College of Engineering

Department of Civil Engineering

CE 573 Behavior of Metallic Structures

Credit and Contact hours	3 / 3 (Lectures), 0 (Tutorials), 0 (Laboratory)
Required, or Elective	Elective
Course Description	The course covers applications of advanced concepts in the design of steel structures with emphasis on the role of member stability in the analysis and design of steel structures, behavior and design of built-up compression members, behavior and design of plate girders, behavior and design of composite steel beams and columns, as well as behavior and design of bolted and welded connections with different load conditions, according to LRFD method and Saudi Building Code Provisions.
Prerequisites or Co-requisites	Under graduate Course CE 473 Steel Structures, or any equivalent course that covers the basic concept of LRFD, design and analysis of tension and compression members, as well as beams and beam-column members. In addition to design of bolted and welded connections.
Course Learning Outcomes	Students completing this course successfully will be able to:

Course Learning Outcomes (CLOs)	*Related Student Outcomes (SO)*
CLO1. Recognize the role of members stability in analysis and design of steel structures with its to design specifications and steel codes. K1	**SO1**
CLO2. Recognize the behavior and limit states of plate girders, composite sections and connections with its to design specifications and steel codes. K1	**SO1**
CLO3. Apply stability design criteria to steel members and structures according to design specifications and steel codes, and using computer software. S1	**SO2**
CLO4. Design built-up compression steel members according to design specifications and steel codes. S4	**SO5**
CLO5. Design plate girders according to design specifications and steel codes. S4	**SO5**
CLO6. Design composite steel beams and columns according to design specifications and steel codes. S4	**SO5**
CLO7. Design bolted and welded connections under different load conditions. S4	**SO5**
CLO8. Demonstrate professional engineering and ethical values in assigned projects and assignments with high academic integrity. V2	**SO7**

Student Outcomes related to this Course	SO 1 Recognize advanced engineering knowledge, concepts, and techniques to identify, interpret, and analyze complex and real-life engineering problems. SO 2 Provide solutions for complex and real-life engineering problems through critical thinking and the use of modern engineering tools, and identify their impact on social, global, cultural, environmental, safety, and economic factors.

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<tr><td></td><td>SO 5 Design novel advanced Civil Engineering systems and evaluate their performance, sustainability, and effectiveness for engineering practice and their impact in global, economic, environmental, and societal contexts
SO 7 Effectively manage, individually or in groups, specialized tasks and activities in coursework, projects, assignments, and research work with a high level of autonomy and responsibility.</td></tr>
<tr><td>Topics Covered</td><td><table>
<tr><th>List of Topics</th><th>Related CLOs</th></tr>
<tr><td>1. Design for Stability using Direct Analysis Method and Alternative Methods</td><td>CLO 1,3</td></tr>
<tr><td>2. Design of Compression Built-up sections</td><td>CLO 3,4</td></tr>
<tr><td>3. Behavior and Design of plate girder</td><td>CLO 2,5</td></tr>
<tr><td>4. Behavior and design of composite beams</td><td>CLO 2,6</td></tr>
<tr><td>5. Behavior and design of composite columns</td><td>CLO 2,6</td></tr>
<tr><td>6. behavior and design of bolted and welded connections with different load conditions</td><td>CLO 7,8</td></tr>
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<tr><td>Textbook(s) and Other Required Material</td><td>• “Structural Steel Design”, Jack C. Mc Cormac,& Stephen Csernak, Latest Edition, Pearson Education Limited.
• “Steel Structures: Controlling Behavior Through Design”, Robert E. Englekirk, 1st Edition, John Wiley and Sons Ltd, 1994</td></tr>
<tr><td>Grading System</td><td>Assignments 20%
Lecture Attendance --
Mini Project and Oral Presentation 10%
Mid-term exam 30%
Final Exam 40%</td></tr>
<tr><td>Instructors</td><td>Prof. Dr. Shehab Mourad; Office 2A38; email: smourad@ksu,edu.sa</td></tr>
<tr><td>Date of Review</td><td>November, 2024</td></tr>
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