

CIVIL-522

Seismic engineering

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Cursus	Sem.	Type
Civil Engineering	MA2, MA4	Opt.

Language of teaching	English
Credits	3
Session	Summer
Semester	Spring
Exam	Written
Workload	90h
Weeks	14
Hours	3 weekly
Courses	2 weekly
Exercises	1 weekly
Number of positions	

Summary

This course deals with the main aspects of seismic design of buildings and bridges. It covers different structural design and evaluation philosophies for new and existing reinforced concrete and masonry structures.

Content

- Introduction
 - Background
 - Seismicity
 - Typical failure modes of structures
- Conceptual seismic design
- Analysis methods
 - Response spectra for elastic and inelastic systems
 - Equivalent lateral force method
 - Response spectrum analysis
- Design and evaluation methods
 - Force-based methods
 - Displacement-based methods
- Design philosophies
 - Conventional design
 - Capacity design
- Reinforced concrete structures
 - Inelastic behaviour when subjected to cyclic loading
 - Seismic detailing of reinforced concrete structures
- Existing reinforced concrete and masonry structures

Keywords

Seismic design and assessment of reinforced concrete and unreinforced masonry structures

Learning Prerequisites

Recommended courses

- Structural dynamics
- Design of reinforced concrete structures
- Analysis of isostatic and hyperstatic systems

Learning Outcomes

By the end of the course, the student must be able to:

- Explain the effects of an earthquake on structures
- Design wall-type structures (RC and URM) for earthquakes

Teaching methods

Lectures, exercises

Expected student activities

Solution of exercises

Assessment methods

Exercises, final exam (written)

Resources

Ressources en bibliothèque

- [Génie parasismique / Lestuzzi](#)

Moodle Link

- <http://moodle.epfl.ch/course/view.php?id=12511>

Prerequisite for

Master projects in earthquake engineering