Credits: 3 hours lecture

Instructor: Sara McCaslin, Assistant Professor of Mechanical Engineering

Text(s): None assigned

Additional Material: Class handouts

Course Information

Catalog Description: An introduction to the finite element method in mechanical engineering. Emphasizes linear stress and strain analysis, but includes other field problems. Utilizes commercial computer codes to solve engineering related problems.

Prerequisites: MATH 3203 Matrix Methods and MENG 3306 Mechanics of Materials; Co-requisite MENG 3316 Heat Transfer

Required, Elective, Selected: Elective

Course Goals

Instructional Outcomes: By the end of this course students will be able to:
1. Demonstrate an understanding of the fundamental concepts of the finite element method by forming the stiffness x displacement = load matrix equations for simple structures, solving for displacement, and then computing strains and stresses.
2. Select an appropriate FE element type for the physical model desired.
3. Apply appropriate loads and boundary conditions to models.
4. Setup for processing, process, and interpret results for linear, 2- and 3-dimensional problems using a commercial finite element code (Autodesk Simulation Multiphysics, formerly known as Algor).
5. Demonstrate the importance of checking the finite element solutions and models with "back - of - the - envelope" solutions and engineering judgment.

Relationship to Student Outcomes: This course supports the following Mechanical Engineering Program Student Outcomes, which state that our students will:
1. be able to apply science, mathematics, and modern engineering tools and techniques to identify, formulate, and solve engineering problems

Topics Covered
- Fundamental equations (direct method)
- Use of Autodesk Multiphysics Simulation software
- Bars, beams and planar elements
- Isoparametric elements
- Solids and solids of revolution
- Applications in stress analysis and in one or more of the following areas: fluid analysis, thermal analysis, and modal analysis

Prepared By: Sara McCaslin            Date: 12/25/2013