UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Active Tectonics and Volcanotectonics

2627-1-F7402Q034

Aims

Explaining methods of geological-structural analysis for the recognition of recent and active tectonic deformations, and for the analysis of the structures in volcanic areas.

Dublin Descriptors:

Knowledge and understanding
With this teaching, the student will complete and strengthen the preparation and understanding acquired during the first cycle of studies. He/she will acquire in-depth knowledge in the field of tectonic and volcano-tectonic processes, which will allow him/her to understand and interpret complex geological processes of endogenous type at small and large scale, with particular reference to the geodynamics of seismically and volcanologically active areas.
This knowledge is acquired through attendance at lectures.

Ability to apply knowledge and understanding
Thanks to the knowledge acquired, the student will be able to analyze in detail the past volcanic evolution and the active tectonic and volcano-tectonic processes; independently carry out geological-structural survey activities in volcanic and non-volcanic areas with active tectonics, also using modern techniques for collecting ground data, organizing and representing the data acquired using cutting-edge computer systems for modeling geological processes; integrate field and laboratory observations with theoretical knowledge relating to the functioning of volcanotectonic and tectonic systems, so as to identify critical situations and propose possible solutions; independently resolve geological-structural problems essential for the assessment of volcanic and seismic hazard and risk.

Autonomy of judgment
The student will acquire the ability to characterize and evaluate the reliability of the information collected, the level of uncertainty in the data and measurements, and the complexity of the models available for solving problems. This ability will therefore allow them to independently evaluate the problems related to active tectonic and volcanotectonic contexts, and to formulate solutions even on the basis of limited or incomplete information.

Communication skills
Through some examples and classroom discussions, the student will acquire awareness of the extreme importance of the ability to communicate in a concise and effective way their assessments and proposed solutions to both a specialist and non-specialist audience. This last aspect is fundamental for the issues of communication of volcanic and seismic hazard, for the consequent management of the related risks.
Furthermore, since the course is in English, the student will have acquired the ability to communicate the results of their research and assessments to foreign interlocutors, and will have mastered the technical terms in English.

Learning ability
The student will acquire the ability to independently learn new concepts and new theories by drawing on both Italian and foreign literature in English. This ability is developed through independent research to delve deeper into the topics studied.

Contents

The contents comprehend the preparation of students in order to: 1) carry out geological-structural analyses applied to the recognition of recent and active tectonic deformations; 2) analyse the structures in volcanic areas to distinguish those caused by magmatic forces and other volcanotectonic processes, and the influence of regional tectonics on the development of volcanic systems.

Detailed program

Active tectonics: geology of earthquakes;
geologically active and seismogenetic structures; geological-structural and morphostructural analyses for recognizing active faults and folds;
measure of the offset along active faults;
dislocation rate;
relationships between surface rupture length, magnitude, dislocation;
influence of the topography on the dislocations;
measures of stress orientation;
palaeoseismologic techniques;
evaluation of geological hazard; examples of study.
Volcanotectonics: deformations of volcanic areas;
calderas; lateral collapses;
tectonic stress and volcano morphometry;
rheology of lava flows and pyroclastic deposits and correlated structures;
volcanism in areas of transcurrent, normal, and reverse faulting;
subvolcanic bodies;
contribution for the evaluation of the geological hazard; examples of study.

Prerequisites

Base knowledge of geology, structural geology and geomorphology.

Teaching form

21 two-hour lectures, in person, Delivered Didactics

Textbook and teaching resource

Tibaldi A., and F. Pasquarè-Mariotto, 2015. Structural Geology of Active Tectonic Areas and Volcanic Regions. Lulu Press, 211 pages (available at: www.Lulu.com).

Semester

First semester

Assessment method

Written exam based on three open questions. On going tests are not present.
Evaluation of the student's level of learning based on the completeness and correctness of the answers, and grade expressed in out of thirty.

Office hours

By appointment fixed by email.

Sustainable Development Goals