earth Sciences

2021-1-E3201Q110

Aims

The goal of this course is to provide the environmental sciences' students with an overview about the basic concepts of geology. This course introduces to geology and Earth system sciences providing knowledge on Earth's composition, structure and configuration, Earth's surface processes and landforms. The course identifies the main geological features present in the lithosphere and hydrosphere.

The course aims to characterize to define the major structural zones of the earth's crust, and then move on continental hydrosphere, declining water cycle in all its main components, with a hint to the atmosphere.

The laboratory of cartography intends to provide students with the ability to interpret topographic maps and calculate some fundamental map elements.

The laboratory of minerals and rocks provides students with competences in the identification of different mineral and rock samples, classification of igneous, sedimentary and metamorphic rocks and related rock-forming processes.

Contents

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 - Soils and their characteristics - The water cycle and water balance - Physical and hydraulic characteristics of rivers and lakes - Basic elements of aquifers and groundwater.

The course also a **LABORATORY OF CARTOGRAPHY** and a **LABORATORY OF MINERALS AND ROCKS** are going to be developed.

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

Atmosphere, climate classification and air fronts.

Soil features and properties. Main soil types -.

Continental hydrosphere. Hydrological cycle and water balance. Rivers, fluxes in river beds and basins. Lakes: origin, physical, hydrological, hydrodynamic characteristics.

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.

FIELD ACTIVITY

Knowledge and use of geo-positioning and localization equipment; instruments for measuring aquifer and soil characteristics.

Prerequisites

None.

Teaching form

Teaching is divided into the following teaching modules:

- Lessons, 6.5 credits
- Cartography experiences, 2 credits
- Petrographic experiences, 3 credits
- Field activity, 0.5 credit

The lectures will be online following the normal teaching hours of the lessons. In addition, the lectures will be recorded.

The laboratory, with active teaching methods, will be in the classroom and online

Cartography experiences will be 1/5 in the classroom and 4/5 online.

Petrographic experiences will be 2/3 in the classroom and 1/3 online.

Field activity will be in January with small groups.

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 - Slides in the classroom

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 70% of the written) and closed (which account for the remaining 30%) 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