Course code	Course Name	L-T-P – Credits	Year of Introduction
ME318	MACHINE DESIGN	3-1-0-4	2016

Prerequisite : NIL

Course Objectives

- To familiarize with the design of machine elements subjected to static and dynamic loading.
- To impart the design procedure for joints and fasteners

Syllabus

Engineering design, different type of loading, safety consideration, theories of failures, fatigue failure, limit, fits and tolerance, ergonomics in design. Design of joints, riveted, welded, design of fasteners. Design of springs. Design of shaft- key ways- couplings – rigid and flexible. Design of bearing, journal bearing, hydrostatic, dynamic bearings with the theory of lubrication- life rating of bearing. Analysis of structures – optimisation - Finite element approach for simple structural problem

Expected outcome.

At the end of the course the students will be able to

i. Design simple components, joints and fasteners
ii. Select bearings for supporting rotating parts
iii. Apply finite element modeling for design analysis

Text Book:

V B Bhandari, Design of Machine Elements, Tata McGraw Hill, 2012.

Data Book : PSG Design Data, DPV Printers, Coimbatore, 2012

References:

1. Robert L Norton Machine Design-An integrated Approach, Pearson, 2002
2. C S Sharma, Kamalesh Purohit, Design of Machine Elements, PHI Learning Pvt. Ltd, 2009
3. Shigly J.E., Mechanical Engineering Design, McGraw Hill, 2003
4. M.F Spotts, Design of Machine Elements, Prentice Hall India Pvt. Limited, 6e, 1991
5. Doughter & Valance, Design of Machine Elements, McGraw Hill publishers
6. Johnson, Optimum Design of Mechanical Elements, John Wiley & Sons, 1980

COURSE PLAN

Module	Contents	Hours	End Sem. Exam Marks
I	Engineering design, different type of loading, safety consideration, theories of failures, fatigue failure, limit, fits and tolerances, ergonomics in design	9	15%
II	Design of joints- riveted & welded joints - stresses in welded joints - strength of welded joints - fatigue loading of welded joints - design of	8	15%

	bolts and screws		
FIRST INTERNAL EXAMINATION			
III	Design of springs - Mechanical springs - design of helical springs - helical torsion spring - critical frequency of helical springs - energy storage capacity - common types of leaf springs	**8**	**15%**
IV	Design of shaft- - stresses in shafts - equivalent twisting and bending moments - effect of keyways - transmission shafts - determination of shaft size for strength - design of shafts for deflection - critical speeds for shafts - operating speeds - shafts subjected to steady and alternating loads. Key ways- couplings – Couplings - rigid and flexible coupling - common types of keys, pins and retainers and their applications	**9**	**15%**
SECOND INTERNAL EXAMINATION			
V	Design of bearings, journal bearing, hydrostatic, dynamic bearings - the theory of lubrication- life rating of bearings	**7**	**20%**
VI	Analysis of structures – optimisation - Finite element approach for simple structural problem- modelling - elements selection – meshing	**9**	**20%**

Question paper pattern

Use of approved data book permitted

Maximum marks: 100 **Time: 3 hrs**

The question paper should consist of three parts

Part A
There should be 3 questions from module I and II and at least 1 question from each module
Each question carries 15 marks
Students will have to answer any 2 questions out of 3 (2X15 marks =30 marks)

Part B
There should be 3 questions from module III and IV and at least 1 question from each module
Each question carries 15 marks
Students will have to answer any 2 questions out of 3 (2X15 marks =30 marks)

Part C
There should be 3 questions from module V and VI and at least 1 question from each module
Each question carries 20 marks
Students will have to answer any 2 questions out of 3 (2X20 marks =40 marks)

Note: Each question can have a maximum of four sub questions, if needed