MANUFACTURING TECHNOLOGY - II

Course Code:13ME1118

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Course Educational Objectives:

To make the student to understand

- Course educational basic principles of theory of metal cutting
- Machine tools like lathe, shaping, slotting, planning, milling, drilling and grinding machines.
- Various surface finishing operations
- The importance of jigs and fixtures

Course Outcomes:

Student will be in a position to

- Apply the knowledge of course in solving the industrial problems and meeting the production targets by choosing the proper input parameters for machine tools.
- Explain the mechanisms of working and material removal of conventional machine tools
- Explain the influence of cutting parameters on output parameters

UNIT-I (12 Lectures)

Elementary treatment of metal cutting theory: Element of cutting process – geometry of single point tool and angles, chip formation and types of chips – chip breakers mechanics of orthogonal cutting –merchant's force diagram, tool life, coolants, machinability – tool materials.

UNIT-II (12 Lectures)

Lathe: Principle of working, specification of lathe – types of lathe – work holders, tool holders – box tools, taper turning, thread cutting.

Turret and capstan lathes-collet chucks– tool holding devices –tool layout. Principal features of automatic lathes. Classification – Single spindle and multi-spindle automatic lathes– tool layout.

UNIT-III **(14 Lectures)**

Shaping, slotting and planning: Principle of working – principle parts– specification, classification, operations performed, machining time calculation.

Drilling and boring: Principle of working, specifications, types, and operations performed – tool holding devices – twist drill – boring machines – fine boring machines – jig boring machine, deep hole drilling machine.

UNIT-IV **(14 Lectures)**

Milling: Principle of working – specifications – classifications of milling machines – principal features of horizontal, vertical and universal milling machines– milling operations , geometry of milling cutter – milling cutters – methods of indexing – accessories to milling machines.

Jigs and fixtures: Classification of Jigs and Fixtures – Principles of location and clamping – Types of clamping and work holding devices. Typical examples of jigs and fixtures

UNIT-V **(12 Lectures)**

Grinding: Fundamentals – theory of grinding – classification of grinding machine– cylindrical and surface grinding machine – tool and cutter grinding machine – special types of grinding machines –different types of abrasives – bond specification of a grinding wheel and selection of a grinding wheel.

Lapping, honing and broaching: Comparison to grinding – lapping and honing, broaching-types of broaching machines, broaching tools, broaching operations.

TEXT BOOK:

1. B.S. Raghuwanshi, *"Workshop Technology"*, Vol. II , 10th Edition, Dhanpat Rai and Co., 2010.

REFERENCES:

1. R.K. Jain and S.C. Gupta, *"Production Technology"*, 16th Edition, Khanna Publishers, 2001.
2. H.M.T. (Hindustan Machine Tools), *" Production Technology"*, 1st Edition, TMH, 2004.
3. Kalpakjian and S R Schmid, *"Manufacturing Engineering and Technology"*, 5th Edition, Pearson, 2006.