

19AE212 MANUFACTURING PROCESSES FOR AUTOMOTIVE COMPONENTS

Hours Per Week :

L	T	P	C
3	0	2	4

Total Hours :

L	T	P	CS	WA/RA	SSH	SA	S	BS
45	-	30	5	5	30	20	5	5



Source :
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COURSE DESCRIPTION AND OBJECTIVES:

This course offers basic theory of metal working and cutting principles such as foundry, welding, metal forming and machining. The objective of the course is to provide basic knowledge of different manufacturing process used in automobile industry. It also imparts knowledge on NC and CNC machines programming and surface finishing process.

COURSE OUTCOMES:

Upon completion of the course, the students will be able to achieve the following outcomes :

COs	Course Outcomes	POs
1	Understand and analyze metal working and cutting processes.	9
2	Apply the knowledge to select process parameters and tools for obtaining desired machining characteristics.	1,6,10
3	Analyze the effect of various parameters on process characteristics.	2,7,9
4	Evaluate the processes involved in surface finishing of the manufactured automotive components	4,9,10

SKILLS:

- ✓ Apply the knowledge of various manufacturing processes
- ✓ Identify various process parameters and their effect on processes
- ✓ Design and analyze various manufacturing processes and their tooling Operate different machines and perform various operations
- ✓ Program NC and CNC machines

UNIT - I **L-8****CASTING:**

Casting terminology, Moulding sand, Types of patterns, Pattern materials, Pattern allowances, Cores, Elements of gating system, Investment casting, Die casting, Centrifugal casting, casting defects.

UNIT - II **L-10****FORMING AND FUSION PROCESS:**

FORGING: Types of forging, Drop forging, Press and machine forging, Forging defects.

SHEET METAL PROCESS: Theory of Shearing, Blanking, Piercing, Spinning, Drawing, Bending.

WELDING: Gas welding, Arc welding, TIG, MIG, Soldering and brazing.

UNIT - III **L-9****METAL CUTTING:**

METAL CUTTING: Elements of metal cutting, Chip formation, Types of chips, Tool geometry speed, Feed, Depth of cut, Merchant's Circle .

LATHE: Working principle of lathe, parts of lathe, work holders, operations.

SHAPER: Working principle, parts of shaper, Shaping operations.

UNIT - IV **L-9****MILLING AND GRINDING:**

MILLING: Principle of working, Column and knee type milling machine, Milling operations and cutters, Indexing Methods.

GRINDING: Theory of grinding, Cylindrical and surface grinding, Lapping and Honing.

UNIT - V **L-9****NC AND CNC MACHINES:**

NC elements, Structure of CNC Machine tools, CNC part programming, Manual part programming , Computer Aided part programming, DNC machine tools.

TEXT BOOKS:

1. P.C. Sharma, "Production Technology", 3rd edition, S. Chand and Co., 2009.

REFERENCE BOOKS:

1. H.N. Gupta, R.C. Gupta and Arun Mittal, "Manufacturing Processes", 2nd edition, New Age International, 2009.
2. M.P. Groover, "Automation, Production Systems and Computer Integrated Manufacturing", 3rd edition, PHI Publications, 2008.
3. HAJIRA CHOWDARY, PN RAO

LABORATORY EXPERIMENTS**LIST OF EXPERIMENTS****TOTAL HOURS:30**

1. Perform Sand Moulding Process to prepare a casting specimen
2. Conduct Arc & Gas Welding Processes to join the two base MS flat plates
3. Conduct an experiment to prepare a wood pattern for the casting process on a wood lathe
4. Perform Facing, Chamfering & Taper turning on a given work piece using lathe machine
5. Perform Step Turning on a given work piece using lathe machine
6. Perform External Thread cutting & Knurling on a given work piece using lathe machine
7. Perform Drilling & Tapping on a given work piece to produce internal threading
8. Perform V-Groove cutting in shaper on a given work piece
9. Perform Spur Gear milling on a given work piece to cut a spur gear
10. Perform Keyway Slotting on a given cylindrical work piece to obtain keyway slots
11. Perform Grinding on a given work piece to obtain required surface finish