

B.E Semester: 4 Mechanical Engineering
Subject Name: Manufacturing Process-I (MA407-N)

A. Course Objective:

- To present a problem oriented in depth knowledge of Manufacturing Processes.
- To address the underlying concepts and methods behind Manufacturing Processes.

B. Teaching / Examination Scheme:

Teaching Scheme				Total Credit	Evaluation Scheme					
L	T	P	Total		Theory		Mid Sem Exam	CIA	Pract.	Total
Hrs	Hrs	Hrs	Hrs		Hrs	Marks	Marks	Marks	Marks	Marks
3	0	2	5	4	3	70	30	20	30	150

C. Detailed Syllabus:

Unit No.	Details
1	Basic Machine Tools and Metal Cutting Principles: Machine tools classification, working and auxiliary motions in machine tools, Primary cutting motions in machines tools. Metal Cutting Lathes: Engine Lathes, construction all arrangement and principal units of engine lathes, type and size range of engine lathes, Operations carried on engine lathe, attachment extending the processing capacities of engine lathes, Types of lathe machines, Capstan and Turret lathes, Taper turning on lathe, Thread cutting on lathe using gear train and chasing dial and its calculations, machining time calculation.
2	Drilling: 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.
3	Boring: Purpose of boring operation, Horizontal and vertical boring machines, Jig boring, process parameters in boring operations, machining time calculation
4	Milling: 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
5	Shaping, Planning, and Slotting: Shaper: Working principle, Shaper operations Planer: Working principle, planer operations, Difference between shaper and planer. Slotter: Operations performed on slotter. Machining time calculation. Broaching and Sawing: Broaching: Fundamentals of broaching, broaching tool terminology, Advantages and limitations of broaching. Sawing: Operation, Saw blades, mounting of power hacksaw and band saw blade

6	Grinding: 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, Super Finishing Processes: Lapping, honing, buffing, and polishing: Characteristics, machining and applications
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Total hours (Theory):48
Total hours (Practical):32
Total hours:80

D. Lesson Planning:

Sr. No.	Date/Week	Unit	Weight age	Topic No
1	1 st ,2 nd ,3 rd	Unit 1	20%	1,2
2	4 th .5 th ,6 th	Unit 2	20%	3
3	7 th , 8 th ,9 th	Unit 3	20%	4
4	10 th . 11 th . 12 th	Unit 4	20%	5
5	13 th , 14 th ,15 th ,16 th	Unit 5	20%	6

E. Instructional Method & Pedagogy

1	At the start of course, the course delivery pattern , prerequisite of the subject will be discussed
2	Lecture may be conducted with the aid of multi-media projector, black board, OHP etc. & equal Weight age should be given to all topics while teaching and conduction of all examinations.
3	Attendance is compulsory in lectures and laboratory, which may carries five marks in overall evaluation.
4	One/Two internal exams may be conducted and total/average/best of the same may be converted to equivalent of 30 marks as a part of internal theory evaluation.
5	Assignment based on course content will be given to the student for each unit/topic and will be evaluated at regular interval. It may carry an importance of ten marks in the overall internal evaluation.
6	Surprise tests/Quizzes/Seminar/Tutorial may be conducted and having share of five marks in the overall internal evaluation.
7	The course includes a laboratory, where students have an opportunity to build an appreciation for the concept being taught in lectures. Suggested list of experiment is given below

F. List of Practical

1	To get acquainted with Lathe machine
2	Different types of Lathe Operations.
3	Thread cutting, right and left hand threads job without nut-One job
4	Thread cutting - multistart-One job
5	To get acquainted with Shaper.
6	Machining plane surface on a shaper and milling machine-One job
7	To get acquainted with Milling machine.
8	Machining a surface of given job by Milling machine.
9	Simple gear cutting job on milling machine-One job

10	To get acquainted with Drilling machine.
11	To get acquainted with grinding machine.
12	To perform job on grinding machine.

G. Students Learning Outcomes:

1	Determine the concept of generatrix and directrix for the generation of surfaces or profiles on the workpiece
2	Analyze the structure, basic elements and working of general purpose machine tools.
3	Comprehend basic mechanisms such as drive, speed, feed and indexing mechanisms for general purpose machine tools.
4	Understand the cutting parameters like cutting speed, feed, depth of cut, machining time and material removal rate for general purpose machine tools
5	Calculate machining time for various machining processes
6	Identify finishing and super finishing processes in context to its applications.

H. Text Books & Reference Books:

1	Workshop Technology Vol. I, II & III, WAJ Chapman.
2	Workshop Technology Vol. II, Hajra & Choudhary.
3	Manufacturing Processes, O.P. Khanna.
4	Production Technology, R. K. Jain
5	Processes and Materials of Manufacture; Lindberg Roy A.; Prentice-Hall India.
6	Principles of Manufacturing Materials and Process, J S Campbell.