



GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering

Subject Code: 3140204

Semester – IV

Subject Name: Automotive Manufacturing Processes and Technology

Type of course:

Prerequisite: Nil

Rationale:

Manufacturing Processes and Technology related to Machining processes, Sheet metal working, Welding processes, Casting, and Powder Metallurgy for Automobile Engineering. All the manufacturing processes are included in this subject with the objectives to students familiar with processes its application and basic principles.

Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs
1	MACHINING: General principles of working and commonly performed operations in the following machines: Lathe, Shaper, Planer, Slotter, Milling, Drilling and Grinding machine. Principles and application of Capstan and Turret lathe. Basics of NC, CNC machines with Application and advantages. Super finishing Technology: Introduction and application: Lapping, Honing, Buffing, Barrel Tumbling, Burnishing, Powder coating, Polishing. General principles and applications of the following processes: Abrasive Jet machining, Water Jet Machining, Ultrasonic machining, electric discharge machining, electro chemical machining, Plasma arc machining, electron beam machining and laser beam machining.	14
2	CASTING: Steps involved in making a casting, Advantage of casting and its applications. Patterns and Pattern making, Types of patterns, Materials used for patterns, core and core making, casting design considerations. Casting processes, Sand, centrifugal, die, investment, lost foam, gravity, squeeze, and shell. Methods of Melting: Crucible melting and cupola operation.	08
3	FORMING AND SHAPING PROCESSES: Stamping, forming and other cold working processes: Blanking and piercing, Bending and forming, Rolling, Drawing and its types, wire drawing and Tube drawing, coining, Hot and cold spinning, Types of presses and press tools. Basic extrusion processes and its characteristics. Forging processes: Principles of forging, tools and dies, Types of forging, Open, closed, drop forging, roll forging.	10
4	WELDING: Classification of welding processes. Principles and Application of Oxy-acetylene gas welding. A.C metal-arc welding, resistance welding, submerged arc welding,	08



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	tungsten inert gas welding, metal inert gas welding, plasma arc welding, Thermit welding, electron beam welding, laser beam welding, defects in welding, soldering and brazing.	
5	PLASTIC TECHNOLOGY: Introduction, Classification of Plastics, Ingredients of Moulding compounds, General Properties of Plastics, Plastic part manufacturing processes such as compression moulding, Transfer moulding, Injection moulding, Extrusion moulding, Blow moulding, Calendaring, Thermoforming, slush moulding, laminating.	05
	Total Hours	45

*to be covered in laboratory

Suggested Specification table with Marks (Theory): (For BE only)

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	20	40	20	0	0

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

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.

Reference Books:

1. Introduction to Manufacturing Processes, Schey A John, Tata McGraw Hill, Noida, 2012.
2. Manufacturing Technology, R L Timing, Volume 1 and 2, Pearson Education
3. Workshop technology (Manufacturing Processes) by S K Garg, University science press.
4. Principles of Metal Casting, Heine, Loper and Rosenthal, Tata McGraw Hill Publishing Co, Ltd; New Delhi, 2011.
5. A Text book of Production Engineering, by P C Sharma, S Chand Publication.
6. Foundry Engineering, Banga T.R; and Agrawal R.L, Khanna Publishers, New Delhi, 2007
7. Processes and Materials of Manufacture; Lindberg Roy A.; Prentice-Hall India.
8. Principles of Manufacturing Materials and Process, J S Campbell.

Course Outcomes:

Students will be able to

Sr. No.	CO statement	Marks % weightage
CO-1	Interpret basics of metal cutting processes and machining operations for different machine tools	35
CO-2	Understand basics of foundry shop	20
CO-3	Make use of basics of sheet metal forming and welding processes and application	35



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CO-4	Identify basics of Plastic technology and application.	10
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Term Work:

The term work shall be based on the topics mentioned above.

List of Experiments:

- Job making on lathe
- Job making on casting
- Job making by using press tool
- Job making on welding
- Job making by using plastic moulding

Major Equipment:

1. Lathe Milling, Shaper, Drilling machine,
2. Unconventional Machine
3. Mechanical Press
4. Mini Foundry
5. Welding machine

List of Open Source Software/learning website:

1. NPTEL
2. Syllabus contents videos