

# AMAE-05 MECHANICS OF MACHINES

## UNIT-1 KINEMATIC OF MECHANICS

- 1.1 Mechanisms- Terminology and definitions- kinematics inversions of 4 bar and slide crank chain- kinematics analysis in simple mechanisms- velocity and acceleration polygons
- 1.2 Analytical method- computer approach- cams- classifications- displacement diagrams- layout of plate cam profiles- derivatives of follower's motion- circular arc and tangent cams.

## UNIT-2 GEARS AND GEAR TRAINS

- 2.1 Spur gear- law of toothed gearing- involute gearing
- 2.2 Interchangeable gears- Gear tooth action interference and undercutting- nonstandard teeth- gear trains- parallel axis gears trains- epicyclical gear trains- automotive transmission gear trains.

## UNIT-3 FRICTION

- 3.1 Sliding and Rolling Friction angle- friction in threads
- 3.2 Friction Drives
- 3.3 Friction clutches
- 3.4 Belt and rope drives- brakes-
- 3.5 Tractive resistance.

## UNIT-4 FORCE ANALYSIS

- 4.1 Applied and Constrained Forces,
- 4.2 Free body diagrams- static Equilibrium conditions
- 4.3 Two, Three and four members
- 4.4 Static Force analysis in simple machine members, Dynamic Force Analysis
- 4.5 Inertia Forces and Inertia Torque
- 4.6 D'Alembert's principle- superposition principle- dynamic Force Analysis in simple machine members.

## UNIT-5 BALANCING AND VIBRATION

- 5.1 Static and Dynamic balancing-
- 5.2 Balancing of revolving and reciprocating masses
- 5.3 Balancing machines- free vibrations- Equations of motion- natural Frequency-
- 5.4 Damped Vibration- bending critical speed of simple shaft- Torsional vibration
- 5.5 Forced vibration- harmonic Forcing- Vibration solution.

## References Books:

1. Thomas Bevan, "Theory of Machines", CBS Publishers and Distributors, 1984.
2. Ghosh. A, and A.K.Mallick, "Theory and Machine", Affiliated East-West Pvt. Ltd., New Delhi, 1988.
3. Rao.J.S. and Dukkipatti R.V. "Mechanisms and Machines", Wiley-Eastern Ltd., New Delhi, 1992.