DEPARTMENT OF PRECISION MANUFACTURING ENGINEERING
LESSON PLAN

Discipline: PME	Semester: 3rd	Name of the Teaching faculty: RANJAN KUMAR PRADHAN
Subject: SOM (TH-2)	No of Days/Week class alloted: 3	Semester from Date: 14/07/25 To Date: 15/11/25 No of weeks: 15
Week	**Class Day**	**Topics**
1st	1st	UNIT-1 : Introduction to Mechanics & Force Concepts .
	2nd	Force Systems and Classification
	3rd	Composition and Resultant of Forces
2nd	1st	Moment of a force .
	2nd	Principle of Transmissibility of forces.
	3rd	Problem Solving and Revision .
3rd	1st	UNIT-2 : Introduction to strength of material -Defination of rigid body & plastic body .
	2nd	Stress and Strain -Basic concepts.Definitions of stress & strain .Classification: tensile , compressive & shear stress.
	3rd	Mechanical properties of Materials.Elasticity, plasticity,rigidity,hardness ,toughness ,ductility,malliability,creep,fatigue etc.
4th	1st	Types of strains & Poissions ratio- longitudinal, lateral volumetric strain. Elongation & contraction.
	2nd	Stress-strain curve & material behavior. for Mild steel,HYSD bar , Non-ferrous metal
	3rd	Working stress, factore of safety & material testing parameter- ultimate, yield,breaking stress & percentage elongation and reduction in area .
5th	1st	Composite bar & principle of superposition. Modular ratio.Axially loaded bar (RCC/Encased columns) Numerical problems .
	2nd	Deformation & Elastic constants . Deformation of uniform and non - uniform bars . Volumetric strain.Relationships among elastic constants.
	3rd	Types of loading , strain energy & thermal stresses . Gradual, sudden ,Impact loads. strain energy, resilence,proof resilience.
6th	1st	CLASS TEST-1
	2nd	UNIN-3 :Introduction to centroid & centre of gravity . Definition and difference between centroid & centre of gravity.
	3rd	Centroid of plane area . centroid of rectangle, traingle,circle semicircle, and quarter circle.
7th	1st	Concepts of moment of inertia (M.I).Theorems of parallel axis and perpendicular axis .
	2nd	Radius of gyration & polar moment of inertia.

	3rd	Problem on C.G of irregular section, M.I of symmetric and unsymmetric section (I ,T ,C , L section) problems
8th	1st	UNIT-4 : Types of beams (simply supported ,cantilever,fixed and continuous beam)
	2nd	Types of loading (axial,transverse,point,uniformly distributed load,uniform varying load 7 moment load)
	3rd	Support reactions for determinate structures.End condition of beam.
9th	1st	Concept of shear force (SF) and Bending moment (BM). sign convention.
	2nd	Relation between bending moment , shear force and rate of loading ,shear force and bending moment diagrams for simply supported beams.
	3rd	Overhanging beams and cantilever subjected to point loads,UDL,point of contraflexure.
10th	1st	UNIT-5 : Intruction -Bending stress in beam,Assumption in simple bending theory.
	2nd	Bending theory , bending equation , neutral axis.
	3rd	Modulus of rupture , section modulus,flexural rigidity,moment of resistance.
11th	1st	Promlems on bending stress distribution diagram-variationof bending stresses across the cross section of the beams only rectangular and T section.
	2nd	Promlems on bending stress distribution diagram-variationof bending stresses across the cross section of the beams only rectangular and T section.
	3rd	Shear stress distribution diagram for rectangular , I , T- section beams.
12th	1st	UNIT-6 : Introduction -Definition of slope .
	2nd	Deflection- slope and deflection using moment area method for simple supported and cantilever .
	3rd	**CLASS TEST-2**
13th	1st	Subjected to symmetrical point loads and UDL.
	2nd	UDL AND overview topics 1 & 2
	3rd	Overview topics 3 , 4 & 5 .
14th	1st	Introduction -short and long columns
	2nd	Eulers theory on columns Effective length ,slenderness ratio .
	3rd	Radius gyration ,buckling load Assumptions , Eulers buckling loads for different end condition.
15th	1st	Limitation of Eulers theory and problems.
	3rd	**Overview topics 6 & 7 .**
	4th	**VST**

signture of faculty

N/A