

RGPV (Diploma Wing ) Bhopal		SCHEME FOR LEARNING OUTCOME			Branch Code			Course Code			CO Code	LO Code	Format No. <b>4</b>
					C	0	3	4	0	2	1	1	
<b>COURSE NAME</b>	<b>Mechanics of Structure</b>												
<b>CO Description</b>	<b>Articulate practical applications of moment of inertia of symmetrical and unsymmetrical structural sections and calculate moment of inertia of plane area sections.</b>												
<b>LO Description</b>	Calculate MI of regular plane area sections and recognize practical significance of MI.												
SCHEME OF STUDY													
S. No.	Learning Content	Method of teaching	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks							
1.	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).	Interactive classroom teachings, demonstration, quiz.	4	0	Handouts, chalk board, PPT, text book, charts, video film								
SCHEME OF ASSESSMENT													
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal								
1.	Pen Paper Test	Define Moment of inertia, its significance State perpendicular/parallel axis theorem Calculate MI of rectangle/square/ circle/ semi-circle/ quarter circle and triangle section	5	Test paper + Rubric	Internal								
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)													

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					C	0	3	4	0	2	1	2	
<b>COURSE NAME</b>	<b>Mechanics of Structure</b>												
<b>CO Description</b>	<b>Articulate practical applications of moment of inertia of symmetrical and unsymmetrical structural sections and calculate moment of inertia of plane area sections.</b>												
<b>LO Description</b>	Calculate MI of various symmetrical and asymmetrical sections.												
SCHEME OF STUDY													
S. No.	Learning Content	Method of teaching	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks							
1.	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. polar moment of Inertia and radius of gyration.	Interactive classroom teachings, demonstration, quiz.	8	0	Handouts, chalk board, PPT, text book, charts, video film								
SCHEME OF ASSESSMENT													
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal								
1.	Pen Paper Test	Solve numerical on MI of symmetrical and unsymmetrical sections Define Polar moment of inertia/radius of gyration	10	Test paper + Rubric	External								
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					C	0	3	4	0	2	2	1	
<b>COURSE NAME</b>	<b>Mechanics of Structure</b>												
<b>CO Description</b>	<b>Analyze structural behavior of materials under various loading conditions.</b>												
<b>LO Description</b>	Calculate simple stress and strain on axially loaded members and articulate significance of stress – strain curve.												
SCHEME OF STUDY													
S. No.	Learning Content	Method of teaching	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks							
1.	<p>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 ie Tensile and Compressive stresses.</p> <p>Standard stress strain curve for steel bar under tension, Yield stress, Proof stress, Ultimate stress, Strain at various critical points, Percentage elongation and Factor of safety.</p> <p>Deformation of body due to axial force, forces applied at intermediate sections, Maximum and minimum stress induced, Composite section under axial loading.</p>	Interactive classroom teachings, demonstration, quiz.	8	0	Handouts, chalk board, PPT, text book, charts, video film								

**SCHEME OF ASSESSMENT**

<b>S. No.</b>	<b>Method of Assessment</b>	<b>Description of Assessment</b>	<b>Maximum Marks</b>	<b>Resources Required</b>	<b>External / Internal</b>
<b>1.</b>	Pen Paper Test	Definitions of terms given in the content Explain Hook's Law Draw and explain stress- strain curve of steel bar Numerical on Deformation of body due to axial force /forces applied at intermediate sections/ Maximum and minimum stress induced/Composite section under axial loading.	<b>10</b>	Test paper + Rubric	<b>External</b>

