

École Polytechnique Fédérale de Lausanne (EPFL)**CIVIL 522: Seismic engineering****Instructors:** Prof. Dr. Dimitrios Lignos, Dr. Savvas Saloustros, Dr. Igor Tomic

Spring 2025

Week #	Part 1		Part 2		In-class exercise	Assignment
	Lecturer	Topic	Lecturer	Topic		
Week 1 Date:	DL 17.02	Introduction	IT 18.02	Conceptual design, Lecture		Assignment 1: Choose one existing building /describe its anticipated expected seismic response. Present in Week 3
Week 2 Date:	DL 24.02	Revision structural dynamics Linear / nonlinear SDFs & MDFs	DL 25.02	Seismic design fundamentals: Stiffness, strength / stability, deformation capacity & Revision of statics / stability	NVM diagrams, drift diagrams of cantilever and frame systems / deflection & stiffness computations for frame structures	
Week 3 Date:	IT 03.03	Conceptual design, presentations and group discussions (Presentation of Assignment 1)	IT 04.03	Elastic spectrum According to SIA Design spectrum (introduction) Seismic design of MDF systems (Revision		Assignment 2: Seismic design forces of an RC wall building

				Response spectrum method, new: equivalent lateral force method)		
Week 4 Date:	IT 10.03	Conventional design / Capacity design	IT 11.03	Capacity design RC walls		Assignment 3: Capacity design of a RC wall
Week 5 Date:	IT 17.03	Capacity design RC walls	IT 18.03	PH analysis, application to RC walls		
Week 6 Date:	DL 24.03	Capacity design of moment-resisting frames (connections)	DL 25.03	Capacity design of moment-resisting frames (joints)	Member design / beam-to-column connection design	Assignment 4: Capacity design of steel MRFs
Week 7 Date:	DL 31.03	Capacity design of moment-resisting frames (columns)	DL 01.04	System-level effects	Member design / beam-to-column joint design	
Week 8 Date:	DL 07.04	Capacity design of steel frames with bracings	DL 08.04	Capacity design of steel frames with bracings	Design of steel columns	Assignment 5: Capacity design of steel frames with bracings

Week 9 Date:	DL 14.04	Capacity design of steel frames with bracings	DL 15.04	Capacity design of steel frames with bracings	Design of bracing members	
Holiday						
Week 10 Date:	All 28.04	Midterm exam	DL 29.04	Capacity design of steel frames with eccentric bracings	design of eccentric links, and non-dissipative elements	
Week 11 Date:	DL 05.05	Seismic retrofit of existing buildings with friction dampers	IT 06.05	Drawbacks of force-based design	Seismic retrofit with friction dampers	
Week 12 Date:	SS 12.05	Displacement-based assessment: N2 method	SS 13.05	Seismic behavior of URM	Case studies - shake table tests (prepare, discuss in groups)	
Week 13 Date:	SS 19.05	In-plane/out of plane response of masonry structures	SS 20.05	In-plane/out of plane response of masonry structures - Predict the response of URM structures	Force/displacement capacity of URM	Assignment 6: Seismic assessment of a stone masonry bell tower
Week 14 Date:	SS 26.05	Seismic retrofit of URM	SS 27.05	Overview of SIA 269/8	Retrofit techniques for URM, SIA 269/8 concepts	

