UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Geologia Strutturale

2425-2-E3401Q055

Aims

Giving the basis for the recognition, classification and description of the geological structures, by lectures, practical classes with geological maps, and field activities.

Contents

It includes the course of “Structural geology” of Prof. A. Tibaldi, the course of “Geologic cartography” of Prof. F. Bonali and S. Mittempergher, and two days of field training.

Structural geology: Stress and strain. The principal types of deformations: reverse, transcurrent and normal faults, folds, foliations and scistosity, fractures and tectonic joints. Elements of structural geology applied to neotectonics.

Geologic cartography: how to read a geological map and prepare geological-structural cross sections.

Field activities: recognition, measurement and mapping of basic geological structures such as faults, folds and joints.

Detailed program

Course of Structural geology:
Stress and strain.
Simple shear and pure shear.
Fundamental equations and relations in different conditions of pressure, temperature and time.
The scale of deformations.

The principal types of deformations: faults, characteristics, types, classification based on their dip and kinematics, methods and limits of reconstructing fault kinematics, problems and limits for the calculus of fault offset, faults with and without morphological features, possible causes and interactions between endogenous dynamics and exogenous modelling.
Possible associations of reverse, transcurrent and normal faults.
Folds: nomenclature, scale, amplitude, wavelength, persistence, coherence and interference, styles in relation with rock rheology, origin of stresses, and crustal environment.
Foliations and scistosity.
Fractures and tectonic joints, types, characteristics, causes and environment of formation.
The main structures linked with magmatic stress and methods for distinguishing them from the tectonic deformations s.s.
Geology of earthquakes. Main methods for the application of structural geology as a contribution for the assessment of seismic hazard. examples of areas in Italy under seismic threat.

Cartography:
Exercises on geological maps containing faults and folds, aimed at learning the methods for the reasoned reading of maps and for the drafting of geological-structural sections on a scale from 1.25,000 to 1:50,000.

Field activity:
Two days dedicated to the field description of brittle and ductile geological structures, their recognition and classification, measurement and transposition on a topographic map.

Prerequisites

Base knowledge of geology. Course on security on the field.

Teaching form

Structural geology: 24 two-hour lectures, in person, Delivered Didactics;

Cartography: 12 three-hour practical classes, in person, Interactive Teaching;

Two daily excursions: 2 six-hours field activities, in person, Interactive Teaching.

The three courses are given in Italian language.

Textbook and teaching resource

Tibaldi Alessandro, 2015. Fondamenti di Geologia Strutturale. Lulu Press, Raleigh, USA, 231 pp (available on: www.Lulu.com).
George H. Davis and Stephen J. Reynolds, 1996. Structural Geology of Rocks and Regions, Editor John Wiley & Sons Inc, 776 pp.

Semester

Second semester

Assessment method

Structural Geology: written exam on 4 open questions related to the delivered didactics and grade out of thirty. There are no ongoing tests.

Cartography: the exam focuses on the development of 2 geological-structural sections and their evaluation out of thirty.

Field activities: the learning path in the two days will be evaluated with a grade of -1, 0, +1.

The final grade is a weighted average between the grade obtained in Structural Geology (6/10), in Cartography (3/10), and the score obtained in the field activities (1/10).

Office hours

By appointment fixed by email.

Sustainable Development Goals