



MARRI LAXMAN REDDY INSTITUTE OF TECHNOLOGY AND MANAGEMENT

(AN AUTONOMOUS INSTITUTION)

(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)

Accredited by NAAC with 'A' Grade & Recognized Under Section 2(f) & 12(B) of the UGC act, 1956

COURSE CONTENT

PRODUCTION TECHNOLOGY								
III Semester: ME								
Course Code	Category	Hours / Week			Credit	Maximum Marks		
2530318	Foundation	L	T	P	C	CIA	SEE	Total
		3	0	0	3	40	60	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes: 45			
Prerequisites: There are no prerequisites for this course.								

Course Overview:

This course provides fundamental knowledge of manufacturing processes including casting, welding, forming, and related modern techniques. Students will learn the principles, equipment, and operations of traditional and advanced manufacturing methods. The course emphasizes process characteristics, advantages, limitations, and defect analysis. By the end of the course, students will develop the ability to select appropriate manufacturing processes for specific engineering applications.

Course Objectives:

1. To understand the principles, processes, and design considerations involved in casting.
2. To study the types, applications, and techniques of welding processes.
3. To analyze gas welding, advanced welding processes, and inspection methods.
4. To comprehend hot and cold working processes and their industrial applications.
5. To gain knowledge of extrusion, forging, and high-energy rate forming processes.

Course Outcomes: After Completion of the Course, Students should be able to

1. To understand the principles, processes, and design considerations involved in casting.
2. To study the types, applications, and techniques of welding processes.
3. To analyze gas welding, advanced welding processes, and inspection methods.
4. To comprehend hot and cold working processes and their industrial applications.
5. To gain knowledge of extrusion, forging, and high-energy rate forming processes.

UNIT - I: CASTING

Casting: Steps involved in making a casting, Advantage of casting and its applications, Patterns, Pattern making, Types, Materials used for patterns, Pattern allowances, Properties of moulding methods. Methods of Melting, Crucible melting and cupola operation, Defects in castings, Principles of Gating, Requirements, Types of gates, Design of gating systems, Riser, Function, Types of Riser and Riser design. Casting processes, Types, Sand moulding, Centrifugal casting, Die, Casting, Investment casting, Shell moulding.

UNIT - II: ARC WELDING

Arc Welding: Classification, Types of welds and welded joints and their characteristics, Welding Positions, Arc welding, shielded metal arc welding, Submerged arc welding, Resistance welding, Thermit welding.

UNIT - III: GAS WELDING

Gas Welding: Gas welding, Types, Oxyfuel gas cutting, Standard time and cost calculations. Inert Gas Welding, TIG Welding, MIG welding, Friction welding, Friction Stir Welding, Induction welding, Explosive welding, Laser Welding. Soldering, Brazing, Heat affected zone in welding. Welding defects, Causes and remedies, Destructive and non, Destructive testing of welds.

UNIT - IV: HOT WORKING AND COLD WORKING

Strain hardening, Recovery, Recrystallization and grain growth. Sheet metal Operations: Stamping, Blanking and piercing, Coining, Strip layout, Hot and cold spinning, Bending and deep drawing. Rolling fundamentals, Theory of rolling, Types of Rolling mills and products. Drawing and its types, Wire drawing and Tube drawing, Types of presses and press tools.

UNIT - V: METAL FORMING AND HIGH-ENERGY PROCESSES

Extrusion of Metals: Basic extrusion process and its characteristics. Hot extrusion and cold extrusion, Forward extrusion and backward extrusion, Impact extrusion, Extruding equipment, Tube extrusion, Hydrostatic extrusion. Forces in extrusion.

Forging Processes: Forging operations and principles, Tools, Forging methods, Smith forging, Drop Forging, Roll forging. Forging hammers: Rotary forging, Forging defects, Cold forging, Swaging, Forces in forging operations.

High Energy Rate Forming Processes: Principles of Explosive Forming, Electrohydraulic Forming, Electro, Magnetic forming and rubber pad forming.

TEXTBOOKS:

1. A Textbook of Production Technology (Manufacturing Processes), Dr. P.C. Sharma, S. Chand Publishing, 11th Revised Edition, 2022.
2. Manufacturing Technology: Foundry, Forming and Welding, P.N. Rao, McGraw Hill Education, Vol. 1, 5th Edition, 2018.

REFERENCE BOOKS:

1. Manufacturing Engineering and Technology, Serope Kalpakjian and Steven R. Schmidt, Pearson, 7th Edition, 2014.
2. Elements of Workshop Technology Vol.1, S.K. Hajra Choudhury, A.K. Hajra Choudhury and Nirjhar Roy, Media Publishers and Promoters Pvt. Ltd., 1st Edition, 2008.

ELECTRONIC RESOURCES:

1. <https://nptel.ac.in/courses/112106200>
2. <https://nptel.ac.in/courses/112104204>
3. <https://nptel.ac.in/courses/112107083>
4. <https://nptel.ac.in/courses/112105127>
5. <https://nptel.ac.in/courses/112104205>

MATERIALS ONLINE:

1. Course template
2. Tech talk and Concept Video topics
3. Open-ended experiments
4. Definitions and terminology
5. Assignments
6. Model question paper – I
7. Model question paper – II
8. Lecture notes
9. E-Learning Readiness Videos (ELRV)