

**FALL 2008**

**MECHANICAL ENGINEERING 205**

**(ME 205)**

**ENGINEERING MECHANICS: DYNAMICS  
(TR 8:00 – 9:15 AM, KAUF 0225, Call # 10411)**

**TEXT:** Engineering Mechanics — Dynamics; by R. C. Hibbler, Eleventh Edition; Prentice Hall; 2006.

**WEBSITE:** Course syllabus and solutions to assigned problems will be posted on the internet. Go to ODU website, academics, college of engineering, departments (Mechanical Engineering), faculty/staff, Dr. Ibrahim.

**MECHANICS:** *"Mechanics is the science that deals with both stationary and moving bodies under the action forces. Theoretical mechanics is generally the concern of physicists and applied mathematicians; engineering mechanics is generally categorized into a study of the mechanics of fluids, the mechanics of bodies that deform, and the mechanics of rigid bodies. Here, we are concerned with the mechanics of rigid bodies.*

*The mechanics of rigid bodies may be considered to consist of two parts, statics and dynamics. Statics treats the equilibrium of stationary bodies under the influence of various kinds of forces. Dynamics on the other hand, includes the motion of bodies and the forces that cause it. The dynamics of particles and rigid bodies will be studied. Vector notation is used where appropriate."*

**REQUISITES:** Prerequisite ME 204 (Statics), Corequisite MATH 212 (Calculus II). **ME majors must have passed Statics with a " C " or better grade.**

**GRADING:**

Tests	60%
Final Examination	40%

**ASSIGNMENTS:** The attached sheet lists assigned problems for this course. No homework will be collected or graded, but it is absolutely beneficial and necessary for you to work these problems to final answers in order to prepare yourself for tests and final exam. Prior to each test, in a review lecture, selected assigned problems will be discussed in class. Solutions to all assigned problems will be posted. The best way to benefit from these solutions is to consult with them after you attempted the problems.

**TESTS:** Five (5) tests will be given during this semester. (See Course Schedule)

**QUIZZES:** None

**EXPECTED COURSE OUTCOME:** Students completing this course are expected to develop:

- 1) An ability to apply knowledge of mathematics, science and engineering.
- 2) An ability to identify, formulate and solve engineering problems.
- 3) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practices.
- 4) An ability to apply the knowledge of differential equations and multivariate calculus to mechanical engineering design and analysis problems.

**I WELCOME YOU TO MY ME 205 CLASS AND WISH YOU ALL SUCCESS.**

Prof. S. R. Ibrahim, KH 238-G  
Office Phone No.: 683-6363 (Secretary)  
Voice Mail: 683-3738  
E-Mail: sbrahim@odu.edu

## TENTATIVE COURSE SCHEDULE

<u>Week</u>	<u>Topic</u>
1	Introductions - Chapter 12
2	Chapter 12
3	Chapters 12-13
4	Chapter 13
5	Review - Test (1) Chapters (12-13)
6	Chapter 14
7	Chapters 14-15
8	Review - Test (2), Chapter (14)
9	Chapter 15
10	Chapters 15-16
11	Review - Test (3), Chapter (15)
12	Chapter 16
13	Review - Test (4), Chapter (16)
14	Chapter 17 (18/19)
15	Test (5) Chapter (17)
16	Final Exam

### NOTES

- The Honor System detailed in the ODU Catalog is strictly applied in this course.
- There will be five (5) tests for this course. The test will usually follow a review lecture.
- Tuesday, November 4<sup>th</sup> is the last day for dropping this course without instructor's signature.
- If you miss a lecture it is your responsibility to contact one of your classmates to know about material covered, announcements, handouts, etc. You are responsible for all what take place in lectures. No need to inform professor if you are missing a lecture and do not ask professor what will be or was covered.
- No make-up tests will be given. With a permission obtained prior to the test and for a valid and documented emergency, the subject test will be excused. A 5 % penalty, on the average of remaining tests, will apply for each missed tests with a maximum of two excused tests.
- Professor's office hours: TR 1:00 – 2:30 PM.
- GTA's office hours: will be announced if available.
- Final examination scheduled for: Tuesday, December 9<sup>th</sup> , **10:00 – 11:30 AM.**
- Students with an average tests score of 70% or above may choose to skip taking the final exam and have their final grade based 100% on tests average. (70 % guarantees at least a C-grade.)

## Assigned Problems

Section	Topic	Assignment List
12.2	Rectilinear Kinematics	12.7, 18, 22
12.4-12.6	Curvilinear x, y, z Motion	12.71, 81, 90
12.7	Curvilinear n, t, b Motion	12.106, 113, 119
12.8	Curvilinear r, $\theta$ , z Motion	12.141, 153, 169
12.9	Absolute Dependent Motion	12.174, 179, 185, 187
12.10	Relative Motion	12.195, 199, 203
13.1-13.4	Equation of Motion x, y, z	13.3, 14, 23,35
13.5	Equation of Motion n, t, b	13.59, 65, 71
13.6	Equation of Motion, r, $\theta$ , z	13.87, 93, 103
14.1-14.3	Principle of Work and Energy	14.5, 10,19, 27
14.4	Power and Efficiency	14.43, 51, 57
14.5-14.6	Conservation of Energy	14.71, 79, 85
15.1-15.2	Linear Momentum	15.5, 11, 22
15.3	Conservation of Linear Momentum	15.34, 39
15.4	Impact	15.58, 67, 78, 81
15.5	Angular Momentum	15.91, 93
16.1-16.3	Rotation About a Fixed Axis	16.3, 11, 21
16.5	Relative Velocity Analysis	16.53, 59, 65
16.7	Relative Acceleration Analysis	16.107, 111, 122
17.1	Moment of Inertia	17.2, 14, 18
17.2-17.3	Eq. of Motion-Translation	17.26, 31, 38, 50
17.4	Eq. of Motion-Fixed Axis Rotation	17.55, 62, 63
17.5	Eq. of Motion-Gen. Plane Motion	17.91, 99, 103