



UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Applied Seismology

2425-1-F7401Q107

Aims

The goal of the course is to teach students intermediate-level knowledge in applied seismology, focusing on the evaluation of seismic risk and its implications for land use planning.

Contents

- a) Basic concepts of seismology
- b) Description of the seismic source
- c) Principles of ground motion attenuation
- d) Parameters indicating ground shaking: peak and duration parameters of ground motion, response spectrum, and Fourier spectrum
- e) Empirical equations for predicting ground motion
- f) Local seismic response
- g) Seismic hazard
- h) Introduction to the Italian Seismic Code (section relevant to the profession of a geologist)

Detailed program

1. **Basic concepts of seismology:** causes of earthquakes; seismic waves; earthquake location; magnitude calculation; instrumental seismic catalogs; monitoring networks; description of seismological instruments.
2. **Concept of the seismic source:** point source and extended source; concept of seismic moment; introduction to the Fourier transform; Brune's source spectrum.
3. **Attenuation of seismic waves:** geometric attenuation, anelastic attenuation.
4. **Parameters indicating ground shaking:** peak and duration parameters, response spectrum, predictive

laws of ground motion.

5. **Seismic hazard:** the macroseismic catalog, magnitude-frequency law, completeness of catalogs, concept of deterministic and probabilistic seismic hazard, National Seismic Hazard Map.
6. **Introduction to Technical Standards for Construction (NTC2018):** design spectra, and selection of spectrum-compatible accelerograms.

Prerequisites

None

Teaching form

12 two-hour lectures, in person, Delivered Didactics

17 two-hour lab activities, in person, Interactive Teaching

Scientific paper reading and 2 hour discussion in person, Interactive Teaching

Textbook and teaching resource

slides, video

Recommended textbook: Faccioli E, Paolucci R, (2005) Elementi di sismologia applicata all'ingegneria, Pitagora Editrice Bologna (ISBN: 8837115008)

Semester

First semester (November 2024-January 2025)

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

Sustainable Development Goals

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