INSTITUTE	**DIPLOMA STUDIES**
PROGRAM	**DIPLOMA ENGINEERING (CIVIL ENGINEERING)**
SEMESTER	**3**
COURSE TITLE	**MECHAICS OF STRUCTURE**
COURSE CODE	**09CI0309**
COURSE CREDITS	**4**

Objective:

1 Calculate stresses and deformations of statically determinate beams
2 Analyze different structures under direct and eccentric axial loading for its stability and internal stresses.
3 Conduct Analysis of beam for shear & bending stresses and thereby know the selection of section for beam.
4 To Calculate stresses and deformations of statically determinate beams.
5 To Analyze different structures under direct and eccentric axial loading for its stability and internal stresses
6 To Conduct Analysis of beam for shear & bending stresses and thereby know the selection of section for beam

Course Outcomes: After completion of this course, student will be able to:

1 Recognise the ductile or brittle material and its other mechanical properties
2 Compute moment of inertia along with asymmetrical and symmetrical sections.
3 Draw shear force and bending moment diagram for statically determinate beams.
4 Calculate load carrying capacity of column and strut. 5 Compute slope and deflection.
5 Compute slope and deflection.
6 Calculate direct and bending stress for different structural components.

Pre-requisite of course:APPLIED MECHANICS

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	0	2	50	30	20	25	25

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Contents : Unit	Topics	Contact Hours
1	**STRESS & STRAIN IN BEAM** Types of loads and structures, Stress and strain, Hook's Law, Modulus of elasticity, Factor of safety, Yield, breaking and ultimate stresses, Lateral strain and poison's ratio, Shear stress, shear strain and shear modulus, Introduction to Bulk modulus and volumetric strain, Strength & Stiffness concept, Strain energy , , Bending theorye quations,bending stresses, sectional modulus, and Neutral-axis, Shear stress equations and shear distribution diagrams	8
2	**ANALYSIS OF BEAM** Statically determinate beams, Shear force, Bending moment and its relation, Sagging and Hogging moment, Point of contra-flexure and its application, Shear force and bending moment diagram (only for point load & UDL, couple), Introduction to slop and deflection, Formula to find slop and deflection for cantilever and Simply supported beam subjected to point load and UDL, , Numerical problems	10
3	**MOMENT OF INERTIA** Introduction to moment of inertia, Parallel and perpendicular axis theorem, Types of sections and formula to find moment of inertia about the sections	12
4	**ANALYSIS OFCOLUMN,STRUT&TRUSS** Introduction to column and strut, Long and short column, End condition and effective length of column,, Modes of failure of column, Radius of Gyration and slenderness ratio, Perfect, Imperfect truss, ypes of truss with different spans and its application, different types of truss under panel point loads by method of joints	12
Total Hours		**42**

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	**Experiment 1** Strength and stiffness experiment using paper models to understand load-deformation behavior	2
2	**Experiment 2** Tensile test on mild steel specimen to draw stress-strain curve and determine mechanical properties	2
3	**Experiment 3** Determination of Young's Modulus of a given wire material using elongation method	2
4	**Experiment 4** Determination of impact value of mild steel using IZOD impact testing machine	2

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Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
5	**Experiment 5** Determination of impact value of mild steel using Charpy impact testing machine	2
6	**Experiment 6** Analysis of truss using experimental setup and verification by analytical method	2
7	**Experiment 7** Deflection test on simply supported beam under different loading conditions	2
8	**Experiment 8** Deflection test on cantilever beam with different materials and cross-sections	2
9	**Experiment 9** Shear force and bending moment diagram plotting on graph paper for given loading cases	2
10	**Experiment 10** Beam reaction experiment to determine support reactions for different loading conditions	4
11	**Experiment 11** Concrete cube compression test to determine compressive strength	2
12	**Experiment 12** Brick compression test to determine compressive strength of brick	2
13	**Experiment 13** Comparative study of material behavior under different loading conditions (tension, compression, impact)	2
Total Hours		**28**

Textbook :

1 Strength of Materials and Mechanics of structure, Dr. B.C.Punamia, Laxmi Publication, 2017

References:

1 Strength of Materials, Strength of Materials, Strength of Materials, Strength of Materials, S. Ramurthan, Dhanpath Rai Publication, 2016

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation

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Remember / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking / Creative
20.00	30.00	40.00	10.00	0.00	0.00

Instructional Method:

1 The course delivery method will depend upon the requirement of content and need of students.The teacher in addition to Conventionalteachingmethodbyblack board, may also use any of tools such as demonstration, role play, Quiz,brainstorming,MOOCs etc.

2 The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room

3 Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory

4 Students will use supplementary resources such as online videos,videos,e-courses,Virtual Laboratory

Supplementary Resources:

1 https://nptel.ac.in/courses/105101085

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