LESSONPLAN

Programme: Diploma in Civil Engg. **Course Name:Mechanics of Materials** **Course Code : CEP205** **Semester: 3rd** **Periods/week :03** **Total Periods :45**	**Name of Faculty :Sanjeeb Meher** **Session: (Winter)**

CLASS	TOPIC
1	**CENTRE OF GRAVITY & MOMENT OF INERTIA** : Definition of centre of gravity -Centre of gravity ofλ of Symmetrical shapes (solid / hollow square, rectangular)
2	Centre of gravity ofλ of Symmetrical shapes (solid / hollow circular, I Sections)
3	Moment of inertia (M.I.): Definition, M.I. of plane• lamina, Radius of gyration, section modulus.
4	Parallel Axis Theorems & Perpendicular Axis Theorem (without derivation).
5	M.I of rectangle,semicircle,quarter circle and triangle section(without derivation)
6	M.I. of symmetrical I-section, Channel section, T-section, Angle section.
7	M.I. of unsymmetrical I-section, Channel section, T-section, Angle section
8	M.I of Hollow and built up section about centroidal and other reference axis.
9	**SIMPLE STRESSES & STRAINS**:Definition of rigid, elastic and plastic bodies, deformation of elastic body under various forces, Definition of stress, strain, elasticity, Hook's law, Elastic limit and modulus of Elasticity
10	Type of Stresses-Normal, Direct, Bending and Shear and nature of stresses i.e. Tensile and Compressive stresses
11	Standard stress strain curve for tor steel bar under tension, Yield stress, Proof stress, Ultimate stress, Strain at various critical points, Percentage. Elongation & factor of Safety
12	Deformation of body due to axial force, forces applied at intermediate sections, Maximum and minimum stress induced, Composite section under axial loading
13	Concept of temperature stresses and strain, Stress and strain developed due to temperature variation in homogeneous simple bar (no composite section)
14	Longitudinal and lateral strain, Modulus of Rigidity
15	Poisson's ratio, Biaxial and tri-axial stresses
16	volumetric strain, change in volume, Bulk modulus (Introduction only)
17	Relation between modulus of elasticity, modulus of rigidity and bulk modulus (without derivation).
18	**COMPLEX STRESSES AND STRAINS** **Principal stresses and strains**: Occurrence of normal and tangential stresses -– Concept of Principal stress and Principal Planes
19	major and minor principal stresses and their orientations – stresses on a given plane , shear and normal stress components on any inclined plane ,
20	Mohr's circle and its use in solving problems on complex stresses.
21	**SHEAR FORCE & BENDING MOMENT :** Types of supports, beams and loads.
22	Concept and definition of shear force and bending moment
23	Relation between load, shear force and bending moment (without derivation)
24	Shear force and bending moment diagram for cantilever
25	Shear force and bending moment diagram for simply supported beams subjected to point loads
26	Shear force and bending moment diagram for simply supported beams subjected to uniformly distributed loads
27	Shear force and bending moment diagram for simply supported beams subjected couple

28	Shear force and bending moment diagram for (combination of any two types of loading)
29	Concept of point of contra flexure
30	problems related to Point of contra flexure.
31	**BENDING & SHEAR STRESSES INBEAMS:** Concept and theory of pure bending, assumptions, flexural equation (without derivation)
32	bending stresses and their nature, bending stress distribution diagram
33	Concept of moment of resistance
34	Simple numerical problems using flexural equation.
35	Shear stresss equation (without derivation) relation between maximum and average shear stress for rectangular
36	relation between maximum and average shear of circular section, shear stress distribution diagram.
37	Shear stress distribution for square, rectangular and circular section
38	Shear stress distribution for hollow, square, rectangular, circular, angle sections, channel section, I-section, T section.
39	Simple numerical problems based on shear equation.
40	**COLUMNS :** Concept of compression member, short and long column, Effective length, Radius of gy- ration
41	Slenderness ratio, Types of end condition for columns, Buckling of axially loadedcolumns
42	Euler's theory, assumptions made in Euler's theory and its limitations
43	Application of Eu- ler's equation to calculate buckling load.
44	Rankine' s formula and its application to calculate crippling load
45	Concept of working load/safe load, design load and factor of safety.