



“Mechanized Design Application”

Department: Mechanical Engineering

Course Name : Elective – I Finite Element Analysis

Final Year of Mechanical Engineering (2015 Course)

Course Code : 402044A

Course Objectives:

1. To understand the philosophy and general procedure of Finite Element Method as applied to solid mechanics and thermal analysis problems.
2. To familiarize students with the displacement-based finite element method for displacement and stress analysis and to introduce related analytical and computer tools.
3. It provides a bridge between hand calculations based on mechanics of materials and machine design and numerical solutions for more complex geometries and loading states.
4. To study approximate nature of the finite element method and convergence of results are examined.
5. It provides some experience with a commercial FEM code and some practical modeling exercises

Course Outcomes:

On completion of the course, students will be able to –

CO1: Understand the different techniques used to solve mechanical engineering problems.

CO2: Derive and use 1-D and 2-D element stiffness matrices and load vectors from various methods to solve for displacements and stresses.

CO3: Apply mechanics of materials and machine design topics to provide preliminary results used for testing the reasonableness of finite element results.

CO4: Explain the inner workings of a finite element code for linear stress, displacement, temperature and modal analysis.

CO5: Use commercial finite element analysis software to solve complex problems in solid mechanics and heat transfer.

CO6: Interpret the results of finite element analyses and make an assessment of the results in terms of modeling (physics assumptions) errors, discretization (mesh density and refinement toward convergence) errors, and numerical (round-off) errors.