COURSE INFORMATON					
Course Title	*Code*	*Semester*	*L+P+L Hour*	*Credits*	*ECTS*
Seismic Assessment of Existing Masonry Structures	CE 533	-	3+0+0	3	10

Prerequisites	-

Language of Instruction	English
Course Level	Master's Degree (Second Cycle Programmes)
Course Type	Departmental Elective
Course Coordinator	Asst. Prof. Dr. Özden Saygılı
Instructors	Asst. Prof. Dr. Özden Saygılı
Assistants	-
Goals	This course is designed for students to understand the fundamental principles of seismic assessment of existing masonry structures and strengthening techniques used for this type of structures. During the course the students will undertake a term project in which an existing masonry structure will need to be seismically assessed.
Content	Mechanical characteristics of masonry structures Damages and failure mechanisms of masonry structures Condition assessment and estimation of residual strength of existing masonry structures Probabilistic seismic hazard analysis calculations Methods and tools for structural analysis of masonry structures Strengthening/Retrofitting Strategies and Techniques

Course Learning Outcomes	**Program Learning Outcomes**	**Teaching Methods**	**Assessment Methods**
Ability to select or scale a ground motion for a particular region	1, 2, 3, 4	1, 2	A, B
Ability to carry out a seismic assessment for existing masonry structures	1, 2, 3, 4	1, 2	A, B

Teaching Methods:	1: Lecture; 2: Application examples
Assessment Methods:	A: Term Project; B: Oral Exam

COURSE CONTENT

Week	Topics	Study Materials
1	Mechanical Characteristics of Masonry Structures Damages and Failure Mechanisms of Masonry Structures	Lecture Notes
2	Condition Assessment and Estimation of Residual Strength of Existing Masonry Structures (Indirect and Direct Approach)	Lecture Notes
3	Seismic Hazard Analysis (Deterministic)	Lecture Notes
4	Seismic Hazard Analysis (Probabilistic)	Lecture Notes
5	Definition of Earthquake Ground Motion Artificially Generated Earthquake Records Simulated Earthquake Records	Lecture Notes
6	Real Earthquake Records Selecting Earthquake Records Scaling Earthquake Records	Lecture Notes
7	Generation, Selection and Scaling of Ground Motion Data Set for the Course Term Project– INTERIM REPORT 1	Lecture Notes
8	Analytical (Numerical) Modeling of Masonry Structures Idealization of Geometry and Material	Lecture Notes
9	Analytical (Numerical) Modeling of Masonry Structures Idealization of Behavior	Lecture Notes
10	Methods and Tools for Structural Analysis of Masonry Structures Review of modern codes approaches to seismic design and methods of analysis (linear static, nonlinear static, linear dynamic, nonlinear dynamic).	Lecture Notes
11	Generation of Numerical Model of the Structure Given in Term Project	Lecture Notes
12	Linear Dynamic Analysis – INTERIM REPORT 2	Lecture Notes
13	Verification of Demand to Capacity ratio (DCR)	Lecture Notes
14	Strengthening/Retrofitting Strategies and Techniques	Lecture Notes
15	Strengthening/Retrofitting Strategies and Techniques	Lecture Notes

RECOMMENDED SOURCES	
Lecture Notes	The slides presented during the lectures will be made available for download by the students from COADSYS (Moodle)
Textbook	-
Additional Resources	-

MATERIAL SHARING	
Documents	-

Assignments	-
Exams	-

ASSESSMENT		
IN-TERM STUDIES	**NUMBER**	**PERCENTAGE**
Interim Reports	2	20
Term Project	1	30
	-	-
	-	-
	-	-
Total		**100**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		50
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		50
Total		**100**

COURSE CATEGORY	Expertise Courses

COURSE'S CONTRIBUTION TO PROGRAM							
No	Program Learning Outcomes	Contribution					
		1	2	3	4	5	
1	Attains knowledge through wide and in-depth investigations his/her field and surveys, evaluates, interprets, and applies the knowledge thus acquired.				√		
2	Has a critical and comprehensive knowledge of contemporary engineering techniques and methods of application.			√			
3	By using unfamiliar, ambiguous, or incompletely defined data, completes and utilizes the required knowledge by scientific methods; is able to fuse and make use of knowledge from different disciplines.			√			
4	Has the awareness of new and emerging technologies in his/her branch of engineering profession, studies and learns these when needed.			√			
5	Defines and formulates problems in his/her branch of engineering, develops methods of solution, and applies innovative methods of solution.						
6	Devises new and/or original ideas and methods; designs complex systems and processes and proposes innovative/alternative solutions for their						

	design.					
7	Has the ability to design and conduct theoretical, experimental, and model-based investigations; is able to use judgment to solve complex problems that may be faced in this process.					
8	Functions effectively as a member or as a leader in teams that may be interdisciplinary, devises approaches of solving complex situations, can work independently and can assume responsibility.					
9	Has the oral and written communication skills in one foreign language at the B2 general level of European Language Portfolio.					
10	Can present the progress and the results of his investigations clearly and systematically in national or international contexts both orally and in writing.					
11	Knows social, environmental, health, safety, and legal dimensions of engineering applications as well as project management and business practices; and is aware of the limitations and the responsibilities these impose on engineering practices.					
12	Commits to social, scientific, and professional ethics during data acquisition, interpretation, and publication as well as in all professional activities					

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration (Excluding the exam weeks: 14x Total course hours)	14	3	42
Hours for off-the-classroom study (Pre-study, practice)	14	10	140
Interim Reports	2	8	16
Term Project	1	40	40
Final	1	2	2
Total Work Load			240
Total Work Load / 25 (h)			10
ECTS Credit of the Course			10