

II YEAR-II Semester

ME4T5

PRODUCTION TECHNOLOGY

Credits: 3

Lecture: 3 periods/week

Internal assessment: 30marks

Tutorial: 1 period/week

Semester end examination: 70 marks

Course Objectives:

- Specify various casting and welding processes with applications
- Study various metal forming processes.
- Familiarize with the processing of plastics

Course Outcomes:

Upon completion of this course the student will be able to:

1. Explain fundamentals in the sand casting process.
2. Illustrate various special casting processes
3. Select suitable welding technique based on their application
4. Describe the necessity of metal forming processes
5. Discuss the types of polymers and their processing methods

UNIT – I

CASTING: Steps involved in making a casting, Advantages of casting and its applications. Patterns and Pattern making: Types of patterns, Materials used for patterns, pattern allowances.

SAND MOLDING: Basic steps in mold preparation, materials used for mould, types of molds, sand tests as per AFS. Introduction to Gating, Gating ratio and design of gating systems.

METHODS OF MELTING: Crucible melting and cupola operation and charge calculations.

UNIT – II

SPECIAL CASTING METHODS:

Permanent Mould Casting, Die Casting: Hot chamber die casting, Cold chamber die casting, Centrifugal casting: True centrifugal casting, Semi – centrifugal casting, Centrifuging. Investment casting, Shell moulding, CO₂ Molding, Continuous casting. Fettling of castings, casting defects: causes and remedies.

UNIT – III

WELDING:

Classification of welding process, types of welded joints, Gas welding, Sub merged Arc welding, electron beam welding, solid state welding processes: Forge welding, resistance welding, Friction welding, Induction welding, Explosive welding. Thermit

welding and Plasma welding, TIG & MIG welding, Laser welding, Destructive and nondestructive testing of welds.

ALLIED PROCESSES: Soldering & Brazing.

UNIT – IV

BULK FORMING PROCESSES:

Introduction, Hot and Cold working of metals. Rolling, Forging, Extrusion, Tube making, Drawing and Wire drawing.

SHEET METAL WORKING OPERATIONS: Introduction, Sheet metal Blanking and Piercing operations. Clearance and shear as applied to Punching/Blanking operations. Coining, Hot and Cold Spinning and Stretch Forming.

UNIT - V

PROCESSING OF PLASTICS:

Introduction to polymers, Classification of Polymers: Plastics and Elastomers, Comparison of Thermo Plastics and Thermo setting Plastics, Moulding Techniques: Compression Moulding, Transfer Moulding, Injection Moulding, Blow Moulding and Extrusion of Plastics.

Learning Resources

Text Books:

1. Manufacturing Technology – Foundry, Forming and Welding by P. N. Rao, TMH Publications, 2nd ed, 2000.
2. Manufacturing Engineering and Technology, by Kalpakjian S, Pearson Edu..., 4th edition, 2001.

Reference Books:

1. Fundamentals of Modern Manufacturing, by Mikell P. Groover, Materials, Processes, and Systems”, Wiley publications. 5th ed, 2013.
2. Principles of Metal Castings, by Richard Heine, Carl Loper, Philip Rosenthal, TMH ed, 2001.
3. Manufacturing Science, by Amitabha Ghosh and Asok Kumar Mallik, East West Press, 2nd Edition, 2010.

Web References:

1. <http://nptel.ac.in/courses/112107086/14>