

1. CEE 4350 (5350) – Advanced Structural Design
2. Course credit hours: 3
Contact hours per week: 3
Credit category: Engineering Topics (Significant Design)
3. Course coordinator: Tim Huff
4. Textbook: ASCE 7-16, Minimum Design Loads and Associated Criteria for Buildings and Other Structures, American Society of Civil Engineers, 2016

Supplemental materials:

- a. AISC Steel Construction Manual, 15th edition, 2017, American Institute of Steel Construction
- b. Visual Analysis, Educational Version 18, Structural analysis and design software

5. Course information:

2020 Catalog description	Special topics in analysis and design of steel structures. Plastic design, composite design, plate girders, and special connections.
Prerequisite(s)	CEE 4310
Course type	Selected Elective

6. Course instructional outcomes:

Course Outcome No.	Course Outcome (CO)	ABET Student Outcome
CO1	Apply the Direct Analysis Method to the design of framed structures	1, 2
CO2	Understand the difference between 1st Order and 2nd Order analysis	1
CO3	Analyze eccentrically loaded bolted connections	1
CO4	Perform plastic analysis of beams and simple frames	1
CO5	Select simple (shear) connection details from the AISC Manual	1
CO6	Calculate the flexural capacity of a composite beam	1
CO7	Determine wind and earthquake loads for a building using ASCE 7-16	1, 2, 4
CO8	Evaluate prequalified RBS moment connections for seismic applications	1, 2
CO9	Identify 3 lateral force resisting systems for buildings	1, 2
CO10	Model structures in Visual Analysis, apply loads, specify non-default settings, and perform design checks	1, 2, 4

ABET criterion 3 Student Outcomes addressed by this course:

SO No.	Student Outcome (SO)
3.1	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
3.2	An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3.4	An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts

7. Course topics:

1. Plastic analysis and design (5%)
2. The AISC Direct Analysis Method (15%)
3. Eccentric, shear, and moment connections (5%)
4. Lateral force resisting systems (10%)
5. Design of composite beams and plate girders (10%)
6. Eccentric braced frame mechanics (10%)
7. ASCE 7-16 load calculations (15%)
8. Visual Analysis structural design by computer (35%)

Program criteria (curriculum) addressed by this course:

1. Apply knowledge of mathematics through differential equations, calculus-based physics, chemistry, and at least one additional area of basic science
2. Analyze and solve problems in at least four technical areas appropriate to civil engineering
3. Design a system, component, or process in at least two civil engineering contexts

8. Additional topics, assignments, or requirements for dual-level (4000/5000) course:

The creation of an additional complex structural model in Visual Analysis will be required of graduate students in the course.

9. Date: 01/16/2020