

2012-13

**PVP SIDDHARTHA INSTITUTE OF TECHNOLOGY  
(COURSE STRUCTURE FOR AUTONOMOUS SCHEME)**

**I Year M. Tech. (Machine Design) M.E.**

**T P C  
5 0 4**

**MEMD2T5C - CONDITION MONITORING  
(Elective-III)**

**UNIT-I**

**Predictive Maintenance Techniques:** Basics, maintenance philosophies, Bath tub curve, Classification of maintenance, advantages and disadvantages of maintenance, plant machinery classifications and recommendations.

**UNIT-II**

**Condition monitoring techniques:** Introduction to Condition monitoring, definition, Types of condition monitoring, advantages and limitations of different condition monitoring techniques like wear debris monitoring, oil monitoring, performance monitoring, vibration monitoring, thermography, corrosion monitoring.

**UNIT-III**

**Data acquisition:** Introduction, collection of vibration signal, vibration transducers, characteristics and mountings, conversion of vibrations to electrical signal.

**UNIT-IV**

**Signal processing, applications and representations:** The fast Fourier transform (FFT) analysis, Time waveform analysis, Phase signal analysis, special signal processes.

**UNIT-V**

**Machinery fault diagnosis using vibration analysis:** Unbalance, bent shaft, Eccentricity, Misalignment, looseness, Belt drive problems, gear defects, bearing defects, Electrical faults, Cavitation Shaft cracks, Rotor rubs, Resonance, Hydraulic and aerodynamic forces.

**UNIT-VI**

**Correcting faults that cause vibration:** Introduction, Balancing Alignment, Resonance vibration control with dynamic absorbers.

**UNIT-VII**

**Oil and practical analysis:** Introduction, oil fundamentals, oil analysis sampling methods, lubricant properties, contaminants in lubricants, practical analysis techniques.

**UNIT-VIII**

**Other predictive maintenance techniques:** Ultrasound, Infrared thermography applications of IR thermography, ISO 2372 standards for vibrations.

### Text Books

1. Machinery vibration Analysis & Predictive Maintenance: Paresh Girdhar , Elsevier publishers.
2. Mechanical Fault diagnosis and condition monitoring-R.A.Collacott.

### References

1. Vibration monitoring and diagnosis – R.A.Collacott.
2. First course on condition monitoring in the process industries, Nov 1979, Manchester, edited by M.J.Neale.
3. Management of Industrial Maintenance-Newman-Butterworth, March 1978.
4. Condition Monitoring Manual-National Productivity council, New Delhi.

