

II YEAR II SEM

15AME20-MANUFACTURING TECHNOLOGY

L T P C

3 1 0 3

Course Objectives

- analyse the practical applications of a variety of forming and machining processes;
- analyse and formulate the costs of various manufacturing processes in terms of fixed and variable costs and break even point;
- formulate practical design methods to materials working techniques;
- interpret the geometry of tooling used on various metal cutting machines;
- analyse the effects of heat, lubrication and various cutting tool materials on the metal cutting process.

UNIT – I

Casting: Steps involved in making a casting– Types of patterns - Patterns and Pattern making — Materials used for patterns, pattern allowances and their Construction, Principles of Gating, Gating ratio and design of Gating systems, Solidification of casting – Concept – Solidification of pure metal and alloys, short & long freezing range alloys. Risers – Types, function and design, casting design considerations, special casting processes 1) Centrifugal 2) Die, 3) Investment.

Methods of Melting: Crucible melting and cupola operation, steel making processes.

UNIT – II

Welding: Classification of welding process types of welds and welded joints and their characteristics, design of welded joints, Gas welding, ARC welding, Forge welding, resistance welding, Thermit welding and Plasma (Air and water) welding.

Cutting of Metals: Oxy – Acetylene Gas cutting, Plasma Cutting , Inert Gas welding, TIG & MIG, welding, Friction welding, Induction welding, Explosive welding, Laser welding, Soldering & Brazing. Heat affected zones in welding; welding defects – causes and remedies – destructive non-destructive testing of welds.


UNIT – III

Hot working, cold working, strain hardening, recovery, recrystallisation and grain growth, Comparison of properties of Cold and Hot worked parts, rolling fundamentals – theory of rolling, types of Rolling mills and products. Forces in rolling and power requirements, plastic blow and injection moulding, Stamping, forming and other cold working processes: Blanking and piercing – Bending and forming – Drawing and its types – wire drawing and Tube drawing – coining – Hot and cold spinning.

UNIT- IV

Extrusion Of Metals: Basic extrusion process and its characteristics. Hot extrusion and cold extrusion - Forward extrusion and backward extrusion – Impact extrusion Hydrostatic extrusion.

Forging processes: Principles of forging – Tools and dies – Types Forging – Smith forging, Drop Forging – Roll forging – Forging hammers: Rotary forging – forging defects.


 Head
 Mechanical Engineering Department,
 JNTUA College of Engineering,
 PULIVENOULA - 516 390.

UNIT - V

Plastic –types, properties and their applications; processing of plastic – different methods – blow and injection molding, process capabilities and equipment details. Ceramic – Processing of different types of ceramics- compaction of metal powders, sintering, finishing operations, process capabilities.

Text Books:


1. Manufacturing Technology / P.N. Rao/TMH
2. Manufacturing Technology/ kalpakjian, Pearson education

References:

1. Production Technology / R.K. Jain
2. Process and materials of manufacturing –Lindberg/PE
3. Principles of Metal Castings / Rosenthal.
4. Welding Process / Paramar
5. Manufacturing Technology / R.K. Rajput, Laxhimi Pub
6. Workshop Technology Vol-, by Raghuvamsi

Course Outcomes

- examine the principles associated with basic operations involving the forming, machining and welding of engineering materials;
 - interpret the advantages and limitations of each process and its influence on the properties of the material in the finished component;
- analyse the basic processes used in performing forming, machining and welding operations on engineering materials;


 Head
 Mechanical Engineering Department,
 JNTUA College of Engineering,
 PULIVENDULA - 516 390.



II YEAR II SEM

15AME21-THERMAL ENGINEERING LAB

L	T	P	C
0	0	4	0

Course Description & Objectives: Students undergoing this course would gain knowledge about the working of I.C engines and will have the knowledge about the working of ignition and fuel system.

1. Valve Timing Diagram of 4 Stroke Diesel Engine
2. Port Timing Diagram of Single Cylinder 2 - Stroke Petrol Engine
3. Assembly and Disassembly of Diesel and Petrol Engines
4. Performance Test on 2 - Stage Reciprocating Air Compressor
5. Performance Test on 2 – Stroke Single Cylinder Petrol Engine Coupled to D.C Generator Loaded Resistance Rheostat with Motoring Test Rig
6. Performance Test on 4 – Stroke 4 Cylinder Petrol Engine Coupled to D.C Generator Loaded Resistance Rheostat with Motoring Test Rig
7. Performance Test on Refrigeration Test Rig
8. Performance Test on Air Conditioning Test Rig
9. Study of Boilers
10. Demonstration of Diesel and Petrol engines by cut models.

Course Outcomes:

Upon the successful completion of the course, learners will be able to:

- Explain the various working cycles of engine
- Describe the various types of combustion in IC engines.
- Illustrate the engine combustion parameters.
- Describe the different types of modern engines.

Explain the modern electronic engine management system (EMS) of IC engines.

