LESSON PLAN

Discipline:civil engineering | Name of The Teaching Faculty:Lect. ANITA PRADHAN

Subject:Structural mechanics(TH1)				Semester From Date:01-10-2021 To Date 08-01-2022	
SEMESTER-5th				No. Of Weeks:14	5P/WEEK
No. of Days/week class allotted:05 period per week(Tue,Wed,Thu,Fri & Sat-1 Period each)					TOTAL PERIOD-75

MONTH	Week	DATE	DAYS	Syllabus to be covered	NO. OF PERIODS AVAILABLE
				1.Review Of Basic Concepts	**4**
OCT	1ST	01-10-2021	FRI	Basic Principle of Mechanics: Force, Moment, support conditions, Conditions of equilibrium,	1
	2ND	05-10-2021	TUE	C.G & MI, Free body diagram	1
		07-10-2021	THUS	Review of CG and MI of different sections	1
		08-10-2021	FRI	Numerical problems	1
				2.Simple And Complex Stress, Strain	**15**
		09-10-2021	SAT	2.1 Simple Stresses and Strains	1
	4TH	21/10/2021	THUS	Introduction to stresses and strains: Mechanical properties of materials – Rigidity, Elasticity, Plasticity, Compressibility, Hardness, Toughness, Stiffness, Brittleness, Ductility, Malleability, Creep, Fatigue, Tenacity, Durability,	1
		22/10/2021	FRI	Types of stresses -Tensile, Compressive and Shear stresses, Types of strains - Tensile, Compressive and Shear strains, Complimentary shear stress - Diagonal tensile / compressive Stresses due to shear, Elongation and Contraction, Longitudinal and Lateral strains,	1
		23/10/2021	SAT	Poisson's Ratio, Volumetric strain, computation of stress, strain, Poisson's ratio, change in dimensions and volume etc, Hooke's law - Elastic Constants, Derivation of relationship between the elastic constants	1
		26/10/2021	TUES	Numerical problems	1
				2.2 Application of simple stress and strain in engineering field:	

Month	Week	Date	Day	Topic	No.
	5TH	27/10/2021	WED	Behaviour of ductile and brittle materials under direct loads, Stress Strain curve of a ductile material, Limit of proportionality, Elastic limit, Yield stress, Ultimate stress, Breaking stress,	1
		28/10/2021	THUS	Percentage elongation, Percentage reduction in area, Significance of percentage elongation and reduction in area of cross section	1
		29/10/2021	FRI	Numerical problems	1
		30/10/2021	SAT	Deformation of prismatic bars due to uniaxial load	1
NOV	1ST	02-11-2021	TUES	Deformation of prismatic bars due to its self weight.	1
				2.3 Complex stress and strain	
		03-11-2021	WED	Principal stresses and strains: Occurrence of normal and tangential stresses	1
		05-11-2021	FRI	Concept of Principal stress and Principal Planes	1
		06-11-2021	SAT	major and minor principal stresses and their orientations	1
	2ND	09-11-2021	TUES	Mohr's Circle and its application to solve problems of complex stresses	1
		10-11-2021	WED	Numerical problems	1
		12-11-2021	THUS	Numerical problems	1
				3.Stresses In Beams and Shafts	**10**
		13/11/2021	SAT	Stresses in beams due to bending: Bending stress in beams – Theory of simple bending – Assumptions – Moment of resistance – Equation for Flexure– Flexural stress distribution	1
	3RD	16/11/2021	TUES	Curvature of beam – Position of N.A. and Centroidal Axis – Flexural rigidity – Significance of Section modulus	1
		17/11/2021	WED	Shear stresses in beams: Shear stress distribution in beams of rectangular, circular and standard sections symmetrical about vertical axis.	1
		18/11/2021	THUS	Numerical problems	1
		20/11/2021	FRI	Stresses in shafts due to torsion: Concept of torsion, basic assumptions of pure torsion,	1
		23/11/2021	TUES	Torsion of solid and hollow circular sections, polar moment of inertia	1

