

Birzeit University
Faculty of Engineering
Department of Civil Engineering

ENCE 436, Reinforced Concrete Design II
3 Credit Hours, Spring Semester 2020-2021

Prerequisites: Reinforced Concrete Design I, Structural Analysis II

Instructor: Jamal Zalatimo, Ph.D., ENG 412

Textbooks: Design of Concrete Structures, Fourteenth Edition, (Nilson, Darwin, Dolan), McGraw-Hill Companies, Inc., 2010 (SI Units), 2016 (US Customary Units). American Concrete Institute, ACI-318 Building Code Requirements, 2014.

References: Reinforced Concrete Design, Seventh Edition, (Salmon, Wang), Addison Wesley Publishers, 2007.
Reinforced Concrete Design, Third Edition, (Leet, Bernal), McGraw Hill Inc., 1997.

Supplementary Materials: Civil Engineering and Structural Engineering Handbooks, Class Notes, Handouts, Library and Online Resources.

Course Description: This course covers the analysis and classification of columns, the design of concentrically loaded columns, the resistance of columns to eccentric axial loads, behavior under bi-axial bending, classification of two-way slabs, analysis and design of different types of two-way slabs, design of beams to resist torsional moments.

Intended Learning Outcomes:

1. To be able to analyze and design reinforced concrete columns, including columns affected by length and slenderness effects.
2. To be able to analyze and design two-way reinforced concrete slabs of any type.
3. To possess the basic knowledge and expertise necessary for analyzing and designing concrete members subjected to torsional moments.

Course Outline and Calendar:

Topics	Expected Duration (Weeks)
Columns	Required Reading 6
Analysis, Load Determination	262-269
ACI Requirements	
Concentrically Loaded Columns, Load Eccentricity	
Interaction Diagrams	269-282
Approximate Formulae	
Design of Concentrically Loaded Columns	282-285
Design of Eccentrically Loaded Columns	
Behavior of Columns Under Bi-axial Bending	285-294
Slender Columns: Analysis, Load Determination	
ACI Requirements, Design	299-325
Two Way Slabs	6
Behavior, Purpose, and Conditions of Use	424-439
Load Transfer	
Mid-Term Exam	
Thickness Determination	
Analysis and Design: Using Tables, Direct Design Method	439-454
Equivalent Frame Method	454-462
Steel Selection, Steel Distribution	462-466
	477-480
Final Design Sketches	
Torsion	2
Load Determination, Behavior, and Analysis	241-254
ACI Requirements	
Design	254-258

Assignments will be given in class and due one week later. Reading assignments are as shown in the handout.

Course Policies: Students are required to attend all classes. All unexcused absences will be penalized. Late homeworks will be accepted under special circumstances with the consent of the instructor only. Missing an exam with an acceptable excuse will result in a 30% penalty inflicted on the makeup exam.

Teaching Methods:

Lectures, Quizzes, and Discussions
Assignments, Reading Assignments, Homeworks, Project

Grading System:

The overall grade of this course will be determined as follows:

Quiz and Mid-Term Exam	30 %
Quiz and Final Exam	35 %
Assignments, Projects, Participation	35 %

Grading Scale:

90 – 100

80 – 89

70 – 79

60 – 69

Below 60

Excellent

Very Good

Good

Fair

Unsatisfactory