THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Smart Materials and Intelligent Systems

MECHENG 5374

Credit Hours:
3.00

Course Levels:
Undergraduate (1000-5000 level)
Graduate (5000-8000 level)

Course Components:
Lecture

Course Description:
Macromechanical modeling of smart materials including piezoceramics, magnetostrictives, shape memory alloys, magnetorheological fluids, and active polymers. Constitutive and system-level modeling. Design of smart dynamic systems.

Prerequisites and Co-requisites:
Prereq: 3360 (571) or 3361, or Grad standing in MechEng, or permission of instructor.

Course Goals / Objectives:
- Model and understand linear and nonlinear effects in smart materials
- Develop models for the macromechanical responses of smart materials
- Utilize smart materials in actuators, sensors, and dynamic systems and structures
- Apply smart materials to practical engineering applications (including automotive components and sub-systems)

Course Topics:
- Introduction and overview of smart materials
- Linear constitutive modeling
- Piezoelectric materials
- Shape memory alloys
- Magnetostrictive materials
- ER fluids and MR fluids

Designation:
Elective