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<b>COURSE NAME</b>	<b>Mechanics of Structure</b>												
<b>CO Description</b>	<b>Analyze structural behavior of materials under various loading conditions.</b>												
<b>LO Description</b>	Calculate stress and strain due to temperature variation												
SCHEME OF STUDY													
S. No.	Learning Content	Method of teaching	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks							
1.	Concept of temperature stresses and strain, Stress and strain developed due to temperature variation in homogeneous simple bar (no composite section)	Interactive classroom teachings, demonstration, quiz.	4	0	Handouts, chalk board, PPT, text book, charts, video film								
SCHEME OF ASSESSMENT													
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal								
1.	Pen Paper Test	Define temperature stress/stain Solve simple numerical on stress and strain developed due to temperature variation.	5	Test paper + Rubric	External								
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					C	0	3	4	0	2	2	3	
<b>COURSE NAME</b>	Mechanics of Structure												
<b>CO Description</b>	Analyze structural behavior of materials under various loading conditions.												
<b>LO Description</b>	Calculate change in volume of a member for given stress condition and Bulk modulus.												
SCHEME OF STUDY													
S. No.	Learning Content	Method of teaching	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks							
1.	Longitudinal and lateral strain, Poisson's ratio, Biaxial and tri-axial stresses, volumetric strain, change in volume, Bulk modulus (Introduction only).	Interactive classroom teachings, demonstration, quiz.	6	0	Handouts, chalk board, PPT, text book, charts, video film								
SCHEME OF ASSESSMENT													
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal								
1.	Pen Paper Test	Define longitudinal, lateral strain, Poisson's ratio, Bulk modulus  Calculate change in volume.	5	Test paper + Rubric	Internal								
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<b>COURSE NAME</b>	<b>Mechanics of Structure</b>												
<b>CO Description</b>	<b>Analyze structural behavior of materials under various loading conditions.</b>												
<b>LO Description</b>	Calculate average shear stress, shear strain and shear modulus.												
SCHEME OF STUDY													
S. No.	Learning Content	Method of teaching	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks							
1.	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).	Interactive classroom teachings, demonstration, quiz.	4	0	Handouts, chalk board, PPT, text book, charts, video film								
SCHEME OF ASSESSMENT													
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal								
1.	Pen Paper Test	Define shear stress, shear strain, modulus of rigidity Explain complimentary shear stress.  Numerical on relation between modulus of elasticity, modulus of rigidity and bulk modulus	5	Test paper + Rubric	Internal								
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					C	0	3	4	0	2	3	1	
<b>COURSE NAME</b>	Mechanics of Structure												
<b>CO Description</b>	Draw & Interpret shear force and bending moment diagrams for various types of beams and loading conditions.												
<b>LO Description</b>	Types of supports, beams and loads.												
SCHEME OF STUDY													
S. No.	Learning Content	Method of teaching	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks							
1.	Discuss various types of load, end condition and beam and relate them with actual field conditions.	Interactive classroom teachings, demonstration, quiz.	3	0	Handouts, chalk board, PPT, text book, charts, video film								
SCHEME OF ASSESSMENT													
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal								
1.	Pen Paper Test	Describe various types of load/ End conditions in beams / beams	03	Test paper + Rubric	External								
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					C	0	3	4	0	2	3	2	
<b>COURSE NAME</b>	<b>Mechanics of Structure</b>												
<b>CO Description</b>	<b>Draw &amp; Interpret shear force and bending moment diagrams for various types of beams and loading conditions.</b>												
<b>LO Description</b>	Calculate shear force and bending moment and draw shear force diagram and bending moment diagram for beams with given end conditions and loads.												
SCHEME OF STUDY													
S. No.	Learning Content	Method of teaching	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks							
1.	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.	Interactive classroom teachings, demonstration, quiz.	17	0	Handouts, chalk board, PPT, text book, charts, video film								
SCHEME OF ASSESSMENT													
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal								
1.	Pen Paper Test	State relationship between load, shear force and bending moment. Calculate & draw shear force and bending moment diagram for Cantilevers, simply supported beams and overhanging beams for loading as per syllabus	14	Test paper + Rubric	External								
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					C	0	3	4	0	2	4	1	
<b>COURSE NAME</b>	Mechanics of Structure												
<b>CO Description</b>	Determine the bending and shear stresses in beams under different loading conditions.												
<b>LO Description</b>	Determine bending stress at a given location and plot bending stress distribution for given beam under given loads.												
SCHEME OF STUDY													
S. No.	Learning Content	Method of teaching	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks							
1	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.	Interactive classroom teachings, demonstration, quiz.	8	0	Handouts, chalk board, PPT, text book, charts, video film.								
SCHEME OF ASSESSMENT													
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal								
1	Pen Paper Test	Explain theory of pure bending / assumptions of theory of pure bending. Write flexural equation. Define moment of resistance and its significance. Solve simple numerical problem using flexural equation.	10	Test paper + Rubrics	External								
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**OUTCOME****C 0 3 4 0 2 4 2****COURSE NAME** Mechanics of Structure**CO Description** Determine the bending and shear stresses in beams under different loading conditions.**LO Description** Determine shear stress at a given location and plot shear stress distribution for various beam sections.**SCHEME OF STUDY**

S. No.	Learning Content	Method of teaching	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	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.	Interactive classroom teachings, demonstration, quiz.	8	0	Handouts, chalk board, PPT, text book, charts, video film.	

**SCHEME OF ASSESSMENT**

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Pen Paper Test	Write shear stress equation. Derive relation between maximum and average shear stress for rectangular / circular section. Solve numerical problem based on shear equation for a given beam.	10	Test paper + Rubric	External

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					C	0	3	4	0	2	5	1	
<b>COURSE NAME</b>	Mechanics of Structure												
<b>CO Description</b>	Analyse the column for various loading and end conditions.												
<b>LO Description</b>	Discuss ways of failure of columns and end conditions of columns.												
SCHEME OF STUDY													
S. No.	Learning Content	Method of teaching	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks							
1	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.	Interactive classroom teachings, demonstration, quiz.	4	0	Handouts, chalk board, PPT, text book, charts, video film.								
SCHEME OF ASSESSMENT													
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal								
1	Pen Paper Test	Differentiate short and long column. Discuss behavior at failure of columns. Define effective length / radius of gyration / slenderness ratio. Discuss types of end conditions in column.	5	Test paper + Rubric	Internal								
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					C	0	3	4	0	2	5	2	
<b>COURSE NAME</b>	Mechanics of Structure												
<b>CO Description</b>	Analyse the column for various loading and end conditions.												
<b>LO Description</b>	Calculate safe load for axially loaded columns applying Euler's formula / Rankine's formula												
SCHEME OF STUDY													
S. No.	Learning Content	Method of teaching	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks							
1	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.	Interactive classroom teachings, demonstration, quiz.	8	0	Handouts, chalk board, PPT, text book, charts, video film.								
SCHEME OF ASSESSMENT													
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal								
1	Pen Paper Test	Write Euler's / Rankine's equation for buckling load. Write assumption of Euler's theory. What is the limitation of Euler's theory. Numerical based on Euler's formula / Rankine formula.	8	Test paper + Rubric	External								
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					C	0	3	4	0	2	6	1	
<b>COURSE NAME</b>	Mechanics of Structure												
<b>CO Description</b>	Evaluate axial forces in the members of perfect plane trusses.												
<b>LO Description</b>	Calculate forces in members of trusses subjected to point loads at joints by Method of joints and Method of sections.												
SCHEME OF STUDY													
S. No.	Learning Content	Method of teaching	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks							
1	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.	Interactive classroom teachings, demonstration, quiz.	8	0	Handouts, chalk board, PPT, text book, charts, video film.								
SCHEME OF ASSESSMENT													
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal								
1	Pen Paper Test	Differentiate perfect frame and imperfect frames. Assumptions in analysis of perfect frames. Numerical on method of joints / method of section.	10	Test paper + Rubric	Internal								
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)													