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

NJIT New Jersey Institute of Technology

MECH 236 - Engineering Mechanics-Dynamics - Spring 2018

Text:

1. Hibbeler, R.C., Engineering Mechanics-Dynamics, 13th Edition, Prentice Hall, 2010, ISBN 978-0-13-291127-6 or 0-13-291127-2
2. NCEES, Fundamentals of Engineering Supplied-Reference Handbook, 8th Edition, (optional, or print pages free from: http://www.ncees.org/exams/study_materials/fe_handbook/)

Instructor: Prof. Henry Fox, P.E., No Office/Hours, email: Henry.E.Fox@njit.edu

Prerequisite: Mech 235 (or Mech 234 for EE, CoE, IE, ME majors). Provides an understanding of the mathematics of the motion of particles and rigid bodies, and of the relation of forces and motion of particles.

WEEK	TOPIC	ARTICLES
1	Kinematics of Particles	12.1 - 12.6
2	Kinematics of Particles	12.7 - 12.10
3	Force & Acceleration	13.1 - 13.3
5	Force & Acceleration	13.4 - 13.5
6	Energy & Work	14.1 - 14.6
	Mid-Term	
7	Momentum, Impact	15.1 - 15.4
10	Rigid body: relative velocity	16.5
11	Rigid body: Instant center	16.6
13	Rigid Bodies acceleration	16.7
14	Kinetics of a Rigid Body	17.1 - 17.5
15	Rigid body energy Vibrations	18.1 - 18.5, 22.1 - 22.2
16	Final exam	

**Homework to be assigned by your professor. Homework will be collected by your professor. NO LATE homework can be accepted.

*Students will be informed in advance by your professor of any modifications or deviation from the syllabus throughout the course of the semester.

MECH 236 - Engineering Mechanics- Dynamics - Spring 2018

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 or Mech 235

Textbook(s)/Materials Required:

Hibbbeler, R.C., Engineering Mechanics-Dyanamics, 11th Edition, Prentice Hall

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

Schedule: Lecture/Recitation- 2 hour class, once per week
Laboratory- none

Professional Component: Engineering Topics

Program Objectives Addressed: 1

Prepared By: Prof. Hsieh

TUTORIAL HELP:

Tutorial hours will be announced in class. Students with difficulties are encouraged to come during the tutorial hours.

GRADING:

The grade will be decided based on the following scheme:

Homework/Participation	30 %
Mid-Term Exam	30%
Final Exam	40%
Total	100%

The grade scheduling:

A	=	88 to 100	C	=	65 to 69
B+	=	82 to 87	D	=	60 to 64
B	=	76 to 81	F	=	59 or less
C+	=	70 to 75	W	=	Voluntary before deadline (school schedule)

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.

SPECIAL NOTES:

*The University Code on Academic Integrity (NJIT Honor Code) will be upheld in this course.
Any violations will be brought to the immediate attention of the Dean of Students
* Students will be consulted on any substantial changes to the course syllabus.

Course Policies:

- Attendance is mandatory
- There will be NO need for mobile telephones during class time.
- Bring your textbook (hard-copy or electronic) to each class meeting.
- Be prepared to participate with class problem solving.
- Bring your calculator.
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Quizzes, Exams and Grading Policies:

- There will be NO make-up quizzes or exams unless there is documentation provided by the Dean of Students Office to validate your absence.
- I do NOT drop the lowest grade.
- I do NOT curve the grades.
- NO IRRATIONAL NUMBERS ALLOWED FOR ANSWERS. (these counts as an incorrect answer)
- ONLY REAL NUMBERS.
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Homework Policies:

- Follow the syllabus and do the homework problems outlined.
- Exam problems may be taken from the homework problems, or
  - be very similar to the homework, or
  - Sample Problems in the textbook, or
  - from a completely different textbook.
- Homework will be collected on a weekly basis. ONLY a select few assigned problems will be graded.
- NO late homework will be accepted. NO EXCEPTIONS.
- Homework NOT submitted will earn ZERO points.
- All work must be shown for full credit.
- Textbook IS REQUIRED.

- You need to obtain a copy of the exact textbook cited (including edition).
- Homework and examples from the textbook change from edition-to-edition.
- If you get a different edition of the textbook, and you submit the wrong homework problems, you will receive a ZERO. (*sorry*)
- P.S. I am aware that a solutions manual is on the web for free.
  - DO NOT USE IT FOR HOMEWORK.
  - Use it for studying for exams.

- You are all entering a Professional Career,
  - Please Respect YOUR work, YOUR Quizzes, YOUR Exams.
  - Please keep work neat and organized.
  - Use grid paper,
    - Print your name on the top of each page
    - Print the Course and Section Number on the top of each page.
    - Staple Your Homework Together. Loose or folded page may be lost. Along with your grade.
  - Yes, I answer emails. However, Emails are not text messages, and do not get an instantaneous response.

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