
CEE 332-142 : Structural Analysis
(3 credits)

Lectures 6:00 pm - 8:50 pm; Mondays/Wednesdays (Hybrid)
[05/27/25 to 07/21/2025]- 8 weeks : 16 Classes

Instructor Dr. Avinash Prasad; PE, PLS, F.ASCE Office Hours:
Online by appointment
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Prerequisite: MECH 237 - Strength of Material
Required Textbook

Mastering Edition: Hibbeler, Russell C., Structural Analysis, 11th Edition, Prentice Hall; ISBN:
13:978-0-13-8022625-7

All reading and homework assignments are shown on the Pearson Website. Students must make sure their names appear on the NJIT and Pearson rosters.

[Students follow these steps to access your course](#)

Course Objectives: Provide the ability to understand the behavior of structures under different loading conditions.

1. Develop the principles and equations for the analysis of statically determinate and indeterminate analysis in preparation for subsequent design courses.
2. Gain experience with commercial structural analysis/design software.

Proposed Topics:

Introduction: Stability and Classification of Structural Behavior
Analysis of Determinate Trusses: Methods of Joints and Sections
Deflection of Trusses: Virtual Work Method
Analysis of Determinate Beams and Frames
Slopes and Deflections: Conjugate Beam Method
Influence Lines: Moving Loads
Cables & Arches
Indeterminate Structures: Consistent Deformation Method
Indeterminate Structures: Slope Deflection Method
Indeterminate Structures: Moment Distribution Method
Rigid Frames: Slope Deflection and Moment Distribution Methods
Approximate Analysis of Structure

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

Lectures/Class: This is a hybrid course. Attendance to all lecture/class periods is expected. Please turn all cell phones off during class and be respectful to the course instructor and your classmates.

Handouts: No Handouts; Lectures will be posted on Canvas.

Homework: The assigned problems shown on the Pearson website are worth 25 points total

Late Homework: No late Homework is allowed.

Homework Solutions: Homework solutions will be posted on Canvas after its due date.

Exams: TBD

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

Mastering Edition HW	25%
Multiple Quizzes(at Least 4)	40%
Attendance & Participation	10%
Final Exam	25%

MANDATORY "F" GRADE WILL BE AWARDED FOR FAILING IN THREE OR MORE QUIZZES. "70" AND MORE GRADE POINTS OUT OF 100 IS REQUIRED TO PASS A QUIZ.

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%

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.

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 [05/27/25 to 07/21/2025]-8 weeks : 16 Classes

DAY	Proposed Topics	Home Work/Quiz
1 (May 28, 2025) Wed	Review of Pre-requisite (Strength of Material); Truss Analysis, Method of Joint/Section:	See masteringengineering assignments (All Weeks)
2 (June 2; 2025) Mon	Truss Analysis, Method of Joint/Section: Quiz#1	Face to Face Quiz#1
3	Beams in Bending; Shear Force & Bending Moment Diagrams	See masteringengineering assignments (All Weeks)
4	Frame Analysis- Axial Force, Shear Force & Bending Moment Diagrams	See masteringengineering assignments (All Weeks)
5	Influence Line; Maximum Response under moving loads	See masteringengineering assignments (All Weeks)
6 (June 16, 2025)	Review of Previous Lectures; Quiz#2	Face to Face Quiz#2
7	Cables & Arches; Conjugate Beam Method, Moment Area Method	See masteringengineering assignments (All Weeks)
8	Deflection of Trusses: Virtual Work Method;	See masteringengineering assignments (All Weeks)
9	Conjugate Beam Method, Moment Area Method	See masteringengineering assignments (All Weeks)
10 (June 30, 2025)	Review of Previous Lectures;Quiz#3	Face to Face Quiz#3
11	Deflection of Trusses: Virtual Work Method;	See masteringengineering assignments (All Weeks)
12	Slope Deflection Method	See masteringengineering assignments (All Weeks)
13	Slope Deflection Method; Moment Distribution Method	See masteringengineering assignments (All Weeks)

1416 (July 14; 2025)	Review of Previous Lectures; Quiz#4	Face to Face Quiz#4
15	Overall Course Review	
16 (July 21; 2025)	Final Exam	Face to Face Final Exam

*The NJIT Honor Code will be upheld and any violations will be brought to the immediate attention of the Dean of Students.

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

Course Objectives Matrix – CE 332-142 (Structural Analysis)

Strategies and Actions	Course Student Learning Outcomes	Student Outcomes (1-7)	Program Educational Objectives	Assessment Methods/Metrics
Course Objective 1: Provide the ability to understand the behavior of structures under different loading conditions.				
Illustrate basic structural applications and static analysis	Understand basic principles	1	1	Weekly Homework & Quizzes
Discuss the design of structures	Knowledge of Design principles	3,5	1,2	Weekly Homework & Quizzes
Course Objective 2: Develop the principles and equations for the analysis of statically determinate and indeterminate structures in preparation for subsequent design courses.				
Develop various methods of analysis	Learn the importance of these methods in both determinate and indeterminate structures	1	1,2	Weekly Homework & Quizzes
Provide distinct and detailed examples of how these methods are utilized	Ability to make the connection between theory and practice	3,5	1,2	Weekly Homework & Quizzes
Course Objective 3: Give an introduction to commercial structural analysis/design software.				
Discuss software tools	Learning to use software tools	2	1	Lab report.
Analyze assignments using software tools.	Gain experience with commercial software.	3,5	1	Review of analysis problems.

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 scholarship among our faculty and students
- to promote service to the engineering profession and society

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

1. Engineering Practice: Alumni will successfully engage in the practice of civil engineering within industry, government, and private practice, working toward safe, practical, 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 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.

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 conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.