RO6503 MECHANICAL DESIGN

DETAILED SYLLABUS

OBJECTIVES:

- To gain knowledge in the design of common types of machine elements.

UNIT I DESIGN OF GEARS

Review of gear fundamentals, interference, gear forces, determining dimensions of a spur gear pair. Design of helical gears-parallel axis helical gear, normal and transverse planes, helix angles, equivalent number of teeth, determining dimension of helical gear pair, nomenclature of straight and bevel gears.

UNIT II DESIGN OF SHAFTS AND COUPLINGS

Forces on shafts due to gears, belts and chains, estimation of shaft size based on strength and critical speed. Couplings-types and applications, Design of square keys-use of standards, rigid couplings, flexible flange couplings - selection.

UNIT III SELECTION OF V BELTS AND CHAINS 13

V belts for given power and velocity ratio, selection of micro V-belts, timing belts. Selection of roller chain and power speed ratio, silent chain.

UNIT IV ROLLING CONTACT BEARINGS 8

Static and dynamic load capacity, cubic mean load, variable load, probability of survival, selection of deep groove and angular contact ball bearings.

UNIT V FRICTION DRIVES 13

Clutches - role of clutches, positive and gradually engaged clutches, toothed claw clutches, design of single plate and multiple plate clutches, variable speed drives, types and selection

TEXT BOOKS:

1. Robert L Mott, "Machine Elements in Mechanical Design", Macmillan Publishing Co., London, 1992.

2. Shigley and Mische, “Mechanical Engineering Design”, McGraw Hill, Inc., New Delhi, 2000.

REFERENCES:

1. Bandari V B, "Design of Machine Elements ", Tata McGraw Hill Publishers Co. Ltd., New Delhi, 2003.

2. Robert L Nortan, “Machine Design-An Integrated Approach”, Pearson Publishers, New Delhi, 2003.

3. Maitra G M, “Handbook of Gear Design”, Tata McGraw Hill, New Delhi, 1998

4. Faculty of Mechanical Engineering, PSG College of Technology, "Design Data Book", M/s. DPV Printers, Coimbatore, 2000