RGPV (DIPLOMA WING) BHOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT-3	Sheet No. 1/3

Branch	CIVIL / CTM	Semester	4

Course Code		Course Name	Mechanics of Structure

Course Outcome 1	**Articulate practical applications of moment of inertia of symmetrical and unsymmetrical structural sections and calculate moment of inertia of plane area sections.**	**Teach Hrs**	**Marks**
Learning Outcome 1	Calculate MI of regular plane area sections and recognize practical significance of MI.	4	5
Contents	Definition, M.I. of plane lamina, Parallel and Perpendicular axes theorems (without derivations) M.I. of rectangle, square, circle, semi-circle, quarter circle and triangle section (without derivations). polar moment of Inertia and radius of gyration.		
Method of Assessment	Pen Paper Test		
Learning Outcome 2	Calculate MI of various symmetrical and asymmetrical sections.	8	10
Contents	M.I. of symmetrical and unsymmetrical I-section, Channel section, T-section, Angle section, Hollow sections and built up sections about centroidal axes and any other reference axis.		
Method of Assessment	Pen Paper Test		
Course Outcome 2	**Analyze structural behavior of materials under various loading conditions.**	**Teach Hrs**	**Marks**
Learning Outcome 1	Calculate simple stress and strain on axially loaded members and articulate significance of stress – strain curve.	8	10
Contents	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 elasticity. Type of Stresses-Normal, Direct, Bending and Shear and nature of stresses i.e. Tensile and Compressive stresses. Standard stress strain curve for tor steel bar under tension, Yield stress, Proof stress, Ultimate stress, Strain at various critical points, Percentage elongation and Factor of safety. Deformation of body due to axial force, forces applied at intermediate sections, Maximum and minimum stress induced, Composite section under axial loading.		
Method of Assessment	Pen Paper Test		

Learning Outcome 2	Calculate stress and strain due to temperature variation	4	5
Contents	Concept of temperature stresses and strain, Stress and strain developed due to temperature variation in homogeneous simple bar (no composite section)		
Method of Assessment	Pen Paper Test		
Learning Outcome 3	Calculate change in volume of a member for given stress condition and Bulk modulus.	6	5
Content	Longitudinal and lateral strain, Modulus of Rigidity, Poisson's ratio, Biaxial and tri-axial stresses, volumetric strain, change in volume, Bulk modulus (Introduction only).		
Method of Assessment	Pen Paper Test		
Learning Outcome 4	Calculate average shear stress, shear strain and shear modulus.	4	5
Contents	Shear stress and strain, modulus of rigidity, complimentary shear stress Concept of single and double shear, punching shear. Relation between modulus of elasticity, modulus of rigidity and bulk modulus (without derivation).		
Method of Assessment	Pen Paper Test		
Course Outcome 3	**Draw & Interpret shear force and bending moment diagrams for various types of beams and loading conditions.**	**Teach Hrs**	**Marks**
Learning Outcome 1	Discuss various types of load, end condition and beam and relate them with actual field conditions.	3	3
Contents	Types of supports, beams and loads.		
Method of Assessment	Pen Paper Test		
Learning Outcome 2	Calculate shear force and bending moment and draw shear force diagram and bending moment diagram for beams with given end conditions and loads.	17	14
Contents	Concept and definition of shear force and bending moment, Relation between load, shear force and bending moment (without derivation). Shear force and bending moment diagram for cantilever, simply supported beams and overhanging beams subjected to point loads, uniformly distributed loads and couple (combination of any two types of loading), point of contra flexure.		
Method of Assessment	Pen Paper Test		
Course Outcome 4	**Determine the bending and shear stresses in beams under different loading conditions.**	**Teach Hrs 12**	**Marks**

Learning Outcome 1	Determine bending stress at a given location and plot bending stress distribution for given beam under given loads.	8	10
Contents	Concept and theory of pure bending, assumptions, flexural equation (without derivation), bending stresses and their nature, bending stress distribution diagram. Concept of moment of resistance and simple numerical problems using flexural equation.		
Method of Assessment	Pen Paper Test		
Learning Outcome 2	Determine shear stress at a given location and plot shear stress distribution for various beam sections.	8	10
Contents	Shear stress equation (without derivation), relation between maximum and average shear stress for rectangular and circular section, shear stress distribution diagram. Shear stress distribution for square, rectangular, circle, hollow, square, rectangular, circular, angle sections, channel section, I-section, T section. Simple numerical problems based on shear equation.		
Method of Assessment	Pen Paper Test		
Course Outcome 5	**Analyse the column for various loading and end conditions.**	**Teach Hours**	**Marks**
Learning Outcome 1	Discuss ways of failure of columns and end conditions of columns.	4	5
Contents	Concept of compression member, short and long column, Effective length, Radius of gyration, Slenderness ratio, Types of end condition for columns, Buckling of axially loaded columns.		
Method of Assessment	Pen Paper Test		
Learning Outcome 2	Calculate safe load for axially loaded columns applying Euler's formula / Rankine's formula	8	8
Content	Euler's theory, assumptions made in Euler's theory and its limitations, Application of Euler's equation to calculate buckling load. Rankine' s formula and its application to calculate crippling load. Concept of working load/safe load, design load and factor of safety.		
Method of Assessment	Pen Paper Test		
Course Outcome 6	**Evaluate axial forces in the members of perfect plane trusses.**	**Teach Hrs**	**Marks**
Learning Outcome 1	Calculate forces in members of trusses subjected to point loads at joints by Method of joints and Method of sections.	8	10

Contents	Classification of frames Types of trusses (Simple, Fink, compound fink, French truss, pratt truss, Howe truss, North light truss, King post and Queen post truss) Assumptions in analysis. Calculate support reactions for trusses subjected to point loads at joints Calculate forces in members of truss using Method of joints and Method of sections.
Method of Assessment	Pen Paper Test

Suggested learning resources:

1. Khurmi, R.S., Strength of Materials, S Chand and Co. Ltd. New Delhi.
2. Bansal R K, Strength of Materials, Laxmi Publications.
3. Ramamurtham, S, Strength of Materials, Dhanpat Rai and sons, New Delhi.
4. Punmia B C, Strength of Materials, Laxmi Publications (p) Ltd. New Delhi.
5. Subramaniam R, Strength of Materials, Oxford University Press.