YEDİTEPE UNIVERSITY
FACULTY OF ENGINEERING

COURSE DESCRIPTION FORM

COURSE INFORMATON				
Course Code	**CE491**	**Course Title**	**DESIGN OF REINFORCED CONCRETE STRUCTURES**	
Semester	*Credits*	*ECTS*	*C +P + L Hour*	Prerequisites
7	3	5	2+2+0	CE 382: Reinforced Concrete

Language of Instruction	**Course Level**	**Course Type**
English	Bachelor's Degree (First Cycle Programmes)	Core

Course Coordinator	Assistant Prof. Almıla Uzel
Instructors	Assistant Prof. Almıla Uzel
Assistants	
Goals	The goal of this course is to apply the knowledge acquired in Structural Analysis and Reinforced Concrete courses to the design of reinforced concrete structures.
Content	Design stages of structures. Loads on structures. Design of continuous beams, one way slabs, two-way slabs, columns, footings, foundation walls, stairs and retaining walls. Lateral load analysis and simple lateral design rules.
Contribution of the Course to the Professional Education	Concrete and reinforced concrete are widely used in the construction industry in every country. Hence, it is important that a civil engineer studies the design of reinforced concrete structures.

Course Learning Outcomes	**Detailed Program Outcomes**	**Teaching Methods**	**Assessment Methods**
Be capable of defining design stages of reinforced concrete structures.	1a,1b,2a,2b	1,3	B
Be capable of designing continuous beams, one-way and two-way slabs, columns, footings, foundation walls, stairs and retaining walls according to applicable Design Codes.	1b,2b,3b,9b	1,2,3	A,B
Be capable of calculating earthquake loads and response of simple structures under these earthquake loads.	1b,2b,3b,9b	1,2,3	A,B

Be capable of applying design provisions as outlined in TS500, TS498 and Turkish Earthquake Design Codes in the design of a multi-story building.	1b,2b,3a,3b,6c,9b	1,2,3	A,B

Teaching Methods:	1: Lecture by instructor, 2: Problem solving by instructor, 3: Project
Assessment Methods:	A: Written exam, B: Project evaluation

COURSE CONTENT

Week	Topics	Study Materials
1	Introduction –Objectives of Design-Serviceability-Ultimate Strength	Lecture Notes, TS500,TS498
2	Design Codes and Specifications-Loads- Overview of design stages	Lecture Notes, TS500,TS498
3	Introduction to Slab System- Term Project (RC design of a multi-story building)	Lecture Notes, TS500,TS498
4	Analysis of one-way slabs and continuous beams – One-way Slab Design Example	Lecture Notes, TS500,TS498
5	Reinforcement Detailing for slabs- Foundation Walls	Lecture Notes, TS500,TS498
6	Introduction to Two way Slab Systems- Two-way slab with stiff beams example	Lecture Notes, TS500,TS498
7	Two-way slab example continued	Lecture Notes, TS500,TS498
8	Study on Term Project-progress report-Midterm Exam	Lecture Notes, TS500,TS498
9	Load transfer to beams and columns- preliminary dimensioning of beams and columns- Approximate analysis of frame systems considering unfavourable loadings	Lecture Notes, TS500,TS498, EQ Code 2018
10	RC Slabs with Joists- design specifications and example	Lecture Notes, TS500,TS498, EQ Code 2018
11	Seismic design and Earthquake Loads- Brief introduction to earthquake resistant deisgn of RC structures	Lecture Notes, TS500,TS498, EQ Code 2018
12	Earthquake Loads and Muto Method for lateral analysis of simple multi-story frames	Lecture Notes, TS500,TS498, EQ Code 2018
13	Design of beams and columns as per EQ code-reinforcement detailing rules for earthquake resistant structures- Footings	Lecture Notes, TS500,TS498, EQ Code 2018
14	Footings continued - Retaining Walls-Stairs	Lecture Notes, TS500,TS498, EQ Code 2018

RECOMMENDED SOURCES	
Textbook	**Reinforced Concrete – Mechanics and Design** (Canadian Edition) Authors: MacGregor, J.G. and Bartlett, F.M., Prentice Hall, 2000 ISBN-13: 978-0-13-101403-9 ISBN-10: 0-13-101403-X
Additional Resources	A booklet of lecture notes and solved design examples prepared by the instructor.

MATERIAL SHARING	
Documents	Lecture notes and solved examples are handed out at the beginning of the semester.
Exams	Solution of exam questions are posted

ASSESSMENT		
IN-TERM STUDIES	**NUMBER**	**PERCENTAGE**
Midterm	1	42
Term Project	1	58
Total		**100**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		40
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		60
Total		**100**

COURSE CATEGORY	Field Course

COURSE'S CONTRIBUTION TO PROGRAM OUTCOMES		
No	Program Learning Outcomes	check √
1a	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline,	√
1b	Ability to use theoretical and applied knowledge in these areas in complex engineering problems.	√
2a	Ability to identify, formulate, and solve complex engineering problems,	√
2b	Ability to select and apply proper analysis and modeling methods for this purpose.	√

3a	Ability to design a complex system, process, device or product under realistic constraints and conditions, in such a way as to meet the desired result,	√
3b	Ability to apply modern design methods for this purpose.	√
4a	Ability to select and use modern techniques and tools needed for analyzing and solving complex problems encountered in engineering practice.	
4b	Ability to employ information technologies effectively.	
5a	Ability to design experiments for investigating complex engineering problems or discipline specific research questions,	
5b	Ability to conduct experiments, gather data, analyze and interpret results for investigating complex engineering problems or discipline specific research questions.	
6a	Ability to work efficiently in intra-disciplinary teams,	
6b	Ability to work efficiently in multi-disciplinary teams,	
6c	Ability to work individually.	√
7a	Ability to communicate effectively in Turkish, both orally and in writing,	
7b	Knowledge of a minimum of one foreign language,	
7c	Ability to write effective reports and comprehend written reports, prepare design and production reports,	
7d	Ability to make effective presentations,	
7e	Ability to give and receive clear and intelligible instructions.	
8a	Recognition of the need for lifelong learning, ability to access information, ability to follow developments in science and technology,	
8b	Ability to continue to educate him/herself.	
9a	Consciousness to behave according to ethical principles and professional and ethical responsibility.	
9b	Knowledge on standards used in engineering practice.	√
10a	Knowledge about business life practices such as project management, risk management, change management.	
10b	Awareness in entrepreneurship and innovation.	
10c	Knowledge about sustainable development.	
11a	Knowledge about the global and social effects of engineering practices on health, environment, and safety,	
11b	Knowledge about contemporary issues of the century reflected into the field of engineering.	
11c	Awareness of the legal consequences of engineering solutions.	
12	Knowledge about project award mechanisms and tendering procedures.	
13	Knowledge about the interaction of designers and constructors.	

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration	13,5	4	54
Midterm	1	2	4
Project	1	60	60
Final examination	1	2	7
Total Work Load			125
Total Work Load / 25 (h)			5
ECTS Credit of the Course			5

Prepared by: Asst. Prof. Almıla UZEL	Preparation date: 14.12.2022