

# GUJARAT TECHNOLOGICAL UNIVERSITY

## B.E. SEMESTER : VIII

### PRODUCTION ENGINEERING

Subject Name: **DESIGN OF PRODUCT AND MACHINE TOOLS**

Sr. No.	Course Contents	Total Hrs
1.	<b>Introduction and design of Machine Tool Drives using Design Data Book</b> Introduction, Machine tool types, machine tool drives, requirements of machine tool design, machine tool design process, need for speed regulation, stepped regulation of speed, design of speed box and feed box, classification of speed and feed box, step less regulation of speed and feed rates, Machine tool chatters, sources and effects of vibration, methods of controlling vibrations in machine tools.	15
2.	<b>Design of Bearings and Spindles using Design Data Book</b> Introduction, classification of bearing, criteria for design and selection, Design of hydrostatic, hydrodynamic bearings, design/selection of antifriction bearing, radial and axial clearance adjustment of bearings. Functions and requirements of Spindle unit, materials of spindles, Design calculations of spindles.	10
3.	<b>Design of machine tool structures and Guide ways</b> Functions, design criteria, Types and uses of stiffness, profile, design procedure, design for strength and stiffness, design of beds, design of columns, design of cross rails, arms, saddles and carriages, function and types of guide ways, design of slide ways, methods of adjusting clearances in slide ways, design of slide ways for stiffness, Guide ways operating under liquid friction conditions, design of Anti-friction Guide ways, protecting devices for slide ways.	10
4.	<b>Material Handling Equipment' design using Design Data Book</b> Introduction, Design of Hoisting Machinery: Design of fiber ropes, pulley system, steel wire ropes, rope sheaves, rope drums, hooks.	07
5.	<b>Product design</b> Introduction, Structure of product design, product design research, Preliminary product design Evaluation, Product development and the prototype stage, Economic evaluation of the design, preparation of Product design specifications, final product design specifications, Other design considerations, Computer assisted design and robotics. Case study on product design.	06

#### Reference Books:

1. Machine Tool design By N.K.Mehta
2. Design of Machine tools by S.K.Basu
3. Principles of Machine tools by Sen and Bhattacharya
4. Machine Design Vol-II by R.C.Patel
5. Operation and Industrial Management by Donald Delmar
6. P.S.G. Design Data Book