

III Year II Semester

L T P C

Code: 20ME6703

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PRODUCTION TECHNOLOGY

Course Objectives:

The Students will acquire the knowledge:

1. To interpret the casting process.
2. To discuss the various welding processes.
3. To outline the systematic understanding of knowledge in cold working and hot working of metals.
4. To discuss about the extrusion and forging processes.
5. To summarize the processing of plastics.

UNIT-I CASTING:

Steps involved in making a casting – Advantage of casting and its applications. – Patterns and Pattern making – Types of patterns – 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, special.

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.

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 nondestructive testing of welds.

Cutting of Metals: Oxy – Acetylene Gas cutting, water plasma. Cutting of ferrous, non-ferrous metals.

UNIT-III COLD WORKING AND HOT WORKING OF METALS

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.

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 – Types of presses and press tools. Forces and power requirement in the above operations.

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.

UNIT-V PROCESSING OF PLASTICS

Types of Plastics, Properties, applications and their Processing methods & Equipment (blow & injection modeling)

TEXT BOOKS:

1. Manufacturing Engineering and Technology/Kalpakjin S/ Pearson Edu.
2. Manufacturing Technology / P.N. Rao/TMH

REFERENCES:

1. Production Technology / R.K. Jain
2. Process and materials of manufacturing –Lindberg/PE
3. Principles of Metal Castings / Roenthal.
4. Welding Process / Paramar /
5. Production Technology /Sarma P C / Production Engineering – Suresh Dalela & Ravi Shankar / Galgotia Publications Pvt. Ltd.

Course Outcomes:

At the end of the course, the student will be able to:

1. Recite the casting process.
2. Narrate the various welding processes.
3. Explain the cold working and hot working of metals.
4. Illustrate the extrusion and forging processes.
5. Integrate the knowledge of processing of plastics.