Department of Civil & Environmental Engineering
Course Policy – Summer 2017 (First Session)

Course Number and Title:
MECH 236 – Engineering Mechanics: Dynamics

Course Location and Hours:

Monday and Wednesday	Lecture	6:00 – 9:00 PM	KUPF 210

Course 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

Textbooks and Course Materials:
Hibbeler, R.C., Engineering Mechanics: Dynamics, 14th Edition,
Prentice Hall, 2016, ISBN 978-0133915389 or 0133915387

Instructors:
Mohamed A Mahgoub, PhD, PE

Office:
The Instructor shall be available in his office (GITC 2511) for consultation, at the times for office hours. Should these times be inconvenient for the student, additional hours are available upon appointment. The instructor may be reached by telephone at 973-596-6081 or by e-mail at mahgoub@njit.edu E-mail is generally preferred.

Office Hours:
Wednesday 4:00 PM – 6:00 PM or by appointment

Teaching Assistant:

TBD

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 ***arriving on time*** as well as leaving during class. Similarly, "private" conversations with fellow students during a class are discourteous and inconsiderate to both your Instructor as well as your fellow students. 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.

No food, laptops, or cell phone are allowed in the class.

Grading Criteria:

Fifteen minute quiz will be given at the end of each class, one midterm and a final examinations shall be administered throughout the course. 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 midterms and the final examination 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. In the event that a student fails to take the tests or the Final Examination, a grade of "F" shall be entered for the student for this course. The quizzes, the midterms and the final examination will be of the "closed notes-closed book" variety.

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. It is the intent to assign approximately 10 homework assignments during the course. 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.***

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 320 John Smith

Assignment No. XXXX June 16th, 2014

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

15% Homework
20% Quizzes
25% 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

Lecture	Dates	Chapters	Topic	Assignment
1	5/22	12.1 thru 12.10	Kinematics of Particles	TBD
2	5/24	13.1 thru 13.5	Force & Acceleration	TBD
3	5/31	14.1 thru 14.6	Energy & Work	TBD
4	6/5	15.1 thru 15.4	Momentum and Impact	TBD
5	6/7	**MIDTERM EXAM**		TBD
6	6/12	16.1 thru 16.7	Kinematics of Rigid Bodies	
7	6/14	17.1 thru 17.3	Kinetics of a Rigid Body	TBD
8	6/19	17.4 thru 17.5	Rigid body Force and Acceleration	TBD
9	6/21	18.1 thru 18.5 22.1 thru 22.2	Rigid body energy Vibrations	TBD
10	6/26	**FINAL EXAM**		TBD

Notes:

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

(2) Assignments are due at 6 pm on the due date.

MECH 236 - Dynamics

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, 12th 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 **Date:** 1/12/12

Course Objectives Matrix – MECH 236 Dynamics

Strategies and Actions	Student Learning Outcomes	Outcomes (a-k)	Prog. Object.	Assessment Methods /Metrics
Course Objective 1: Provide transition from Physics (science) to Dynamics (engineering).				
Present engineering approach and problem solving techniques.	Learn problem solving techniques while building on engineering and science.	a, e	1	Homework tests and success in future courses.
Course Objective 2: Provide basic concepts of kinematics and kinetics of particles and rigid bodies in engineering dynamics.				
Discuss the underlying concepts, principles and procedures of dynamics of particles and rigid bodies.	Learn to solve problems concerned with the dynamics of particles and rigid bodies.	a, e	1	Homework tests and success in future courses.
Course Objective 3: Master the fundamental principles and how to formulate and structure problem solving techniques which is fundamental to the solution of all engineering problems.				
Require FBDs for all problems.	Learn the technique of translating a problem statement into FBDs by repetition of many problems.	a, e	1	Homework tests and success in future courses.
Illustrate the problem solving process including FBD, equation formulation and mathematical solution.	Learn the techniques of problem solving based upon the use of FBDs.	a, e	1	Homework tests and success in future courses.

CEE Mission, Program Objectives and Program 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 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.

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

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(a) an ability to apply knowledge of math, science, and engineering
(b) an ability to design and conduct experiments, as well as to analyze and 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