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

NJIT New Jersey Institute of Technology

MECH 236 - Engineering Mechanics-Dynamics - Summer 2025 (First Summer session)

Text:	Hibbeler, R.C., Engineering Mechanics: Dynamics, 15th Edition, Pearson, 2022, ISBN 978-0134814988
Instructor:	Mohamed A Mahgoub, PhD, PE, FACI
Office Hours:	Sunday 4 to 6 pm The Instructor shall be available online for consultation. Instructor may be reached by telephone: 973-596-6081 or e-mail: mahgoub@njit.edu. E-mail is generally preferred.
Course Location and Hours	Sundays Lectures 10:00 AM to 4:00 PM (CKB 106) or Online, Zoom (50%/50% Hybrid Course) See Course Outline below for details ***Please attend/log in on time.*** ***Cameras Must be on During all online lectures***
Course Description:	Students study the mathematics of the motion, forces, energies of particles and rigid bodies.
Prerequisites:	MECH 234, MECH 235, or MECH 320
Teaching Assistant	N/A

Attendance Policy and Student Conduct:
It is the student's responsibility to attend class. If a class is missed, the student is responsible for all material and announcements provided during his/her absence.

During the conduct of the class, professional courtesy is expected. This includes ***attending/logging in on time*** as well as leaving during class. You are encouraged to ask any questions that you feel further clarifies the material being presented or that will be to the benefit of class in general. Please feel free to ask any question at any time.

Grading Criteria:

Assignments will be given at the end of each class. one midterm and a final examination shall be administered. The tests shall cover only the material designated by the Instructor. The Final Examination shall be a comprehensive examination of all material covered during this course. It is mandatory that the midterm and the final examination to be taken to successfully complete course. It is strongly encouraged that all students make every effort to attend the midterms and the final examination as make-up tests are strongly discouraged.

Homework assignments will be used to assess the student's progress during the course as well as to be employed to assess the quality of student's effort and understanding of the material presented. All homework shall be graded for accuracy. Homework may be covered in class as a review for the student. In the completion of homework assignments, the assignment should be logically presented with citation to reference materials properly presented. It is suggested that, whenever possible, final answers be underlined or "boxed". All assignments are due at the beginning of the class session as designated on the assignment or as assigned by the Instructor. ***Late homework will not be accepted – no exceptions. Assignments will be on Canvas under "Files".***

The student's name should appear on the upper right hand corner, followed by the date, the assignment number and description as shown below. No cover or cover sheet is required.

*********Sample Assignment Heading *********

MECH 236 John Smith
Assignment No. XXXX Date: xxxx

In determining the final grade for this course, all grades shall be weighted as follows:

10% Homework
20% Quizzes
30% Midterm Exam
30% Final Exam
10% Class Participation

Grading Scale:

Letter grades will be assigned based on the following scale:

A	88 – 100
B+	82 – 87
B	76 – 81
C+	70 – 75
C	65 – 69
D	60 – 64
F	59 or less

The grade of Incomplete will only be granted in the case of an extreme emergency on the part of the student, demonstrated by appropriate documentation. Your Instructor reserves the right to vary the above as necessary based on the results of the course.

Professional Communications:

All communications between the student and Instructor (homework, reports, papers, emails, etc.) are professional communications and should be treated as same. Use of slang and computer short-hand are improper and should be avoided.

Course Outline (First Summer Session)

Lecture	Dates	Chapters	Topic	Assignment
1	6/1	12.1 thru 12.10 13.1 thru 13.5	Kinematics of Particles Force & Acceleration	TBD
2	6/8	14.1 thru 14.6 15.1 thru 15.4	Energy & Work Momentum and Impact	TBD
3	6/15	16.1 thru 16.7	Kinematics of Rigid Bodies **MIDTERM EXAM**	TBD
4	6/22	17.1 thru 17.5 18.1 thru 18.5	Kinetics of a Rigid Body Rigid body Energy & Work	TBD
5	6/29	**FINAL EXAM**		

Notes:

(1) Please read the Topic before coming to the lecture.

(2) Red color denotes Online, Zoom lecture and Blue color denotes face-to-face lecture.

Statement on 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/academicintegrity-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.

Synchronous Online Information

The instructor will discuss these requirements on the first day of the course and/or post on their Learning Management System (LMS). Please become familiar with zoom:

MECH 236 - Engineering Mechanics-Dynamics - Summer 2025 (First Summer Session)

Description:

Students study the mathematics of the motion of particles and rigid bodies, and the relation of forces and motion of particles.

Prerequisites: MECH 234, MECH 235, or MECH 320

Textbook(s)/Materials Required:
Hibbeler, R.C., Engineering Mechanics: Dynamics, 15th Edition,
Prentice Hall, 2021, ISBN 978-0133915389

Course Objectives:

1. To provide transition from Physics (science) to Dynamics (engineering).
2. To develop an understanding of the basic concepts of kinematics and kinetics of particles and rigid bodies in engineering dynamics.
3. To master the fundamental principles and how to formulate and structure problem solving techniques which is fundamental to solution of all engineering problems.

Topics:

Kinematics of a Particle: Rectilinear Motion and Curvilinear Motion
Kinematics of a Particle: Erratic Motion and Dependent Motion
Kinetics of a Particle: Newton's Equation
Kinetics of a Particle: Work and Energy
Kinetics of a Particle: Impulse and Momentum
Mass Moments of Inertia
Planar Kinematics of a Rigid Body: Relative Motion Analysis of Velocity and Acceleration
Planar Kinetics of a Rigid Body: Translation and Fixed Axis Rotation
Planar Kinetics of a Rigid Body: General Plane Motion

Professional Component: Engineering Topics

Program Objectives Addressed: 1 , 2 and 3

Prepared By: Dr. Mohamed Mahgoub

Outcomes Course Matrix – MECH 236 Engineering Mechanics: Dynamics

Strategies, Actions and Assignments	ABET Student Outcomes (1-7)	Program Educational Objectives	Assessment Measures
Student Learning Outcome 1: Identify transition concepts from Physics (science) to Dynamics (engineering).			
Present engineering approach and problem solving techniques.	1	1	Homework, tests and success in future courses.
Student Learning Outcome 2: Analyze and solve kinematics, kineties of particles and rigid bodies in engineering dynamics problems.			
Discuss the underlying concepts, principals and procedures of dynamics of particles and rigid bodies.	1	1	Homework, tests and success in future courses.
Student Learning Outcome 3: Formulate, diagram and solve FBD problems.			
Require FBD's for all problems .	1, 2	1	Homework, tests and success in future courses.
Illustrate the problem solving process including FBD, equation formulation and mathematical solution.	1	1	Homework, tests and success in future courses.

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