

PE303: MACHINING PROCESSES
CREDITS = 6 (L=2, T=0, P=4)

Teaching and Examination Scheme:

Teaching Scheme				Evaluation Scheme				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	ESE	CE	ESE	CE	
2	0	4	6	70	30	30	20	150

Course Contents:

Unit No.	Topics	Teaching Hrs.
1.	<p><u>Basic Machine Tools:</u></p> <p>Classification of machining processes and machine tools, Basic motions in various machines tools, Specification of machine tools, Classification of various machine tools, constructional, specifications, accessories and attachments of various machines such as lathe, capstan and turret lathe, single spindle automate, shaper, planer, milling, grinding, broaching, sawing, work holding and tool holding devices.</p>	08
2.	<p><u>Metal Cutting principles:</u></p> <p>Cutting tool materials, Different types of cutting tools, Nomenclature of single point and multi point cutting tools, Concept of cutting speed, feed, and depth of cut and MRR for various machine tools under consideration. Tool life, Cutting fluids- types, & applications, Merchant circle diagram, chip removal, different type of coolant.</p>	05
3.	<p><u>Lathe operations:</u></p> <p>Lathe operations such as turning, grooving, thread cutting, knurling, chamfering, parting, counters sinking, grinding, milling, process parameters in lathe operations, Methods of taper turning and its calculation, chip breakers, Thread cutting on lathe and its calculations, machining time calculation.</p>	08
4.	<p><u>Drilling:</u></p> <p>Fundamentals of drilling operation, Twist drill geometry, gang and multiple spindle drilling, deep hole drilling, counter sinking, counter boring, spot facing, tapping, reaming, Allied operations performed on drilling machine, process parameters in drilling, operations machining time calculation.</p>	05

5.	<u>Boring:</u>	02
	Purpose of boring operation, Horizontal and vertical boring machines, Jig boring, process parameters in boring operations, machining time calculation.	
6.	<u>Milling:</u>	10
	Principle of milling, Concept of up-milling and down-milling, Types of milling cutters, Different types of milling operations, up and climb milling, Inline, gang & straddle milling, Cutting conditions in milling, Accessories and attachments, Indexing, Helical milling operation and its set up, process parameters in milling operations , machining time calculation.	
7.	<u>Shaping, Planning, and Slotting:</u>	05
	Shaper: Working principle, Shaper operations Planer: Working principle, planer operations, Difference between shaper and planer Slotter: Operations performed on slotter. Machining time calculation.	
8.	<u>Grinding:</u>	05
	Characteristic of grinding process, grinding wheel and its designations, Operations and applications of surface, cylindrical and centreless grinding processes, Dressing, truing and balancing of grinding wheels, Abrasives, process parameters in grinding operations machining time calculation.	
9.	<u>Broaching and Sawing:</u>	03
	Broaching: Fundamentals of broaching, broaching tool terminology, Advantages and limitations of broaching. Sawing: Operation, Saw blades, mounting of power hacksaw and band saw blade.	
10.	Alignment Test on various machine tools.	02
11.	<u>Unconventional Machining Processes I:</u>	08
	Introduction, needs, classification, brief overview Mechanical Energy Based processes: Abrasive Jet Machining Processes, Water Jet Machining processes electrical energy based processes, process parameters in unconventional machining operations, Modeling of process parameters.	
12.	<u>Unconventional Machining Processes II:</u>	08
	Introduction, needs, classification, brief overview Chemical and electro-chemical energy based processes Thermal energy based processes, process parameters in unconventional machining operations, Modeling of process parameters.	

Reference Books:

1. Rao P. N., "*Manufacturing Technology (Vol. 2)*", Tata McGraw-Hill
2. Hajra Choudhury S. K., Bose H. K., Hajra Choudhury A. K., "*Elements of Workshop Technology (Vol. II, 12th Edition)*", Media promoters and Publishers Pvt. Ltd.
3. Raghuwanshi B. S., "*A Course in Workshop Technology (Machine Tools Vol.II)*", Dhanpat Rai & Sons
4. Khanna O.P and Lal M, "*A Text book of Production Technology (Vol. II)*", Dhanpat Rai Publications (P) ltd.
5. HMT, "*Production Technology*", Tata Mc GrawHill
6. W.A.J. Chapman, "*Workshop Technology (Vol. I, II & III)*", CBS publication
7. R. K. Jain, "*Production Technology*", Khanna publishers
8. Pandey P.C. and Shan H.S. "*Modern Machining Processes*" Tata McGraw-Hill, New Delhi.
9. V. K. Jain, "*Advance machining processes*", Allied publisher