Devi Ahilya Vishwavidhyalaya, Indore, India **Institute of Engineering & Technology**					**II Year B.Tech. (Mechanical Engineering)**
Course Code & Name	**Instructions Hours per Semester and Credits**				
3RMPC3 **MANUFACTURING PROCESSES**	**Classroom Instruction (CI)**		**Lab Instruction (LI)**	**Term Work (TW) and Self Learning (SL)**	**Total no. of Hours Per semester**	**Total Credits (Total Hours/30)**
	L	**T**	**P**	**TW+SL**		
	20	**10**	**20**	**70**	**120**	**4**

Learning Objectives:

The course is designed

1. To provide an understanding of the turning and related processes, machine tools: conventional and CNC, cutting tools and tool materials.
2. To learn about the processes, machines and tooling used to produce prismatic parts
3. To learn about the various processes, machine tools and tooling used to produce holes, screw threads and gears.
4. To understand the various grinding operations, grinding machines-wheels and other abrasive finishing operations.
5. To learn about the basic measuring tools, comparators and limit gauges used on the shop floor.

Pre requisite(s): A basic course in general mechanical engineering, material science and workshop practice.

COURSE CONTENTS

UNIT-I

Production of Axi-symmetric Parts: Introduction to the mechanics of metal cutting, Turning and related processes, Turning parameters, Constructional features and operation of turning and related machine tools: Lathes, Capstan-Turret lathes, Automats, CNC lathes: Machining centres and Turning centres. Single point cutting tools: Types and geometry, Tool Materials.

UNIT-II

Production of Prismatic Parts: Introduction to the Shaping, Planning and Milling processes and their process parameters, Constructional features and operation of Shaper, Planner and Milling machines, Tool holding, Work holding and Indexing methods, Cutting tools: Types and geometry.

UNIT-III

Drilling, Broaching, Screw Thread and Gear cutting: Introduction to Drilling and related operations. Drilling machines and accessories, Process parameters for drilling and boring operations, Accuracy and finish of drilled holes, Broaching processes and broaching machines, Cutting tools like drills, reamer, broach and taps: Types and geometry. Thread forms and thread fits, External and Internal thread cutting processes. Gears: Types and methods of gear manufacturing, Machine tools and tooling used for gear manufacturing.

UNIT-IV

Abrasive Machining: Introduction to various grinding operations, Types of abrasives and bonds, Marking system for grinding wheels and their selection criteria, Mechanics of grinding, Truing and dressing of grinding wheels, Grinding machines for cylindrical and surface grinding, Tool & cutter grinders. Safety in grinding. Other abrasive finishing processes: Honing, Lapping, Super finishing, Polishing and Buffing.

UNIT-V

Metrology: Basic measurements and the use of Squares and Surface Plates, Micrometres, Vernier Callipers, Gage Blocks, Inside, Depth and Height measuring instruments, Angular measurements, Limits, tolerances and fits: Need for limit systems, Interchangeability, Statistical assembly, Selective assembly, Limit system. Taylor's principles of gauge design, Gauge tolerance and wear allowances, Types of limit gauges, Advantages & limitation of limit gauges. Measurement and inspection of external screw threads and gears.

BOOKS RECOMMENDED:

[1] Gupta I.C.,*A Textbook of Engineering Metrology,7ed,* Dhanpat Rai Publications.

[2] Sharma P.C.,*Production Technology, Production Engineering,* S. Chand and Co.

[3] HMT *Production Technology* ,Tata McGraw-Hill Publishing Company Ltd.

[4] Chapman W.A.J.,*WorkshopTechnology Part1,2 and,3, 4ed,* Viva Books Private Ltd.

[5] Hajra Choudhury A.K., Hajra Choudhury S.K., Roy Nirjhar *Elements of Workshop Technology : Machine Tools* (Volume-2),Media Promoters and Publishers Pvt. Ltd.

[6] Rao P.N., *Manufacturing Technology: Metal Cutting and Machine Tools (Volume 2),3ed,* McGraw Hill Education (India) Private Limited.

LIST OF PRACTICAL ASSIGNMENTS:

1. To study the geometry of Single Point Cutting Tools.
2. To Study the geometry of Plain Milling Cutters and End Milling Cutters.
3. To study the geometry of a double fluted twist drill.
4. To study the geometry of Taps and Reamers.
5. To study the constructional features of the conventional Lathe and to machine a workpart as per given dimensions on it.
6. To study the constructional features of a standard shaper and to machine a job as per given dimensions on it.
7. To study the constructional features of a conventional milling machine and to machine a job as per given dimensions on it.
8. To study the constructional features and operation of a CNC Turning Centre.
9. To study the constructional features and operation of a Milling Centre.
10. To study the various types of limit gauges and to design a limit gauge for a given fit.

Course Out Come (CO)	After completion of the course, students will be able to:
CO1	Understand the construction and working of machine tools used for turning operations and select the cutting conditions and tools for the various operations.
CO2	Understand the construction and working of the machine tools used for producing prismatic parts and select the cutting conditions and tools for various operations.
CO3	Understand different types of drilling machines, screw cutting machines, broaching machines and gear cutting machines and select the tools used for these operations.
CO4	Understand the various types of finishing operations and select the grinding wheels for different grinding operations as per the machining conditions.
CO5	Learn the use of basic measurement and inspection tools used in production shop floors and understand the use of standards for limit gauging and limit gauge design.

CO-PO- PSO Mapping

Course Name**: Manufacturing Processes** Course Code**: 3RMPC3**

CO	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2	PSO-3
CO1	3	3	3	1	2	1	1	1	3	3	2	3	2	1
CO2	3	3	3	1	2	1	1	1	3	3	2	3	2	1
CO3	3	3	3	1	1	1	1	1	3	3	2	3	1	1
CO4	3	3	3	1	2	1	2	1	3	3	2	3	1	1
CO5	3	3	3	1	2	1	2	2	3	3	2	3	3	2
Avg	3	3	3	1	1.8	1	1.4	1.2	3	3	2	3	1.8	1.2

* CO (rows) mention nil/very small/insignificant contribution to the PO(column)
1→ relevant and small significance 2 → medium or moderate and 3 →strong