

COLLEGE OF ENGINEERING & TECHNOLOGY

(AUTONOMOUS)

Accredited by National Board of Accreditation, AICTE, New Delhi, Accredited by NAAC with "A" Grade – 3.32 GGPA, Recognized under 2(f) & 12(B) of UGC Ad. 1956, Approved by AICTE, New Delhi, Permanent Affiliation to JNTUK, Kakinada Seetharampuram, W.G.DT., Narsapur-534280, (Andhra Pradesh)

DEPARTMENT OF MECHANICAL ENGINEERING

TEACHING PLAN

Cou Co		Course Title	e	Semester	Branches	Contact Periods /Week	Academic Year	comm	ite of encement mester
16ME7T01 ELEM		FINITE ELEMEN METHO	1T	VII	Mechanical Engineering	6	2021-22	04.1	0.2021
COUI		UTCOMES		ls of finite	e element analys	sis, stress-ec	quilibrium,	strain-Dis	placemen
CO2		and stress –strain relationships and concept of potential energy. (K2) Solve the One dimensional problems by using different methods. (K2)							
CO3					truss and beam				
CO4 CO5 CO6	integ Appl Solve	ration for H y finite eler	ligher on ment and nt matri	rder elemer alysis to so	sing CST and hi nt analysis.(K3) lve Heat transfer ed and consisten	r problems (K3)		
	0			1 200 mil 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		A 100 100 100 100	Text Book	Val. Lity Artis	Milet III
UNIT	1	tcomes / m's Level	Topic s No.		Topics/Activity		/ Reference	Contact Hour	Delivery Method
UNIT	1	m's Level	s No.		Topics/Activity		/ Reference		•
UNIT	Bloo	m's Level IN ain the	s No.	UCTION 7		EMENT M	/ Reference		•
UNIT	Explain of the clean	m's Level IN ain the mentals finite ment	s No.	UCTION 7 Introduction method stress and	TO FINITE EL	EMENT Monent	/ Reference IETHOD	Hour	•
	Explain fundament of fundament analysis	IN ain the mentals	s No. TROD	UCTION Introduction method stress and condition relations	TO FINITE EL	EMENT Monent	Reference IETHOD T1, T2, R4	Hour 2	Method Chalk &
I	Explain of factorial equilibrium str	m's Level IN ain the mentals finite ment sis,stres	s No. TROD 1.1 1.2	Introduction method stress and condition relations stress – st Special ca Two dime	TO FINITE EL ion to finite elen l equilibrium, Bo s strain – displac	DEMENT Monent Doundary cement sional,	/ Reference IETHOD T1, T2, R4 T1, T2, R4	Hour 2	Chalk & Talk PPT, Classroo
	Explain fundament of fundament	ain the mentals finite ment sis, stres s- ibrium, ain - acement and s-strain	s No. TROD 1.1 1.2 1.3	UCTION Introduction method stress and condition relations stress – st Special ca Two dimer plane strain Potential	ro FINITE EL ion to finite elen equilibrium, Bo s strain – displac train relations, ases- one dimens	DEMENT Monent Doundary cement sional, tress and librium;	/ Reference IETHOD T1, T2, R4 T1, T2, R4 T1, T2, R4	2 2 1	Chalk & Talk PPT,
	Explifundation of find analysis equiling stream displacements are stream at the stream	in the mentals finite ment sis, stres s- ibrium, ain - acement and s-strain conships	1.1 1.2 1.3 1.4	UCTION To Introduction method stress and condition relations stress – stres	ro FINITE EL. ion to finite element equilibrium, Bos strain – displace train relations, asses- one dimensional plane strain condition energy and equi	DEMENT Monent Doundary cement sional, tress and librium;	/ Reference IETHOD T1, T2, R4 T1, T2, R4 T1, T2, R4 T1, T2, R4	2 2 1	Chalk & Talk PPT, Classroo
	Explifundation of find analysis equiling stream displacements are stream at the stream	ain the mentals finite ment sis, stres s- ibrium, ain - acement and s-strain	1.1 1.2 1.3 1.4	UCTION To Introduction method stress and condition relations stress – stres	ro FINITE EL. ion to finite elem l equilibrium, Bos strain – displace rain relations, ases- one dimensensional plane strain condition energy and equiligh-Ritz method s Method	DEMENT Monent Doundary cement sional, tress and librium;	/ Reference IETHOD T1, T2, R4	2 2 1 1 2 2	Chalk & Talk PPT, Classroo



