CES570 - Structural Assessment and Retrofit

Course Title	Structural Assessment and Retrofit				
Course Code	CES570				
Course Type	Technical Elective				
Level	MSc (Level 2)				
Year / Semester	1st or 2nd Year / 2nd or 3rd Semester				
Teacher's Name	Dr. Petros Christou				
ECTS	7	Lectures / week	3	Laboratories / week	
Course Purpose	The course aims to present the underlying concepts structural assessment and damage identification of existing structures and also present alternatives for the repair and strengthening of structures according to the current legislation and practice. The students will be presented with the principles and concepts of modern design codes appropriate for different repair or strengthening methods and gain an understanding of the performance based design. The students will become familiar with the methods for the structural assessment of existing structures, identify available materials and methods for repair and strengthening and propose alternative repair schemes for the same structure.				
Learning Outcomes	1. Use state of the art software to assess the performance of existing structures; 2. Apply the code provisions to assess the capacity of existing structures; 3. Propose alternative repair schemes for the same structure; 4. Assess the structural capacity of the structure after the application of the strengthening technique.				
Prerequisites		Co-requisites			
Course Content	1. Damage identification and structural performance; 2. Legislation Framework; 3. Introduction to Nonlinear Analysis (material, geometric); 4. Introduction to risk assessment and fragility analysis; 5. Performance assessment of existing structures; 6. Repair and Strengthening techniques.				
Teaching Methodology	The course will be presented through theoretical lectures in class. The lectures will present to the student the course content and allow for questions. Part of the material will be presented using visual aids. The aim is to familiarize the student with the different and faster pace of presentation and also allow the instructor to present related material (photographs etc.) that would otherwise be very difficult to do. The learning process will be enhanced with the requirement from the student to solve exercises. These include self-evaluation exercises which will be solved in class. These exercises will not be graded. Exercises will also be given as homework which will be part of their				

	assessment. Besides from the notes taken by students in class, all of the course material will be made available through the class website and also through the eLearning platform. Finally the instructor will be available to students during office hours or by appointment in order to provide any necessary tutoring.
Bibliography	**Textbook** **1.** Eurocode Code 8 – 3 (2005). EN 1998-3 Eurocode 8: Design of Structures for Earthquake Resistance, Part 3: Assessment and Retrofitting of Buildings. **References** **1.** Fardis, M. N. (2009). Seismic design, assessment and retrofitting of concrete buildings: based on EN-Eurocode 8 (Vol. 8). Springer Science & Business Media; **2.** FEMA-440. (2005). Improvement of nonlinear static seismic analysis procedures. FEMA-440, Redwood City; **3.** ATC-40. (1996). Seismic evaluation and retrofit of concrete buildings. Applied Technology Council, Report ATC-40. Redwood City.
Assessment	The course is assessed through mid-term examinations, assignments and a final examination. The criteria for assessment can be found on the individual assignments and exams. The weights of the course assessment are as follows: Midterm Exams 30% Assignments 20% Final Exam 50%
Language	English