

**PPD4I102 DESIGN OF MACHINE ELEMENTS**

**[Only specified data book as mentioned in the syllabus is permitted during examination]**

**Module-I (8 hours)**

**1 Mechanical engineering design:** Introduction to design procedure, Stages in design, Code and Standardization, Interchangeability, Preferred numbers, Fits and Tolerances, Engineering materials: Ferrous, Non-ferrous, Non-metals, design requirements – properties of materials, Material selection, Use of Data books.

**2 Fundamentals of Machine Design:** Types of load, Modes of failure, factor of safety concepts, Theories of Failure, concept and mitigation of stress concentration, Fatigue failure and curve, endurance limit and factors affecting it, Notch sensitivity, Goodman, Gerber and Soderberg criteria.

**Module-II (8 hours)**

**3 Machine Element Design:** Design of Joints: Rivets, welds and threaded fasteners based on different types of loading, Boiler joints, cotter joints and knuckle joints.

**Module-III (10 hours)**

**4 Design of Keys, Shaft and Couplings:** Classification of keys and pins, Design of keys and pins, Theories of failure, Design of shafts: based on strength, torsional rigidity and fluctuating load, ASME code for shaft design, Design of couplings: Rigid coupling, Flexible coupling.

**5 Design of Mechanical Springs:** Types of helical springs, Design of Helical springs, bulking of spring, spring surge, end condition of springs, Design of leaf springs: nipping.

**Module-IV (6 hours)**

**6 Bearings:** Types and selection of ball and roller bearings, Dynamic and static load ratings, Bearing life, Design of sliding contact bearings, Journal bearing, foot step bearing.

**TEXT BOOKS:**

1. Design of Machine Elements, V.B. Bhandari, Tata McGraw Hill
2. Mechanical Engineering Design, J.E.Shigley, C.R.Mischke, R.G.Budynas and K.J.Nisbett, TMH

**REFERENCE BOOKS:**

1. Machine Design, P.Kanaiah, Sciotech Publications
2. Fundamentals of Machine Component Design by R.C.Juvinall and K.M.Marshek, John Wiley & Sons
3. Machine Drawing by N.Sidheswar, McGraw-Hill
4. Machine Design, P.C.Sharma and D.K.Agrawal, S.K.Kataria & Sons
5. Machine Design, Pandya and Shah, Charotar Book Stall
6. Machine Design, Robert L. Norton, Pearson Education Asia.
7. Design of Machine Elements by C. S. Sharma and K. Purohit, PHI