University of Wisconsin - Madison College of Engineering [EGR] Last Offered: 2014 Spring [1144] Direct Link to this Syllabus :

http://aefis.engr.wisc.edu/index.cfm/page/CourseAdmin.ViewABET?coursecatalogid=303&pdf=True

- 1. M E 240, Dynamics
- 2. Credits : 3.00 Contact Hours : 2.5
- 3. **Textbook and Materials :** Engineering Dynamics: Dynamics + ConnectPlus Access Card For Dynamics; Gray, Costanzo, Plesha; 2; No Year Given
- 4. Specific Course Information :
 - a. **Brief description of the content of the course (Course Catalog Description) :** Rectilinear and curvilinear motion of a particle; force, mass, acceleration; work, potential, and kinetic energy; impulse and momentum; kinematics of rigid bodies; moving coordinate systems with relative motion; general planar rigid body kinematics and kinetics. Applications to linkages, cams and geared systems.
 - b. Pre-requisites or Co-requisites : EMA 201, Math 222
 - c. This is a Required course.

5. Specific Goals for the Course :

- a. Course Outcomes :
 - The primary objective of ME 240 -- Dynamics is to introduce students to the concepts of dynamics. The students are expected to develop working skills in the dynamic analysis of both particles and rigid bodies. A special emphasis is placed on mechanical components, such as mechanisms, linkages, and gears.
 - 2. Develop the kinematics of displacement, velocity and acceleration for systems of particles and rigid bodies
 - 3. Determine the dynamic response of the system to applied loadings, using Newton's Laws
 - 4. Apply the Principle of Work and Energy and the Principle of Impulse and Momentum to mechanical systems
 - 5. Analyze the motion of sliders, linkages, and gears regarding their performance and mechanical attributes

b. ABET Student Learning Outcomes :

- (a) Ability to apply mathematics, science and engineering principles.
- (e) Ability to identify, formulate and solve engineering problems.

6. Brief List of Topics to be Covered : Kinematics of Particles – Rectilinear and Curvilinear Motion;

Kinetics of Particles - Newton's Second Law;

Kinetics of Particles - Principle of Work and Energy;

Kinetics of Particles - Principle of Impulse and Momentum;

Kinematics of Rigid Bodies - General Plane Motion;

Kinematics of Rigid Bodies - Rotating Axes, Coriolis Acceleration;

Planar Kinetics of Rigid Bodies - Newton's Second Law;

Planar Kinetics of Rigid Bodies - Principle of Work and Energy;

Planar Kinetics of Rigid Bodies - Principle of Impulse and Momentum;

Planar Kinetics of Rigid Bodies - Linkages and Mechanisms