	4TH	24/11/2021	WED	Torsional shearing stresses, angle of twist, torsional rigidity, equation of torsion	1
		25/11/2021	THUS	Combined bending and direct stresses: Combination of stresses, Combined direct and bending stresses, Maximum and Minimum stresses in Sections	1
		26/11/2021	FRI	Numerical problems	1
		27/11/2021	SAT	Conditions for no tension, Limit of eccentricity, Middle third/fourth rule, Core or Kern for square, rectangular and circular sections, chimneys, dams and retaining walls	1
				4.Columns and Struts	**4**
	5TH	30/11/2021	TUES	Columns and Struts	1
D E C	5TH	01-12-2021	WED	Definition Short and Long columns, End conditions	1
	1ST	02-12-2021	THUS	Equivalent length / Effective length, Slenderness ratio, Axially loaded short and long column	1
		03-12-2021	FRI	Euler's theory of long columns, Critical load for Columns with different end conditions	1
				5.Shear Force and Bending Moment	**12**
				5.1 Types of loads and beams:	
		04-12-2021	SAT	Types of Loads: Concentrated (or) Point load, Uniformly Distributed load (UDL)	1
	2ND	07-12-2021	TUES	Types of Supports: Simple support, Roller support, Hinged support, Fixed support	1
		08-12-2021	WED	Types of Reactions: Vertical reaction, Horizontal reaction,moment reaction	1
		09-12-2021	THUS	Calculation of support reactions using equations of static equilibrium.	1
				5.2 Shear force and bending moment in beams:	
		10-12-2021	FRI	Shear Force and Bending Moment: Signs Convention for S.F. and B.M	1
		11-12-2021	SAT	B.M of general cases of determinate beams with concentrated loads and udl only	1
	3RD	14/12/2021	TUES	S.F and B.M diagrams for Cantilevers, Simply supported beams and Over hanging beams,	1
		15/12/2021	WED	Numerical problems	1
		16/12/2021	THUS	Numerical problems	1

		17/12/2021	FRI	Numerical problems	1
		18/12/2021	SAT	Position of maximum BM, Point of contra flexure	1
		21/12/2021	TUES	Relation between intensity of load, S.F and B.M.	1
				6.Slope and Deflection	**10**
	4TH	22/12/2021	WED	Introduction: Shape and nature of elastic curve (deflection curve)	1
		23/12/2021	THUS	Relationship between slope, deflection and curvature (No derivation), Importance of slope and deflection.	1
		24/12/2021	FRI	Class test	1
		25/12/2021	SAT	Slope and deflection of cantilever and simply supported beams under concentrated load(by Double Integration method	1
	5TH	28/12/2021	TUES	Slope and deflection of cantilever and simply supported beams uniformly distributed load (by Double Integration method	1
		29/12/2021	WED	Slope and deflection of cantilever and simply supported beams under concentrated load (by Macaulay's method)	1
		30/12/2021	THUS	Slope and deflection of cantilever and simply supported beams uniformly distributed load (by Macaulay's method)	1
		31/12/2021	FRI	Numerical problems	1
	1ST	01-01-2022	SAT	Numerical problems	1
				7.Indeterminate Beams	**10**
	2ND	04-01-2022	TUES	Indeterminacy in beams	1
J A N		05-01-2022	WED	Principle of consistent deformation/compatibility	1
		06-01-2022	THUS	Principle of consistent deformation/compatibility	1
		07-01-2022	FRI	Analysis of propped cantilever beam by principle of superposition	1
		08-01-2022	SAT	Analysis of fixed beam by principle of superposition	1
		08-01-2022	SAT	Analysis of two span continuous beams by principle of superposition	1
				SF diagrams (point load and udl covering full span)	1
				BM diagrams (point load and udl covering full span)	1
				BM diagrams (point load and udl covering full span)	1
				Numerical problems	1

E				**8.Trusses**	**10**
X				Introduction	1
T				Types of trusses	1
R				statically determinate and indeterminate trusses	1
A				Degree of indeterminacy	1
C				Stable and unstable trusses	1
L				Advantages of trusses.	1
A				Analysis of trusses: Analytical method (Method of joints, method of Section)	1
S				Analysis of trusses: Analytical method (Method of joints, method of Section)	1
S				Analysis of trusses: Analytical method (Method of joints, method of Section)	1
				Numerical problems	1

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