



CE 411 – Steel Structures

Code and Name: CE 411 – Steel Structures

Credit Hours: 3 (Lecture: 3, Tutorial: 1)

Textbook:

Steel Structures – Design and Behavior by Charles Salmon, John Johnson and Faris Malhas, 5th Ed., Pearson, 2009

Other References:

American Institute of Steel Construction (AISC) Manual 13th Edition

Course Description:

Introduction to the design of steel structures; analysis and design of members and various types of bolted and welded connections; strength, serviceability and stability requirements in the current design codes; gravity and lateral load resisting systems; plastic analysis and design; introduction to computer based design of steel structures; overview of structural steel drawings and fabrication and erection practices for steel structures.

Pre-requisites: CE 311 (Structural Engineering)

Co-requisites: None

Course Learning Outcomes:

With relation to ABET Student Outcomes (From Fall 2019-SOs: 1-7)

1. Understand various limit states for the design of structural steel members and know the basic requirements of the American Institute of Steel Construction (AISC) design specifications for the economical design of structural members. (4)
2. Design the steel tension members (2)
3. Design the compression members (2)
4. Design connections with bolts and welds (2)
5. Design both laterally braced and unbraced beams (2)
6. Design the beam-columns (2)
7. Apply the concept of plastic analysis for beams and frames
8. Design composite beams with shear connectors (2)
9. Identify and analyze the alternative solutions for the design and analysis of structural steel elements (1,2)

Topics to be covered:

- Introduction to steel structures, design philosophies, design codes, loads, types of structural steel
- Tension members: failure modes, design
- Connections in steel structures – Bolted connections and welded connections
- Compression members: stability and Euler buckling, Effective length and code based design
- Laterally supported beams – flexural design, shear strength and serviceability
- Laterally unsupported beams – flexural design
- Analysis and design of members subjected to bending and axial load
- Plastic analysis and design, Lateral load resisting systems in steel structures
- Composite steel-concrete construction – flexural design and shear connectors

Grading Policy:

The grading for the course is: 60% coursework and 40% Final Exam. The course work consists of two Midterm Exams, where each midterm exam is worth 20%. It also includes quizzes, and projects for the remaining 20% that is modified by the course instructor.

