

B.E Semester: 7 Automobile Engineering
Subject Name: Automotive Manufacturing Process (AE703-N-C)
[Dept. Elect.-3]

Course Objectives

- The purpose of this course is to introduce machine tools in their proper perspective and present the necessary to grasp the subject
- To learn and apply the basic terminology associated with different fields of manufacturing process.
- To address the underlying concepts, methods and application of different Manufacturing Process.

B. Teaching / Examination Scheme:

Teaching Scheme				Total Credit	Evaluation Scheme					
L	T	P	Total		Theory		Mid Sem Exam	CIA	Pract./ Viva	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	Introduction Importance of manufacturing, economic and technological definition of manufacturing, Classification of manufacturing processes, Selection of manufacturing process. Theory of metal cutting: Single point cutting operation, types of chips, chip breakers, tool dynamometers, tool wears and methods of tool failure, tool life, significance of temperature and sources of heat generation, temperature measurement, cutting fluids and their properties, economics of machining, machinability and its evaluation.
2	Metal Joining Processes Welding - Principle of welding, Classification of welding and allied processes, Arc welding, Gas welding and cutting, Resistance welding, Advanced welding processes, Friction and Explosive welding, Welding defects and their remedies, Electrode specifications. Atomic hydrogen, ultrasonic, Plasma and laser beam welding, Electron beam welding, and special welding processes e.g. TIG, MIG, and Welding Equipments. Brazing and soldering – Principle of soldering and brazing, compositions of solder, Different equipment and Processes involved in brazing and soldering process.
3	Forming Processes Plastic deformation of metals: Variables in metal forming and their optimization. Dependence of stress strain diagram on Strain rate and temperature. Hot and cold working of metals, classification of metal forming processes. Rolling: Pressure and Forces in rolling, types of rolling mills, Rolling defects. Forging: Smith Forging, Drop and Press forging, M/c forging, Forging defects.

	<p>Extrusions: Direct, Indirect, Impact and Hydrostatic extrusion and their applications, Extrusion of tubes Wire drawing methods and variables in wire –drawing.</p> <p>Brief introduction to sheet metal working: Bending, Forming and Deep drawing, shearing. Brief introduction to explosive forming, coating and deposition methods.</p>
4	<p>Jigs And Fixtures Usefulness and principles of jig-fixture design, principles of location, types of locators, types of clamping devices, types of bushes, selection of locators, clamps and bushes, types of jig, their relative merits, demerits and applications, materials for various elements of jig-fixture, design of milling, turning and boring fixtures, testing of jig-fixture and economics of jig-fixture.</p>
5	<p>Modern Machining Processes Purpose, need and classification and aspects considered in selection of a process. Principle, construction, working, process parameters and their influence on machining, selection of parameters and product applications of the following processes: Ultrasonic machining, Abrasive jet machining, Water jet machining, Chemical machining, Electro chemical machining and grinding, Electro discharge machining, Plasma arc machining, Laser beam machining, Electron beam machining and Hot machining.</p> <p>Super Finishing Processes Introduction, Grinding, Lapping, Honing, Buffing, Barrel Tumbling, Burnishing, Powder coating, Polishing.</p>

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	Unit 1	10%	1
2	3 rd , 4 th ,5 th ,6 th	Unit 2	25%	2
3	7 th , 8 th ,9 th ,	Unit 3	25%	3
4	10 th , 11 th ,12 th	Unit 4	20%	4
5	13 th , 14 th ,15 th ,16 th	Unit 5	20%	5

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.

F. List of Practical:

Sr. No.	Title
1	Demonstrations of various flames in oxy acetylene gas welding.
2	To join the given two work pieces as a required type of joint by MMAW process.
3	To join the given two work pieces as a butt joint by TIG welding process.
4	To join the given two work pieces as a butt joint by MIG welding process.
5	To weld given material by spot welding process.
6	To make rectangular tray from the given sheet metal.
7	To study Powder Metallurgy through process flow chart
8	Parameter demonstrates in Plastic Injection Moulding Process.
9	Introduction To Non-Traditional Machining Process and Demonstration of EDM machine

G. Text Books & Reference Books:

	A. Text Books:
1	Manufacturing Processes, by J. P. Kaushish, PHI Publications
2	Manufacturing Engg. And Technology By S. Kalpakajain, PHI/Pearson.
	B. Reference Books:
1	Welding technology, by O.P.Khanna, Dhanpat Rai publishers
2	Manufacturing Technology Vol-II, By P.N. Rao, Tata McGraw Hill.
3	Production technology, by R.K. Jain, Khanna publishers.
4	Production Technology by P.C. Sharma S Chand & Co Ltd.