

**1. Preamble**

This course provides an introduction to the basic concepts and techniques of metal casting processes, joining & deformation processes, special welding processes and various types of plastic component manufacturing techniques.

**2. Pre-Requisite**

1150ME101	Basic Mechanical Engineering
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**3. Links to Other Courses**

- Automotive components manufacturing

**4. Course Educational Objectives**

- To understand the various manufacturing processes and machining related to casting, forming, joining of metals, molding and extrusion processes of plastic materials.

**5. Course Outcomes**

The students would be benefitted with the following outcomes:

CO Nos.	Course Outcomes	Level of learning domain (Based on revised Bloom's)
CO1	Explain various casting process, defects and its applications.	K2
CO2	Illustrate the various fusion welding process and its applications.	K2
CO3	Describe different deformation processes of manufacturing.	K2
CO4	Explain the various special welding processes for industrial applications	K2
CO5	Describe various moulding process for manufacturing plastic components	K2

**6. Correlation of COs with Programme Outcomes**

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1		M		L								L	M	H
CO2		H		L								L	M	M
CO3		H		L								L	M	M
CO4		M		L								L	M	M
CO5		M		L								L	M	M

H- High; M-Medium; L-Low

**7. Course Content****UNIT – I: METAL CASTING PROCESSES****L-9**

Sand Casting – Sand Moulds - Type of Patterns – Pattern Materials – Pattern Allowances – Types of Moulding Sand – Properties – Core Making – Methods of Sand Testing – Working

Principle of Special Casting Processes – Shell– Pressure Die Casting – Centrifugal Casting – CO<sub>2</sub> Process – Sand Casting Defects – Inspection Methods

**UNIT – II: JOINING PROCESSES** **L-9**

Fusion Welding Processes – Types of Gas Welding – Equipments Used – Flame Characteristics – Filler and Flux Materials - Arc Welding Equipments - Gas Metal Arc Welding – Flux Cored – Submerged Arc Welding – Electro Slag Welding – TIG and MIG Welding Process. Principles Of Resistance Welding – Spot/Butt, Seam Welding – Percussion Welding- Weld Defects

**UNIT – III: DEFORMATION** **L- 9**

Hot Working and Cold Working of Metals – Forging Processes – Hot Forging and Cold Forging - Open, and Closed Die Forging Process – Typical Forging Operations – Embossing – Engraving - Rolling of Metals – Types of Rolling Mills - Defects in Rolled Parts - Principle of Rod And Wire Drawing - Tube Drawing .

Principles of Extrusion – Types of Extrusion – Hot and Cold Extrusion. Sheet Metal Characteristics - Typical Shearing Operations, Bending and Drawing Operations – Stretch Forming Operations - Metal Spinning

**UNIT – IV: SPECIAL WELDING AND MACHINING PROCESS** **L- 9**

Principle And Application of Special Welding Processes - Plasma Arc Welding – Thermit Welding – Electron Beam Welding – Friction Welding -Laser Beam Welding.–Ultra Sonic Welding, CNC Machining Process - Case Study.

**UNIT – V: MANUFACTURING OF PLASTIC COMPONENTS** **L-9**

Types of Plastics - Characteristics of the Forming and Shaping Processes – Moulding of Thermoplastics – Working Principles and Typical Applications - Injection Moulding – Blow Moulding – Rotational Moulding – Film Blowing – Extrusion – Thermoforming. Moulding of Thermosets- Working Principles and Typical Applications - Compression Moulding - Transfer Moulding - Bonding of Thermoplastics.

**Total: 45 periods**

**8. Text Books:**

1. Manufacturing Technology: Foundry, Forming and Welding, 4e (Volume 1)2013 by Dr. P.N Rao
2. HajraChoudhury, “Elements of Workshop Technology, Vol. I and II”, Media Promoters Pvt Ltd., Mumbai, 2011

**9. References:**

1. “H.M.T. Production Technology – Handbook”, Tata McGraw-Hill, 2000.
2. Begman, ‘Manufacturing Process’, John Wiley & Sons, VIII Edition, 2010.
3. Fundamentals of Modern Manufacturing: Materials, Processes, and Systems  
By Mikell P. Groover, 2010
4. B.S. Magendran Parashar & R.K. Mittal, “Elements of Manufacturing Processes”, Prentice Hall of India, 2012.
5. Beddoes.J and Bibby M.J, ‘Principles of Metal Manufacturing Processes’, Elsevier, 2011.
6. Serope Kalpajian, Steven R. Schmid, “Manufacturing Processes for Engineering Materials”, 4/e, Pearson Education, Inc. 2007.
7. R.K. Jain and S.C. Gupta, “Production Technology”, Khanna Publishers. 16th Edition, 2001.
8. Roy. A. Linberg, “Process and Materials of Manufacture”, PHI, 2000.