Course Specification
(Bachelor)

Course Title:	Design of Steel Structures
Course Code:	CE 4107
Program:	Bachelor of Science in Civil Engineering
Department:	Civil Engineering Department
College:	College of Engineering and Architecture
Institution:	Umm Al-Qura University
Version:	1
Last Revision Date:	31 January 2025

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A. General information about the course:

1. Course Identification

1. Credit hours: (3)					
2. Course type					
A.	☐ University	☐ College	☒ Department	☐ Track	☐ Others
B.	☒ Required		☐ Elective		
3. Level/year at which this course is offered: (7th/4th year)					
4. Course General Description:					
The course contains the mechanical properties of steel along with load combinations. It covers the analysis and design of tension members. It comprises the analysis and design of steel compression members, and base plates. It includes the analysis and design of members subjected to bending and axial loads. The connections, and continuous beams and frames, design according to (AISC) specifications is also included.					
5. Pre-requirements for this course (if any)**:**					
Theory of structures CE 2103					
6. Co-requisites for this course (if any)**:**					
Nil					
7. Course Main Objective(s):					
1. Ability to analyze and design tension members in accordance to the AISC specifications. 2. Ability to analyze and design compression members under axial and biaxial loads and frames, in accordance to AISC specifications. 3. Ability to design flexural members in accordance to AISC specifications. 4. Ability to design connections and connectors in accordance to AISC specifications.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	45	100%

No	Mode of Instruction	Contact Hours	Percentage
2	E-learning		
3	Hybrid • Traditional classroom • E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	45
2.	**Laboratory/Studio**	
3.	**Field**	
4.	**Tutorial**	
5.	**Others (specify)**	
Total		45

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Demonstrate fundamental knowledge of structural steel design taking economic considerations.	K1	Lectures and training tutorials, team work project.	Monthly exams Semester project Final exam
1.2	To illustrate advanced knowledge of techniques, contemporary issues, and skills of using modern engineering methods and tools needed in designing structural steel.	K2	Lectures and training tutorials, team work project.	Monthly exams Semester project Final exam
2.0	**Skills**			
2.1	To solve a variety of structural steel design	S1	Lectures and training tutorials,	Monthly exams Semester project

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	problems applying mathematics and science theories and principles.		team work project.	Final exam
2.2	To design optimum systems/components of steel structure elements to meet the desired needs using realistic constraints.	S3	Lectures and training tutorials, team work project.	Monthly exams Semester project Final exam
2.4	To assess and compare the appropriate steel design elements following thorough examinations of diverse steel design alternatives.	S4	Lectures and training tutorials, team work project.	Team work project report
3.0	**Values, autonomy, and responsibility**			
3.1	To integrate professionally and ethically with multidisciplinary teams in steel structures design projects, operations and services.	V1	Team work project	Team work project report
3.2	To judge complex steel structure design problems using official codes, specification and practices, and demonstrate ability of life-long learning.	V3	Team work project	Team work project report
3.3	To develop expertise in steel structure design required for real-life projects serving society and providing solutions for Hajj and Umrah.	V3	Team work project	Team work project report

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to Structural Steel Design	3

2.	Specifications, Loads, and Methods of Design	3
3.	Analysis of Tension Members	3
4.	Design of Tension Members	3
5.	Introduction to Axially Loaded Compression Members	3
6.	Design of Axially Loaded Compression Members	3
7.	Design of Axially Loaded Compression Members (Continued) and Column Base Plates	3
8.	Introduction to Beams	3
9.	Design of Beams for Moments	3
10.	Design of Beams–Miscellaneous Topics (Shear, Deflection, etc.)	3
11.	Bending and Axial Force (1)	3
12	Bending and Axial Force (2)	3
13.	Bolted Connections	3
14.	Welded Connections	3
15.	Building Connections	3
Total		**45**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Exam 1	3	10%
2.	Exam 2	6	10%
3.	Exam3	9	10%
4.	Project	13	20%
5.	Final Exam	14-15	50%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	• Steel Construction Manual, American Institute for Steel Construction(AISC) 14th edition, 2018.
Supportive References	• Structural Steel Design, Jack C. McCormac Clemson UniversityStephen F. Csernak. 7th edition, Published by Pearson (October 12, 2023) © 2024 • Unified Design of Steel Structures, by Louis F. Geschwindner, Judy Liu, Charles J. Carter.
Electronic Materials	• International Journal of Steel Structures • Journal of Steel Structures & Construction

	• ٥ Journal of Constructional Steel Research
Other Learning Materials	• https://www.journals.elsevier.com • https://www.omicsonline.org • https://www.scimagojr.com

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	• Class room • White board
Technology equipment (projector, smart board, software)	• Printers • Laptop • Engineering Software • Projector
Other equipment (depending on the nature of the specialty)	• International journal membership

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	students	• Students questioners at the end of the semester. • Analysis of students feedback.
Effectiveness of Students assessment	Civil engineering Course coordinator	The faculty member would submit a course folder containing detailed information about the course, students achievements and feedback.
Quality of learning resources	The specialized committee in each civil engineering division.	• C.E program Assessment Committee analyzes the data collected through various sources, e.g., student feedback surveys assignments grades etc. • Periodical workshop may be conducted to improve quality.

Assessment Areas/Issues	Assessor	Assessment Methods
The extent to which CLOs have been achieved	Done by the Assessment Committee during the Faculty Council meeting.	The results are discussed with the faculty (by The Assessment Committee) during the Faculty Council meeting. The recommendation are documented. An action plan would be made for improvement after the approval of the Department Faculty Council and to be sent to The College Council for approval and implementation.
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	CIVIL ENGINEERING COUNCIL
REFERENCE NO.	THE FIFTEENTH SESSION OF THE ACADEMIC YEAR 1446
DATE	30 APRIL 2025

