THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Advanced Dynamics

MECHENG 7230

Credit Hours:
4.00 - 4.00

Course Levels:
Graduate (5000-8000 level)

Course Components:
Lecture

Course Description:
Three-dimensional kinematics and dynamics of particles and rigid bodies using vector (Newton-Euler) and analytical (Lagrange's equations and Hamilton's principle) methods. Rotating systems. Non-holonomic systems.

Prerequisites and Co-requisites:
Prereq: Sr or Grad standing.

Course Goals / Objectives:
- Gain knowledge of three-dimensional kinematics and dynamics of particles and systems of particles
- Attain an in-depth understanding of energy methods to derive equations of motion including virtual work and Lagrange?s equations
- Become fluent in basic concepts and kinematics of rigid body motion
- Learn how to derive and implement the general equations of motion for describing the dynamics of a rigid body

Course Topics:
- Kinematics of particles; velocity and acceleration of particles in a moving coordinate system
- Dynamics of a particle or a system of particles; momentum and impulse; collisions
- Lagrange's equations of motion; virtual work
- Kinematics of rigid body motion; principal axes; Euler angles
- Dynamics of a rigid body; general equations of motion, Euler equations of motion

Designation:
Elective