UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Applied Seismology

2526-1-F7402Q018

Aims

The aim of the course is to provide students with the basic concepts of seismology and applied seismology, necessary for interpreting seismic hazard models and for producing analyses required for land-use planning (seismic microzonation maps).

Contents

- Evaluate the parameters that quantify the size of an earthquake and the ground shaking with an applied perspective
- Empirical techniques for the estimation of ground shaking and local site response oriented to engineering design
- Concept of probabilistic and deterministic seismic hazard
- Basics of the Italian building code (sections of interest for geologists)
- Earthquake induced hazards: landslides, liquefaction and surface faulting
- Basics of seismic microzonation, a tool for urban and land planning in a seismic prone area
- Realization of a first level microzonation study

Detailed program

Basics of earthquake characterization: size of an earthquake, fault characterization and seismic waves; seismic catalogues (historical and instrumental)

Ground motion intensity measures and ground motion prediction equations: parameters that quantify the ground shaking (peak, integral and frequency dependent)

Site effects: basic theory on site amplification and numerical and empirical techniques to quantify site amplification; acquisition of seismic noise in the field

Ground motion prediction: empirical ground motion models (derivation and applications) and realization of an earthquake scenario

Earthquake induced hazards (landslides, liquefaction and surface faulting): basic concepts and empirical techniques to qunatify earthquake induced hazards

Fundamentals of deterministic and probabilistic seismic hazard: basic concepts on probablistic seismic hazard (Gutemberg-Richter equation, Poisson assumptions and interpretation of a hazard curve

The Italian seismic hazard map (MPS04) and introduction to the Italian seismic code (sections of interest to geologists): interpretation of MPS04 to characterize the seismic hazard of a site and derivation of design spectra

Seismic microzonation: principles of seismic microzonation and realization of a first level seismic hazard map

Prerequisites

None

Teaching form

Interactive teaching (48 hours)

Textbook and teaching resource

Lecture slides

Recommended textbooks:
Faccioli E, Paolucci R, (2005) Elementi di sismologia applicata all'ingegneria, Pitagora Editrice Bologna (ISBN: 8837115008)
Lanzo G., Silvestri E. (1999) Risposta Sismica Locale. Hevelius Edizioni ISBN 978-88-86977-91-3

Free pdf
F. Bramerini, G. Di Pasquale, G. Naso, M. Severino (2008) Indirizzi e criteri per la microzonazione sismica (Parte I, II, III), Dipartimento della Protezione Civile

Semester

Second semester (March 2026 - May 2026)

Assessment method

Oral exam
DISCUSSION AND EVALUATION OF THE REPORT OF THE LAB PRACTICALS
DISCUSSION ON THE TOPICS OF THE LECTURES.

Office hours

By appointment Thursday 9:30 -11:30 (at INGV department via Corti 12, Milano)

Sustainable Development Goals

QUALITY EDUCATION | INDUSTRY, INNOVATION AND INFRASTRUCTURE | SUSTAINABLE CITIES AND COMMUNITIES