Staff Name: Mr.C.Subramaniyan Assistant Professor

Year : III Year/ V Sem

UNIT I STEADY STRESSES AND VARIABLE STRESSES IN MACHINE MEMBERS

Introduction to the design process - factor influencing machine design, selection of materials based on mechanical properties -- Preferred numbers, fits and tolerances – Direct, Bending and torsional stress equations – Impact and shock loading – calculation of principle stresses for various load combinations, eccentric loading – Design of curved beams – crane hook and ‘C’ frame - Factor of safety - theories of failure – stress concentration – design for variable loading – Soderberg, Goodman and Gerber relations

UNIT II DESIGN OF SHAFTS AND COUPLINGS

Design of solid and hollow shafts based on strength, rigidity and critical speed – Design of keys, key ways and splines - Design of crankshafts -- Design of rigid and flexible couplings.

UNIT III DESIGN OF TEMPORARY AND PERMANENT JOINTS

Threaded fastners - Design of bolted joints including eccentric loading, Knuckle joints, Cotter joints – Design of welded joints, riveted joints for structures - theory of bonded joints.

UNIT IV DESIGN OF ENERGY STORING ELEMENTS

Design of various types of springs, optimization of helical springs -- rubber springs -- Design of flywheels considering stresses in rims and arms, for engines and punching machines.

UNIT V DESIGN OF BEARINGS AND MISCELLANEOUS ELEMENTS

Sliding contact and rolling contact bearings -- Design of hydrodynamic journal bearings, McKee's Eqn., Sommerfield Number, Raimondi & Boyd graphs, -- Selection of Rolling Contact bearings -- Design of Seals and Gaskets -- Design of Connecting Rod.

TEXT BOOKS:

1. Shigley J.E and Mischke C. R., “Mechanical Engineering Design”, Sixth Edition, Tata McGraw-Hill , 2003.

2. Bhandari V.B, “Design of Machine Elements”, Second Edition, Tata McGraw-Hill BookCo, 2007.

REFERENCES:

1. Sundararajamoorthy T. V, Shanmugam .N, "Machine Design", Anuradha Publications, Chennai, 2003.

2. Orthwein W, “Machine Component Design”, Jaico Publishing Co, 2003.

3. Ugural A.C, “Mechanical Design – An Integral Approach, McGraw-Hill Book Co, 2004.

4. Spotts M.F., Shoup T.E “Design and Machine Elements” Pearson Education, 2004.

STANDARDS:

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1. IS 10260 : Part 1 : 1982 Terms, definitions and classification of Plain bearings Part 1 :

Construction.

2. IS 10260 : Part 1 : 1982 Terms, definitions and classification of Plain bearings Part 2 :

Friction and Wear.

3. IS 10260 : Part 1 : 1982 Terms, definitions and classification of Plain bearings Part 3 :

Lubrication.