

College of Engineering

Department of Civil Engineering

جامعة  
الملك سعود  
King Saud University



## CE 473 Steel Structures

<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>	Introduction to types of structural steel and steel structures. Concept of LRFD method. Strength and design of tension members with bolted and welded connections. Strength and design of columns, beams and beam-columns. Design of bolted and welded connections, splices, and column base plates. Analysis and design of roof trusses and frame structures.		
<b>Prerequisites or Co-requisites</b>	CE 360 (Structural Analysis I),		
<b>Course Learning Outcomes</b>	<b>Course Learning Outcomes</b>		<i>Related Student Outcomes (SO)</i>
	<b>CLO1.</b> Evaluate strength of existing bolted and welded tension members, and connections by applying the LRFD specifications.		<b>SO4</b>
	<b>CLO2.</b> Design tension members and connections by applying LRFD specifications, and considering both safety and economic aspects.		<b>SO2</b>
	<b>CLO3.</b> Design of columns, and beams considering the effect of local and global buckling by applying the LRFD specifications and design aids		<b>SO2</b>
	<b>CLO4.</b> Evaluate the strength of existing beams, columns and beam-columns by applying the LRFD specifications and design aids.		<b>SO4</b>
	<b>CLO5.</b> Illustrate all analysis and design stages of typical steel structures through the presentation and discussion of the work in a professional way to students and faculty.		<b>SO3</b>
<b>Student Outcomes related to this Course</b>	<p><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> <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 and 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>		<b>Related CLOs</b>
	1. Introduction to Steel structures. (Typical layouts-steel material and sections- Advantages and disadvantages)		CLO1
	2. Concept of LRFD approach.		CLO1
	3. Strength of Bolted and welded tension members and connections		CLO1
	4. Design of Bolted and welded tension members and concentric bolted and welded connections.		CLO2

	5. Design of axially loaded columns considering local and global buckling	CLO3
	6. Design of beams for flexural, shear and serviceability conditions	CLO3
	7. Strength of beams, columns and Beam-columns.	CLO4
	8. Design of typical shear and moment connections and base plates	CLO2
	9. Review, discuss and illustrate the progress in steel project	CLO5
<b>Textbook(s) and Other Required Material</b>	5. "Structural Steel Design, LRFD Method", Jack C. McCormac, James Nelson, 2003 by Pearson Education International. 6. Manual of Steel Construction, LRFD, volume 1 and 2, Metric Conversion of the second Edition, 1999, AISC. 1. The Saudi Building Code; SBC 306, Steel Structures	
<b>Grading System</b>	Mid-term exams 30 % Quizzes, Attendance 10% Project 20% Final Exam: 40%	
<b>Instructors</b>	Prof. Shehab M. Mourad (2A38), email; smourad@ksu.edu.sa	
<b>Date of Review</b>	September 2020	