CVM UNIVERSITY
Aegis: Charutar Vidya Mandal (Estd.1945)

FACULTY OF ENGINEERING & TECHNOLOGY

Effective from Academic Batch: 2022-23

Programme: **Bachelor of Technology (Mechanical Engineering)**

Semester: **III**

Course Code: **202090302**

Course Title: **Machining Processes**

Course Group: **Professional Core Course - III**

Course Objectives: This course will make student familiar with fundamentals of cutting mechanics, constructional features and selection criterion for various basic machine tools, work holding devices, cutting tools, tool holders and common operations performed on conventional machine tools

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
				Theory		J/V/P*		Total
Lecture	Tutorial	Practical		Internal	External	Internal	External	
3	0	2	4	50 / 18	50 / 17	25 / 9	25 / 9	150/53

* **J**: Jury; **V**: Viva; **P**: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	**Fundamentals of Metal Cutting** Machine tools classification, Working and auxiliary motions in machine tools, Primary cutting motions in machines tools, Forces evolved during machining processes and Merchant's Circle diagram, Mechanics of chip formation, Types of chip, Orthogonal and Oblique cutting, cutting tool geometry and tool signature, Desirable Properties of tool materials, Characteristics of Cutting Tool Materials, Tool wear, Tool life and its Estimation, Cutting fluids and Machinability	06
2	**Lathe Machine** Purpose and field of applications, Classification and Types of Lathe machines, Constructional Arrangements and Principle Units of lathe machine lathes, Tool holding devices, Work holding devices, Lathe attachments, Lathe Operations, Capstan and Turret lathes, Estimation of machining time, Alignment tests of lathes.	07
3	**Drilling Machine** Principle and application of Drilling machines, Classification and Types of drilling machines, Tools for Drilling, Drilling and allied Operations, Tool holding devices, Work holding devices, Estimation of machining time, Alignment tests of drilling machine.	05

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4	**Boring Machine** Principle of operation and application, Classification and Types of Boring machines.	**02**
5	**Shaper, Planner and Slotter Machine** Principle of operation and Field of application of Shaper, Planar and Slotter Machine, Classification and Types of Shaper, Planner and Slotter machines, Tool holding devices, Work holding devices, Quick Return Mechanism, Operations done on Shaper and Slotter machine, Estimation of machining time, Alignment tests on Shaper machine.	**06**
6	**Milling Machine** Purpose and field of application, Classification and Types of Milling machines, Constructional all Arrangement and Principle Units of Milling machine, Tool holding devices, Work holding devices, Operations done on Milling machine, Attachment extending the processing capacities of Milling machine, Milling indexing, Estimation of machining time, Helical Milling, Alignment tests on Milling machine.	**07**
7	**Gear and Thread Manufacturing** Thread nomenclature and important terminologies used in thread production, Various threads production processes with their applications, advantages and limitations, Thread cutting on lathe using gear train and chasing dial. Gear generating and forming processes, Principle of Gear Hobbing, Type of Hobbing	**04**
8	**Sawing and Broaching Machine** Principle of operation and applications, Classification and Types of Sawing and Broaching machines.	**02**
9	**Grinding Machine** Purpose and field of applications, Classification and Types of Grinding machines, Types of grinding wheels, Grinding wheel nomenclature and characteristics, Operations done on Grinding machine, Cylindrical grinders, Internal grinders, Surface grinders, Tool and cutter grinders, Center-less grinders, Alignment tests on Grinding machine. Super-Finishing Processes Lapping and Honing	**06**
	Total	**45**

List of Practicals / Tutorials:

1	Study of Machine Tools (Lathe, Shaper, Slotter) – Analyze capacity and capability of respective machine tools.
2	Study of Machine Tools (Grinding, Milling, Drilling) – Analyze capacity and capability of respective machine tools.
3	Practice Job on Lathe Machine
4	Practice Job on Drilling Machine
5	Machine Study & Demonstration on Capstan Machine
6	Practice Job on Shaper Machine
7	Machine Study & Demonstration on Slotter Machine
8	Practice Job on Milling Machine
9	Practice Job on Grinding Machine
10	Alignment Test on Lathe, Drilling, Shaper, Milling Machine

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Reference Books:

1	Workshop Technology Vol. I, II & III, WAJ Chapman.
2	Workshop Technology Vol. II, Hajra & Chaudhary.
3	Manufacturing Processes, O.P. Khanna.
4	Manufacturing Engineering and Technology, Kalpakjian. S, Pearson Education India Edition.
5	A Text book of production Technology, Sharma, P.C., S. Chand and Co. Ltd.

Supplementary learning Material:	
1	NPTEL resources

Pedagogy:

- Direct classroom teaching
- Audio Visual presentations/demonstrations
- Assignments/Quiz
- Continuous assessment
- Interactive methods
- Industrial/ Field visits

Internal Evaluation:

The internal evaluation comprised of written exam (40% weightage) along with combination of various components such as Certification courses, Assignments, Mini Project, Simulation, Model making, Case study, Group activity, Seminar, Poster Presentation, Unit test, Quiz, Class Participation, Attendance, Achievements etc. where individual component weightage should not exceed 20%.

Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						**R**: Remembering; **U**: Understanding; **A**: Applying; **N**: Analyzing; **E**: Evaluating; **C**: Creating
R	**U**	**A**	**N**	**E**	**C**	
20%	30%	20%	15%	10%	05%	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes (CO):

Sr.	**Course Outcome Statements**	**%weightage**
CO-1	Understand the basic concept of machining operations.	**15**
CO-2	Analyze conventional machining processes, select the right tool and machining condition.	**25**
CO-3	Know the methods and applications of various machining operations and generate the sequence of machining operation to produce the end product.	**30**
CO-4	Judge the limitations and scope of machines to perform variety of operations.	**30**

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Curriculum Revision:	
Version:	2
Drafted on (Month-Year):	June-2022
Last Reviewed on (Month-Year):	--
Next Review on (Month-Year):	June-2025

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