

CE 332-102: STRUCTURAL ANALYSIS

SPRING 2025

- Text: Names: Hibbeler, R. C., author. Title: Structural Analysis/R. C. Hibbeler. Any Edition
- Class: CE 332-102
- Location: FMH 213
- Time:Lecture: Wednesday 6:00pm 8:50pm
- Instructor: Prof. S. Saigal, Ph.D., P.E. Email: <u>saigal@njit.edu</u>, 213 Colton Hall, 973-596-5443

Teaching TBA Assistant:

Prerequisites: MECH 235 with a grade of C or better. A working knowledge of free body diagrams, equilibrium conditions for force systems and moments under concentrated and distributed forces.

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: <u>http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf</u>.

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 <u>dos@njit.edu</u>"

SYLLABUS

WEEK	TOPIC
1	Review of Concepts from Statics and Mechanics of Materials
	Chapter 3: Review of Analysis of Statically Determinate Trusses
2	Chapter 4: Review of Shear and Moment Diagrams for Statically
	Determinate Beams
2	Chapter 4: Axial Force, Shear and Moment Diagrams for
3	Statically Determinate Frames
4	Chapter 6: Influence Lines for Statically Determinate Structures
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5	Chapter 6: Influence Lines for Statically Determinate Structures
ć	Computer Analysis of Structures - Introduction to Software RISA
6	2D
7	Chapter 7: Deflections. The Double Integration Method
8	Chapter 8: Method of Virtual Work: Trusses and Beams
9	SPRING RECESS
10	EXAM 2
11	Chapter 8: Method of Virtual Work: Continued
12	Chapter 9: Analysis of Statically Indeterminate Structures:
12	Method of Consistent Deformation
13	Chapter 10: Displacement Method of Analysis: Slope Deflection
	Equations - Beams
14	Chapter 10: Displacement Method of Analysis: Slope Deflection
	Equations - Beams
15	Problem Solving and EXAM 3

 Students will be informed in advance by the instructor of any modifications or deviation from the syllabus throughout the course of the semester.

SEMESTER WEEKS

LECTURE/ WEEK #	DAY	DATE	NOTE
	TUE.	1/21/2025	First Day of Classes
1	WED.	1/22/2025	First Day of CE332 Classes
2	WED.	1/29/2025	
3	WED.	2/5/2025	
4	WED.	2/12/2025	
5	WED.	2/19/2025	
6	WED.	2/26/2025	
7	WED.	3/5/2025	
8	WED.	3/12/2025	
	WED.	3/19/2025	Spring Recess
9	WED.	3/26/2025	
10	WED.	4/2/2025	
11	WED.	4/9/2025	
12	WED.	4/16/2025	
13	WED.	4/23/2025	
14	WED.	4/30/2025	
15	WED.	5/7/2025	Friday Classes Meet

IMPORTANT DATES

DATE		DAY	NOTE	
January	27	Monday	Last Day to Add/Drop a Class	
T	27	Monday	Last Day for 100% Refund, Full	
January	27	Monday	or Partial Withdrawal	
Ionuory	20	Tuesday	W Grades Posted for Course	
Janual y	20	Tuesday	Withdrawals	
			Last Day for 90% Refund, Full or	
February	3	Monday	Partial Withdrawal, No Refund for	
			Partial Withdrawal after this date	
February	17	Monday	Last Day for 50% Refund, Full	
i cordary	17	Williady	Withdrawal	
March	10	Monday	Last Day for 25% Refund, Full	
iviaren	10	lilonday	Withdrawal	
			Spring Recess Begins - No	
March	16	Sunday	Classes Scheduled - University	
			Open	
March	22	Saturday	Spring Recess Ends	
April	3	Thursday	Wellness Day	
April	7	Monday	Last Day to Withdraw	
April	10	Enidory	Good Friday - No Classes	
Арті	10	Thuay	Scheduled - University Closed	
April	20	Sunday	Easter Sunday - No Classes	
дрш	20	Sunday	Scheduled - University Closed	
May	6	Tuesday	Thursday Classes Meet	
May	7	Wednesd ay	Friday Classes Meet	
	-	Wednesd		
Мау	/	ay	Last Day of Classes	
May	8	Thursday	Reading Day 1	
May	9	Friday	Reading Day 2	
May	10	Saturday	Final Exams Begin	
May	16	Friday	Final Exams End	
May	18	Sunday	Final Grades Due	

GRADING SCALE

- A: 100-90
- B+: 89-85
- B: 84-80
- C+: 79-75
- C: 74-70
- D: 69-60
- F: Below 60

Course Policies:

- Attendance is mandatory
- Please turn off all electronic devices (including cell phone, laptop, tablet) during class time.
- Bring your textbook to each class meeting or pages from the relevant chapter.
- Bring your calculator.

Grading Policy:

ITEM	TIME	GRADE (%)
Homeworks	Weekly	10
Exam 1	Week 5	20
Exam 2	Week 9	20
Exam 3	Week 13	25
Final Exam		25
TOTAL		100

- There will be NO make-up quizzes or exams.
- Quizzes and Exams must have Free-Body-Diagrams with Force Vectors shown. ALL work must be shown for full credit.

Homework Policies:

- Follow the syllabus and do the homework problems listed in the Syllabus
- Have your homework ready each class meeting.
- Homework may be collected on a random basis. Not all assigned problems will be collected. Only a select few will be collected randomly.
- NO late homework will be accepted.
- All homework MUST include a Free-Body-Diagram to show Force Vectors. All work must be shown for full credit.
- Homework NOT submitted will earn MINUS points deducted from your overall quiz grades.

Helpful Suggestions:

- Take notes and pay attention.
- Ask questions.
- Participate with board work and/or class problem solving.

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

Program Educational Objectives

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

- **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.
- **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

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.

Strategies, Actions and Assignments	ABET Student Outcomes (1-7)	Program Educational Objectives	Assessment Measures					
Student Learning Outcome 1: Identify transition from Physics (science) to Statics (engineering).								
Present engineering approach and problem solving techniques used for vector analysis.	1	1	Homework, exams and success in future courses.					
Illustrate applications to practical problems of torque, moments, and couples.	1	1	Homework, bonus problems, and exams.					
Student Learning Outcome 2: Analyze and calculate two-dimensional and three-dimensional vectors.								
Illustrate 2D vector components by orientation using trigonometry and proportions.	1	1	Homework and exams.					
Use vivid Power Point examples to demonstrate analysis technique for force systems on beams and trusses and frames.	1	1	Homework and exams.					
Demonstrate logical approach to spatial vectors by visualization of forces, moments.	1	1	Homework, exams, and bonus challenge problems.					
Student Learning Outcome 3: Diagram and employ free body diagrams to formulate and analyze solution of engineering problems.								
Require FBD's, for all problems and emphasize importance of vector directions.	1, 2	1	Homework, bonus challenge problems, and exams.					
Illustrate the approach of going from the FBD to the problem solution by formulating the appropriate equation set.	1, 2	1	Homework, bonus challenge problems, and exams.					
Provide numerous solved problems available on web. Require numerous homework problems weekly.	1, 2	1	Homework, exams and bonus challenge problems.					