ROSE School | in Earthquake Engineering

Seismic Hazard and Engineering Seismology

Lecturer: **V. Poggi**
Date: 02/03/2026 – 27/03/2026
Credits: 6 ECTS (CFU)

Course Description

The course aims to provide students with the essential knowledge and skills required to address the most common problems in engineering seismology and applied geophysics. The course is structured into two main blocks. The first module focuses on topics of engineering interest, such as intensity measures, ground motion prediction equations, earthquake occurrence analysis, seismotectonics, and deterministic and probabilistic seismic hazard assessment. The second module introduces fundamental concepts of theoretical seismology, with particular emphasis on wave propagation and seismic source representation.

Practicum

The course is complemented by in-class laboratory activities, selected readings, and homework assignments. Laboratory work is an integral part of the course and is aimed at developing practical skills through computerbased exercises. Part of the laboratory activity contributes directly to the development of the personal project.

Prerequisites

Advanced calculus and linear algebra are useful, although not strictly required for the course. The course lab will make use of Python language for some exercises, therefore some familiarity with computer programming is recommended.

Qualification

The course assessment consists of both a practical project and a written exam.
The practical part consists of the discussion of a personal project developed during the laboratory hours. Students are expected to present their work to the class and the examiner through a short slide presentation (10 minutes plus questions).
The written exam consists of a test with multiple questions freely drawn from the course program.

Grading

Activities	Percentage
Class participation	10%
Project presentation	20%
Final Exam	70%

Reference textbooks

The course assessment consists of both a practical project and a written exam.

- Stein S., and Wysession M - An Introduction to Seismology, Earthquakes, and Earth Structure. 1st ed. Malden, MA: Blackwell, September 2002. ISBN 9780865420786;
- Kramer S.L. - Geotechnical Earthquake Engineering, Prentice Hall, 1996, ISBN 0133749436;
- Lecture notes, scientific articles and tutorials will be provided throughout the course.

Note

The instructor reserves the right to make changes to this syllabus as necessary.

Schedule

CLASSROOM EUC 3 – Eucentre Foundation

Week	Day	Time	Topics	Hours
1	Mon 02/03	9:30-12:30	Course Introduction; Earthquakes and faults	3
	Tue 03/03	9:30-12:30	Seismotectonics; Ground motion measurements	3
	Wed 04/03	9:30-12:30	Earthquake size: intensity and magnitude	3
	Thur 05/03	14:30-17:30	Seismic catalogues; Seismic occurrence analysis	3
	Fri 06/03	9:30-12:30	*Tutorial* - PSHA modelling laboratory	3
2	Mon 09/03	9:30-12:30	Ground motion prediction equations	3
	Thur 10/03	9:30-12:30	DSHA and PSHA	3
	Wed 11/03	9:30-12:30	*Tutorial* - PSHA modelling laboratory	3
	Thur 12/03	14:30-17:30	Wave types and seismograms	3
	Fri 13/03	9:30-12:30	Seismic source representation	3
3	Mon 16/03	9:30-12:30	*Tutorial* - PSHA modelling laboratory	3
	Tue 17/03	9:30-12:30	Wave propagation in heterogenous earth	3
	Wed 18/03	9:30-12:30	Earthquake location and Inverse problems	3
	Thur 19/03	14:30-17:30	Seismometers and seismic networks	3
	Fri 20/03	9:30-12:30	Ambient vibration seismology	3
4	Mon 23/03	9:30-12:30	*Tutorial* - Exercises – Revision/Questions	3
	Tue 24/03	9:30-12:30	*Tutorial* - Exercises – Revision/Questions	3
	Wed 25/03	9:30-12:30	Personal project discussion	3
	Thur 26/03	—		
	Fri 27/03	9:30-12:30	Exam	3

Additional tutorial and revision hours will be agreed with students during the course.