REGULAR COURSE SYLLABUS

School of: Professional Studies
Department: Engineering Technology
CIP Code: 15.0805
Prefix & Course Number: MET 3160 Crosslisted With*: __
Course Title: Mechanics II - Dynamics

Check All That Apply: Required for Major: X Required for Minor: ____ Specified Elective: ____
Required for Concentration: ____ Elective: ____ Service Course: ____

Credit Hours: 3 (3+0)
Total Contact Hours per semester (assuming 15-16 week semester):
  Lecture 45 Lab 0 Internship ____ Practicum ____ Other (please specify type and hours):____
Schedule Type(s): L Grading Mode(s): L

Variable Topics Courses (list restrictions, including the maximum number of hours that can be earned**):

** NOTE: This information must be included in the course description.
Restrictions (Variable Topics Course): ____
Prerequisite(s): CET 2150 and MTH 2410 with grades of “C” or better, or permission of instructor
Corequisite(s): ____
Prerequisite(s) or Corequisite(s): ____

Banner Enforced:
  Prerequisite(s): CET 2150 and MTH 2410 with grades of “C” or better
  Corequisite(s): ____
  Prerequisite(s) or Corequisite(s): ____

Catalog Course Description:
This course covers the principles of dynamics: Students learn about kinematics which is the study of the geometry of motion of a body without reference to the forces that cause the resulting motion. The course also covers kinetics which is the study of the relation existing between the forces acting on the body, the mass of the body, and the motion of the body.

Approved: ____________ 3/18/09
Department Chair OR Program Director

Approved: ____________ 3/18/09
Dean OR Associate Dean

Approved: ____________ 4/13/09
Associate VP, Academic Affairs

*If crosslisted, attach completed Course Crosslisting Agreement Form
Required Reading and Other Materials will be equivalent to:


Specific, Measurable Student Behavioral Learning Objectives:

Upon completion of this course the student should be able to:

1. Solve engineering mechanics problems that involve particles in motion.
2. Apply the principles of kinematics and kinetics to problems of particles in motion.
3. Apply the principles of work, energy, and power to problems of particles in motion.
4. Apply the principles of impulse and momentum to problems of particles in motion.
5. Apply principles of differential and integral calculus to problems of velocity and acceleration of particles in motion.
6. Identify diagrams of rigid elements in order to solve problems for velocity and acceleration involving finite structures.
7. Apply the principles of particle dynamics to rigid bodies in motion.

Detailed Outline of Course Content (Major Topics and Subtopics) or Outline of Field Experience/Internship (experience, responsibilities and supervision):

I. Kinematics of Particles - Rectilinear
   A. Position, Velocity, Acceleration
   B. Cartesian Coordinate Components
   C. Uniform Accelerated Motion
   D. Motions of Several Particles
   E. Direct Integration

II. Kinematics of Particles - Curvilinear
   A. Position, Velocity, Acceleration
   B. Projectile Motion
   C. Tangential and Normal Components
   D. Radial and Transverse Components

III. Kinetics of Particles – Newton’s 2nd Law
    A. Linear and Angular Momentum
    B. Equations of Motion
    C. Alternate Components
    D. Newton’s Law of Gravitation

IV. Kinetics of Particles – Energy/Momentum
    A. Work of a Force
    B. Kinetic Energy and Principle of Virtual Work
    C. Potential Energy
    D. Conservation of Energy
    E. Principle of Impulse and Momentum
    F. Central Impact
    G. Mixed Problems

V. System of Particles
   A. Motion of Mass Center
   B. Newton’s 2nd Law
   C. Momentum formulations
   D. Energy
   E. Alternate Components

VI. Kinematics of Rigid Bodies
    A. Translation, Rotation
    B. General Plane Motion
    C. Relative Motion
    D. Instantaneous Center
    E. Coriolis Acceleration

VII. Kinetics of Rigid Bodies – Plane Motion
    A. Equations of Motion
    B. Angular Momentum I Plane Motion

VIII. Kinetics of Rigid Bodies – Energy/Momentum
     A. Kinetic Energy and Principle of Virtual Work
     B. Conservation of Energy
     C. Principle of Impulse and Momentum
     D. Impact
Evaluation of Student Performance:
1. Homework
2. Examinations
3. Projects