

B.E Semester: VIII

Mechanical Engineering

Subject Name: Machine Design - II

A. Course Objective

- To develop a solution oriented approach by in depth knowledge of Design of Machine Component(s).
- To address the underlying concepts and methods to analyze different Machine Component(s).

B. Teaching / Examination Scheme

SUBJECT		Teaching Scheme				Total Credit	Evaluation Scheme					Total Marks
		L	T	P	Total		THEORY		IE	CIA	PR. / VIVO	
CODE	NAME	Hrs	Hrs	Hrs	Hrs		Hrs	Marks	Marks	Marks	Marks	
ME803	Machine Design II	4	0	2	6	5	3	70	30	20	30	150

C. Detailed Syllabus

- 1) SPUR GEARS AND PARALLEL AXIS HELICAL GEARS:
Gear Terminology, Speed ratios and number of teeth, Force analysis, Tooth stresses, Dynamic effects, Fatigue strength, Factor of safety, Gear materials, Module and Face width-power rating calculations based on strength and wear considerations
Parallel axis Helical Gears :
Pressure angle in the normal and transverse plane, Equivalent number of teeth-forces and stresses. Estimating size of helical gears.
- 2) BEVEL AND WORM GEARS:
Straight and spiral bevel gear: Tooth terminology, tooth forces and stresses, equivalent number of teeth. Estimating the dimensions of pair of straight and spiral bevel gears.
Worm Gear: Merits and demerit, - terminology, Thermal capacity, materials, forces and stresses, efficiency, estimating the size of the worm gear pair.
- 3) DESIGN OF GEAR BOXES:
Geometric progression - Standard step ratio - Ray diagram, kinematics layout - Design of sliding mesh gear box -Constant mesh gear box, Design of multi speed gear box.
- 4) DESIGN OF I.C. ENGINE COMPONENTS:
Selection of type, general design consideration, design of cylinder, cylinder liner, cylinder head, pistons, connecting rod, crank shaft, valves gears mechanism, flywheel.
- 5) DESIGN OF MATERIAL HANDLING EQUIPMENTS:
Introduction: material handling equipments, classification and their selection. Concept of material handling system design. Lifting Equipments: classification and selection and design of hooks, sheaves, drums and grab buckets. Classification of cranes, construction working of different types of conveyors, feeders and elevators. Conveying

equipments: classification construction and working of different types of conveyors, feeders and elevators. Design of belt conveyors, screw conveyors and vibratory conveyors.

D. Lesson planning

<u>SR.NO</u>	<u>DATE/WEEK</u>	<u>UNIT NO</u>	<u>%WEIGHTAGE</u>	<u>TOPIC NO</u>
1	1 ST , 2 ND , 3 RD	1	20	1
2	4 TH , 5 TH , 6 TH	2	20	2
3	7 TH , 8 TH , 9 TH	3	20	3
4	10 TH , 11 TH , 12 TH	4	20	4
5	13 TH , 14 TH , 15 TH	5	20	5

E. Instructional Method & Pedagogy

1. At the start of course, the course delivery pattern , prerequisite of the subject will be discussed
2. Lecture may be conducted with the aid of multi-media projector, black board, OHP etc. & equal weightage should be given to all topics while teaching and conduction of all examinations.
3. Attendance is compulsory in lectures and laboratory, which may carries five marks in overall evaluation.
4. One/Two internal exams may be conducted and total/average/best of the same may be converted to equivalent of 30 marks as a part of internal theory evaluation.
5. Assignment based on course content will be given to the student for each unit/topic and will be evaluated at regular interval. It may carry an importance of ten marks in the overall internal evaluation.
6. Surprise tests/Quizzes/Seminar/Tutorial may be conducted and having share of five marks in the overall internal evaluation.
7. The course includes a laboratory, where students have an opportunity to build an appreciation for the concept being taught in lectures.
8. Term Work should be as per below with maximum 5 students in one group:
9. **Practical / Oral:** The candidate shall be examined on the basis of term-work.

F. Students Learning Outcomes

- The student can identify different areas of Manual & Computer Aided Machine Design.
- Can find the applications of all the areas in day to day life.

G. Recommended Study Materials

1. Machine Design – by P C Sharma, Agarwal
2. Mechanical Engineering Design by Josheph shighly, McGraw Hill Book Co.
3. Design of Machine Elements by V.B. Bhandari, McGraw Hill Publishing Co.
4. Design of Machine Elements by M.F.Spotts, T.E.Shoup, L.E.Hornberger, S.R.Jayaram and C.V. Venkatesh Pearson Education.
5. Design of Machine Elements by C.S.Sharma & Kamlesh Purohit, Prentice Hall of India Pvt. Ltd.
6. Mechanical System Design II & III by Farazdak Haideri Nirali Prakashan.
7. Machine Design by U.C. Jindal Pearson Education.
8. Engineering Design a material and processing approach/ George Dieter/ McGraw Hill international book company 1983

9. Design of Machinery: An Introduction to the Synthesis and Analysis of Mechanisms and Machines, R.Norton, McGraw-Hill Higher Education, 2004