# GUJARAT TECHNOLOGICAL UNIVERSITY
## BRANCH NAME: B.ARCH.
### SUBJECT CODE: 2X35003
### SUBJECT NAME: STRUCTURE - II
### 2nd Year, 3rd. SEMESTER

**Type of course:** B.Arch.

**Prerequisite:** Structure - I

**Rationale:** This subject is conceptual applications of principles of mechanics of rigid and deformable bodies in Engineering

**Teaching and Examination Scheme:**

| Teaching Scheme | | | Credits | Examination Marks | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|
| | | | | Theory Marks | | Practical Marks | | |
| L | T | P | C | ESE (E) | PA (M) | ESE (V) | PA (I) | |
| 2 | 1 | 0 | 3 | 50 | 50 | 0 | 0 | 100 |

**Content:**

| Sr. No. | Topics | Teaching Hrs. | Weightage % |
|---|---|---|---|
| 1 | **Shear Force and Bending Moment:**<br>Definition, sign conventional, Relation between S.F and B.M., Draw S.F. and B.M. for Cantilever and simply supported beam having Point load, U.D.L, Point of contra flexure. | **06** | **15** |
| 2 | **Column and Struts:**<br>Introduction, Euler's theory, Assumption and limitation of Euler's theory, Slenderness ratio, Eccentricity, Long Column and Short Column, Effective end conditions of column, Numerical based on axially loaded members. | **06** | **15** |
| 3 | **Fixed beam method:**<br>Introduction, Determinate and Indeterminate Structure, Advantages and disadvantages of indeterminate beam, Numerical of Fixed beam considering fixed support with Point load, and U.D.L.<br><br>**Continuous Beam Method:**<br>Introduction, CLAPEYRON'S Theorem, Numerical of two span beams with Point load, and U.D.L. | **08** | **30** |
| 4 | **Energy Principles:**<br>Castigliano's 1st theorems, computation of displacements and slope of statically determinate beams, and single bay Portal frames.<br><br>**Slope Deflection Method:**<br>Introduction, Computation of Slope and Deflection of two span continuous beams with point load and U.D.L. | **06** | **20** |
| 5 | **Direct and Bending stresses:**<br>Introduction, objective, axial load and bending moment, eccentrically loaded sections one axis and both the axis, Neutral axis, condition for no tension in the section, numerical based on stress distribution for | **04** | **20** |

| | | | |
|---|---|---|---|
| | different shape like circular, hollow and square. | | |

**Suggested Specification table with Marks (Theory):**

| Distribution of Theory Marks | | | | | |
|---|---|---|---|---|---|
| R Level | U Level | A Level | N Level | E Level | C Level |
| **10** | **20** | **20** | **30** | **10** | **10** |

**Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)**

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

**Reference Books:**


1. Junarkar S.B. & Shah H.J.; Mechanics of Structures Vol-I; Charotar publishing house, Anand
2. Wang C. K.; Intermediate Structural Analysis; Tata McGraw Hill book Company, New Delhi
3. Popov E.P.; Engineering Mechanics of Solids; Prentice Hall of India, New Delhi


**Course Outcome:**

| Sr. No | CO Statement | Marks % Weightage |
|---|---|---|
| **Upon completion of this course, the students should be able to:** | | |
| 1 | Apply equilibrium conditions and determine Shear force and Bending Moment diagram. | 15 |
| 2 | Determine buckling load for columns & struts with different end conditions. | 30 |
| 3 | Apply compatibility equations to determine response of statically determinate and indeterminate structures. | 30 |
| 4 | Determine the Slope and Deflection of Structure. | 15 |
| 5 | Determine the Stress in structure | 10 |

**Term Work:**

The students will have to solve at least five examples and related theory from each topic as an assignment.

**List of Tutorials:**

1. Prepare model of Determinate and Indeterminate Structure.
2. Prepare model of column member with various end condition to understand the behavior of member under axial load.