NEW JERSEY INSTITUTE OF TECHNOLOGY

Department of Civil & Environmental Engineering

MECH 235-002 and MECH 235-004: Engineering Mechanics: Statics Spring 2024

Text: ENGINEERING MECHANICS - STATICS
Pearson, Any Edition

Class: **MECH 235-002 and MECH 235-004**

Format: Hybrid

Location: ECEC 100

Time: MONDAY 10:00 – 11:20 AM (Online)
WEDNESDAY 10:00 – 11:20 AM (In Class, ECEC 100)

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

Teaching Assistant: TBA

Office Hours: Wednesday 11:30 AM – 1:00 PM

Webex Link: https://njit.webex.com/meet/saigal

Prerequisites: Phys 111, Math 112. Provides an understanding of equilibrium of particles and rigid bodies subject to concentrated and distributed forces.

Students must earn a C or better in this course to register for Strength of Materials, MECH237.

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

1	Ch 1: Introduction Ch 2: Statics of Particles, Trig Method (sketch force polygon)
2	Ch 2: Rectangular Components Equilibrium of a Particle
3	Ch 2: Force in Space Forces and Equilibrium in Space
4	Ch 3: Rigid Bodies: Equivalent System of Forces. Scalar (Dot) Products
5	Ch 3: Couples and Force-Couple Systems Equivalent Systems
6	Ch 4: Equilibrium of Rigid Bodies Equilibrium of a 2-Force Body
7	MIDTERM EXAM Ch 5: Centroids and Center of Gravity
8	Ch 5: Distributed Loads
9	Ch 6: Truss Analysis: Method of Joints
10	Ch 6: Truss Analysis: Method of Sections
11	Ch 6: Frame Analysis
12	Ch 9: Moments of Inertia
13	Ch 9: Parallel Axis Theorem
14	Problems and Review for Finals

- 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

WEEK #	DAY	DATE	NOTES
WEEK 1	Wednesday	17-Jan	
WEEK 2	Monday	22-Jan	
	Wednesday	24-Jan	
WEEK 3	Monday	29-Jan	
	Wednesday	31-Jan	
WEEK 4	Monday	5-Feb	
	Wednesday	7-Feb	
WEEK 5	Monday	12-Feb	
	Wednesday	14-Feb	
WEEK 6	Monday	19-Feb	
	Wednesday	21-Feb	
WEEK 7	Monday	26-Feb	
	Wednesday	28-Feb	
WEEK 8	Monday	4-Mar	
	Wednesday	6-Mar	
SPRING BREAK	Monday	11-Mar	SPRING RECESS
	Wednesday	13-Mar	SPRING RECESS
WEEK 9	Monday	18-Mar	
	Wednesday	20-Mar	
WEEK 10	Monday	25-Mar	
	Wednesday	27-Mar	
WEEK 11	Monday	1-Apr	
	Wednesday	3-Apr	
WEEK 12	Monday	8-Apr	
	Wednesday	10-Apr	
WEEK 13	Monday	15-Apr	
	Wednesday	17-Apr	
WEEK 14	Monday	22-Apr	
	Wednesday	24-Apr	
WEEK 15	Monday	29-Apr	

IMPORTANT DATES

MONTH	DATE	DAY	NOTES
January	15	Monday	Martin Luther King, Jr. Day
January	16	Tuesday	First Day of Classes
January	20	Saturday	Saturday Classes Begin
January	22	Monday	Last Day to Add/Drop a Class
January	22	Monday	Last Day for 100% Refund, Full or Partial Withdrawal
January	23	Tuesday	W Grades Posted for Course Withdrawals
January	29	Monday	Last Day for 90% Refund, Full or Partial Withdrawal, No Refund for Partial Withdrawal after this date
February	12	Monday	Last Day for 50% Refund, Full Withdrawal
March	4	Monday	Last Day for 25% Refund, Full Withdrawal
March	10	Sunday	Spring Recess Begins - No Classes Scheduled - University Open
March	16	Saturday	Spring Recess Ends
March	29	Friday	Good Friday - No Classes Scheduled - University Closed
March	31	Sunday	Easter Sunday - No Classes Scheduled - University Closed
April	1	Monday	Last Day to Withdraw
April	30	Tuesday	Friday Classes Meet
April	30	Tuesday	Last Day of Classes
May	1	Wednesday	Reading Day 1
May	2	Thursday	Reading Day 2
May	3	Friday	Final Exams Begin
May	9	Thursday	Final Exams End
May	11	Saturday	Final Grades Due

Course Policies:

- Attendance is mandatory.
- Please turn off all electronic devices (including cell phone, laptop, tablet) during class time.
- Bring your calculator each time to class.

Grading Policy:

ITEM	TIME	GRADE (%)
Homeworks	Weekly	10
Class Quizzes	Each Week	30
Mid-Term Exam	Week 7	30
Final Exam	Week 15	30
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.

Grading Scale:

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

Homework Policies:

- Follow the syllabus and do the assigned homework problems
- 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.

Tutoring:
Tutoring facilities will be provided for the class. Additional information concerning tutoring will be provided in the class and posted on CANVAS.

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, resilient, 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

Revised: 2/20/2024

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.