

## ME 455 - Computer Aided Design

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**Hour:** Lecture: 2 Hrs.

Tutorial: 2 Hrs.

Credit: 3.

**Coordinator:** Mostafa Rostom

**Text Book:**

- CAD lecture notes

**Reference Books:**

- Sham Tickoo. "Solid edge V20 for designers", 2008, Cadcim Technologies.
- Chandrakant S. Desai & Tribikram Kundu, "Introductory finite element method", 2001, CRC Pub., 1st edition.
- I. Zeid, "CAD/ CAM Theory and practice", McGraw Hill, 1994, 4th edition

**Specific course information**

- a. Introduction to computer aided drafting and analysis – 2D and 3D Drafting (parametric solid modeling) – Introduction to the software "Solid Edge" – 2D and 3D parametric modeling – Introduction to finite element analysis – The finite element software "FEMAP" – Application to different machine element problems – Simulation of dynamic systems – MATLAB analysis and graphics – Application to different Mechanical, Hydraulic and Thermal systems (MATLAB 'Simulink') – Introduction to optimization – System and element optimum design problems.
- b. Prerequisite: ME 356 / ME 454
- c. Designation: Required

**Specific goals for the course:**

- Design a system, process, or component to meet desired needs subject to given constraints. Analyze and evaluate alternative solutions.
- Identify, formulate, and solve engineering problems. Make appropriate and necessary assumptions. Suggest and evaluate new approaches.
- Recognize the need for and demonstrate ability to engage in lifelong learning.
- Ability to put forward the design requirements and considerations and manage the different design steps for any mechanical systems.

**Course instruction outcomes:**

- The students will be able to know how to design, analyze and present various problems encountered in the field of mechanical engineering with enough accuracy and speed by the aid of the computer

**Student outcomes:**

C, E, I

**Topics Covered:**

- Introduction to computer aided drafting and analysis
- Introduction to the software "Solid Edge"
- Basics of solid 2D and 3D parametric modeling using Solid Edge
- Solid Edge profile environment
- Primary and treatment features with Solid Edge
- Introduction to finite element analysis
- The finite element software "FEMAP" - Quiz
- "FEMAP" model and mechanical generation
- Application to different machine element problems
- MATLAB analysis and graphics
- Simulation of dynamic systems
- Application to different Mechanical, Hydraulic and Thermal systems (MATLAB 'Simulink')
- Introduction to Optimization
- System and element optimum design problems

Course / credit hours	Math & Basic Sciences	Engineering Topics	General Education
Computer aided design(ME455)/3		3	