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	CBS		Saint Venant's Principle	T1, T2, R4	1	
	CDS	and the second s	entroni en en den freite den dentronomicane in carponamente en antimpo des de carponamento (compresenta en esta	TOTAL	12	
			DIMENSIONAL PROBLEMS			
	Concept of potential energy and solve 1-D problems	2.1.	Finite element Modeling, Element Division, Numbering scheme.	T1, T2, R4	1	
		Concept of 2.2	Coordinates and shape functions	T1, T2, R4	1	
II		2.3	Total Potential energy Approach- Element Stiffness Matrix Force terms. Assembly of the Global Stiffness matrix and load vectors. Properties of 'K'	T1, T2, R4	1	Chalk & Talk PPT, Animat
**		2.4	Band width, node numbering, mesh Generation	T1, T2, R4	1	ion,Vid eos
		2.5	The finite element equations; treatment of boundary conditions 1. Elimination approach 2. Penalty approach	T1, T2, R4	1	
		2.6	1-D Problems both approaches	T1, T2, R4	5	
	CBS	2.7	Tempertrure effects	T1, T2, R4	1	
				TOTAL	11	The state of the s
	* 4	AN	ALYSIS AND TRUSSES OF BEA	AMS		
,		3.1	Analysis of Trusses Plane Trusses Local and global coordinate systems, Formulas for Calculating '1' and 'm'	T1,R4	2	
	Solve structural applications using truss and beam elements [K3]	3.2	Stiffness Matrix- Assembly of global stiffness matrix and load vector, finite element equations,	T1,R4	1	Chalk & Talk, PPT,Pr
III		3.3	Treatment of boundary conditions, stress, and strain and support reaction calculations.	T1,R4	1	ojec Based
		3.4	Problems	T1,R4	4	Learnin
		3.5	Analysis of Beams: Potential — Energy approach, Finite element formulation and load vector, Shear force and Bending moment. Beam on elastic support.	T1,R4	1	g



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		3.6	Element stiffness matrix for Hermite beam element, derivation of load vector for concentrated and UDL, simple problems on beams.	T1,R4	1	
		3.7	Problems	T1,R4	1	-
	CBS	3.8	Beams on elastic supports		 	
				TOTAL	15	
		Т	WO DIMENSIONSL ELEMENTS			
	Solve two dimensional problems using	4.1	Finite element modeling of two dimensional stress analysis with constant strain triangles and treatment of boundary conditions	T1, R4	2	
	CST and higher order elements and	4.2	Two dimensional fournodedisoparametricel ementsand numerical integration,	T1, R4	2	Chalk & Talk, PPT,Vi
IV	apply Numerical integration for Higher order element analysis [K3]	4.3	Problems	T1, R4	8	rtual Class
	CBS	4.4	Orthotropic materials	T1,R4	1	
	CDS			TOTAL	13	
		STEAD	Y STATE HEAT TRANSFER ANA	LYSIS		
	Apply finite element	5.1	Steady state heat transfer analysis cone dimensional analysis of a fin and two dimensional analysis ofthinplate,.	T1	2	Chalk & Talk, PPT,Ac
V	analysis to	5.2	Analysis of a uniform shaft subjected to torsion.	T1	1	tive
	solve Heat transfer [K3]	5.3	Problems	T1	7	Based Learnin g
	CBS	5.4	Electric and magnetic field problems	Tl	1	
	1			TOTAL	11	
			DYNAMIC ANALYSIS		**************************************	
VI	Solve the element	6.1	Dynamic Analysis: Formulation of finite element model, element consistent and lumped mass matrices,	TI	1	Chalk & Talk,



