



Gear and Gear Unit Design : Theory and Practice

Mechanical Engineering

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About Instructor: Dr. Rathindranath Maiti is at present Professor in Mechanical Engineering Department, IIT, Kharagpur. His teaching and research interests are Machine design, Gear Engineering, Mechanical and Fluid Drives. He has worked in Design and R&D in Hindustan Aeronautics Ltd. and Macneil and Magor Ltd. in India and Eaton Hydraulics in Japan, for about ten years together. Recipient of DAAD and INSA Fellowships he has worked in the areas of Fluid power/Mechanical Power Transmissions in TU-Dresden, Germany; Cardiff School of Engineering, UK ; Krakow University of Technology and Wroclaw University of Technology, Poland. Publications, over 40 in peer reviewed international journals and conferences; and few patents are in his credit.

Pre Requisites: : Prior knowledge of general mechanics, theory of machines and solid mechanics

Core/Elective: : Core_Elective

UG/PG: : UG

Industry Support : Industries designing/manufacturing gears and gear units, and machines involving gears, such as earth moving & construction machineries, conveying and elevating equipments, automobiles, aircrafts, machine tools etc., would recognize this online course

Course Intro: : Over and above the outline of gear design that are taught in undergraduate and postgraduate levels through the basic course of design of Machine Elements or specialized course Mechanical Drives, detail aspects of practical design in industries will be focused. The course would help to fill the gap the knowledge at graduation and step into producing the detail design and drawing of gear units in Industries. The course is developed based on long time research, teaching and working in industries in this area.

COURSE PLAN

SL.NO	Week	Module Name
1	1	Introduction to Gear and Gear unit Design, (Gear Kinematics, Geometry, properties etc.)
2	2	Design of Spur (Straight and Helical), Bevel and Worm gears
3	3	Design of a gear box- part-1 Gear Design and Lay-out (AutoCAD Drawing)
4	4	Design of a gear box- part-2 Bearing Selection, Loads on shaft (SFD, BMD etc.) 1 Layout of Shafts and Bearings (AutoCAD Drawing)
5	5	Design of a gear box- part-3 Finalizing design (including housing), (AutoCAD Drawing) Labeling components, Bill of materials



6	6	Design of a gear box- part-4 Detail drawing of components (Considering manufacturing aspects and Fits and Tolerances) (AutoCAD Drawing)
7	7	Introduction to Involute Gear Tooth Correction
8	8	Internal Gearing, Epicyclic and other special Gearing (With some practical examples)