

**PR8451 MECHANICS OF MACHINES**

DETAILED SYLLABUS

**OBJECTIVES:**

- To understand the principles in the formation of mechanisms and their kinematics.
- To understand the effect of friction in different machine elements.
- To understand the importance of balancing and vibration.

**UNIT I KINEMATICS OF MACHINES**

Mechanisms – Terminology and definitions – kinematics inversions of 4 bar and slide crank chain – kinematics analysis in simple mechanisms – velocity and acceleration polygons – Cam and followers – classifications – displacement diagrams - layout of plate cam profiles – derivatives of followers motion

**UNIT II GEARS and GEAR TRAINS**

Spur gear – law of toothed gearing – involute gearing – Interchangeable gears – Gear tooth action interference and undercutting – nonstandard teeth – gear trains – parallel axis gears trains – epicyclic gear trains.

**UNIT III FRICTION**

Types of friction – Friction Drives -friction in screw threads – bearings – Friction clutches – Belt drives

**UNIT IV BALANCING AND MECHANISM FOR CONTROL**

Static and Dynamic balancing – Balancing of revolving and reciprocating masses – Balancing machines -Balancing a single cylinder engine – Balancing of Multi-cylinder inline, V-engines – Partial balancing in engines- Governors and Gyroscopic effects.

**UNIT V VIBRATION**

Free, forced and damped vibrations of single degree of freedom systems – force transmitted to supports – vibration Isolation – vibration absorption – torsional vibration of shafts – single and multirotor systems – geared shafts – critical speed of shafts.

**TEXT BOOKS:**

1. Ambekar A.G, Mechanism and Machine Theory|| Prentice Hall of India, New Delhi, 2007
2. Shigley J.E., Pennock G.R and Uicker J.J., —Theory of Machines and Mechanisms||, Oxford University Press, 2003

**REFERENCES:**

1. Ghosh.A, and A.K.Mallick, —Theory and Machine II, Affiliated East-West Pvt. Ltd., New Delhi, 1988.
2. Ramamurthi. V., "Mechanisms of Machine", Narosa Publishing House, 2005.
3. Rao.J.S. and Dukkippatti R.V. —Mechanisms and Machines II, Wiley-Eastern Ltd., New Delhi, 1998.
4. Robert L.Norton, "Design of Machinery", McGraw-Hill, 2012.