

Course Type	Course Code	Name of Course	L	T	P	Credit
DC	MEC 207	Dynamics of Machinery	3	0	0	9

Course Objective

The course aims to equip the students with basic understanding of dynamics of common moving parts of a machine.

Learning Outcomes

Upon successful completion of this course, students will be able to:

- Solve three dimensional rigid body problems
- Do the dynamic analysis of mechanisms
- Design flywheel for engines.
- Analyze and modify the design of cams.
- Understand the dynamic part of an internal combustion engine.
- Solve balancing problems

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Introduction: Rigid body dynamics and Gyroscopes	7	Students will be able to solve engineering problems in rigid body dynamics
2	Static force analysis: free-body diagram, static equilibrium, analysis of multi-force member, force analysis with friction.	6	Students will learn to do static force analysis of mechanism
3	Dynamic force analysis: shaking effect, dynamic equilibrium, dynamic analysis of mechanisms, Dynamics of reciprocating and rotary machines	7	Students will learn to find out shaking forces, shaking moments in machines
4	Turning moment diagram, fluctuation of energy, flywheel, Governors	6	Students will understand the concept of regulating speed in machines
5	Balancing of reciprocating and rotary machines, single and multi-cylinder engine balancing.	6	Students will be able to balance the reciprocating and rotary machines
6	Cam dynamics, analysis of disc cam with reciprocating roller follower, analysis of elastic cam system.	4	Students will be able to do dynamic analysis of CAM-Follower system
7	Introduction to free and forced vibrations, critical speed of shaft, vibration measuring instruments	6	Students will understand the basics of mechanical vibration

Text book:

1. Kinematics and Dynamics of Machinery, C. L. Wilson, J. P. Sadler, Pearson, 3rd Ed. 2016

Reference books:

1. Vector Mechanics for Engineers: Statics and Dynamics, F. P. Beer, E. R. Johnston, P. J. Cornwell, S. Sanghi, Tata McGraw Hill, 10th Ed. 2017
2. Kinematics, Dynamics and Design of Machinery, K. J. Waldron, G. L. Kinzel, Wiley 2nd Ed, 2007.
3. Theory of Machines, S. S. Rattan, McGraw Hill, 4th Ed. 2007