ME 4042 - Interactive Computer-Aided Design and Computer-Aided Engineering – Fall 2026

Course Catalog Data: ME 4042 Interactive Computer-Aided Design and Computer-Aided Engineering
Credit: 2-3-3; Prereq: COE 3001 Mech of Deformable Bodies; Coreq: ME 3345 Heat Transfer
Catalog Description: Principles of Geometric Modeling and Finite-Element Method; interactive CAD and CAE software tools. CAD and CAE applications in thermal and mechanical design problems. Design projects.

Textbook: *Mastering CAD/CAM*, I. Zeid, McGraw-Hill, 2005

References: Web-based notes; on-line user manual
Michael Mortenson, *Geometric Modeling*, 3rd Edition, Industrial Press, 2006
D. L. Logan, *A First Course in Finite-Element Method*, 6th Edition, CENGAGE Learning, 2015
D. Solomon, *Curves and Surfaces for Computer Graphics*, Springer, 2006

Instructor: Suresh K. Sitaraman, Regents' Professor, Mechanical Engineering
suresh.sitaraman@me.gatech.edu, 404-894-3405,
Callaway Manufacturing Research Center or GT Manufacturing Institute Building, Room 471)

Graduate Assistants

Class Hours	12:30 – 1:20 PM, Tuesdays and Thursdays
Office Hours	2:00 – 3:00 PM, Mondays and Tuesdays
Lab Hours	3:30 – 6:15 PM, Tuesdays (Section A01) or Wednesdays (Section A02), Allen SEB 316
Lab Office Hours	On appointment with Graduate Assistants through email

Outcomes:
Objective 1: To explain the basics of Geometric Modeling and Computer Graphics.
Objective 2: To explain the theory behind the Finite-Element Method (FEM), and to provide insight into the practical aspects of FEM.
Objective 3: To develop skills in the design and analysis of practical engineering problems through the integration of geometric modeling, FEM and computer graphics.
Objective 4: To gain hands-on experience with commercial CAD/CAE packages.
Objective 5: To underscore the importance of validating the results obtained from numerical models

Topics:

I. Introduction
II. Features of CAD/CAE/CAM Systems
III. Geometric Modeling
IV. General Process of Finite-Element Procedure
V. Finite-Element Theory
VI. Practical Aspects of Finite-Element Modeling
VII. Design Projects

Delivery Mode

Lecture	65%
Supervised Lab	35%

Grading Allocation

Homework	20%
Lab Preparation and Participation	10%
Midterm Exam (I-Theory and II-Practice)	30%
Group Project (Interim Presentation)	10%
Group Project (Final Presentation and Final Report)	30%
Bonus (Class Participation and Attendance)	1%

Grading Guidelines

A: 90% and above
B: 80% and above, and less than 90%
C: 70% and above, and less than 80%
D: 60% and above, and less than 70%
F: Less than 60%