

**ME 531 Mechanical Vibration (3-0-0-6)**

Generalised co-ordinates, constraints, virtual work; Hamilton's principle, Lagrange's equations; Discrete and continuous system; Vibration absorbers; Response of discrete systems-SDOF & MDOF: free-vibration, periodic excitation and Fourier series, impulse and step response, convolution integral; Modal analysis: undamped and damped non-gyroscopic, undamped gyroscopic, and general dynamical systems. Effect of damping; Continuous systems: vibration of strings, beams, bars, membranes and plates, free and forced vibrations; Raleigh-Ritz and Galerkin's methods. Measurement techniques.

**Texts/References:**

1. L. Meirovitch, Elements of Vibration Analysis, McGraw Hill, 2nd edition, 1986.
2. L. Meirovitch, Principles and Techniques of Vibrations, Prentice Hall International (PHIPE), 1997.
3. W. T. Thomson and M. D. Dahleh, Theory of Vibration with Applications, 5th edition, Pearson, 1997.
4. F. S. Tse, I. E. Morse and R. T. Hinkle, Mechanical Vibrations, 2nd edition, CBS Publications, 2004.
5. J. S. Rao and K. Gupta, Introductory course on Theory and Practice of Mechanical Vibrations, 2nd edition, New Age Publication, 1999.