ME 302: Engineering Mechanics II
Lecture: MW 4:00 – 6:00 PM GCB 209
Discussion Section: F 3:00 – 4:00 PM GCB 205

Instructor: Dr. Tyrone M. Porter
Office: ENG 305
Office Hours: Tuesday 5-6 pm, Thursday 9:30-10:30 am, or by appointment
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Required Textbook:
Williams JH, *Fundamentals of Applied Dynamics*, John Wiley and Sons, Inc., 1996.
Supplemental Textbooks/Resources:
Hibbeler, R.C., *Engineering Mechanics: Dynamics 10th ed*, Pearson Prentice Hall, 2004.
Nelson EW, Best CL, McLean WG, *Schaum's Outline of Engineering Mechanics 5th edition*, McGraw-Hill, 1997.

Course Topics:
Kinematics of particles and rigid bodies
- Inertial reference frames; coordinate systems; orbital elements & trajectories
- Intermediate noninertial reference frames
Direct/Algebraic approach to kinetic analysis (Newtonian)
- Universal law of gravitation, linear and angular momenta, moments of inertia
- Work/energy relationship
Indirect approach to kinetic analysis (Lagrangian)
- Calculus of variations, Hamilton's principle, Lagrange's equation

Grading:
Quizzes:	20% (quiz given every week)
Projects:	20%
Exams (3):	20% per exam (October 8, November 12, December 19, 2008)

Assignments:
(1) Homework problems will be assigned and solutions made available on CourseInfo. The homework problems and lectures will serve as the basis for quizzes to be given one week after homework is assigned.
(2) Projects will serve as a platform for students to apply principles learned in class to real-world scenarios**.** Students will be required to perform some aspect of dynamic analysis (kinematics or kinetics) and investigate design considerations for a particular device or structure.
(3) Students will have the opportunity to gain extra credit by researching a specific engineering achievement (relevant to engineering mechanics) and challenging a panel of ME professors to conduct an analysis of the system and explain the scientific basis for the performance/functionality of the system. The topic and basic information regarding the question to be posed must be submitted one day before the scheduled "Stump the Profs" session.

Date	Required Reading	Topic
9/3	Schaum's Chapter 12	Particle Kinematics (review)
9/8, 10	Williams Chapter 3 Schaum's Chapter 14	Rigid Body Translation and Rotation around Fixed Axis; Time Rate of Change of Arbitrary Vector
9/15, 17	Williams Chapter 3 Schaum's Chapter 14	Rigid Body Relative Motion: Velocity and Acceleration
9/22, 24	Williams Chapter 3	Use of Intermediate Reference Frames in Kinematics
9/29, 10/1	Williams Chapter 3	Use of Intermediate Reference Frames in Kinematics
10/6, 8	Review & Exam	Review & Exam
10/13, 15	Schaum's Chapter 13	Particle Dynamics (review) Newton's 2nd Law, Work-Energy, Linear Momentum and Impulse
10/20, 22	Schaum's Chapter 15 Williams Chapter 6-3.1	Moments of Inertia Parallel Axis Theorem
10/27, 29	Schaum's Chapter 16	Rigid Body Dynamics: Force/linear acceleration, torque/angular acceleration
11/3, 5	Schaum's Chapter 17	Rigid Body Dynamics: Work-Energy, Linear and Angular Momentum
11/10, 12	Review & Exam	Review & Exam
11/17, 19	Williams Chapter 5	Variational Mechanics for Particles; Introduction of Lagrange's Equation
11/24	Williams Chapter 5	Variational Mechanics for Particles
12/1, 3	Williams Chapter 6	Variational Mechanics for Rigid Bodies
12/8, 10	Williams Chapter 6	Variational Mechanics for Rigid Bodies