2012-13

PVP SIDDHARTHA INSTITUTE OF TECHNOLOGY

(COURSE STRUCUTRE FOR AUTONOMOUS SCHEME)

I Year M. Tech. (Machine Design) M.E.	**T**	**P**	**C**
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MEMD2T2 - MECHANICAL VIBRATIONS

Unit I

Single degree of Freedom systems I: Undamped and damped free vibrations: forced vibrations coulomb damping; Response to harmonic excitation;

Unit II

Forced Vibrations and measuring instruments: rotating unbalance, reciprocating unbalance and support excitation; Vibration isolation and transmissibility Vibrometers, velocity meters & accelerometers

Unit III

Two degree freedom systems: Principal modes – undamped and damped free and forced vibrations ; undamped vibration absorbers ;

Unit IV

Multi degree freedom systems: Matrix formulation, stiffness and flexibility influence coefficients; Eigen value problem; normal modes and their properties; Free and forced vibration by Modal analysis; Method of matrix inversion; Torsional vibrations of multi – rotor systems and geared systems; Discrete-Time systems.

Unit V

Numerical Methods: Rayliegh's, stodola's, Matrix iteration, Rayleigh-Ritz Method and Holzer's methods.

Unit VI

Continuous systems: Free vibration of strings – longitudinal oscillations of bars-traverse vibrations of beams- Torsional vibrations of shafts.

Unit VII

Critical speeds of shafts: Critical speeds without and with damping, secondary critical speed.

Unit VIII

Transient Vibrations: Introduction, Laplace transformation, Response to impulsive input Response to step input, rectangular phase, Phase plane method, shock spectrum

Text books:

1. Mechanical Vibrations by G.K. Groover Nem Chand &Bros Roorke
2. Elements of Vibration Analysis by Meirovitch

References:

1. Vibrations by W.T. Thomson
2. Mechanical Vibrations – Schaum series.
3. Vibration problems in Engineering by S.P. Timoshenko.
4. Mechanical Viabrations – V.Ram Murthy.