CE 332-001 STRUCTURAL ANALYSIS
Fall 2017

Time:
Monday 2:30 pm – 3:55 pm
Wednesday 2:30 am – 3:55 pm

Location:
CUL LEC 2

Textbook:
Hibbeler, Russell C., Structural Analysis, 10th Edition, Prentice Hall
ISBN: 978033942842

Instructor:
Sunil Saigal. Colton 213. x5443. saigal@njit.edu

Office Hours:
Monday 1:00 pm – 3:00 pm
Thursday 3:00 pm – 5:00 pm

Prerequisites:
MECH 237

EXAMS/QUIZZES

One midterms and a final exam will be given. These exams will be closed books. No make-up exams will be given.

In addition, a number of unannounced short pop-quizzes may be given during the class to ensure students are making progress as the course proceeds.

HOMEWORK

Problems are given each week to be solved and turned in at the beginning of the lecture in the week following the assignment. Homework will be returned the following week. To obtain credit, you must submit the work on time and in the proper form. At least 75% of the homework must be submitted on time, and correct, to receive a passing grade in the course. No late homework is allowed.

TUTORIAL HELP

Help will be provided during the posted office hours. Students are encouraged to see the instructor during office hours. Additionally, an appointment may be made via email to meet the instructor.

GRADING

Mid-Term Exam	30%
Pop Quizzes (5-8)	40%
Final Exam	30%
Total	100%

GRADE SCHEDULE

A	91 to 100		C	65 to 70
B+	82 to 90		D	60 to 64
B	76 to 81		F	59 or less
C+	71 to 75		W	Voluntary before deadline

Incomplete = given in rare instances where the student is unable to attend or otherwise do the work of the course due to illness, etc. The grade must be made up in the next semester by completing all of the missed work.

HOMEWORK INSTRUCTIONS

The following are to be observed when handling in homework for grading. Failure to do so may result in significant deductions in the homework grade.

1.	Use 5-square per inch National Computation pad paper ONLY (sold at the NJIT Bookstore). Problems should be done on one side of the 8-1/2 x 11 pad paper.
2.	On the top of each page, in the space provided, Print your instructor's name, section, problem number, student's name (LAST, FIRST) date, and page number.
3.	The problems must be presented in numerical order as assigned, with each problem beginning on a new page. Letters and numbers must be neat, clear and legible.
4.	Draw neat, clear, free body diagrams as required. Use a straight edge or other drawing instruments as needed.
5.	Box in the final answer accompanied by its units. DO NOT HAND IN CLASS NOTES.
6.	Staple the problems in proper numerical order with a single staple in the upper left-hand corner.

*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 for any modifications or deviations from the syllabus throughout the course of the semester.

CLASS SCHEDULE	
Sept. 5	**First Day of Classes at NJIT**
Sept. 5	Introduction, Review of Truss Analysis
Sept. 7	Review of Beam Bending Equations, Shear Force and Bending Moment Diagrams
Sept. 12	*Problems Day*
Sept. 14	Computer Analysis of Structures. Demonstration of RISA and Example Problems.
Sept. 19	Frame Analysis: Axial Force, Shear Force and Bending Moment Diagrams
Sept. 21	Frame Analysis Continued
Sept. 26	*Problems Day*
Sept. 28	Influence Lines. Direct Method
Oct. 3	Influence Lines. Muller Breslau Principle
Oct. 5	Influence Lines. Maximum Responses under Moving Loads
Oct. 10	*Problems Day*
Oct. 12	Deflection of Beams. Moment Area Theorems
Oct. 17	Deflections Using Moment Area Method
Oct. 19	Mid-Term Review
Oct. 24	*Problems Day*
Oct. 26	**Mid-Term Exam. Frames. Influence Lines. Moment Area Method**
Oct. 31	Principle of Virtual Work
Nov. 2	PVW for Truss Deflections
Nov. 7	PVW for Beam Deflections
Nov. 9	*Problems Day*
Nov. 14	Slope Deflection Method Equations
Nov. 16	Slope Deflection Method Continued
Nov. 21	Slope Deflection Method Continued
Nov. 23 - 26	**Thanksgiving Recess**
Nov. 28	*Problems Day*
Nov. 30	Moment Distribution Method - Introduction
Dec. 5	Moment Distribution Method Examples
Dec. 7	*Problems Day*
Dec. 12	Class Review
Dec. 13	**Last day of Classes.**

EXAMINATION DATES	
Date	**Activity**
Dec. 14	Reading Day
Dec. 15	Final Exams Begin
Dec. 21	Final Exams End
Dec. 23	Final Grades Due

IMPORTANT DATES	
Date	**Withdrawal**
Sept. 11	Last day to Add/Drop Classes. Last day for 100% refund
Oct. 2	Last day for 50% refund
Oct. 23	Last day for 25% refund
Nov. 6	Last day to Withdraw

Department of Civil and Environmental Engineering
CE 332 – Structural Analysis

Description:

Analysis of statically determinate and indeterminate beams, frames, and trusses in civil engineering practices. Influence lines, approximate structural analysis and computer analysis.

Prerequisites:

MECH 237 - Strength of Materials

Textbook(s)/Materials Required: Please see above

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.

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
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 Structures

Schedule: (3-0-3)

Professional Component: Engineering Topics

Program Objectives Addressed: 1, 2

Course Objectives Matrix – CE 332 Structural Analysis

Strategies and Actions	**Student Learning Objectives**	**Student Outcomes (a-l)**	**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.	a	1	Weekly homework and quizzes.
Discuss the design of structures.	Knowledge of design principles.	c, e	1, 2	Weekly homework and quizzes.
Course Objective 2: Develop the principles and equations for the analysis of statically determinate and indeterminate analysis in preparation for subsequent design courses.				
Develop various methods of analysis.	Learn the importance of these methods in both determinate and indeterminate structures.	a	1, 2	Weekly homework and quizzes.
Provide distinct and detailed examples of how these methods are utilized.	Ability to make the connection between theory and practice.	c, e, j, i	1, 2	Weekly homework and quizzes.
Course Objective 3: Give an introduction to commercial structural analysis/design software.				
Discuss software tools.	Learn to use software tools.	b	1	Lab report.
Analyze assignments using software tools.	Gain experience with commercial software.	c, e, j	1	Review of analysis problems.

CEE Mission, Program Educational Objectives and Program Outcomes

Mission

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.

1 – Engineering Practice: Recent alumni will successfully engage in the practice of civil engineering within industry, government, and private practice, working in a wide array of technical specialties including construction, environmental, geotechnical, structural, transportation, and water resources.

2 – Professional Growth: Recent alumni will advance their skills through professional growth and development activities such as graduate study in engineering, professional registration, and continuing education; some graduates will transition into other professional fields such as business and law through further education.

3 – Service: Recent alumni will perform service to society and the engineering profession through membership and participation in professional societies, government, civic organizations, and humanitarian endeavors.

Program Outcomes

Our program outcomes are what students are expected to know and be able to do by the time of their graduation:

(a) an ability to apply knowledge of math, science, and engineering
(b) an ability to design and conduct experiments, as well as interpret data
(c) an ability to design a system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
(d) an ability to function on multi-disciplinary teams
(e) an ability to identify, formulate, and solve engineering problems
(f) an understanding of ethical and professional responsibility
(g) an ability to communicate effectively
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
(i) a recognition of need for, and an ability to engage in life-long learning
(j) a knowledge of contemporary issues
(k) an ability to use techniques, skills and modern engineering tools necessary for engineering practice
(l) take the FE examination as the first step toward professional licensure