I YEAR M. TECH (MACHINE DESIGN) FIRST SEMESTER

17MEMD1L1 **MACHINE DYNAMICS LAB** **Credits 2**

Lecture: 3 periods/week **Internal assessment: 25 marks**

Tutorial: - - **Semester end examination: 50 marks**

COURSE OBJECTIVES:

- Determine the vibration parameters of a vibrating system
- Predict the radius of gyration and moment of inertia of vibrating system
- Verify the static and dynamic balancing
- Study the effect of gyroscopic couple and operations of robotic arm

COURSE OUTCOMES:

Upon the completion of this course the student will be able to:

1. Evaluate the natural frequencies in different vibrating systems and effect of gyroscopic couple
2. Compute the radius of gyration & Moment of Inertia of oscillating part in vibration system
3. Measure the amplitude of vibration in damped and un damped vibrating system
4. Verify the static balancing and dynamic balancing
5. Implement the operations to manipulate the robot arm in industries
6. Determine the critical speed using whirling of shaft.
7. Determination of vibrations using FFT analyzer

List of Experiments:

Any 12 experiments from the following

1. Determination of the magnitude of gyroscopic couple, angular velocity of precession, and representation of vectors.
2. Checking of Static balancing using steel balls.
3. Determination of the magnitude and orientation of the balancing mass in dynamic balancing.
4. Determination of steady state amplitude of a forced vibratory system without damping.

5. Determination of steady state amplitude of a forced vibratory system with damping.
6. Determination of Natural frequency of un damped torsional single rotor system.
7. To determine damping coefficient of torsional single rotor system.
8. Determination of critical speed with Rotors /whirling of shafts.
9. Determination of radius of gyration and moment of inertia – trifilar suspension method.
10. Determination of vibrations in machines using FFT analyzer.
11. Determination of misalignment in given machine using FFT analyzer
12. Diagnosis of unbalance in a machine using FFT analyzer.
13. Direct kinematic analysis of a robot.
14. Inverse kinematic analysis of a robot.
15. Trajectory planning of a robot in joint space scheme.
16. Palletizing operation using Robot programming.