UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Introduction To Geology

2021-1-E3401Q039-E3401Q032M

Aims

The purpose of the “Introduction to Geology” class is to give a general understanding of the main tectonic processes that control Earth's evolution, with special emphasis on rock deformations, the genesis and meaning of the main tectonic structures, on earthquakes and their effects. Principles of stratigraphy including the definition of stratigraphic units, geological chronology and an introduction to geological maps complete this general introduction to the basic concepts of Geology.

During the practical activities (Cartography Lab), students acquire the basic skills and the ability to read and use topographic maps.

Contents

FRONTAL LECTURES (4 CFU) – Plate tectonics, plates and their margins, historical origins, geological evidence of continental drift, structure of oceanic basins, convection and its origin. Earth paleomagnetism and its role in the formulation of the theory of Plate Tectonics. Stratigraphy, general principles, relative and absolute chronology; introduction to geological maps. Brittle (faults and joints) and ductile deformations (folds). Earthquakes, tsunamis and Italian seismicity.

CARTOGRAPHY LABS (2 CFU) - Reading topographic maps and basic exercises (building topographic profiles, defining hydrographic basins, tracing geologic boundaries on a topographic map).

Detailed program

Plate tectonics. Compositional and rheological structure of the Earth. Plate margins, their features and evolution. Paleomagnetism and the structure of the ocean floor. The orogenic process, collisional orogenic (Alps and Himalayas) and non-collisional belts (Andes). Evolution and structure of the continents.

Brittle and ductile deformation and related structures generali principles and examples. Joints, faults and their regional associations. Folds and their classification. Earthquakes and seismic waves, Prediction and prevention of earthquakes, seimic hazard and risk in the World and in Italy.

Relative and absolute chronology. General principles of stratigraphy, stratigraphic units and stratigraphic discontinuities. Introduction to the general principles of radiometric dating. General principles of geological mapping and reading of geological maps.

Elements of cartography: cartographic projections, U.T.M. system; Official Italian Cartography (IGMI). Regional Technical Cartography. Positioning methods; map symbols. Building topographic profiles, defining hydrographic basins, tracing geologic boundaries on a topographic map. Graphic rendering of stratimetric exercises.

Prerequisites

None

Teaching form

The "*Introduction to Geology*" class consists of a combined learning approach based on *Lectures* (28 hours in total), *Practical Activity* (Rock Lab, 24 hours in total) and a field trip of 1 day. Lectures usually run between mid-November and December, whereas the practical activity lasts the entire first semester (from October to January). Attendance at the lectures is not mandatory, but recommended. Attendance at the Rock Lab is required for 75% of total (students have to sign in).

Additional educational material is available on the e-learning platform: 1) a multiple-choice test in order to self-evaluate the exam preparation; 2) a concept map in order to understand how develop a long essay question on a broad subject; 3) examination tests.

During Covid-19 emergency part of the lectures will be given in the presence of the lecturer at the University institute, whereas the rest of the course will be video-recorded.

Any doubts on lectures and practical activity, as well as on available e-material, can be clarified during the tutoring.

Textbook and teaching resource

All teaching material is available on the e-learning platform (http://elearning.unimib.it/)

F. Press, R. Siever, Capire la Terra, Zanichelli, 2007.

J.P. Grotzinger, T.H. Jordan, Capire la Terra, Zanichelli, 2016

P. Casati, Scienze della Terra, Volume 1, Elementi di Geologia Generale, Ed. Città Studi, Milano, 1996

Semester

First semester (October-January)

Assessment method

Seven exam sessions of the *Principles of Geology* course are scheduled at the beginning of the Academic Year. Students are evaluated on three tests in this course. Each test has an evaluation in thirtieths. A positive assessment of each test is required to sit for the next one. The three tests have to take as follows:

1. **Cartography Test** (2 CFU) - written examination, related to the module of "Introduction to Geology". The student will have to: draw a topographic profile, a drainage basin and the intersection of a geological surface with the topography; calculate the coordinates of a point on the map, draw a geological section (from a simplified geological map) and answer 9 questions about cartography. This examination will take place approximately one week before the oral examination on Rock Recognition and of the written examination related to the Theoretical Part. The dates will be communicated from the professor to all students by e-mail. A rating ? 18/30 is valid for all subsequent dates of examination.

2. **Rock Lab Test** (2 CFU) – oral examination about the Practical Activity of "*Introduction to Petrography*". Students have to identify the main rock-forming minerals, to describe with correct terminology rock textures and structures, and to classify two rocks among those analyzed. This oral examination has to be taken on the same day of the Final Test. If students do not pass the Final Test, a grade ? 25/30 in Rock Lab test shall be considered valid only for the next exam session.

3. **Final Test** (4 + 4 CFU) – written examination about both classes of "*Introduction to Geology*" and "*Introduction to Petrography*". This test consists of five questions: two long and three short essay questions. The long essay questions require that students are able to neatly and clearly describe with correct terminology the key-concepts relevant to the topic, as well as all related minor issues. The short essay questions require a clear and concise response focused on the subjects.

The final grade of the *Principles of Geology* exam is calculated on the weighted average of the three tests.

No Mid-semester examinations are expected.

Office hours

On Mondays between 14.30 and 16.30. Otherwise, please contact the teacher (andrea.zanchi@unimib.it) by the student e-mail address (.....@campus.unimib.it).