

College of Engineering

Department of Civil Engineering

جامعة
الملك سعود
King Saud University



CE 573 Behavior of Metallic Structures

Credit and Contact hours	3/ 3 (Lectures), 0 (Tutorials), 0 (Laboratory)	
Required, or Elective	Elective for a MSCE degree	
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	Related Program Outcomes
	CLO1: Recognize the role of members stability in analysis and design of steel structures	K1
	CLO2: Recognize the behavior and limit states of plate girders, composite sections and connections.	K1
	CLO3: Recognize design specifications and codes of steel structures	K1
	CLO4: Apply stability design criteria to steel members and structures	S1
	CLO5: Design built-up compression steel members	C2
	CLO6: Design plate girders	C2
	CLO7: Design composite steel beams and columns	C2
CLO8: Design bolted and welded connections under different load conditions	C2	

Student Outcomes related to this Course	<p>K1. Recognize advanced engineering knowledge, concepts and techniques to identify, interpret and analyze complex and real-life engineering problems.</p> <p>S1. Provide solution for complex and real-life engineering problems through critical thinking and using modern engineering tools and identify its impact on social and ethical issues.</p> <p>C2. Design novel advanced Civil Engineering systems and evaluate its performance and effectiveness for engineering practice and its impact on society.</p>																									
Topics Covered	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">List of Topics</th> <th style="text-align: center;">Related CLOs</th> </tr> </thead> <tbody> <tr> <td>1. Concepts and Assumptions for Design for Stability</td> <td style="text-align: center;">CLO1</td> </tr> <tr> <td>2. Design for Stability using Direct Analysis Method and Alternative Methods</td> <td style="text-align: center;">CLO4</td> </tr> <tr> <td>3. Limit States, and Specifications for design steel sections</td> <td style="text-align: center;">CLO3</td> </tr> <tr> <td>4. Design of Compression Built-up sections</td> <td style="text-align: center;">CLO5</td> </tr> <tr> <td>5. Behavior of plate girders</td> <td style="text-align: center;">CLO2</td> </tr> <tr> <td>6. Design of plate girder</td> <td style="text-align: center;">CLO6</td> </tr> <tr> <td>7. Behavior of composite sections</td> <td style="text-align: center;">CLO2</td> </tr> <tr> <td>8. Design of composite beams</td> <td style="text-align: center;">CLO7</td> </tr> <tr> <td>9. Design of composite columns</td> <td style="text-align: center;">CLO7</td> </tr> <tr> <td>10. Behavior of different types of bolted and welded connections with different load conditions</td> <td style="text-align: center;">CLO2</td> </tr> <tr> <td>11. Design of bolted and welded connections with different load conditions</td> <td style="text-align: center;">CLO8</td> </tr> </tbody> </table>	List of Topics	Related CLOs	1. Concepts and Assumptions for Design for Stability	CLO1	2. Design for Stability using Direct Analysis Method and Alternative Methods	CLO4	3. Limit States, and Specifications for design steel sections	CLO3	4. Design of Compression Built-up sections	CLO5	5. Behavior of plate girders	CLO2	6. Design of plate girder	CLO6	7. Behavior of composite sections	CLO2	8. Design of composite beams	CLO7	9. Design of composite columns	CLO7	10. Behavior of different types of bolted and welded connections with different load conditions	CLO2	11. Design of bolted and welded connections with different load conditions	CLO8	
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Textbook(s) and Other Required Material	<ul style="list-style-type: none"> • “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 																									
Grading System	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;">Assignments</td> <td style="text-align: right;">20%</td> </tr> <tr> <td>Mini Project and Oral Presentation</td> <td style="text-align: right;">10%</td> </tr> <tr> <td>Midterm Exam</td> <td style="text-align: right;">30%</td> </tr> <tr> <td>Final Exam</td> <td style="text-align: right;">40%</td> </tr> </table>		Assignments	20%	Mini Project and Oral Presentation	10%	Midterm Exam	30%	Final Exam	40%																
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Instructors	Prof. Dr. Shehab Mourad; Office 2A38; email: smourad@ksu.edu.sa																									
Date of Review	February, 2021																									