THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Manufacturing Processes and Simulation

ISE 5503

Credit Hours:
3.00 - 3.00

Course Levels:
Undergraduate (1000-5000 level)
Graduate

Course Components:
Lecture
Lab

Course Description:
An introduction to theory and simulation of different manufacturing processes. Learn to apply numerical methods to manufacturing processes such as machining, hot embossing, and injection molding.

Prerequisites and Co-requisites:
Prereq: Jr or Grad standing in Engineering, or permission of instructor.

Course Goals / Objectives:
- Understand the mathematical background for solving engineering problems.
- The ability to create computational simulations of manufacturing processes.
- Apply numerical simulation tools to manufacturing process simulation/optimization.

Course Topics:

- Introduction: manufacturing process modeling and foundation of error analysis
- Taylor expansion
- Injection Molding (090BE)
- Injection Molding Simulation
- Roots of equations: bracketing and open methods
- Linear algebraic equations
- LU Decomposition and matrix inversion
- Curve fitting, regression, interpolation
- Spline Interpolation
- Machining lab (090BE)
- Machining Simulation 1 (Matlab)
- Machining Simulation 2 (FEM)
- Differentiation
- Integration
- Ordinary Differential Equation (ODE)
- Partial Differential Equation (PDE)
- Optimization
- Finite Element Analysis
- Hot embossing Lab
- Hot embossing Simulation

Designation:

Elective