THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Advanced Kinematics and Mechanisms

MECHENG 7751

Credit Hours:
3.00 - 3.00

Course Levels:
Graduate (5000-8000 level)

Course Components:
Recitation
Lecture

Course Description:
Kinematic design and analysis of mechanisms. The focus is on kinematic representations of rigid transformations in space, derivation and solution of the kinematic constraint equations. Computer projects involve Solidworks and Matlab/Mathematica.

Prerequisites and Co-requisites:
Prereq: 3671 (563) or Engr 1183, or Grad standing; or permission of instructor.

Course Goals / Objectives:
- Be able to apply fundamental concepts to mobility analysis of planar, spherical and spatial linkages
- Be able to derive planar, spherical, spatial displacements through the use of transformation matrices, screw axes and quaternions
- Be able to perform kinematic analysis and synthesis of planar linkages
- Be able to utilize computer algebra software for deriving kinematic constraint equations and obtain solutions to kinematics problems
- Be able to analyze complex mechanisms using both graphical and analytical techniques
- Be able to analyze spatial mechanisms and linkages using matrix techniques

Course Topics:

- Mechanism review, Matlab, and Solidworks
- Design for finitely separated positions of a rigid body
- Design for infinitesimally separated positions of a rigid body
- Instantaneous invariants in kinematics
- Analysis of planar mechanisms
- Introduction to analysis of spatial mechanisms

Designation:

Elective