NEW JERSEY INSTITUTE OF TECHNOLOGY

Department of Civil & Environmental Engineering

MECH 235-001 and MECH 235-003: Engineering Mechanics: Statics Fall 2023

Text: ENGINEERING MECHANICS - STATICS
Pearson, Any Edition

Class: **MECH 235-001 and MECH 235-003**

Format: Hybrid

Location: CULM LECT 1

Time: MONDAY, WEDNESDAY 10:00 – 11:20 AM Lecture

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

Teaching Assistant: TBA

Office Hours: Monday 2:30 – 3:30 PM

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	TUE	5-Sep	First Day of Classes
	WED	6-Sep	
WEEK 2	MON	11-Sep	
	WED	13-Sep	
WEEK 3	MON	18-Sep	
	WED	20-Sep	
WEEK 4	MON	25-Sep	
	WED	27-Sep	
WEEK 5	MON	2-Oct	
	WED	4-Oct	
WEEK 6	MON	9-Oct	
	WED	11-Oct	
WEEK 7	MON	16-Oct	
	WED	18-Oct	
WEEK 8	MON	23-Oct	
	WED	24-Oct	
WEEK 9	MON	30-Oct	
	WED	1-Nov	
WEEK 10	MON	6-Nov	
	WED	8-Nov	
WEEK 11	MON	13-Nov	
	WED	15-Nov	
WEEK 12	MON	20-Nov	
	WED	22-Nov	
WEEK 13	MON	27-Nov	
	WED	29-Nov	
WEEK 14	MON	4-Dec	
	WED	6-Dec	
WEEK 15	MON	11-Dec	
	WED	13-Dec	Last Day of Classes

IMPORTANT DATES

DATE		DAY	NOTE
Sept	5	TUE	First Day of Classes
Sept	11	MON	Last Day to Add/Drop a Class
Sept	11	MON	Last Day for 100% Refund, Full or Partial Withdrawal
Sept	12	TUE	W Grades Posted for Course Withdrawals
Sept	18	MON	Last Day for 90% Refund, Full or Partial Withdrawal - No Refund for Partial Withdrawal after this date
Oct	2	MON	Last Day for 50% Refund, Full Withdrawal
Oct	23	MON	Last Day for 25% Refund, Full Withdrawal
Nov	13	MON	Last Day to Withdraw from Classes
Nov	21	TUE	Thursday Classes Meet
Nov	22	WED	Friday Classes Meet
Nov	23	THUR	Thanksgiving Recess Begins. No Classes
Nov	26	SUN	Thanksgiving Recess Ends
Dec	13	WED	Last Day of Classes
Dec	14	THUR	Reading Day 1
Dec	15	FRI	Reading Day 2
Dec	16	SAT	Saturday Classes Meet
Dec	17	SUN	Final Exams Begin
Dec	23	SAT	Final Exams End
Dec	25	MON	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
Clas 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.

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.

GRADING SCALE

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

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

Revised: 2/13/18

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.