Fall 2020

CE 332-101: Structural Analysis

Eduardo Castro

NEW JERSEY INSTITUTE OF TECHNOLOGY

Department of Civil & Environmental Engineering

MECH 332: STRUCTURAL ANALYSIS

Fall 2020

Text: Names: Hibbeler, R. C., author.
Title: Structural analysis/R. C. Hibbeler.
Description: Tenth edition. | New York, NY: Pearson, [2018] | Includes index.
Identifiers: LCCN 2017018248 | ISBN 0134610679 | ISBN 9780134610672

Class: **MECH 332-101**

Location: Online

Time: Lecture: Thursday. 6:00pm – 8:50pm

Instructor: Prof. S. Saigal, Ph.D., P.E.
Email: saigal@njit.edu, 213 Colton Hall, 973-596-5443

Teaching Assistant: Bruno Bezerra de Souza. Email: bb322@njit.edu

Prerequisites: *MECH 235 with a grade of C or better. A working knowledge of free body diagrams, equilibrium conditions for force systems and moments subject to 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: 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"

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
3	Chapter 4: Axial Force, Shear and Moment Diagrams for Statically Determinate Frames
4	Chapter 6: Influence Lines for Statically Determinate Structures
5	Computer Analysis of Structures - Introduction to Software RISA 2D
6	Chapter 7: Deflections. The Double Integration Method
7	MIDTERM EXAM
8	Chapter 8: Method of Virtual Work: Trusses and Beams
9	Chapter 8: Method of Virtual Work: Frames
10	Chapter 9: Analysis of Statically Indeterminate Structures: Method of Consistent Deformation
11	Chapter 10: Displacement Methofd of Analysis: Slope Deflection Equations - Beams
12	Chapter 10: Displacement Methofd of Analysis: Slope Deflection Equations - Frames
13	Chapter 12: Approxiamte Analysis of Statically Interminate Structures
14	FINAL EXAM

- 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

MONTH	WEEK	DAY	DATE	COMMENTS
SEPT.	0	Tuesday	1-Sep	NJIT Classes Begin
	1	Thursday	3-Sep	
	2	Thursday	10-Sep	
	3	Thursday	17-Sep	
	4	Thursday	24-Sep	
OCT.	5	Thursday	1-Oct	
	6	Thursday	8-Oct	
	7	Thursday	15-Oct	
	8	Thursday	22-Oct	
		Thursday	29-Oct	THANKSGIVING
NOV.	9	Thursday	5-Nov	
	10	Thursday	12-Nov	
	11	Thursday	19-Nov	
	12	Thursday	26-Nov	
DEC.	13	Thursday	3-Dec	
	14	Thursday	10-Dec	

IMPORTANT DATES

EVENT	DATE
First Day of Classes	1-Sep
Last Day to Add/Drop a Class	8-Sep
Withdrawl - 100% refund	8-Sep
Withdrawl - 90% refund	14-Sep
Withdrawl - 50% refund	28-Sep
Withdrawl - 25% refund	19-Oct
Last Day to Withdraw	9-Nov
Thanksgiving Break	11/26 to 11/29
Last Day of Classes	10-Dec
Final Exams Begin	15-Dec
Final Exams End	21-Dec
Final Grades Due	23-Dec

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 (%)
Weekly Quizzes	Each Week	30
Mid-Term Exam	Week 7	35
Final Exam	Week 14	35
TOTAL		100

- There will be NO make-up quizzes or exams unless there is documentation provided to the Dean of Students Office to validate your absence.
- 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.

Outcomes Course Matrix – CE 332 Structural Analysis

Strategies, Actions and Assignments	ABET Student Outcomes (1-7)	Program Educational Objectives	Assessment Measures
Student Learning Outcome 1: Provide the ability to understand the behavior of structures under different loading conditions.			
Illustrate basic structural applications and static analysis.	1	1	Weekly homework and quizzes.
Discuss the design of structures.	1	1, 2	Weekly homework and quizzes.
Student Learning Outcome 2: Apply the principles and equations for the analysis of statically determinate and indeterminate analysis in preparation for subsequent design courses.			
Develop various methods of analysis.	1	1, 2	Weekly homework and quizzes.
Provide distinct and detailed examples of how these methods are utilized.	1, 2	1, 2	Weekly homework and quizzes.
Student Learning Outcome 3: Use structural analysis/design software.			
Discuss software tools.	3	1	Lab report.
Analyze assignments using software tools.	1, 7	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 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 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