KIIT POLYTECHNIC

Department of Mechanical Engineering

LESSON PLAN

Session :: Winter – 2022

Course Type :: Theory

Semester/Branch :: 3rd Semester, Mechanical Engineering

Subject (with code) :: **Strength of Material (Th.2)**

Contact hours/week :: 4

Name of Faculty :: Prasant Kumar Patra

SL. NO.	CLASS ID	COURSE CONTENT	MODE OF DELIVERY	EXHIBIT/ REFERENCE
1	1	Introduction to Strength of Material. Types of loads, stresses & strains (Axial and tangential).	Lecture (Model)	https://youtu.be/GkFgysZC4Vc https://youtu.be/IpMZNpWjsk4
2	2	Poisson's ratio, Lateral and Linear strain. Hooke's law. Young's modulus, bulk modulus, modulus of rigidity.	Lecture (Explanation)	1. Study Material 2. (Book) Strength of Material book by R.S. Khurmi 3. (Book) Mechanics of Material book by S. Ramamrutham
3	3	Relation between Elastic constants		
4	4	Determination of stress, strain, deformation.	Problem based Learning	
5	5	Determination of poisons ratio and elastic constant		
6	6	Principle of super position.		
7	7	Stresses in composite section.		
8	8	Temperature stress and strain		
9	9	Temperature stress in composite bar (single core).		
10	10	Strain energy and resilience, Stress due to gradually applied, suddenly applied and impact load	Lecture (Explanation)	NPTEL Lecture by Dr. Satish C Sharma https://nptel.ac.in/courses/112107146
11	11	Class Test/Assignment		
12	12	Introduction to Thin cylinder and spherical shell. Assumption for thin cylindrical shell. Hoop and longitudinal stress and strain.	Lecture (Explanation)	1. Study Material 2. (Book) Strength of Material book by R.S. Khurmi 3. (Book) Mechanics of Material book by S. Ramamrutham
13	13	Determination of safe thickness, pressure or diameter of thin cylindrical shell based on Hoop stress and longitudinal stress.	Problem based Learning	
14	14	Hoop strain, Longitudinal strain, change in dimensions and volume.	Lecture (Explanation)	1. Study Material 2. (Book) Strength of Material book by R.S. Khurmi 3. (Book) Mechanics of Material book by S. Ramamrutham
15	15	Determination of change in dimensions of thin cylindrical shell.	Problem based Learning	

16	16	Type of beams and loads. Concepts of Shear force and bending moment.	Lecture (Explanation)	1. Study Material 2. (Book) Strength of Material book by R.S. Khurmi 3. (Book) Mechanics of Material book by S. Ramamrutham
17	17	Sign convention. Relationship between SF, BM and Loading	Lecture (Explanation)	
18	18	Draw Shear Force and Bending moment diagram in cantilever beam subjected to point load.	Problem based Learning	
19	19	Draw Shear Force and Bending moment diagram in cantilever beam subjected to U.D.L.	Problem based Learning	
20	20	Draw Shear Force and Bending moment diagram in simply supported beam subjected to point load.	Problem based Learning	
21	21	Draw Shear Force and Bending moment diagram in simply supported beam subjected U.D.L.	Problem based Learning	
22	22	Draw Shear Force and Bending moment diagram in overhanging beam subjected to point load.	Problem based Learning	
23	23	Draw Shear Force and Bending moment diagram in overhanging beam subjected U.D.L.	Problem based Learning	
24	24	Class Test/Assignment		
25	25	Revision		
26	26	Introduction to Theory of simple bending, Assumptions in the theory of bending	Lecture (Explanation)	1. Study Material 2. (Book) Strength of Material book by R.S. Khurmi 3. (Book) Mechanics of Material book by S. Ramamrutham
27	27	Theory of simple bending	Lecture (Explanation)	
28	28	Determination of Section modulus of rectangular and circular beam sections	Problem based Learning	
29	29	Determination of bending stress, bending moment and load.	Problem based Learning	
30	30	Define column, types of columns, Axial load, Eccentric load and Buckling load on column	Lecture (Explanation)	1. Study Material 2. (Book) Strength of Material book by R.S. Khurmi 3. (Book) Mechanics of Material book by S. Ramamrutham
31	31	Direct stresses, Bending stresses, Maximum & Minimum stresses in short column: for uniaxial and biaxial system	Lecture (Explanation)	
32	32	Determination of resultant stress in column	Problem based Learning	
33	33	Buckling load computation using Euler's formula (no derivation) in Columns with various end conditions	Lecture (Explanation)	
34	34	Class Test/Assignment		
35	35	Torsion in shafts, Assumption of pure torsion	Lecture (Explanation)	1. Study Material 2. (Book) Strength of Material book by R.S. Khurmi 3. (Book) Mechanics of Material book by S. Ramamrutham
36	36	Theory of pure torsion	Lecture (Explanation)	
37	37	Torsion equation for solid and hollow circular shaft	Lecture (Explanation)	
38	38	Comparison between solid and hollow shaft subjected to pure torsion, torsional rigidity,	Lecture (Explanation)	
39	39	Problem solving using torsion equation	Problem based Learning	

40	40	Introduction to 2-dimensional stress system; Concept of Principal plane, Principal stress and strain; Stresses in oblique plane	Lecture (Explanation)	1. Study Material 2. (Book) Strength of Material book by R.S. Khurmi 3. (Book) Mechanics of Material book by S. Ramamrutham
41	41	Determination of normal stress, shear stress and resultant stress on an oblique plane of a body which subjected to (i) direct stress in one direction only.	Problem based Learning	
42	42	Determination of normal stress, shear stress and resultant stress on an oblique plane of a body which subjected to (ii) direct stress in two perpendicular directions.	Problem based Learning	
43	43	Determination of normal stress, shear stress and resultant stress on an oblique plane of a body which subjected to (iii) shear stress only.	Problem based Learning	
44	44	Determination of normal stress, shear stress and resultant stress on an oblique plane of a body which subjected to (iv) direct stress in one direction and followed by shear stress.	Problem based Learning	
45	45	Determination of normal stress, shear stress and resultant stress on an oblique plane of a body which subjected to (iv) direct stress in two perpendicular directions and followed by shear stress.	Problem based Learning	
46	46	Class Test/Assignment		
47	47	Revision		
48	48	Revision		

Signature of Concern Teacher