

2012-13

**PVP SIDDHARTHA INSTITUTE OF TECHNOLOGY
(COURSE STRUCTURE FOR AUTONOMOUS SCHEME)**

I Year M. Tech. (Machine Design) M.E.

T P C

5 0 4

**MEMD1T6B - GEAR ENGINEERING
(Design Data Book is allowed)
(Elective-II)**

Unit – I

Introduction: Principles of gear tooth action, Generation of Cycloid and Involute gears, Involutometry, gear manufacturing processes and inspection, gear tooth failure modes, stresses, selection of right kind of gears.

Unit – II

Spur Gears: Tooth loads, Principles of Geometry, Design considerations and methodology, Complete design of spur gear teeth considering Lewis beam strength, Buckingham's dynamic load and wear load, Design of gear shaft and bearings.

Unit – III

Helical Gears: Tooth loads, Principles of Geometry, Design considerations and methodology, Complete design of helical gear teeth considering Lewis beam strength, Buckingham's dynamic load and wear load, Design of gear shaft and bearings.

Unit – IV

Bevel Gears: Tooth loads, Principles of Geometry, Design considerations and methodology, Complete design of bevel gear teeth considering Lewis beam strength, Buckingham's dynamic load and wear load, Design of gear shaft and bearings.

Unit – V

Worm Gears: Tooth loads, Principles of Geometry, Design considerations and methodology, Complete design of worm gear teeth considering Lewis beam strength, Buckingham's dynamic load and wear load, Heat dissipation considerations. Design of gear shaft and bearings.

Unit – VI

Gear failures: Analysis of gear tooth failures, Nomenclature of gear tooth wear and failure, tooth breakage, pitting, scoring, wear, overloading, gear-casing problems, lubrication failures

Unit – VII

Gear trains: Simple, compound and epicyclic gear trains, Ray diagrams, Design of a gear box of an automobile, Design of gear trains from the propeller shafts of airplanes for auxiliary systems.

Unit – VIII

Optimal Gear design: Optimization of gear design parameters, Weight minimization, Constraints in gear train design-space, interference, strength, dynamic considerations, rigidity etc. Compact design of gear trains, multi objective optimization of gear trains. Application of Traditional and non-traditional optimization techniques

Text Books:

1. Maleev and Hartman, Machine Design, C.B.S. Publishers, India.
2. Henry E.Meritt, Gear engineering, Wheeler publishing, Allahabad, 1992.
3. Practical Gear design by Darle W. Dudley, McGraw-Hill book company

References:

1. Earle Buckingham, Analytical mechanics of gears, Dover publications, New York, 1949.
2. G. M. Maitha, Hand book of gear design, TaTa Mc.Graw Hill publishing company Ltd., New Delhi, 1994.

