MAE 150
Computational Methods for Design (4 units)

Class/Laboratory Schedule: Four hours of lecture, eight hours of outside preparation, 12 hours/week total

Course Coordinator(s): James Friend, Michael Tolley, Frank Talke, Marko Lubarda

Textbooks/Materials:

1. Course Reader – Talke's Computer-Aided Design and Analysis (from UCSD Bookstore)

Catalog Description: Computer-aided analysis and design. Design methodology, tolerance analysis, Monte Carlo analysis, kinematics and computer-aided design of linkages, design of cams and cam dynamics, design optimization, finite element analysis fundamentals, design using commercially available CAD and analysis software.

Prerequisites: MAE 30A or MAE 130A or SE 101A or BENG 110, MAE 107 or SE 121, MAE 3 or MAE 2, and senior standing in engineering major, or consent of instructor

Course Type: Required

Course Objectives:

1. To teach students how to solve typical engineering design problems with the use of computers.
2. To teach students to develop their own computer programs (e.g., in MATLAB) for the solution of engineering design problems.
3. To teach students how to use typical commercially available design software (e.g., SolidWorks, ANSYS, Creo-Pro) for the solution of engineering design problems.

Course Topics:

1. Principles of design
2. Tolerance analysis
3. Monte Carlo analysis
4. Kinematics analysis and design of four bar linkages; open and closed linkages
5. Introduction to SolidWorks or other CAD software
6. Dynamics analysis and design of cams
7. Finite element analysis
8. Design optimization

Last Updated: 20th March 2025