ME- 5003 DESIGN OF MACHINE ELEMENTS

Note: PSG Design data book and/ or Mahadevan and Reddy's Mechanical design data book are to be provided/ permitted in exam hall (duly verified by authority)

Unit I: Engineering Design; Steps in designing, design process and role of designer, iteration. preliminary design, detail design. Conceptual Design; abstraction, modeling of an engineering problem; iconic, analog and symbolic Embodiment Design; steps, rules and principles, design for quality and cost. Design for safety, Concept & evaluation of factor of safety

Unit II: Shafts: Design of shaft under combined bending, twisting and axial loading; shock and fatigue factors, design for rigidity; Design of shaft subjected to dynamic load; Design of keys and shaft couplings.

Unit III : Design of Belt, Rope and Chain Drives: Methods of power transmission, selection and design of flat belt and pulley; Selection of V-belts and sheave design; Design of chain drives, roller chain and its selection; Rope drives, design of rope drives, hoist ropes.

Unit IV Brakes & Clutches: Materials for friction surface, uniform pressure and uniform wear theories, Design of friction clutches: Disk , plate clutches, cone & centrifugal clutches. Design of brakes: Rope, band & block brake, Internal expending brakes, Disk brakes.

Unit V:Design of Gears Force analysis of gear tooth, modes of failure, beam strength, Lewis equation, form factor, formative gear and virtual number of teeth; Gear materials; Surface strength and wear of teeth; strength against wear; Design of straight tooth spur and Helical Gears. Application of bevel, formative gear and virtual number of teeth; Force analysis; Lewis equation for bevel gears; Strength against wear; Design of bevel gear.

References:

1. Shingley J.E; Machine Design; TMH

2. Wentzell Timothy H; Machine Design; Cengage learning

3. Mubeen; Machine Design; Khanna Publisher

4. Bhandari V B ,Design of Machine elements . TMH

5 Sharma & Agrawal; Machine Design; Kataria & sons

6 Maleev; Machnine Design;

List of Experiment (Pl. expand it):

Designing and sketching of components contained in the syllabus