MME 312 L: Machine Design2 Lab

Programme: B.Tech. (MME) Year: 3rd Semester: V sem, ODD
Course:Core Credits:1 Hours: 2 / week

Course Context and Overview (100 words):

The objective of the design labare to provide the knowledge to the students in the field of design of machine components. This will help the students for designing and analysing the structural components as per the customer or client requirements. The further detailed objectives are as following:

1. To understand the basic concepts of machine design.
2. To understand the application of static and fatigue load.
3. To learn the various types of analytical approach used for designing structural components or assemblies.
4. To learn the working principle, applications and design criteria.

Prerequisites Courses: Nil

(Course name and course code)

Course outcomes (Cos):

On completion of these experiments, the students will have the ability to:	
CO1 Understand the design approach of beam under static load.	Exp.-1
C02 Understand the design concept of machine components using different failure criteria.	All Exp.
C03Understand the design concept of shaft using Von-Mises theory.	Exp-3, Exp-6
C04 Understand the design approach of beam based of structures.	Exp.-1
C05 Understand the basic design approach machine component subjected to fatigue load.	Exp.-2, Exp.-3
C06Understand the cumulative fatigue design approach of machine components.	Exp.-2, Exp.-3
C07 Understand the concept of modal analysis.	Exp-7, Exp-8

C08 Understand the design approach of transient and impact load.	Exp.-9, Exp.-10
C09 Understand the design approach of spur gear.	Exp.-4
C10 Understand the design approach of helical gear.	Exp.-5

List of Experiments:

S. No.	Experiments	Hours	Student developement
1	Structural static analysis of a simply supported I-section beam of 2 m long for different types of load. Take E=210GPA and poission's ratio = 0.3 (1) vertical point load of 4 KN at center (2) UDL of 10KN/m (3) Moment 10KN-M	3	**Skill developemen t**
2	Fatigue analysis of a rectangular plate with a hole using Ansys Workbench	3	**Skill development**
3	Fatigue Analysis of a shaft subjected to fluctuating torque on ansys workbench.	3	**Skill development**
4	Structural static analysis of a "GEAR ASSEMBLY with and without shaft" in ANSYS Workbench	3	**Skill development & Employability**
5	Structural Static Analysis of a Helical Gear	3	**Skill development**
6	Rigid dynamics analysis of rotating shaft using ansys workbench	3	**Skill development**
7	Modal dynamics analysis of Cantilever using ansys workbench	3	**Skill development**
8	Modal dynamics analysis of Plate using ansys workbench	3	**Skill development**
9	Transient analysis of Plate using ansys workbench	3	**Skill development**

10	Explicit analysis of plate using ansys workbench	**3**	**Employability**

Textbook references (IEEE format):
Text Book:

1. Bhandari V B, "Design of Machine Elements", 3rd ed., McGraw-Hill.
2. Norton L. Robert., "Machine Designan Integrated Approach" 2nd ed., Pearson.

Reference books:

1. Shigley's*et al*., "Mechanical Engineering Design" 9th ed., McGraw-Hill.
2. Jindal U. C., "Machine Design", Pearson.

Additional Resources (NPTEL, MIT Video Lectures, Web resources etc.):

Evaluation Methods:

Item	Weightage
Attendance	10
Lab Assessment	20
Practical File	30
Final Examination (Experiment and Viva voce)	40

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