Course: ME 54600: CAD/CAM and Application

Type of Course: Graduate course for MSE-ME concentration
Elective (Group 1) for ME program

Catalog Description: This course is to introduce computer-aided design (CAD) and computer-aided manufacturing (CAM) theory and applications. The course subjects include CAD/CAM systems, Geometric modeling, data exchange and integration, mechanical assembly, mechanical tolerancing, process planning and Tool path generation, integration of CAD/CAM with the production machine, and Computer control of machines and processes in manufacturing systems. Projects will focus on solid modeling for design and manufacturing applications and the use of commercial CAD/CAM software for automating the production cycle. Applications include NC machining, design of (optimum) cutting tools and modeling and design of fixtures for dies and molds. Hands-on experience is attained through CNC machine tool laboratory.

Credits: 3

Contact Hours: 3

Prerequisite Courses: Graduate Standing

Corequisite Courses: None


Course Objectives: This course is to teach the theory and tools of Computer Aided Design (CAD) and Computer Aided Manufacturing (CAM) with an emphasis on the central role of the geometric model in their seamless integration. It focuses on the integration of these tools and the automation of the product development cycle. It is to introduce geometric modeling techniques, data structure design and algorithms for solid modeling. It also covers the machining theory, automated CNC machining, and process control.

Course Outcomes: A student who successfully fulfills the course requirements should be able to:
[1] explain the concepts and underlying theory of modeling and the usage of models in different engineering applications (1,2)
[2] Create accurate and precise geometry of complex engineering systems and use the geometric models in different engineering applications (2,6).
[3] Compare the different types of modeling techniques and explain the central role solid models play in the successful completion of CAD/CAM-based product development (2)
[4] Use and assess commercial CAD/CAM tools efficiently, effectively and intelligently in advanced engineering applications (1,2,6)
[5] Use current state-of-the-art CAD/CAM technology in research (6)
[6] Extend CAD/CAM technology for research and development purposes (1,2,6)
[7] Explain the basic concepts of CNC programming and machining (6)

Lecture Topics

[1] CAD/CAM theory
[2] Introduction to CAD/CAM
[5] Product Design and development
[6] Product Manufacturing and management
[7] Future directions for CAD/CAM
[8] CAD/CAM Programming
[9] Soldworks CAD/CAM package (labs)
[10] CNC machining (labs)

Computer Usage

High

Laboratory Experience

Medium

Design Experiences

Medium

Coordinator

Zhuming Bi

Date

March 26, 2018