ME554
Introduction to CAD
Spring 2023

Course Syllabus

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COURSE DESCRIPTION

Designs of modern products and processes are very complex, and complex designs rely heavily on computer aided technologies. This course introduces fundamentals of CAD and its application in design and manufacturing practices. Students will learn theory and practice related to geometric modeling, mechanical assembly, parametric design, freeform surface modeling, and CAD/CAE/CAM simulation tools for the product design. Students will learn the state of art CAD software like Creo Parametric through tutorials and exercises.

STUDENT LEARNING OUTCOMES

After successful completion of this course, students will be able to

- understand the basic concepts of CAD.
- create three dimensional models using basic and advanced features of current CAD systems.
- understand how CAD technology can be leveraged in the design process.
- design a part or assembly of parts using Computer-Aided Design software.
- make appropriate selection of CAD/CAE/CAM functionality to use as tools in the design process.

COURSE MATERIALS

Textbook: Bi, Zhuming, and Xiaoqin Wang, *Computer Aided Design and Manufacturing*, Wiley Global Research (STMS), 2020.

References: Rider, Michael, *Designing with Creo Parametric 7.0*, SDC Publications, Inc.

COURSE REQUIREMENTS

Homework (30%)
- Creo Tutorial & Exercise
- CAE/CAM Simulation
- **Late homework will not be accepted**, except for medical reasons (with doctor's note) or prior approval by instructor.

Project 1 - Individual Project (10%)
- Model a given assembly design

Project 2 - Group Project (30%)
- Model an existing object that you choose

Final Exam (30%)
Final exam will be given during the final exam period. Final exam will consist of two parts, modeling and written exam. Modeling exam part will ask students to demonstrate proficiency with CAD software with respect to the topics covered in class. The written exam part will cover theory and practical aspects of CAD/CAM.

TENTATIVE COURSE SCHEDULES

Week	Subject	Software
1	Introduction to CAD/CAM	Introduction to Creo Parametrics
2	Computer Aided Geometric Modeling	Creo Basic Techniques
3	Curves, Surface, and Solid	Creo Feature Generation (Extrusion)
4	Feature Based Modeling	Creo Feature Generation (Revolve)
5	Knowledge-Based Engineering (Parametric Modeling)	Creo Engineering Drawings
6	Platform Technologies (standardization, modularization, platforms)	Creo Assemblies
7	Computer Aided Reverse Engineering	Creo Advanced Assembly & Drawing
8	Computer Aided Machine Design	Creo Patterns
9	Computer Aided Manufacturing (CAM)	Creo Advanced Techniques (Sweep & Blend)
10	Finite Element Modeling and Analysis	Creo CAM
11	Computer Aided Engineering (CAE)	Creo Simulate
12	Digital Manufacturing	Creo Generative Design – Topology optimization
13	Direct and Additive Manufacturing	Creo Relations and Family Tables
14	Design for Sustainability	
15	Final Exam	