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	matrices,	6.2	Evaluation of eigen values and eigen	T1	2	DDT	
	Lumped and	0.2	vectors.		2	PPT, Animati	
	consistent mass matrices			T1	7	on,Vide	
	evaluation of Eigen values and Eigen vectors [K3]	6.3	Problems.			os	
	CBS		Guyan reduction method	T1	1		
				TOTAL	11		
NOTE: C	BS - CONTENT BEYON	ID SYLLAB	us				
	20		CUMULATIVE PROPOSED PI	ERIODS	73		
Text F	Books:						
S.No.	AUTHORS, BO	OOK TI	TLE, EDITION, PUBLISHER, YEA	R OF PU	BLICAT	ION	
T1	Chandraputla, Ashok and Belegundu, Introduction to Finite Elements in Engineering, 4 th Edition, Eight Impression, Pearson publications, 2018.						
T2	SS Rao, The Finite Element Methods in Engineering, Elsevier india Private Limited, 5 th edition 2011.						
Refer	ence Books:						
S.No.	AUTHORS R					A THE COURT OF THE	
	ACTIONS, D	OOK TI	TLE, EDITION, PUBLISHER, YEA	R OF PU	BLICAT	ION	
R1	YM Desai, Eldl	10&Shah	TLE, EDITION, PUBLISHER, YEA , Finite Element Method with applicati				
R1	YM Desai, Eldl publishers,2011	10&Shah	, Finite Element Method with applicati	ons in Eng	gineering		
	YM Desai, Eldl publishers,2011 JN Reddy, An Kenneth H. Hu	introduct	, Finite Element Method with application to Finite Element Method, McGravonald L. Dewhirst, Douglas E. Smith an	ons in Eng wHill20 d Ted G. I	gineering O Syrom, Th	Pearson	
R2	yM Desai, Eldl publishers,2011 JN Reddy, An Kenneth H. Hu Element Metho	introductebner, Do	ion to Finite Element Method with application to Finite Element Method, McGravonald L. Dewhirst, Douglas E. Smith angineers, John Wiley & Sons (ASIA) Pte	wHill20 d Ted G. I Ltd., 2001	gineering O Syrom, Th	Pearson e Finite	
R2 R3 R4	yM Desai, Eldl publishers,2011 JN Reddy, An Kenneth H. Hu Element Metho	introductebner, Do	, Finite Element Method with application to Finite Element Method, McGravonald L. Dewhirst, Douglas E. Smith an	wHill20 d Ted G. I Ltd., 2001	gineering O Syrom, Th	Pearson e Finite	
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R2 R3 R4	YM Desai, Eldl publishers,2011 JN Reddy , An Kenneth H. Hu Element Metho S.S.Bhavikatti, Details https://nptel.ac. https://nptel.ac.	introduct ebner, De d for Eng Finite E	ion to Finite Element Method with application to Finite Element Method, McGray and L. Dewhirst, Douglas E. Smith an gineers, John Wiley & Sons (ASIA) Pte lement Analysis, New age International and the ses/112/104/112104116/#	wHill20 d Ted G. I Ltd., 2001	gineering O Syrom, Th	Pearson e Finite	
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	5	Name	Signature with Date
i.	Faculty	Dr.A Gopichand	-A. Some
ii.	Faculty II (for common Course)	B Mahesh Krishna	Brohlhl
iii.	Faculty III (for common Course)	John Bunyan V	Telmon



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iv.	Course Coordinator	Dr.A Gopichand	Abal
v.	Module Coordinator	Dr.A Gopichand	A-hul
vi.	ProgrammeCoordinator	Dr.A Gopichand	A-mi