



Course: Theory and design of reinforced concrete structures		Teaching Language: English	
SSD (Subject Areas): ICAR/09		CREDITS: 9	
Course year: I	Type of Educational Activity: B (Characterising)		
Teaching Methods: In-person			
Contents extracted from the SSD declaratory consistent with the training objectives of the course: The course is focused on general principles and detailed procedures for the design of reinforced concrete (RC) buildings, with emphasis on seismic action. First, the methods of analysis for RC buildings under seismic action are illustrated, starting from the fundamentals of the dynamics of structures. Then, the nonlinear response of Single Degree Of Freedom systems is discussed, focusing on strength, stiffness and ductility concepts and introducing the behaviour factor approach. The conceptual design of RC buildings under seismic action is introduced, discussing the influence of aspects such as structural regularity. Then, Performance-Based Earthquake Engineering concepts are illustrated. Modern earthquake engineering principles, based on the capacity design approach, are introduced as well as seismic design rules. The hysteretic response of single structural members, such as beams, columns, and beam- column joints, is discussed, illustrating capacity models for strength and deformation capacity, and analyzing the influence of confinement on local ductility. Then, the detailed seismic design procedure is illustrated, from the application of capacity design concept to seismic detailing. During the course, reference is made to the principles inspiring the most advanced international building codes. A project on the design of a RC frame building is assigned to the students and developed during the course.			
Objectives: This course strives to provide knowledge of the basic concepts regarding the fundamental principles of earthquake engineering and understanding of the modern approach to the seismic design of RC buildings. The students should be able to analyse simple moment-resisting frame RC structures, for design of new buildings, defining the actions and the structural model, applying a method of analysis, and carrying out safety checks at the Limit States of interest, complying with technical code provisions.			
Propaedeuticities: none Is a propaedeuticity for: none			
Types of examinations and other tests: The exam will consist of an oral test, focused on the theoretical discussion of the issues analysed during the course, including the discussion of the project.			