



**ESOGU CIVIL ENGINEERING DEPARTMENT
COURSE INFORMATION FORM**

Course Title	Course Code
REINFORCED-CONCRETE I	151416346

Semester in Program	Number of Course Hours per Week		ECTS Credit
	Theory	Practice	
6	4		5

Course ECTS Credit Distribution				
Basic Sciences	Engineering Sciences	Design	General Education	Social
	3	2		

Language of Instruction	Course Level	Course Type
Turkish	Undergraduate	Compulsory

Prerequisite	Structural Analysis I
Objectives of the Course	<p>By the end of this module students will be able to:</p> <ol style="list-style-type: none"> 1. Know material properties 2. Understand the behaviour of concrete. 3. Understand the behaviour of concrete members. 4. Learn how to design and draw the concrete members. 5. Use the related national codes.
Brief Course Content	<p>The main aim of the course is to introduce the behaviour and design principles of reinforced concrete members. Content of the course is as follows: Cement, water, aggregates, concrete mixture, admixtures. Mechanical properties of concrete and reinforcing steel. Mechanical behaviour of concrete. Assumptions for limit state design. Safety factors for material and loads. Reinforced concrete short columns, types of columns, importance of binder, minimal conditions (National codes). Reinforced concrete beams, types of beams, behaviour of the beam in pure bending. Capacity and design of the beam, minimal conditions. Shear strength and reinforcement. Axially and eccentrically loaded columns, design of columns.</p>

Learning Outcomes of the Course	Contributed POs	Teaching Methods *	Assessment Methods **
1 Skills to solve problems related to concrete and steel behavior	1, 2, 3, 4	1, 6,10	A, B/D
2 Skills to solve problems related to load and material capacity of a simple load-bearing system/element	1, 2, 3, 4	1, 6,10	A, B/D
3 Skills to solve problems related to design load, design strength and bearing capacity	1, 2, 3, 4	1, 6,10	A, B/D
4 Bearing capacity and section calculation of rectangular and plated sections	1, 2, 3, 4	1, 6,10	A, B/D
5 Bending analysis in beams	1, 2, 3, 4	1, 6,10	A, B/D
6 Beam reinforcement calculation and drawing - design-	1, 2, 3, 4	1, 6,10	A, B/D
7 Shear calculation and drawing in beams	1, 2, 3, 4	1, 6,10	A, B/D
8 Bearing capacity of axially loaded columns			

***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:Individual 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	<p>1. Celep, Z. , (2022). Betonarme Yapılar, Beta dağıtım, İstanbul.</p> <p>2. Doğangün, A. (2018). Betonarme Yapıların Hesap ve Tasarımı, Birsen Yayınevi, İstanbul.</p> <p>3. Jack C.McCORMAC & Russel H. BROWN Design of Reinforced Concrete, Wiley 2016</p> <p>4. Ersoy, U., Özcebe, G. (2012). Betonarme, Evrim yayınevi, İstanbul.</p> <p>5. Ersoy, U., Özcebe, G., Tankut, T. (2010). Reinforced Concrete, ODTÜ, Ankara.</p>
Supplementary Resources	<p>1. Aydın, M. R., Akgün, Ö. R., Topçu, A. (2002). Betonarme Kolon Tabloları, Eskişehir.</p> <p>2. TS 498 (2021). Yapı Elemanlarının Boyutlandırılmasında Alınacak Yüklerin Hesap Değerleri, TSE.</p> <p>3. TS ISO 9194 (1997). Yapıların Projelendirilme Esasları-Taşıyıcı Olan ve Olmayan Elemanlar-Depolanmış malzemeler-Yoğunluk, TSE.</p> <p>4. TS 500 (2000). Betonarme Yapıların Hesap ve Yapım Kuralları, Türk Standardları Enstitüsü.</p> <p>5. Türkiye Bina Deprem Yönetmeliği, Bayındırlık Bakanlığı, 2018. Türkiye</p> <p>6. Deprem Bölgeleri Haritası, Yerleşim Birimleri ve Deprem Bölgeleri, Bayındırlık Bakanlığı, 1996.</p>
Necessary Course Material	

Course Weekly Schedule	
1	Cement, water, aggregates, concrete mixture, admixtures.
2	Mechanical properties of concrete and reinforcing steel. Behaviour of concrete, Shrinkage and Creep
3	Safety factors for material and loads.
4	Assumptions for limit state design.
5	Reinforced concrete short columns, types of columns, importance of binder
6	Reinforced concrete beams, types of beams, behaviour of the beam in pure bending
7	Flexural Analysis of beams
8	Mid-Term Exams
9	Behavior of beams subjected to simple bending Determination of bearing capacity,
10	Moment carrying capacity of rectangular, plated and box section beams, dimensioning.
11	Minimum conditions. Shear strength and reinforcement.
12	Reinforced concrete short columns and column types
13	Interaction diagrams in columns
14	Minimum conditions (Turkish codes). Columns subjected to axial compression and biaxial bending, dimensioning.
15	Dimensioning of columns subjected to axial compression and biaxial bending by computer.
16,17	Final Exams

Calculation of Course Workload			
Activities	Count	Time (Hour)	Total Workload (Hour)
Weekly classroom time	14	4	56
Weekly study time (review, reinforcing, preparation)	14	4	56
Homework	5	5	25
Taking a quiz			
Studying for a quiz			
Oral exam			
Studying for an oral exam			
Report writing (Preparation and presentation time included)			
Project (Preparation and presentation time included)			
Presentation (Preparation time included)			
Mid-Term Exam	1	2	2
Studying for Mid-Term Exam	1	5	5
Final Exam	1	2	2
Studying for Final Exam	1	5	5
Total workload			151
Total workload / 30			5.03
Course ECTS Credit			5

Assessment	
Activity Type	%
Mid-term	30
Quiz	
Homework	20
Bir öge seçin.	
Bir öge seçin.	
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 of engineering subjects related with mathematics, science and own branch; an ability to apply theoretical and practical knowledge on solving and modeling of engineering problems.	4
2	Ability to determine, define, formulate and solve complex engineering problems; for that purpose an ability to select and use convenient analytical and experimental methods.	5
3	Ability to design a complex system, a component and/or an engineering process under real life constrains or conditions, defined by environmental, economical and political problems; for that	5
4	Ability to develop, select and use modern methods and tools required for engineering applications; ability to effective use of information technologies.	4
5	In order to investigate engineering problems; ability to set up and conduct experiments and ability to analyze and interpretation of experimental results.	
6	Ability to work effectively in inner or multi-disciplinary teams; proficiency of interdependence.	
7	Ability to communicate in written and oral forms in Turkish/English; proficiency at least one foreign language.	
8	Awareness of life-long learning; ability to reach information; follow developments in science and technology and continuous self-improvement.	3
9	Understanding of professional and ethical issues and taking responsibility	4
10	Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development.	
11	Knowledge of actual problems and effects of engineering applications on health, environment and security in global and social scale; an awareness of juridical results of engineering solutions.	4

INSTRUCTORS				
Prepared by	Prof.Dr. Yunus Özçelikörs	Prof.Dr. Mizan Doğan		

Date:17.07.2024