UNIT I

Introduction to casting processes, Patterns : Pattern materials, types of pattern, allowances pattern design, Moulding sand, Properties of moulding sands, Core making, Melting practices and furnaces, Pouring and Gating system design, Numerical estimation to find mold filling time, Riser design and placement, Principles of cooling and solidification of casting, Directional and Progressive solidification, Estimation of solidification rate, Cleaning and Finishing of casting, Defects and remedies, Principle and equipments of Permanent (or Pressure Die) mould casting, Investment casting, Centrifugal casting, Continuous casting

UNIT II

Plastic deformation. Stress-strain diagram for different types of material, Hot and Cold working, Factors affecting plastic deformation, Yield criteria, Concept of flow stress, Forming Limit diagram

Rolling Process : Rolling terminology, Friction in rolling, Calculation of rolling load

Forging : Open and closed die forging, Forging operations

Extrusion : Types, Process parameter

Wire and Tube Drawing : Wire and tube drawing process, Die profile Friction and lubrication in metal forming, Forming defects, causes and remedies for all forming processes

UNIT IV

Classification of joining processes, Welding terminology and types of joints, Arc Welding Processes : Principles and equipment's of Single carbon arc welding, FCAW, TIG, MIG, SAW Resistance Welding: Spot, Seam and Projection weld process, Heat balance in resistance welding, Gas Welding and Cutting, Soldering, brazing and braze welding Welding Metallurgy and Heat Affected Zone, Weld inspection, Defects in various joints and their remedies

UNIT V

Thermoplastics and Thermosetting, Processing of polymers, Thermoforming, Extrusion
Moulding : Compression moulding, Transfer moulding, Blow moulding, Rotation moulding, Injection moulding - Process and equipment **Extrusion of Plastic :** Type of extruder, extrusion of film, pipe, Cable and Sheet - Principle Pressure forming and Vacuum forming

UNIT VI

Introduction to composites, Composite properties, Matrices, Fiber reinforcement Composite Manufacturing Processes: Hand lay-up Process, Spray lay-up, Filament winding process, Resin transfer moulding, Pultrusion, and Compression moulding process, Vacuum impregnation process, Processing of metal matrix composites, Fabrication of ceramic matrix composites, Carbon-carbon composites, Polymer matrix and nano-composites

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