LESSON PLAN

Subject Name- Finite Element Methods in Manufacturing	Branch- Production Engineering
Subject Code- BPEPE606	Semester- 6th , B.Tech

S/N	Module	Topic(s)	Period/ Hours
1.	I	Introduction to FEA, Initial value and boundary value problems	1
2.	I	Galerkin method	2
3.	I	Raleigh Ritz methods	3
4.	I	Raleigh Ritz methods Continued	4
5.	I	Steps in FEA: Discretization, Interpolation, derivation of element characteristic matrix for solving One dimensional solid mechanics,	5
6.	I	Steps in FEA: Shape function, assembly and imposition of boundary conditions- Solution and post processing for solving One dimensional solid mechanics,	6
7.	I	plane truss problems	7-8
8.	II	Global and Natural co-ordinates	9-10
9.	II	Shape functions for one dimensional elements (Bar element)	11-12
10.		Shape functions for two dimensional elements (for Three Node Triangular Element)	13-14
11.	II	Shape functions for two dimensional elements (Four Node Quadrilateral Element)	15-16
12.	II	Shape functions for two dimensional elements (Iso-parametric elements)	17-18
13.	II	Jacobian matrices and transformations	19
14.	II	Basics of two dimensional Axi-symmetric analysis	20

S/N	Module	Topic(s)	Period/ Hours
15.	III	FE analysis of metal casting	21
16.	III	FE analysis of metal casting- continued	22
17.	III	Special considerations, latent heat incorporation	23-24
18.	III	Gap element-Time stepping procedures	25
19.	III	Crank-Nicholson algorithm	26
20.	III	Prediction of grain structure	27
21.	IV	Basic concepts of plasticity-	28
22.	IV	Solid and flow formulation	29-30
23.	IV	Small incremental deformation formulation	31
24.	IV	FE analysis of metal cutting,	32
25.	IV	Chip separation criteria,	33
26.	IV	incorporation of strain rate dependency	34
27.	V	ANSYS and DEFORM: Pre Processing, Mesh generation, element connecting	35
28.	V	ANSYS and DEFORM: boundary conditions, input of material and processing characteristics- Solution and post processing	36
29.	V	Development of code for one dimensional analysis and validation	37
30.	V	ANSYS and DEFORM- Overview of application packages with solid mechanics problems	38-40