Finite Element Methods

(ME702)

Course Objectives

1. To learn basic principles and skills of finite element modeling and analysis.
2. To learn the theory and characteristics of finite elements that represent engineering structures.
3. To learn and apply finite element solutions to problems in mechanical engineering.
4. To develop the knowledge and skills needed to effectively evaluate finite element analyses performed by others.

Course Outcomes:

CO1) To understand the theory of elasticity including strain/displacement and Hooke's law relationships.

CO2) To analyze solid mechanics problems using classical methods and energy methods;

CO3) To solve torsion problems in bars and thin walled members.

CO4) To solve for stresses and deflections of beams under unsymmetrical loading;

CO5) To analyze the maximum and minimum principal stresses using analytical and graphical (mohr's circle)methods.

CO6) To obtain stresses and deflections of beams on elastic foundations;

CO7) To Understand the fundamental concepts of stress and strain and the relationship between both through the strain-stress equations in order to solve problems for simple tridimensional elastic solids Calculate and represent the stress diagrams in bars and simple structures.

CO8) To apply various failure criteria for general stress states at points

Program Educational Objectives:

PEO1: Our graduates will apply their knowledge and skills to succeed in a computer engineering career and/or obtain an advanced degree.

PEO2: Our graduates will apply basic principles and practices of computing grounded in mathematics and science to successfully complete hardware and/or software related engineering projects to meet customer business objectives and/or productively engage in research.

PEO3: Our graduates will function ethically and responsibly and will remain informed and involved as fully in their profession and in our society.

PEO4: Our graduates will successfully function in multi-disciplinary teams.

PEO5: Our graduates will communicate effectively both orally and in writing.

Program Outcomes:

a. Graduates will demonstrate knowledge of mathematics, science and engineering applications

b. Graduates will demonstrate ability to identify, formulate and solve engineering problems

c. Graduates will demonstrate an ability to analyse, design, develop and execute the programs efficiently and effectively

d. Graduates will demonstrate an ability to design a system, software products and components as per requirements and specifications

e. Graduates will demonstrate an ability to visualize and work on laboratories in multi-disciplinary tasks like microprocessors and interfacing, electronic devices and circuits etc.

f. Graduates will demonstrate working in groups and possess project management skills to develop software projects.

g. Graduates will demonstrate knowledge of professional and ethical responsibilities

h. Graduates will be able to communicate effectively in both verbal and written

i. Graduates will show the understanding of impact of engineering solutions on society and also be aware of contemporary issues like global waste management , global warming technologies etc

j. Graduates will develop confidence for self education and ability for life long learning.

k. Graduates can participate and succeed in all competitive examinations and interviews

Mapping of course out comes with program outcomes:

Course outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	√								√		
CO2			√				√				
CO3		√			√						√
CO4						√					
CO5				√						√	
CO6	√										
CO7								√			
CO8						√					
CO9			√								
CO10		√									