

SYLLABUS :-

Single-degree-freedom systems: undamped and damped free vibration; Response to harmonic and periodic excitations; Response to non-periodic excitations; Numerical evaluation of dynamic response; Generalized single-degree-freedom systems. Elements of analytical dynamics: The principle of virtual work; Principle of D Alembert; Hamiltons principle; Lagrange s equation. Multi-degree-freedom systems: Equation of motion; undamped free vibration; Intepretation of modal orthogonality; Decomposition of response in terms of modal co-ordinates; Modal analysis; Response to external excitations; Rayleigh s quotient and its properties; Systems with proportional damping; Systems with arbitrary viscous damping. Distributed parameter systems: axial and bending vibration of beams; orthogonality of modes; Response to external excitations; Rayleigh s quotient; Approximate methods. Earthquake response of linear systems: Earthquake excitations; Equations of motion; Response spectrum concept; Response spectrum characteristics; Design response spectrum; Modal analysis; Displacement response; Element forces; Modal response contribution; Response history analysis; Response spectrum analysis. Introduction to Random Vibration; Stationary and non-stationery random processes; Ergodic random processes; Narrow band and wide band random processes; Properties of Autocorrelation and Power spectral density functions; Response to arbitrary excitation by Fourier transform method; Response of SDOF and MDOF systems to random excitations