



Course: Earthquake Engineering and Structural Control (EESC)		Teaching Language: English
SSD (Subject Areas): ICAR/09		CREDITS: 9
Course year: I	Type of Educational Activity: B (Characterising)	
Teaching Methods: in-person (face-to-face)		
Contents extracted from the SSD declaratory consistent with the training objectives of the course: Dynamics of elastic SDOF systems: free vibrations, steady-state and generic forced vibrations, response spectrum representation of input action - Dynamics of elastic discrete MDOF systems: periods and vibration modes, modal analysis technique - Dynamics of continuum systems: one-dimensional shear and flexural beams, wave propagation in a three-dimensional body - Dynamic testing of structures: free and forced vibration tests - Inelastic dynamic response of structures: method of analysis, local and global ductility, energy balance Causes of earthquakes - Intensity and magnitude - Measurement instrumentation: seismometer, strong-motion accelerometer - Seismic waves - Amplification characteristics of surface waves and site response Behaviour of constructions materials under dynamic loading: concrete, steel, other materials - Dynamic analysis of building structures: torsional vibration of space structures, site response, soil-structure interaction Earthquake resistant design: fundamental aseismic planning, static and dynamic analysis procedures, design earthquakes (response spectra and time histories) Dynamic structural control: classification (passive, active, semi-active and hybrid control), energy dissipation devices (viscous, visco-elastic, hysteretic and friction dampers), isolation and filtering devices, tuned mass dampers and tuned liquid dampers, semi-active (oleodynamic, electrorheological and magnethoreological) and active devices, design of structural control systems.		
Objectives: Scope of the course is to provide the required background knowledge of structural dynamics and basic methodologies for the design of engineered structures in seismic zones, as well as to conceive structural control systems able to reduce vibrations induced by other sources (wind, human and ambient born, traffic, industrial machines, etc.).		
Propaedeuticities: none Is a propaedeuticity for: none		
Types of examinations and other tests: A written midterm exam is assigned in the second half of the course during class hours. The final exam is oral and requires the student to demonstrate knowledge of all the topics covered during the course as well as discussion of the assigned homework problems. A regular continuous attendance of the course certainly allows to more easily and profitably pass the final exam.		