Fall 2019

CE 332-101: Structural Analysis

Ala Saadeghvaziri

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

NJIT New Jersey Institute of Technology

CE 332 – Structural Analysis Section: 001 & 101	Fall 2019
Texts:	Hibbeler, Russell C., Structural Analysis, 10th Edition, Prentice Hall ISBN: 978033942842
Instructor:	Dr. M. Ala Saadeghvaziri, Room 216 Colton Hall, Tel: 973-596-5813, ala@njit.edu ; Office hours: Tuesdays 1 – 2:30 PM, Thursdays 4-5:30 PM, other times by appointment. TA (Jin Fan – jf372@njit.edu) office hours: Mondays 4:30-6PM, and Fridays 10-11:30AM room 421 Colton Hall

Prerequisite: MECH 237 with a grade of C or better. A working knowledge of free body diagrams, equilibrium conditions for force systems and moments. The primary objective is an understanding of the various methods of analyzing determinate and indeterminate beams, frames, and trusses encountered in practice.

"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"

Week	Topics	Chapter	Homework Problems
1	Introduction, Stability and Classification of Structural Behavior	1, 2	Assigned in class.
2, 3	Analysis of Determinate Beams and Frames	4	
4, 5	Influence lines, Moving Loads, Shear and Moment Envelops	6	
6	Review, Test I		
7	Introduction to Approximate Analysis of Structures	12 – This will be mostly self-study. Complemented with a computer-based project.	
8, 9	Deflections: Diagram and Elastic Curve, Moment area, and integration methods	7	
10	Deflection of Trusses: Virtual Work Method (Unit Load Method)	3, 8	
11	Review, Test II		
12	Indeterminate Structures: Consistent Deformation Method	9	
13	Indeterminate Structures: Slope Deflection Method	10	
14	Indeterminate Structures: Moment Distribution Method	11	
15	FINAL EXAM		

Homework and computer project will be assigned by the instructor.

GENERAL INFORMATION
Homework problems will be assigned by the instructor. Also, the students are encouraged to solve many additional problems in the text book. During the term, each student is required to complete the following requirements in addition to the requirements previously mentioned.

1. Self-study approximate analysis methods (Chapter 7)
2. Use Robot (or program of your choice) to analyze a frame (to be assigned). Basic training on Robot will be provided.

The final grade will be arrived at on the following basis.

Tests (TBD – around 5^{th} and 10^{th} week)	40 Points
Final Exam (15th week)	35 Points
Homework	10 Points
Computer Project	15 Points
TOTAL	100 Points

*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 notified well in advance should there be any modifications or deviations from the syllabus throughout the course of the semester.
*No makeup will be given. Under legitimate, documented and extenuating circumstances the grade for the final exam will be used for missed test.

Statement of Academic Integrity:

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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