

Government Engineering College, Dahod
Civil Engineering Program
Applied Mechanics Department
Even Semester 2024 - 2025

Syllabus for Mid Semester Examination March 2025
Structural Analysis 1 (3140603)

Sr. No.	Topics
1	<p>Fundamentals of Statically Determinate Structures:</p> <p>Basics: Types of statically determinate & indeterminate structures, static and kinematic indeterminacy, stability of structures, principle of superposition, Maxwell's reciprocal theorems.</p> <p>Framed structure: Computation of internal forces in statically determinate framed structures such as plane truss, plane frame, grids,</p> <p>Arches and Cables: Calculation internal forces in three hinge arches with circular and parabolic shapes subjected to various types of loading. Forces and end actions in cables due to various types of loading.</p> <p>Thin cylinder: Analysis of thin cylinder and spherical vessels under pressure.</p>
2	<p>Strain energy & Displacement of Statically Determinate structures</p> <p>Strain Energy : Resilience, strain energy due to axial loads & flexure, proof resilience, modulus of resilience, impact loads, and sudden loads</p> <p>Displacement : Differential equation of elastic curve, relation between moment, slope and deflection, Displacement of beam by Macaulay's method, Moment Area Method, Conjugate Beam Method and by strain energy using first principle (i.e equating strain energy to work done)</p>
3	<p>Direct and Bending stresses + Column & Struts</p> <p>(A) Direct and Bending stresses</p> <p>Basics: Members subjected to eccentric loads, middle third rule, kernel of section, stress distribution</p> <p>Applications of Direct & Bending stresses: (1) chimney subjected to wind pressure, (2) Retaining walls subjected to earth pressure and (3) Dams subjected to hydraulic pressure. (B) Columns and Struts Basics: Buckling of columns, different end conditions, effective length, least radius of gyration</p> <p>Applications: Euler's and Rankine's formulae, columns with initial curvature, eccentrically loaded columns, columns with lateral loading.</p>

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