III B. Tech – II Semester

(20ME6703) PRODUCTION TECHNOLOGY

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	4

Pre-Requisites: Engineering physics, Basic mathematical skills

Course Objectives:

The Students will acquire the knowledge:

- To interpret the casting process.
- To discuss the various welding processes.
- To outline the systematic understanding of knowledge in cold working and hot working
- of metals.
- To discuss about the extrusion and forging processes.
- 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)

Course Outcomes:

A student who successfully fulfills this course requirement will be able to:

S. No	Course Outcome	BTL
CO1	Design the patterns and core boxes for metal casting processes.	L2
CO2	Design the gating system for different metallic components.	L2
CO3	Know the different types of joining processes.	L3
CO4	Be able to use forging, extrusion processes.	L4
CO5	Learn about the different types of sheet metal forming processes and methods for processing of plastics.	L4

Correlation of Cos with POs & PSOs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	0	1	1	1	1	0	0	2	2	3	3	1
CO2	2	2	0	1	1	1	1	0	0	2	2	3	2	2
CO3	2	2	0	1	1	1	1	0	0	2	2	3	3	2
CO4	2	2	0	1	1	1	1	0	0	2	2	3	3	2
CO5	2	2	0	1	1	1	1	0	0	2	2	3	3	2

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