Devi Ahilya University, Indore, India Institute of Engineering & Technology				BE III Year (Mechanical Engg.)					
Subject Code & Name	**Instructions Hours per Week**			**Marks**					
3ME101 DYNAMICS OF MACHINE	**L**	**T**	**P**		**TH**	**CW**	**SW**	**PR**	**Total**
	4	**-**	**2**	**Max**	**100**	**50**	**50**	**50**	**250**
Duration of Theory Paper: 3 Hours				**Min**	**35**	**25**	**25**	**25**	**110**

Objective: To Develop the Understanding of Dynamic Behavior Machine components. Pre requisites are Theory of Machine.

Pre requisites: nil

COURSE CONTENTS

Unit-I

Friction & Power Transmission Devices:

Introduction, classification and types of friction, laws of frictions and screw frictions, journal Bearings, thrust bearings, pivot and collar bearings, ball and roller bearings, single & multi-plate clutch, cone clutch, centrifugal clutch, belt, rope and chain drives.

Unit-II

Brakes & Dynamometer:

Introduction, classification and types of brakes, shoe/block brake, band brake, band and block brake, internal expanding shoe brake, disc brake.

Introduction, classification and types of dynamometers, propulsion and breaking of vehicles.

Unit-III

Analysis of Dynamic Forces:

Inertia force and inertia torque, D.Alemberts principle, gas forces, equivalent masses, piston efforts, crank shaft torque, turning moment diagrams, fly wheels, fluctuation of energy and speed.

Unit-IV

Governors:

Introduction, types and classifications, centrifugal governors, gravity controlled and spring controlled governors, inertia governors, governor characteristics and effect of friction.

Unit-V

Balancing:

Balancing of Rotating Masses: Static and dynamic balancing, balancing a single cylinder engine, balancing multi-cylinder engines

Balancing of Reciprocating Masses: Primary and secondary balancing, locomotive balancing, hammer blow, pitching and swaying couples, conditions of balance in V-engine, radial engine and multi-cylinder in line engines.

BOOKS RECOMMENDED

[1]. Rattan S.S., *Theory of Machines*, Tata McGraw Hill Publishing Company Ltd., New Delhi, Second Reprint 2005.

[2].Shigley J.E. and Uicker J.J., *Theory of Machines and Mechanisms*, McGraw Hill, Inc., 1995.

[3].Thomas Bevan, *Theory of Machines*, CBS Publishers and Distributors, 1984.

[4].Ghosh A. and Mallick A.K., *Theory of Mechanisms and Machines*, Affiliated East-West Press Pvt.Ltd., New Delhi, 1988.

[5]. Rao J.S. and Dukkipati R.V., *Mechanism and Machine Theory,* Wiley-Eastern Limited, New Delhi, 1992.

[6]. John Hannah and Stephens R.C., *Mechanics of Machines*, Viva low-Priced Student Edition, 1999.

LABORATORY EXPERIMENTS:

1. To determine the coefficient of friction between the surfaces of different materials by inclined plane method.
2. To determine coefficient of friction between leather belt and CI pulley by differential band brake method.
3. To determination the coefficient of friction between leather belt and wooden pulley by belt and pulley apparatus.
4. To Study different types of bearings.
5. To Determine the pressure distribution in the oil film of the journal bearing for various speeds and
   a) Plot the Cartesian and polar pressure curves for various speeds.
   b) Determine the constants 'n' and 'K' in the summer field pressure function from the Cartesian pressure curves.
   c) Plot the summer field pressure curve for each speed.
   d) Compare the mean load, due to the mean upward pressure on the projected and developed areas of the bearing with the total applied load.
   e) With the aid of the values of 'n' and 'K' determined as above for each speed, determine the total load on the journal and compare with total load on the bearing.
   d) Determination of tract ional torque.
6. To study different types of clutches.
7. To study different types of brakes.
8. To study absorption types of dynamometer.
9. To study transmission types of dynamometers.
10. To determine the torque in shaft by epicyclical gear train and holding torque apparatus
11. To determine the moment of inertia of objects using trifler suspension method.
12. To determine the moment of inertia of connecting rod by compound pendulum method.
13. To determine characteristic curves of (i) sleeve position against controlling force and speed and (ii) radius of rotation for Watt, Porter, Proell and Hartnell type governors.
14. To perform static balancing of given weights by balancing apparatus.
15. To perform dynamic balancing of given weights by balancing apparatus.