



MANIPAL UNIVERSITY JAIPUR

School of Automobile Mechanical and Mechatronics Engineering

Department of Mechanical Engineering

Course Hand-out

Design of Machine elements-I | ME 1506 | 4 Credits | 3 1 0 4

Session: July 18 – Dec 18 | Faculty: Prof Sasanka Sekhar Ghosh, Ms Priyanshu Sharma, Mr. Rakesh Kumar/B.Tech Vth Semester

COURSE OUTCOMES: At the end of the course, students will be able to

[ME1506.1]. Describe the design process, material selection, identify stresses for machine components.

[ME1506.2]. Estimate the dimensions of the machine elements which are subjected to static loading.

[ME1506.3]. Design machine elements subjected to fluctuating loads.

[ME1506.4]. Design Shafts, Keys and Couplings.

[ME1506.5]. Design riveted, welded joints, threaded fastener subjected to different loading conditions.

[ME1506.6]. Design Power Screws for various applications in order to enhanced his/her employability.

A. SYLLABUS

Machine Design philosophy. **Engineering Materials:** Stress-strain diagrams for ductile and brittle materials, **Stresses in Machine Elements:** Types of simple stresses, State of stress at point-implications, principal stresses and compound stresses. **Design for strength:** Static loading, Theories of failures, Allowable stress, Factor of safety, Stress concentration factor, curved beams. Variable and impact loading. **Shafts** - ASME & ISI code equations for design of transmission shafts, design of shafts subjected to combined load. Key and couplings design. Riveted joints: Structural joints of lap & butt types, Boiler joints, Rivets Coured to eccentric loading conditions. Welded joints : Types of welding joints and symbols, Strength of welded joints and Design principle. Eccentric loading in welded joint Threaded fasteners, Power screws.

B. TEXT BOOKS:

- I. J.E. Shigley and C.R. Mischke, *Mechanical Engineering Design*, McGraw Hill Publication, 7th Edition, 2003.
- II. V. B. Bhandari, *Design of Machine Element*, McGraw Hill Education Pvt. Ltd., 4th Edition, 2017.

REFERENCE BOOKS:

- I. R. L. Norton, *Machine Design-An Integrated Approach*, Pearson Publisher, 5th Edition, 2013.
- II. U.C. Jindal, *Machine Design*, Pearson publisher, 1st Edition, 2010.
- III V. B. Bhandari, *Machine Design Data book*, McGraw Hill Publication, 2014.

