

College of Engineering

Department of Civil Engineering

جامعة الملك سعود  
King Saud University



## CE 470 Reinforced Concrete Design - 2

<b>Credit and Contact hours</b>	3 / 3 (Lectures), 1 (Tutorials), 0 (Laboratory)	
<b>Required, or Elective</b>	Elective for a BSCE degree	
<b>Course Description</b>	Analysis and Design of short columns under combined axial load and bending, P-M interaction diagrams. Design of biaxially loaded columns, slenderness effect and behavior of slender columns, Design of slender columns in Nonsway and Sway frames. Two-way slab systems, Design of two-way slabs using direct design and coefficient methods. Design of spread, continuous and combined footings. Introduction to torsion, deep beams, corbels and staircases. Design Project.	
<b>Prerequisites or Co-requisites</b>	CE 370 ( Reinforced Concrete Design-1) , Prerequisite by Topics: <ol style="list-style-type: none"> <li>1. Flexural behavior of RC beams, analysis and design of rectangular beams</li> <li>2. Analysis and design of reinforced concrete beams for shear</li> <li>3. Bond, development lengths, and splicing of reinforcement</li> <li>4. Analysis and design of short columns and P-M interaction curves</li> </ol>	
<b>Course Learning Outcomes</b>	Students completing this course successfully will be able to	
	<b>Course Learning Outcomes</b>	<b>Related Student Outcomes (SO)</b>
	<b>CLO1.</b> Evaluate strength of existing long columns, two-way slab systems, combined footings, and cantilever retaining walls to decide safety and load-carrying capacity.	<b>SO4</b>
	<b>CLO2.</b> Design long columns, two-way slab systems, combined footings, and cantilever retaining walls considering safety, serviceability and economic aspects.	<b>SO2</b>
	<b>CLO3.</b> Evaluate the serviceability requirements for reinforced concrete members,	<b>SO4</b>
<b>CLO4.</b> Demonstrate knowledge of element design for carrying out team-based mini design projects and present the designs professionally to instructors and the students.	<b>SO3</b>	
<b>Student Outcomes related to this Course</b>	<b>SO 2.</b> an ability to apply <b>engineering design</b> to produce solutions that meet specified needs with consideration of <b>public health, safety, and welfare</b> , as well as <b>global, cultural, social, environmental, and economic factors</b> . [ABET 2]	

	<p><b>SO 3.</b> an ability to communicate effectively with a <b>range of audiences</b>. [ABET 3]</p> <p><b>SO 4.</b> an ability to recognize <b>ethical</b> and <b>professional responsibilities</b> in engineering situations and make <b>informed judgments</b>, which must consider the <b>impact of engineering solutions in global, economic, environmental, and societal contexts</b>. [ABET 4]</p>	
<b>Topics Covered</b>	<b>List of Topics</b>	
	1. Introduction and Background Information	<b>Related CLOs</b> CLO1
	2. Analysis of slender columns with consideration to Biaxial bending	CLO1
	3. Analysis of two-way slabs,	CLO1
	4. Design of slender columns with consideration to Biaxial bending	CLO2
	5. Direct design method and SBC coefficient method for two-way slabs	CLO2
	6. Analysis of combined footings and cantilever retaining walls	CLO1
	7. Design of combined footings and cantilever retaining walls	CLO2
	8. Serviceability requirements for reinforced concrete members	CLO3
	9. Mini Project and Presentation of the Project	CLO4
<b>Textbook(s) and Other Required Material</b>	<ol style="list-style-type: none"> <li>1. James K. Wight, James G. Macgregor. Reinforced concrete, Mechanics and Design. Fifth Edition, Pearson Prentice Hall, USA.</li> <li>2. Saudi Building Code (SBC 304) and Saudi Building Commentary (SBC 304C). Concrete Structures Requirements, 2007.</li> <li>3. Design of Reinforced Concrete by J.C. McCormac and R.H. Brown, Eighth Edition, John Wiley &amp; Sons.</li> <li>4. American Concrete Institute, 2011, Building Code Requirements for Structural Concrete (ACI 318M-11), Farmington Hills, Michigan.</li> </ol>	
<b>Grading System</b>	1st Mid-Term Exam	20%
	2nd Mid-Term Exam	20%
	Quizzes and Homework	20%
	Final Exam	40%
<b>Instructors</b>	Prof. Nadeem A. Siddiqui (Room 2A89), email; nadeem@ksu.edu.sa	
<b>Date of Review</b>	September 2020	