

## **Structural Analysis and Vibration (43 hours)**

- **Mechanics of Materials and Applied Elasticity**
  - Isotropic, Orthotropic and Anisotropic Materials,
  - Axial Loading,
  - Torsion of Closed and Circular Cross-sections.
- **Mechanics of Materials and Applied Elasticity**
  - Pure Bending,
  - Transverse loading,
  - 2-D stress-strain transformations,
  - 3-D stress-strain transformations,
  - Unsymmetric Bending,
  - Shear Center,
  - Torsion of Open Cross-sections,
  - Warping.
  - Introduction to Failure Theories of Isotropic and Orthotropic Materials.
- **Theory of Vibrations of Linear Discrete Systems**
  - Fundamentals, SDOF undamped and damped systems,
  - MDOF undamped systems.
- **Theory of Vibrations of Linear Continuous Systems**
  - Euler-Bernoulli Beams,
  - Timoshenko Beams,
  - Kirchhoff Plates,
  - Periodic Structures.
- **Approximate Methods of Vibrations of Linear Continuous Systems**
- **Theory of Vibrations of Non-Linear Discrete and Continuous Systems**
- **Finite Element Method**
  - Introductory theory,
  - Package programs,
  - Beam, plate and shell vibrations animations for various boundary conditions.
- **Experimental Analysis of Vibration Structures**
  - Excitation, Sensing and Data Recording,
  - Signal Processing and Spectral Analysis,
  - Test Equipments for Modal Testing,
  - Test Planning and Structure Preparation.

- **Experimental Analysis of Vibration Structures**

- Experimental Modal Analysis,
- FRF and Modal Parameter Extraction,
- Harmonic Excitation Application,
- Roving Hammer Application,
- Laser Vibrometer Application,
- PZT Application.

- **Theory and Application of Vibration Control**

- Damping Mechanisms,
- Passive Vibration Control,
- Active Vibration Control.