

Course Guideline:

Part 1: Determination of Stress and Strain

Determine the internal resultant loadings at a point
Determine average normal and shear stresses in axially loaded members.
Interpret Stress-Strain Diagram
Design structural member based on allowable stress and factor of safety.
Solve the deformation of a body using the concept of normal and shear strain.

Part 2: Solving stress and strain problems under pure axial loads

Solve stress and strain in statically determinate problems subjected to axial loads.
Solve stress and strain in statically indeterminate problems subjected to axial loads.

Part 3: Solving stress and strain problems under pure torsional loads

Determine shear stress in circular shaft.
Determine angle of twist of one end of shaft with respect to its other end.
Solve deformation of member in statically indeterminate problem under torque – loaded members.

Part 4: Solving stress and strain problems under pure bending loads

Determine and construct shear and moment diagram for the beam.
Determine the bending deformation of straight members.
Determine the bending stress and the orientation of the neutral axis of unsymmetrical members.

Part 5: Solving stress and strain problems under transverse shear loads

Solve shear stress problems on the horizontal face of a beam element.
Solve shear flow problems in built-up members.

Part 6: Solving stress and strain problems under combined loads

Determine stresses in thin-wall pressure vessel.
Determine state of stress caused by combined loadings.

Part 7: Stress Transformation

Conduct plane-stress transformation
Determine principal stresses and maximum in-plane shear stress and strain
Conduct plane stress transformation using Mohr's Circle
Material-property relationships and theory of failure