



Course Title: MACHINE DESIGN – II

Credit Units: 04

Course Level: UG

Course Code: MAE302

L	T	P/S	SW/F W	TOTAL CREDIT UNITS
3	0	2	-	04

Course Objectives: The course aims at developing concepts as to how to analyze mechanical systems and select proper machine elements (bearing, gears, belts, chains). It prepares the students how to design machine element by specifying their type, geometry, material and how to integrate these elements to build a mechanical systems.

Pre-requisites: Basic Concepts of I.C Engines and sound knowledge of Engineering Materials.

Course Contents/Syllabus:

	Weightage (%)
Module I: Mechanical Drives	25%
Descriptors/Topics 1. Selection of transmission. 2. Helical, bevel and worm gears. 3. Belt and chain drives.	
Module II: Friction Clutches & Brakes	15%
Descriptors/Topics 1. Common friction materials. 2. Shoe, band, cone and disc brake their characteristics and design. 3. Friction clutches.	
Module III: Bearings and Lubrication	20%
Descriptors/Topics 1. Types of sliding bearing. 2. Materials, type of lubrication, design of sliding bearing. 3. Selection and application of rolling bearing, seals.	
Module IV: Spring Design	20%
Descriptors/Topics 1. Design of spring. 2. Design of helical spring. 3. Design of Leaf spring.	

Module V: Engine parts	20%
1. Design of Piston. 2. Design of connecting rod. 3. Design of crankshaft.	

Student Learning Outcomes:

On completion of the course the student will be able to:

1. At the end of this course, students will be able to analyze and design mechanical springs.
2. At the end of this course, students will be acquainted with standards, safety, reliability, importance of dimensional parameters and manufacturing aspects in mechanical design.
3. At the end of this course, students will be able to improve their technical report writing skills.
4. At the end of this course, students will be able to analyze and design gears.

Pedagogy for Course Delivery:

The course pedagogy will include lectures, numerical practice, case studies, seminars and presentations. It also includes discussion on real life problems related to design of mechanical components.

Lab/ Practicals details, if applicable:

List of Experiments:

1. Design and drawing of automotive transmission system.
2. Design and drawing of automotive brakes.
3. Design and drawing of clutches.
4. Design and drawing of connecting rod.
5. Design and drawing of I.C. engine piston.
6. Design and drawing of connecting rod.
7. Design and drawing of hydraulic rivet, mechanical hoist.

Assessment/ Examination Scheme:

Theory L/T (%)	Lab/Practical/Studio (%)	Total
75%	25%	100%

Theory Assessment (L&T):

	Continuous Assessment/Internal Assessment				End Term Examination
Components (Drop down)	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

Lab/ Practical/ Studio Assessment:

	Continuous Assessment/Internal Assessment				End Term Examination	
Components (Drop down)	A	PR	LR	V	PR	V
Weightage (%)	5	10	10	5	35	35

Text & References:**Text Books:**

- Sadhu Singh, Machine Design
- R.S. Khurmi & J.K. Gupta, Machine design
- D.K. Aggarwal & P.C. Sharma, Machine Design

Reference Books:

- J.E. Shigley, Mechanical Engineering Design.
- Mahadevan, "Design Data Book", CBS Publication & Publisher

Any other Study Material:

- Lab Manuals of various software
- MACHINE DESIGN DATA handbook