Course Number and Name
BME602 – FINITE ELEMENT ANALYSIS

Credits and Contact Hours
4&60

Course Coordinator's Name
Mrs.C.M.Meenakshi

Text Books and References
TEXT BOOKS: 1. J.N.Reddy – An introduction to Finite Element Method – McGraw Hill, 2007. 2. S.Senthil- An introduction to Finite Element Analysis – Laxmi Publications. **REFERENCES :** 1. K.J.Bathe – Finite Element Procedure – Prentice Hall of India, 1996. 2. O.C.Zienkiewicz–The Finite Element Method in Engineering Science, McGrawHill, 2000. 2. T.R.Chandraputla , A.D.Belegundu – Introduction to Finite Elements in Engineering – Prentice Hall of India, 2002. 3. S.S.Bhavikati – Finite Element Analysis, New Age International Publishers. **4.** https://www.amazon.in/...**FINITE**-**ELEMENT**-**ANALYSIS**...**ebook**/.../B0

Course Description
To introduce the concepts of Mathematical Modeling of Engineering Problems. To appreciate the use of FEM to a range of Engineering Problems

Prerequisites	Co-requisites
Numerical Methods	Nil

required, elective, or selected elective (as per Table 5-1)
Required

Course Outcomes (COs)	
CO1	Upon completion of this course, the students can able to understand different mathematical Techniques used in FEM analysis and
CO2	Understand the concepts of Nodes and elements
CO3	Understand use of FEA in Structural and thermal problem
CO4	Understand the application of FEA in heat transfer problem
CO5	Learn how to do analysis learn the various concepts and types of analysis
CO6	Learn finite element modeling techniques.

Student Outcomes (SOs) from Criterion 3 covered by this Course												
COs/SOs	a	b	c	d	e	f	g	h	i	j	k	l
CO1	H	M					M			M		
CO2	H							L		M		
CO3	H							L		M		L
CO4											L	
CO5							M					
CO6					M							L

List of Topics Covered

UNIT I   AN INTRODUCTION TO FINITE ELEMENT METHODS   12

Field problems – Elementary treatments – Elements and types – Steady state problems – Propagation problems – Eigen value problems – Differential formulation – Weighted residual Method- Galarkin Approach – Variational methods – Convergence criteria.

UNIT II BAR ELEMENTS   12

Bar element – Mechanical and Thermal loads – Shape functions – Lagrange's Interpolation – Temperature effects and strain distributions.

UNIT III HEAT TRANSFER IN FE   12

Heat Transfer-Conduction, Convection, Radiation, Elasticity concepts – Plane stress and Plane strain - Euler - Bernoulli Beam Elements – Trusses and Frames.

UNIT IV GAUSS QUADRATURE METHODS   12

Node numbering – Natural co-ordinates – Isoparametric formulation – Gauss quadrature – Choice of quadrature rule – Gauss Point.

UNIT V COMPUTERIZED FEA   12

Computerized FEA – Preprocessing –Element types - Mesh generation – Solution – Post processing – Procedures of Case studies.