

GUJARAT TECHNOLOGICAL UNIVERSITY

B.E. SEMESTER : VIII

MECHANICAL ENGINEERING

Subject Name: **MACHINE DESIGN II**

Sr. No.	Course Contents	Total Hrs
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 the size of the helical gears.	07
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.	07
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.	05
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.	14
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.	12

Term Work: The term work shall be based on the topics mentioned above.

Practical / Oral: The candidate shall be examined on the basis of term-work.

USE OF PSG DESIGN DATA BOOK IS PERMITTED IN EXAM

Text Books:

1. Bhandari, V.B., "Design of Machine Elements", Tata McGraw-Hill Publishing Company Ltd., 1994.
2. P.C.Sharma & D.K. Agrawal Machine Design – S.K.Kataria & Sons, 2010
3. Dr. Sadhu Singh, "Machine Design", – Khanna Pub.2009
4. M.P. Alexandrov, "Material handling equipments", MIR publishers.
5. N. Rudenko, "Material handling equipments", MIR publishers.

Reference Books:

1. Maitra G.M., Prasad L.V., "Hand book of Mechanical Design", II Edition, Tata McGraw-Hill,1985
2. Spivakovskii, "Conveyors and related equipments". MIR publishers.
3. J.M. Apple, "Plant Layout and Material Handling", John Wiley & sons, 1997.
4. Shigley J.E and Mischke C. R., "Mechanical Engineering Design", McGraw-Hill International Editions, 1989
5. Norton R.L., "Design of Machinery", McGraw-Hill Book co, 2004.
6. Hamrock B.J., Jacobson B., Schmid S.R., "Fundamentals of Machine Elements", McGraw- Hill Book Co.,