Gautam Buddha University, Greater Noida

School of Engineering (Mechanical Engineering)

Degree	Course Name	Course Code	Marks:100
Integrated B. Tech. + M. Tech. / M.B.A.	Manufacturing Technology - I	ME 203	SM+MT+ET 25+25+50
Semester	**Credits**	**L-T-P**	**Exam.**
III	3	3-0-0	3 Hours

Unit – I

Machine Tools:

(i) Lathe: Principle; Construction; Types; Operations; Turret/Capstan; Semi/Automatic; Tool layout.

(ii) Shaper; Slotter; Planer: Construction; Operations & drives.

(iii) Milling: Construction; Milling cutters; Up & down milling. Indexing (Dividing) head; Max chip thickness & power required.

(iv) Drilling and boring: Drilling; Boring; Reaming tools. **(08 Hours)**

Unit – II

Tool Materials: Properties of cutting tool materials; Cutting tool materials of common use; Advanced cutting tool materials; Concept of machinability and its improvement; Failure of cutting tools and tool life; Cutting temperature – causes; effects; Cutting fluid application; Estimation of machining time.

(06 Hours)

Unit -III

Theory of Machining: Introduction to manufacturing and machining; Basic working principle; Configuration; Specification and classification of machine tools; Geometry of single point cutting tool; Twist drill and milling cutter; Conversion of tool angles from one system to another; Mechanism of chip formation; Types of chips and chip control including chip breaking; Mechanics of machining- orthogonal and oblique cutting; Machining forces and Merchant's circle diagram (MCD); Analytical and experimental determination of cutting forces; Dynamometers for measuring cutting forces. **(09 Hours)**

Unit - IV

Abrasive Cutting and Finishing Processes: Surface roughness; Surface roughness terminology; Different methods of surface roughness measurement; Basic principle; Purpose and application of grinding; Specification; Selection of grinding wheels and their conditioning; Classification of grinding machines and their uses; Super finishing processes; Honing; Lapping. **(08 Hours)**

Unit – V

Arc Welding Processes: Introduction; Principle of welding; General applications; Classification of welding processes; Brief description of Manual metal arc(MMA) or shielded metal arc (SMA) welding; Electrode coating constituents and their functions; Submerged arc welding (SAW) and field of applications; Gas metal arc welding (GMAW) or MIG/MAG welding; Shielding gases; TIG welding; shielding gases; Application of process. **(07 Hours)**

Unit – VI

Resistance welding: General principle of heat generation in resistance welding; Application of resistance welding processes; Working principle of spot; Seam and Projection welding; Electrode materials.

Soldering and brazing; Difference between both the processes; Consumables used; Methods of brazing; Fluxes used; Their purpose and flux residue treatment. **(07 Hours)**

Recommended Books:

1. Fundamentals of Modern Manufacturing: Materials; Processes and Systems; Mikell P. Groover; Publisher Willey.
2. Manufacturing Technology: Metal cutting and Machine Tools (Vol. 1 & 2); P. N. Rao; Tata McGraw Hill; New Delhi.
3. Manufacturing Engineering & Technology; Kalpakjian; Pearson Pub.
4. Materials and Processes in Manufacturing; E. P. DeGarmo; J. T. Black and R.A. Kohser; Prentice Hall of India.
5. Manufacturing science; Ghosh and Malik; East West Press.
6. Principles of Metal Cutting; Sen and Bhattacharya; New Central Book.
7. Metal Cutting Principles; Shaw; MIT Press Cambridge.
8. Manufacturing Analysis; Cook; Adisson-Wesley.