ESOGU CIVIL ENGINEERING DEPARTMENT

COURSE INFORMATION FORM

Course Name	Course Code
REPAIR AND STRENGTHENING OF STRUCTURES	**151418718**

Semester	Number of Course Hours per Week		ECTS
	Theory	Practice	
8	3	0	6

Course Category (Credit)				
Basic Sciences	**Engineering Sciences**	**Design**	**General Education**	**Social**
	2	4		

Course Language	Course Level	Course Type
Turkish	Undergraduate	Elective

Prerequisite(s) if any	Reinforced Concrete, Structural Analysis, Earthuake Resistant Structural Design
Objectives of the Course	Repair and strengthening of reinforced concrete and steel structures
Short Course Content	Repair and/or strengthening of existing structures according to current earthquake and relevant regulations

Learning Outcomes of the Course	Contributed PO(s)	Teaching Methods *	Measuring Methods **
1 Designs the repair and strengthening.	1, 2, 3	1,6,10	A, D
2 Decides on the repair and/or strengthening of existing structures.	1, 2, 3	1,6,10	A, D
3 Knows which method to use for repair and strengthening.	1, 2, 3	1,6,10	A, D
4 Draws/prepares the repair and strengthening project.	1, 2, 3	1,6,10	A, D
5 Explains the performance level achieved by the structure after repair and strengthening.	1, 2, 3	1,6,10	A, D
6 Determines the sequence and method of the repair and strengthening application.	1, 2, 3	1,6,10	A, D
7			
8			
9			
10			

***Teaching Methods** **1:**Expression, 2**:**Discussion, **3:**Experiment, **4:**Simulation, **5:**Question-Answer, **6:**Tutorial, **7**:Observation, **8**:Case Study, **9:**Technical Visit, **10:**Trouble/Problem Solving, **11:**Induvidual Work, **12**:Team/Group Work, **13**:Brain Storm, **14:**Project Design / Management, **15:**Report Preparation and/or Presentation

****Measuring Methods** **A:**Exam, **B:**Quiz, **C:**Oral Exam, **D:**Homework, **E:**Report, **F:**Article Examination, **G:**Presentation, **I:**Experimental Skill, **J:**Project Observation, **K**:Class Attendance; **L**:Jury Exam

Main Textbook	Course notes
Supporting References	Demir H., Depremden Hasar Görmüş Betonarme Yapıların Onarım ve Güçlendirilmesi, İTÜ İnşaat Fak., İstanbul 1992. Repair and Strengthening of Reinforced Concrete, Stone and Brick-Masonry Buildings, UNDP/UNIDOPROJECT RER / 79 / 015, Vienna 1983. Celep Z., Kumbasar N., Deprem Müh. Giriş ve Dep. Day. Yapı Tasarımı, Beta Dağıtım, İstanbul 2000. Aydoğan M.,Betonarme Binalarda Onarım ve Güçlendirme Sistemleri ve Tasarımı,Lefkoşe,KTMMOB-İMO,Seminer Notları,2001.
Necessary Course Material	

Course Schedule	
1	Definition and explanation of repair and strengthening and their areas of application
2	Explanation of relevant regulations
3	Calculation of section effects of structures under vertical loads
4	Calculation of section effects of structures under earthquake loads
5	Detailed explanation of the criteria in Article 15 of TBDY
6	Determination of performance analysis levels in reinforced concrete and steel structures
7	Performance analysis in reinforced concrete and steel structures
8	Mid-Term Exam
9	Evaluation of performance analysis results in reinforced concrete and steel structures and making a decision
10	Detailing the repair and strengthening of the structure using steel
11	Detailing the repair and strengthening of the structure using reinforced concrete
12	Detailing the repair and strengthening of the structure using FRP, steel, and reinforced concrete as composites
13	Detailing the repair and strengthening of the structure's foundation
14	Determining the cost of the structure's repair and strengthening
15	Implementation and project planning of the structure's repair and strengthening
15,17	Final Exam

Calculation of Course Workload			
Activities	**Number**	**Time (Hour)**	**Total Workload (Hour)**
Course Time (number of course hours per week)	14	3	42
Classroom Studying Time (review, reinforcing, prestudy,….)	14	5	70
Homework	6	5	30
Quiz Exam			
Studying for Quiz Exam			
Studying for Oral Exam			
Report (Preparation and presentation time included)			
Project (Preparation and presentation time included)			
Presentation (Preparation time included)			
Mid-Term Exam			
Studying for Mid-Term Exam			
Final Exam	1	2	2
Studying for Final Exam	1	13	13
Course Time (number of course hours per week)	1	2	2
Classroom Studying Time (review, reinforcing, prestudy,….)	1	15	15
		Toplam iş yükü	**174**
		Toplam iş yükü / 30	**5,8**
		Dersin AKTS Kredisi	**6**

Evaluation	
Activity Type	**%**
Mid-term	30
Homework	20
Final Exam	50
Total	100

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES (PO) (5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)		
NO	**PROGRAM OUTCOME**	**Contribution**
1	Sufficient knowledge in mathematics, science, and fundamental engineering; ability to apply theoretical and practical knowledge in these fields to model and solve Engineering problems.	5
2	Skills to identify, define, formulate complex engineering problems in civil engineering and related fields, and to select and apply appropriate analysis and modeling methods to solve them.	4
3	Ability to design a complex system, device, or product under realistic constraints and conditions, applying modern design methods towards a specified goal.	3
4	Ability to develop, select, and use modern techniques and tools necessary for Civil Engineering applications, and to effectively utilize information technologies.	
5	Ability to design experiments, conduct experiments, collect data, analyze and interpret results for the investigation of Civil Engineering problems.	
6	Ability to work effectively in intra-disciplinary and inter-disciplinary teams.	
7	Effective communication skills in Turkish, both oral and written, and ability to use/improve knowledge of a foreign language.	
8	Recognition of the need for lifelong learning; ability to access information, follow developments in science and technology, and continuously renew oneself.	
9	Consciousness of professional and ethical responsibility.	
10	Knowledge about business life practices such as project management, risk management, and change management; awareness about entrepreneurship, innovation, and sustainable development.	
11	Knowledge about the effects of engineering practices on health, environment, and safety in universal and societal dimensions; awareness about national and international legal regulations and standards, and the legal consequences of engineering solutions.	

LECTUTER(S)				
Prepared by	Prof. Dr. Mizan DOĞAN			
Signature(s)				

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