College of Engineering

Department of Civil Engineering

CE 462 Analysis and Design of Buildings

Credit and Contact hours	3 / 1 (Lectures), 0 (Tutorials), 4 (Laboratory)
Required, or Elective	Elective for a BSCE degree
Course Description	Structural design process of RC buildings, preliminary design and selection of appropriate structural system. Integration and implementation of analysis and design process through a term-long design project of real structures utilizing modern computer software and including: idealization and modeling of structures, estimation of gravity and wind loads, results validation and verification, preparation of structural drawings and details.
Prerequisites or Co-requisites	CE 470 (Reinforced Concrete Design-2),
Course Learning Outcomes	Students completing this course successfully will be able to

Course Learning Outcomes	***Related Student Outcomes (SO)***
CLO1. Analyze a complex reinforced concrete building, using different assumptions in structural analysis, applying updated related codes, and different mathematical modeling using structural software	**SO4**
CLO2. Design different elements in a reinforced concrete building using structural software with the emphasis on manual verifications using approximate methods, and considering the safety and economic aspects.	**SO2**
CLO3. Demonstrate the modeling process, design results and final conclusions through professional discussions and presentations with students and faculty	**SO2**

Student Outcomes related to this Course	**SO 1**. an ability to **identify**, **formulate**, and s**olve complex engineering** problems by applying principles of engineering, science, and mathematics, and using **modern engineering tools** [ABET 1] **SO 2**. an ability to apply **engineering design** to produce solutions that meet specified needs with consideration of **public health, safety**, and **welfare,**

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<tr><td></td><td>as well as global, cultural, social, environmental, and economic factors. [ABET 2]

SO 3.an ability to communicate effectively with a range of audiences. [ABET 3]</td></tr>
<tr><td>Topics Covered</td><td>
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<tr><th>List of Topics</th><th>Related CLOs</th></tr>
<tr><td>1. Introduction- structural design process, and different structural systems of buildings through professional architectural and structural drawings</td><td>CLO1</td></tr>
<tr><td>2. Mathematical modeling including assumptions on geometry loading transfer, and structural analysis</td><td>CLO1</td></tr>
<tr><td>3. Design of different elements in a concrete building with emphasis on manual verifications using approximate methods, computer software, and considering the safety and economic aspects.</td><td>CLO2</td></tr>
<tr><td>4. Review, discuss and present the modeling process, design results and final conclusions through professional discussions and presentations with students and instructors.</td><td>CLO3</td></tr>
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<tr><td>Textbook(s) and Other Required Material</td><td>1. American Concrete Institute, "ACI Detail Manual".
2. ACI Committee 318, “Building Code Requirements for Structural Concrete (ACI 318M-14) and Commentary (ACI 318RM-14)”, American Concrete Institute, Farmington Hills, MI.
3. Saudi Building Code 304, “Saudi Building Code Requirements for Structural Concrete (SBC 304-07)”.</td></tr>
<tr><td>Grading System</td><td>Class attendance and Contributions 5%
mid-term exam 30%
Project 25%
Final Exam: 40%</td></tr>
<tr><td>Instructors</td><td>Dr. Mohammad Alhaddad (2A8), email; malhaddad@ksu.edu.sa</td></tr>
<tr><td>Date of Review</td><td>September 2020</td></tr>
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