JOHN A. REIF, JR. DEPARTMENT OF
CIVIL AND ENVIRONMENTAL ENGINEERING

NJIT New Jersey Institute of Technology

Course: CE 432-101 - Steel Design Spring 2025

Instructor: Dr. Methi Wecharatana, methi@njit.edu
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(973) 596-2458

Office Hours: Wednesday 4:00-5:30 pm
Thursday 4:00-5:30 pm
Or online by appointment

Textbook: **Steel Design, 6th Edition; Author: William T. Segui; ISBN:** 9781337094740

Design Manual: **AISC Steel Construction Manual, 16th Edition**

Prerequisites: CE332 and CE260. A working knowledge of structural analysis including determinate and indeterminate beams and frames is essential. This course requires students to understand the development of current design procedures for structural steel elements and their use in multistory buildings, bridges, and industrial buildings.

Week	Date	Subject	Chapter
1		Introduction	1
2		Concepts in Structural Steel Design	2
3		Tension Members	3
4		Tension Members	3
5		Compression Members	4
6		Compression Members	4
7	3/13	Exam #1	4

8		Beams	5
9		Beams	
10		Beams	5
11	4/17	Exam #2	0
12		Beam Columns	6
13		Beam Columns	6
14		Connections (Simple and Eccentrics)	7, 8
15		Final Exam	

*Students will be consulted with by the instructor to any modifications or deviations from the syllabus throughout the course of the semester.

Academic Integrity: Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. **Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university.** If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu

Communication: All communication by the instructor will be done through Canvas or email. It is your responsibility to check e-mail, and the course page on Canvas regularly.

Lectures/Class: This is a face-to-face course. Attendance to all lectures is expected. Please turn all cell phones off during class, keep laptops closed, and be respectful to the course instructor and your classmates. You should always bring a pencil and calculator with you to class.

Homework: Homework will be assigned to encourage further reading, to extend the material presented in lectures, and to provide practice in arriving at engineering solutions to problems. Completion of the homework is an essential part of the learning process. All homework is to be turned in individually unless specified otherwise on the assignment. If you collaborate with a classmate, be sure to state that collaboration and his/her name at the top of your assignment.

Homework Format: It is expected that all homework be presented in an organized manner; use engineering paper, if possible, one side of each page (clear side, not grid side); begin each problem on a new page and number all pages; have your name written clearly on the front page.

Homework Grading: All homework will be submitted electronically on Canvas. It is your responsibility to scan your assignment and upload it on Canvas before the due date. All homework will be collected and graded. Presentation will account for 33% of the grade.

Late Homework: Late Homework will be accepted up to 72 hours after the due date with a 30-point penalty on the grade. After 72 hours, submissions will not be accepted.

Exams: There will be three exams during the semester plus a cumulative final exam.

Calculation of Course Grade: A weighted average grade will be calculated as follows:

Homework 10%
2-Exam Average 60%
Final Exam 30%

The minimum requirements for final letter grades are as follows:

A = 90.0%, B+ = 85.0%, B = 80.0%, C+ = 75.0%, C = 70.0%, D = 60.0%, F < 60.0%

Note: Grades are not curved. It is theoretically possible for everyone in the class to get an A (or an F). Your performance depends only on how you do and how much you learn, not on how everyone else in the class does. It is therefore in your best interest to help your classmates, while acting within the bounds of the stated academic integrity policy (i.e., NJIT's Code of Academic Integrity).

Instructor Commitment: You can expect the Instructor to be courteous, punctual, organized, and prepared for lecture and other class activities; to answer questions clearly; to provide a suitable guest lecturer or pre-recorded lecture when they are traveling; and to grade uniformly and consistently.

Students with Documented Disabilities: NJIT is committed to providing students with documented disabilities equal access to programs and activities. If you have, or believe that you may have a physical, medical, psychological, or learning disability that may require accommodations, please contact the Coordinator of Student Disability Services located in the Center for Counseling and Psychological Services, in Campbell Hall, Room 205, (973) 596-3414. Further information on disability services related to the self-identification, documentation and accommodation processes can be found at: https://www.njit.edu/accessibility/accommodations-and-support-services

Legal Disclaimer: Students' ability to meet outcomes listed may vary, regardless of grade. They will achieve all outcomes if they attend class regularly, complete all assignments with a high degree of accuracy, and participate regularly in class discussions. This syllabus is subject to change at the discretion of the instructor throughout the term.

Course Objectives:

1. Illustrate and develop methodologies and introduce and employ the concept of codes and specifications for design of structural steel members and elementary structures.
2. Apply and enhance the knowledge of strength of materials and structural analysis.
3. Incorporate proper use of modern engineering tools for problem solving and communication.

Course Objectives Matrix – CE 432 Structural Steel Design

Strategies, Actions and Assignments	ABET Student Outcomes (1-7)	Program Educational Objectives	Assessment Measures
Student Learning Outcome 1: Apply design methodologies and concept of codes and specifications for design of structural steel members and elementary structures			
Illustrate load and resistance factor design LRFD and allowable stress design (ASD) philosophies. Formulate the LRFD methodology.	1,2	1,2	Homework, projects, quizzes, and exams.
Discuss AISC Construction Manual Load & Resistance Factor Design (LRFD).	1,2	1	Homework, projects, quizzes, and exams.
Student Learning Outcome 2: Apply and enhance the knowledge of strength of materials and structural analysis.			
Incorporate and apply basic knowledge of strength of materials and structural analysis.	1,2	1	Homework, projects, quizzes, and exams.
Student Learning Outcome 3: Use modern engineering tools for problem solving and			
Introduce state of the art analysis and design software (STAAD/Pro), and code.	7	1,2	Homework and projects that are solved using STAAD/Pro, and AISC Manual
Discuss the pitfalls with “black box” use of computers and interpretation of computer output.	7	1,2	Certain homework and projects are solved both manually and by STAAD/Pro, and AISC Manual

CEE Mission, Program Educational Objectives and Student Outcomes

The **Mission** of the John A. Reif Jr. Department of Civil and Environmental Engineering is to:

- Educate a diverse student body to be employed in the engineering profession.
- Encourage research and scholarships among our faculty and students.
- Promote service to the engineering profession and society.

Program Educational Objectives

Our **Program Educational Objectives** are reflected in the achievements of our recent alumni:

- **Engineering Practice:** Alumni will successfully engage in the practice of civil engineering within industry, government, and private practice, working towards safe, practical, resilient and sustainable solutions in a wide array of technical specialties including construction, environmental, geotechnical, structural, transportation, and water resources.
- **Professional Growth:** Alumni will advance their technical and interpersonal skills through professional growth and development activities such as graduate study in engineering, research and development, professional registration and continuing education; some graduates will transition into other professional fields such as academia, business, and law through further education.
- **Service:** Alumni will perform service to society and the engineering profession through membership and participation in professional societies, government, educational institutions, civic organizations, charitable giving and other humanitarian endeavors.

Student Outcomes

Our **Student Outcomes** are what students are expected to know and be able to do by the time of their graduation:

- an ability to identify, formulate and solve complex engineering problems by applying principles of engineering, science and mathematics
- 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
- an ability to communicate effectively with a range of audiences
- 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
- an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks and meet objectives
- an ability to develop and conduct appropriate experimentation, analyze and interpret data and use engineering judgment to draw conclusion
- an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Updated 1/6/2025