

Mechanical and Aerospace Engineering
MAE 6550
Advanced Structural Analysis

Syllabus

Course Description:

MAE 6550 – A treatment of various important topics structure engineers need to know about modern civil, mechanical, and aerospace structures. This course assumes an introductory background in the mechanics of solids while explaining subjects typically spread in various more advanced courses. 3 credits, Sp.

Prerequisites: MAE 6040

Textbooks: There is no textbook required. Lecture notes will be provided.

Course Objectives:

This course emphasizes concepts of mechanics through formulating and solving typical problems of engineering structures, and helps foster an in-depth understanding of the subject. Students not only gain a knowledge of the fundamental principles needed to analyze and design structures but also gain an integrated and consistent understanding of solid and structure mechanics based on linear elasticity.

Topics Covered:

- Review of vectors and tensors in Cartesian Coordinate Systems
- Introduction of Basic Mechanics Concepts: Traction/stress/equilibrium, deformation/strain/compatibility, and constitutive laws
- Variational and energy principles: calculus of variations, energy principles of mechanics
- Common structural components – beams: beam models, classical solutions for beams
- Common structural components – plates: plate models, classical solutions for plates
- Introduction to structural analysis codes including ANSYS, VABS, VAPAS, and DYMORE

Class Schedule:

Three 50 minute classes, M-W-F