II Year – II SEMESTER

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3+1	0	3

PRODUCTION TECHNOLOGY

Course Objective:
To impart basic knowledge and understanding about the primary manufacturing processes such as casting, joining, forming and powder metallurgy and their relevance in current manufacturing industry; To introduce processing methods of plastics.

UNIT – I
Objective: To make the students understand fundamentals of casting
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

UNIT – II
Objective: To provide insight into sand casting and introduce other casting processes
Methods of melting and types of furnaces, Solidification of castings, Solidification of pure metals and alloys, short & long freezing range alloys. Risers – Types, function and design, casting design considerations, Basic principles and applications of Centrifugal casting, Die casting and Investment casting.

UNIT – III
Objective: To impart fundamentals of gas welding and arc welding
Welding : Classification of welding processes, types of welded joints and their
characteristics, Gas welding, Different types of flames and uses, Oxy – Acetylene Gas cutting.
Basic principles of Arc welding, Manual metal arc welding, Sub merged arc welding, Inert Gas welding- TIG & MIG welding.

UNIT – IV
Objective: To teach principles of advanced welding processes and their applications
Resistance welding, Solid state welding processes- Friction welding, Friction stir welding, Forge welding, Explosive welding; Thermit welding, Plasma welding, Laser welding, electron beam welding, Soldering & Brazing.

Heat affected zones in welding; pre & post heating, Weldability of metals, welding defects – causes and remedies – destructive and nondestructive testing of welds, Design of welded joints.

UNIT – V

Objective: To impart knowledge on bulk forming processes

Plastic deformation in metals and alloys, Hot working and Cold working, Strain hardening and Annealing.

Bulk forming processes: Forging - Types Forging, Smith forging, Drop Forging, Roll forging, Forging hammers, Rotary forging, forging defects; Rolling – fundamentals, types of rolling mills and products, Forces in rolling and power requirements. Extrusion and its characteristics. Types of extrusion, Impact extrusion, Hydrostatic extrusion; Wire drawing and Tube drawing.

Introduction to powder metallurgy – compaction and sintering, advantages and applications

UNIT – VI

Objective: To provide understanding of various sheet metal forming and processing of plastics.

Sheet metal forming - Blanking and piercing, Forces and power requirement in these operations,

Deep drawing, Stretch forming, Bending, Springback and its remedies, Coining, Spinning, Types of presses and press tools.

Processing of Plastics: Types of Plastics, Properties, Applications and their processing methods,

Blow and Injection molding.

TEXT BOOKS:

1. Manufacturing Processes for Engineering Materials - Kalpakjian S and Steven R Schmid- Pearson Publ , 5th Edn.
2. Manufacturing Technology -Vol I- P.N. Rao- TMH
3. Fundamentals of Modern Manufacturing - Mikell P Groover- Wiley publ – 3rd Edition.

REFERENCES :

1. Manufacturing Science – A.Ghosh & A.K.Malik – East West Press Pvt. Ltd.
2. Process and materials of manufacture- Lindberg- PHI
3. Production Technology- R.K. Jain- Khanna
4. Production Technology-P C Sharma-S. Chand
5. Manufacturing Processes- H.S. Shaun- Pearson
6. Manufacturing Processes- J.P. Kaushish- PHI