New Jersey Institute of Technology

CE 432 - Structural Steel Design Summer 2025

Text:	Segui, William, Steel Design, **6th Edition**, Cengage Learning ISBN: 978-1337094740 and AISC Steel Construction Manual - **16th Edition**.
Instructor:	Prof. Raj Navalurkar, Raj.Navalurkar@mbakerintl.com Central King Building 222 and via ZOOM Sunday 9-2:30PM (Note: this is hybrid course)
Office Hrs:	Upon request and in-person on campus.

Prerequisite: *A working knowledge of structural analysis including determinate and indeterminate beams and frames is essential. The development of current design procedures for structural steel elements and their use in multistory buildings, bridges, and industrial buildings.*

POLICIES & PROCEDURES

Academic Integrity: It is expected that NJIT's University Code on Academic Integrity will be followed in all matters related to this course. Refer to NJIT's Dean of Students website to become familiar with the Code on Academic Integrity and how to avoid Code violations.

https://www.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf

Communication: Describe your policy on how you communicate to the class outside of class (i.e., e-mail, canvas, etc.)
Lectures/Class: Describe your policy on attendance at lectures and in class. Describe how you expect the students to participate during classes.
Handouts: Describe your policy on how handouts will be made available (e.g, online, in-class printouts, etc.).
Homework: Describe your policy on how often homework will be assigned and if they will work individually or in groups.
Homework Format: Describe your policy on how homework should be formatted. Provide and distribute an example of properly formatted homework if possible.
Late Homework: Describe your policy on how late homework will be accepted, if it is, and how deductions will be taken.
Homework Solutions: Describe your policy on how homework solutions will be distributed and made available.
Exams: Describe your policy on quizzes/exams. Explain what resources students will be allowed to take in during quizzes/exams.
Calculation of Course Grade: A weighted average grade will be calculated as follows:
Describe how your assignments, exams, quizzes, projects, etc. are weighted.

Homework	10%
In-Class Quizzes (2)	60%

Final Exam 30%

The minimum requirements for final letter grades are as follows:

A = 88.0%, B+ = 82.0%, B = 75.0%, C+ = 68.0%, C = 60.0%, D = 55.0%, F < 55.0%

Grades are not curved in computing the final grade.

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 be available during office hours or to notify you beforehand if office hours are moved; to provide a suitable guest lecturer or pre-recorded lecture when they are traveling or unavailable; and to grade uniformly and consistently.
AI statement: The use of artificial intelligence (AI) is permitted in this course only when explicitly stated in assignments. If students use AI for any course-related work, they must cite it according to the guidelines provided on the **NJIT Library AI Citation page**. If you have any questions about AI use in this course, please contact the course instructor before submitting any assignments. In cases where AI use is not allowed, students are expected to complete work without AI assistance to develop their skills in this subject area.

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 on the webpage at: (http://www.njit.edu/counseling/services/disabilities.php)

Course Schedule: Include a table with a preliminary schedule including estimated exam dates, course topics, project dates, etc.

Week	Topics	Pages	Problems (To be assigned in class)
1	Introduction to Steel Design, Concepts, Specifications and Applied Loads	Chapter 1,2 Page 1-40	To be assigned in class
2	Tension Members	Chapter 3 Page 41-108	
3,4	Compression Members	Chapter 4 Page 109-188	
5	Introduction to Beams	Chapter 5 Page 189-298	

6	Review & Qui (2 hrs.)	Open Book-Open Note	
7,8	Beam Design and Analysis	Chapter 5 Page 189-298	
9,10	Beam Columns	Chapter 6 Page 299-376	
11	Review &Quiz (2 hrs.)	Open Book/Open Note	
12	Simple Connections	Chapter 7 Page 377-476	
13	Eccentric Connections	Chapter 8 Page 477-592	
14	Plate Girders	Chapter 10 Page 665-717	
15	Final Exams (2.5) hrs.)	Open Book/Open Note	

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Course Objectives Matrix – CE 432

Strategies and Actions	Course Student Learning Outcomes	**Student Outcomes (1-7)**	Program Educational Objectives	Assessment Methods/Metrics
Course Objective: Illustrate and develop the design methodologies and introduce and employ the 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.	Learn basic design concepts and modes of failure. Learn the relationship between theoretical concepts and design procedures	1, 3, 5, 6, 7 1, 2, 3, 4	1,2 1	Homework, projects, quizzes, and exams. Homework, projects, quizzes and exams.
Discuss AISC Construction Manual Load & Resistance Factor Design (LRFD).	Gain professional knowledge required to design safe, serviceable and economical steel structures.	1, 3, 4, 6, 7	1	Homework, quizzes, and final exam.

CEE Mission, Program Educational Objectives and Student Outcomes

The mission of the Department of Civil and Environmental Engineering is:

- to educate a diverse student body to be employed in the engineering profession
- to encourage research and scholarships among our faculty and students
- to promote service to the engineering profession and society

Program Educational Objectives

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

1. **Engineering Practice:** Alumni will successfully engage in the ethical 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.
2. **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.
3. **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:

1. an ability to identify, formulate and solve complex engineering problems by applying principles of engineering, science, and mathematics
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. an ability to communicate effectively with a range of audiences
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
5. 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
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data and use engineering judgment to draw conclusion
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Updated 5/025

Updated 6/4/2025