Theory of Machines 2(2+0)

Theory-

Elements, links, pairs, kinematics chain, and mechanisms. Classification of pairs and mechanisms. Lower and higher pairs. Four bar chain, slider crank chain and their inversions. Determination of velocity and acceleration using graphical (relative velocity and acceleration) method. Instantaneous centers. Types of gears. Law of gearing, velocity of sliding between two teeth in mesh. Involute and cycloidal profile for gear teeth. Spur gear, nomenclature, interference and undercutting. Introduction to helical, spiral, bevel and worm gear. Simple, compound, reverted, and epicyclic trains. Determining velocity ratio by tabular method. Turning moment diagrams, coefficient of fluctuation of speed and energy, weight of flywheel, flywheel applications. Belt drives, types of drives, belt materials. Length of belt, power transmitted, velocity ratio, belt size for flat and V belts. Effect of centrifugal tension, creep and slip on power transmission, Chain drives. Types of friction, laws of dry friction. Friction of pivots and collars. Single disc, multiple disc, and cone clutches. Rolling friction, anti friction bearings. Types of governors. Constructional details and analysis of Watt, Porter, Proell governors. Effect of friction, controlling force curves. Sensitiveness, stability, hunting, iso-chronism, power and effort of a governor. Static and dynamic balancing. Balancing of rotating masses in one and different planes.

Suggested Readings-

Bevan Thomas. 1984. Theory of Machines. CBS Publishers and Distributors, Delhi.

Ballaney P L. 1985. Theory of Machines. Khanna Publishers, 2-B Nath Market, Nai Sarak, New Delhi.

Rao J S and Dukkipatti R V. 1990. Mechanisms and Machine Theory. Wiley astern Ltd., New Delhi.

Lal Jagdish. 1991. Theory of Mechanisms and Machines. Metropolitan Book Co. Pvt.Ltd., 1 Netaji Subash Marg, New Delhi..