THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Manufacturing Processes and Machine Tools

ISE 5555

Credit Hours:
3.00 - 3.00

Course Levels:
Undergraduate (1000-5000 level)
Graduate

Course Components:
Lecture
Lab

Course Description:
Focuses on machining processes: cutting, grinding and milling. It includes descriptive and analytical treatment of machining processes, equipment, computer control and integrated systems.

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

Course Goals / Objectives:
- A descriptive and qualitative understanding of traditional and non-traditional machining processes.
- The ability to use engineering science tools such as stress analysis, theory of vibrations, control theory, and heat transfer to analyze machining processes and machines.
- The ability to rapidly and accurately perform machining engineering evaluations and analyses.
- The ability to create computational simulations of machining processes and machines.

Course Topics:

- Introduction
- Machine tools and machining operations
- Turning process (force and process conditions) (090BE)
- Turning process simulation (Matlab)
- Turning process simulation (FEM)
- Mechanics of metal cutting
- Temperatures in metal cutting
- Computing the temperature field
- Tool material, life, wear, chip control
- Micromachining Simulation 1 (FEM)
- Design of machine tools: structures, slides and drives
- Accuracy of machine tools, machine tool metrology
- Mechanical vibration
- Forces and forced vibration
- Chatter in machining
- Numerically controlled machine tools
- Manufacturing Systems
- Machine tool metrology (spindle error motion)

Designation:

Elective