



College: Engineering

Department: Civil Engineering

Course Title : Design of Steel Structures

Course No : 0901404

Credit Hours : 3 C.H.

Semester: 2020/2021

About The Course

Course Title : Design of Steel Structures

Class : 1

Course No : 0901402

Credit Hours : 3C.H.

Lecture Room: 202

Obligatory / Optional : Obligatory

Text Book: Segui, W. T. (2013). " LRFD Steel Design", Fifth Edition.

The Instructor

Name : Title: Engineering

Office Tel / ext. :

Office No :

Office Hours : 09:30-11:00 and 12:30-02:00 SUN,TUS , 11:00-12:30 MON,WED

E-mail:

Course Description

This course teaches the engineering thought process through the design of steel structures. The course uses fundamentals of statics, mechanics of materials, and structural analysis and applies them to the design of structural members, with emphasis on satisfying real-world needs. Topics include an introduction to the design of structural systems, design of steel tension and compression members, design of beams and beam-columns, and an introduction to connection design. All design is performed in accordance with codes and specifications used in current engineering practice. A comprehensive design problem requires development of a design methodology, consideration of alternative solutions, and design of an optimal steel structure to meet stated functional requirements.

Course Objectives

This course is designed to enable civil engineering students to apply classic structural behavior principles, along with the AISC LRFD Specification, to the proper analysis and design of steel structures. Students are required to demonstrate proficiency in the analysis and design of tension members, tension connections, (both welded and bolted), compression members, flexural members, beam-columns and the complex structures comprised of such members.

A concurrent and explicit goal is to develop the ability to take an engineering approach to problem solving, i.e., to define the problem, formulate and evaluate alternatives, and make rational, reasonable and economical decisions. The use of several PC- based software packages is emphasized throughout the course. Students are exposed to elements of the structural steel industry through a construction site visit and by a guest lecture.

Learning Outcome

A concurrent and explicit goal is to develop the ability to take an engineering approach to problem solving, i.e., to define the problem, formulate and evaluate alternatives, and make rational, reasonable and economical decisions. The use of several PC- based software packages is emphasized throughout the course. Students are exposed to elements of the structural steel industry through a construction site visit and by a guest lecture.

Course Outline and Time schedule

Week	Course Outline	
1/16	<i>Introduction: Basic Structural Shapes, Steel structures, Structural Steel Cross Sections, Structural Steel Materials, Building Codes and Specifications, Design philosophies, Probabilistic Basis for LRFD Determining AISC load and resistance factors.</i>	Chapter 1
2/16	<i>Structural loads Design of Tension Members: Typical tension members, Design criteria, tensile strength, Net and gross areas, Examples.</i>	Chapter 1 & 2 Chapter 3
3/16	<i>Design of Tension Members: Effective area,</i>	Chapter 3

	<i>Block shear, tensile strength, Examples.</i>	
4/16	Design of Tension Members: How to design a tension member, Threaded rods, Cables and pin connected members. Examples.	Chapter 3
5/16	EXAM I	
6/16	Review of section properties. Design of Compression Members: Buckling of Compression members and buckling failure modes, Effective length	Review Chapter 4
7/16	<i>Design of compression members</i>	
8/16	<i>Local buckling</i>	
9/16	<i>Buckling factor for rigid frames, Examples</i>	
10/16	Design of Flexural Members: Classification of sections, Moment curvature, Flexural stability and lateral torsional buckling	Chapter 5
11/16	EXAM II Compression member	
12/16	Design of Flexural Members: Shear strength of bending elements, Serviceability requirements, Design of beams, Design of beam bearing plates	Chapter 5
13/16	Beam-Column Design: Beam-columns , Moment amplification analysis, Compact sections for beam columns, Braced and unbraced frames, Analysis/design of braced and un-braced frames	Chapter 6
14/16	FINAL EXAM	

Presentation methods and techniques

Methods of teaching varied according to the type of text, student and situation. The following techniques are usually used:

- 1- Lecturing with active participations.
Involve the civil engineering students in asking some questions related to the target topic of the course.
- 2- Problem solving.
Encourage the students to solve the given assignments and submit them at the definite time,
- 3- Cooperative learning.
By enhancing the students studying in groups .

- 4- Discussion.
To discuss the results and the answers of the target problems.
- 5- Learning by activities.
To encourage the students to some group activity.
- 6- Connecting students with different sources of information.

Sources of information and Instructional Aids

- Computer softwear ... power point
- Using weight board.

Assessment Strategy and its tools

The assigned syllabus is assessed and evaluated
Through: feed back and the skills that are acquired by the students
The tools:

- Assignments: 10%
- Attendance: 10%
- Term Tests: 20 +20%
- Final Examination: 40 %

Tool & Evaluation

Tests and attendance are permanent tools & assessment, in addition to the activity file which contains curricular and the co-curricular activities, research, report papers and the active participation of the student in the lecture.

The following table clarifies the organization of the assessment schedule:

Test	Date	Grade
First Exam	24/3/2019	20
2 nd Exam	5/5/2019	20
Assignments and Attendance	Students should be notified about their marks	20
Final Exam	2/6 - 5/6/2019	40

Activities and Instructional Assignment

- 1- Practical assignments to achieve the syllabus objectives.
- 2- Group Activity and demonstrations.

Regulations to maintain the teaching-Learning Process in the Lecture:

- 1- Regular attendance.
- 2- Respect of commencement and ending of the lecture time.
- 3- Positive relationship between student and teacher.
- 4- Commitment to present assignments on time.
- 5- High commitment during the lecture to avoid any kind of disturbance and distortion.
6. Allowed Absence percentages is (15%).

References :

- Segui, W. T. (2013). " LRFD Steel Design", Fifth Edition.
- AISC (2010). Manual of Steel Construction – Load and Resistance Factor Design, 13th and 14th Editions, American Institute of Steel Construction, Chicago, IL.

Syllabus Classification

Objectives	<i>Learning outcome</i>	<i>Assessment tools</i>
<ul style="list-style-type: none"> • Introduction 	<p><i>To develop the student's skills in order to Basic Structural Shapes, Steel structures, Structural Steel Cross Sections, Structural Steel Materials, Building Codes and Specifications, Design philosophies, Probabilistic Basis for LRFD Determining AISC load and resistance factors.</i></p>	<p><i>By using solved problems. Power point and weight board.</i></p>
<ul style="list-style-type: none"> • Design of Tension Members 	<ul style="list-style-type: none"> • <i>To produce student in civil engineering to be familiar</i> 	<p><i>By using solved problems. Power point and weight board.</i></p>

	<i>design a tension member, Threaded rods, Cables and pin connected members. with, velocity, and acceleration.</i>	
<ul style="list-style-type: none"> • <i>Design of Compression Members</i> 	<i>To produce student in civil engineering to be familiar Buckling of Compression members and buckling failure modes, Effective length.</i>	<i>By using solved problems. Power point and weight board.</i>
<ul style="list-style-type: none"> • <i>Design of Flexural Members</i> 	<i>To produce student in civil engineering to be familiar Classification of sections, Moment curvature, Flexural stability and lateral torsional buckling, Shear strength of bending elements, Serviceability requirements, Design of beams, Design of beam bearing plates.</i>	<i>By using solved problems. Power point and weight board.</i>
<ul style="list-style-type: none"> • <i>Beam-Column Design</i> 	<i>To produce student in civil engineering to be familiar: Beam-columns, Moment amplification analysis, Compact sections for beam columns, Braced and unbraced frames, Analysis/design of braced and un-braced frames.</i>	<i>By using solved problems. Power point and weight board.</i>

