

### **ME 692 Gear Engineering (3-0-0-6)**

Gear fundamentals; Materials: steels, localized hardening of teeth, cast irons, nonferrous and nonmetallic; Force analysis and bearing loads: spur, helical and worm; Design: Fundamental design includes Lewis beam strength, Buckingham's dynamic load and wear load, corrections, characteristics and distribution, scoring, thermal limits, indexes of tooth loading, data needed for drawing and rating practice; Gear box design: ray diagram, and kinematic layout. Manufacturing: hobbing, shaping, milling, broaching and punching, casting, injection molding, sintering, cold drawn and rolled worm threads; Finishing: grinding, shaving, rolling, honing; Failures: system, tooth, bearing and lubrication failures; Metrology: functional checking, equipments, tooth thickness, single flank and backlash. Few research aspects include asymmetric and micro gears.

#### *Texts/References:*

- [1] Darle W Dudley, Handbook of Practical Gear Design, CRC Press LLC, 2002.
- [2] Gitin M Maitra, Handbook of Gear Design, 2nd Edition, Tata McGraw-Hill, 2003.
- [3] H. E Merritt, Gear Engineering 3rd Indian Edition, Wheeler Publication, 1992.
- [4] AE-15, Gear Design Manufacturing and Inspection Manual, SAE International, 1990.
- [5] AGMA Standards Collection, American Gear Manufacturing Association, 2009.
- [6] Design Data, PSG College of Technology, 1995.
- [7] Joseph E Shigley, Charles R Mischke, Mechanical Engineering Design, 6th Edition, Tata McGraw Hill, 2003.
- [8] Robert C Juvinall, Kurt M Marshek, Fundamentals of Machine Component Design, 3rd Edition, John Wiley & Sons, 2000.