NILASAILA INSTITUTE OF SCIENCE & TECHNOLOGY
SERGARH-756060, BALASORE (ODISHA)
(Approved by AICTE& affiliated to SCTE&VT, Odisha)

LESSON PLAN

SUBJECT: CEP203 TH-3 (MECHANICS OF MATERIALS)

Name Of The Faculty :- Er. Kumar Swatiranjan
Branch :- Civil Engineering **Semester :-** 3rd
Academic Year : 2025-26 **Examination :-** 2025 (w)

CHAPTER WISE DISTRIBUTION OF PERIODS

Sl.No.	Name of the chapter as per the Syllabus	No. of Periods as per the Syllabus	No. of periods actually needed
1	Centre of Gravity and Moment of Inertia	8	8
2	Simple Stresses and Strains	12	15
3	Shear Force and Bending Moment	10	14
4	Bending and Shear Stresses in beams	9	13
5	Columns	6	10
	Total Period:	45	60

Sign of Faculty

Sign of H.O.D.

Name of the programme: Diploma in CIVIL ENGINEERING	**Semester:** 3rd	**Name of the Teaching Faculty:** Er. Kumar Swatiranjan	
		Academic Year : 2025-26 **Examination :** 2025 (W)	
Course Code: CEP205 TH-3	**Course Year:** Second Year	**No. of Classes Alloted Per Week :**	4
		Planned Classes Required to Complete the Course	60
Week	**Class Day**	**Topics to be Covered**	
1st	**1st**	**UNIT-I:Centre of Gravity and Moment of Inertia** Definition of centre of gravity -Centre of gravity of of Symmetrical shapes (solid / hollow square, rectangular, circular, I Sections.	
	2nd	Moment of inertia (M.I.): Definition, M.I. of plane lamina, Radius of gyration, section mod- ulus, Parallel and Perpendicular axes theorems (without derivations).	
	3rd	M.I. of rectangle, square, circle, semicircle, quarter circle and triangle section (without derivations).	
	4th	M.I. of symmetrical and unsymmetrical I-section, Channel section.	
2nd	**1st**	M.I. of T-section, Angle section, Hollow sections.	
	2nd	M.I. of built up sections about centroidal axes and any other reference axis.	
	3rd	Polar Moment of Inertia of solid circular sections.	
	4th	Polar Moment of Inertia of solid circular sections.	
3rd	**1st**	**UNIT-2:Simple Stresses and 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, Modulus of elastic-ity.	
	2nd	Type of Stresses-Normal, Direct, Bending and Shear and nature of stresses i.e. Tensile and Compressive stresses.	
	3rd	Standard stress strain curve for tor steel bar under tension, Yield stress, Proof stress, Ultimate stress.	
	4th	Strain at various critical points, Percentage elongation and Factor of safety.	
4th	**1st**	Deformation of body due to axial force, forces applied at intermediate sections.	
	2nd	Maximum and minimum stress induced, Composite section under axial loading.	
	3rd	Concept of temperature stresses and strain, Stress and strain developed due to temperature variation in homogeneous simple bar (no composite section).	
	4th	Concept of temperature stresses and strain, Stress and strain developed due to temperature variation in homogeneous simple bar (no composite section).	

5th	1st	Longitudinal and lateral strain, Modulus of Rigidity, Poisson's ratio.
	2nd	Biaxial and tri-axial stresses, volumetric strain, change in volume, Bulk modulus (Introduction only).
	3rd	Relation between modulus of elasticity, modulus of rigidity and bulk modulus (without derivation).
	4th	COMPLEX STRESSES AND STRAINS Principal stresses and strains: Occurrence of normal and tangential stresses - Concept of Principal stress and Principal Planes.
6th	1st	Major and minor principal stresses and their orientations – stresses on a given plane –shear and normal stress components on any inclined plane.
	2nd	Mohr's circle and its use in solving problems on complex stresses - Numerical problems.
	3rd	Mohr's circle and its use in solving problems on complex stresses - Numerical problems.
	4th	**UNIT-3:Shear Force and Bending Moment** Types of supports, beams and loads.
7th	1st	Concept and definition of shear force and bending moment.
	2nd	Relation between load, shear force and bending moment (without derivation).
	3rd	Relation between load, shear force and bending moment (without derivation).
	4th	Shear force and bending moment diagram for cantilever beams subjected to point loads.
8th	1st	Shear force and bending moment diagram for cantilever beams subjected to point loads.
	2nd	Shear force and bending moment diagram for simply supported beams subjected to point loads.
	3rd	Shear force and bending moment diagram for simply supported beams subjected to point loads.
	4th	Shear force and bending moment diagram for simply supported beams subjected to point loads.
9th	1st	Shear force and bending moment diagram for uniformly distributed loads and couple (combination of any two types of loading).
	2nd	Shear force and bending moment diagram for uniformly distributed loads and couple (combination of any two types of loading).
	3rd	Shear force and bending moment diagram for uniformly distributed loads and couple (combination of any two types of loading).
	4th	Shear force and bending moment diagram for uniformly distributed loads and couple (combination of any two types of loading).

10th	1st	Determination of point of contra flexure.
	2nd	**UNIT-4:Bending and Shear Stresses in beams** Concept and theory of pure bending, assumptions, flexural equation (without derivation.
	3rd	Bending stresses and their nature.
	4th	Bending stress distribution diagram**.**
11th	1st	Concept of moment of resistance and simple numerical problems using flexural equation.
	2nd	Concept of moment of resistance and simple numerical problems using flexural equation.
	3rd	Shear stresss equation (without derivation).
	4th	Relation between maximum and average shear stress for rectangular and circular section.
12th	1st	Shear stress distribution diagram.
	2nd	Shear stress distribution for square, rectangular, circle, hollow, square, rectangular, circular.
	3rd	Shear stress distribution for angle sections, channel section.
	4th	Shear stress distribution for angle sections, channel section.
13th	1st	I-section, T section. Simple numerical problems based on shear equation.
	2nd	I-section, T section. Simple numerical problems based on shear equation.
	3rd	**UNIT-5:Columns** Concept of compression member
	4th	Short and long column, Effective length, Radius of gy- ration, Slenderness ratio.
14th	1st	Types of end condition for columns, Buckling of axially loadedcolumns.
	2nd	Euler's theory, assumptions made in Euler's theory and its limitations
	3rd	Application of Eu- ler's equation to calculate buckling load.
	4th	Application of Eu- ler's equation to calculate buckling load.
15th	1st	Rankine' s formula and its application to calculate crippling load.
	2nd	Rankine' s formula and its application to calculate crippling load.
	3rd	Concept of working load/safe load, design load and factor of safety.
	4th	Concept of working load/safe load, design load and factor of safety.

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