

PCME4304 **MACHINING SCIENCE & TECHNOLOGY** (3-0-0)

Module – I

(13 hours)

Geometry of cutting tools in ASA and ORS, Effect of Geometrical parameters on cutting force and surface finish, Mechanics of chip formation, Merchant's theory, Force relationship and velocity relationship, Cutting tool materials, Types of Tool Wear: Flank wear, Crater wear, Wear measurement, Cutting fluid and its effect; Machinability Criteria, Tool life and Taylor's equation, Effect of variables on tool life and surface finish, Measurement of cutting force, Lathe tool dynamometer, Drill tool dynamometer. Economics of machining.

Module – II

(13 hours)

Conventional machining process and machine tools – Turning, Drilling, Shaping, Planning, Milling, Grinding. Machine tools used for these processes, their specifications and various techniques used.

Principles of machine tools : Kinematics of machine tools, speed transmission from motor to spindle , speed reversal mechanism, mechanism for feed motion, Tool holding and job holding methods in different Machine tools, Types of surface generated, Indexing mechanism and thread cutting mechanism, Quick return mechanism,.

Production Machine tools – Capstan and turret lathes, single spindle and multi spindle semiautomatics, Gear shaper and Gear hobbing machines, Copying lathe and transfer machine

Module – III

(10 hours)

Non-traditional Machining processes :

Ultrasonic Machining, Laser Beam Machining, Plasma Arc Machining, Electro Chemical Machining, Electro Discharge Machining, Wire EDM , Abrasive Jet Machining

Text Books :

1. Fundamentals of Machining and Machine Tools, G.Boothroyd and W.A.Knight, CRC Press
2. Metal Cutting Principles, M.C.Shaw, Oxford University Press
3. Metal Cutting Theory and Practice, A.Bhattacharya, Central Book Publishers

Reference Books :

1. Manufacturing Technology – by P.N.Rao, Tata McGraw Hill publication.
2. Modern Manufacturing Processes, P.C.Pandey, H.S.Shan, Tata McGraw Hill
3. Manufacturing Science, Ghosh and Mallik, East West Press.
4. Metal Cutting Theory and Practice, D.A.Stephenson and J.S.Agapiou, CRC Press
5. Machining Technology; Machine Tools and Operation, H.A.Youssef and H. El-Hofy, CRC Press
6. Machine Tools and Manufacturing Technology, Krar, Rapisarda and Check, Cengage Learning
7. Technology of Machine Tools, Krar, Gill and Smidt, Tata McGraw Hill
8. Principles of Metal Cutting, G.Kuppuswamy, Universities Press
9. Metal Cutting and Machine Tools, G.T.Reddy, Scitech
10. Fundamentals of tool Engineering Design, S.K.Basu, S.K.Mukherjee, R. Mishra , Oxford & IBH Pub Co.
11. Machine Tools, R.N.Datta, New Central Book Agency