3ME02: MACHINING PROCESSES
CREDITS - 4 (LTP: 3,0,1)

Course Objective:
To illustrate theory of machining processes and operations of machine tools.

Teaching and Assessment Scheme:

Teaching Scheme (Hours per Week)			Credits	Assessment Scheme				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE	CE	ESE	CE	
3	0	2	4	60	40	20	30	150

Course Contents:

Unit No.	Topics	Teaching Hours
1	**Basic Machine Tools and Metal Cutting Principles:** Classification of machining processes and machine tools, Basic motions in various machines tools, Cutting tool materials, Cutting fluids, Different types of cutting tools, Nomenclature of single point and multi point cutting tools, Concept of cutting speed, feed, depth of cut and MRR for various machine tools.	05
2	**Turning Operations:** Lathe operations, Methods of taper turning, Thread cutting, milling, gear cutting and grinding on lathe. Classification of lathes, Constructional details/elements of engine lathe, Accessories and attachments, Specifications Capstan and Turret lathes: Construction details, Operations and applications. Alignment tests of lathes.	09
3	**Drilling and Allied Operations:** Fundamentals of drilling, reaming, tapping, boring operations, Construction of drilling machines, Types of drilling machines, Twist drill, tap and reamer geometry, Alignment tests of drilling machine. Horizontal and vertical boring machines, Jig boring machines and construction features.	06
4	**Shaping, Planning, and Slotting operations:** shaping, planing and slotting operations, Shaper: Working principle, Classification of shapers, Principal parts of shaper, Shaper mechanisms, Shaper operations Planer: Working principle, Difference between shaper and planer Slotter: Principal parts, Operations performed on slotter. **Broaching and Sawing Machines:** Fundamentals of broaching, broaching tool terminology, Types of broaching machines, Advantages and limitations of broaching. Sawing: Operation, Saw blades, Types of sawing machines.	07
5	**Milling Operations:** Principle of milling: Concept of up-milling and down-milling, Types of milling machines, Construction details of column and knee type milling machine, Types of milling cutters, Different types of milling operations: gang milling, progressive milling, Cutting conditions in milling, Accessories and attachments, Indexing, Helical milling operation and its set up, Alignment tests of milling machine.	08
6	**Grinding Machines and Abrasives:** Characteristic of grinding process, Classification of grinding machines, Operations and applications of surface,	07

Unit No.	Topics	Teaching Hours
	cylindrical and center less grinding processes, Dressing, truing and balancing of grinding wheels, Abrasives, Grinding wheel designation and selection. **Super Finishing Processes:** Lapping, honing, buffing, and polishing: Characteristics, machining and applications.	
	Total	**42**

List of References:

1. Hajra Choudhury S. K., Bose H. K., and Hajra Choudhury A. K., "*Elements of Workshop Technology*" (Vol. II, 12th Edition), Media promoters and Publishers Pvt. Ltd.
2. Raghuwanshi B. S., A Course in "*Workshop Technology*" (Machine Tools Vol.II), Dhanpat Rai & Sons.
3. W.A.J. Chapman, "*Workshop Technology*" (Vol. I, II & III).
4. Rao P. N., "*Manufacturing Technology"* (Vol. 2), Tata McGraw-Hill.
5. HMT, "*Production Technology*", Tata Mc Graw Hill.
6. J P Kaushish, "Manufacturing Processes", PHI Learning Pvt. Ltd.

Course Outcomes (COs):

At the end of this course students will be able to

1. Appreciate the conditions required for metal cutting, including tool geometry.
2. Understand and preform lathe operations
3. Explain drilling and allied operations
4. Explain shaping, planing and slotting operations
5. Explain milling operations
6. Explain finishing and superfinishing operations