

PRODUCTION TECHNOLOGY

Module-I

Foundry: Fluidity and factors effecting fluidity, Design of gating system, gases in metals and alloys, gas porosity and shrinkage phenomena in casting, direction solidification, risering of casting, riser design, mechanism of feeding, method of risering, feeding distance and feeder heads, use of padding, chills and fine inoculation of C.I., grain refinement principle, casting defects and their elimination.

Module-II

Welding: Heat flow of metals, isothermal contours, cooling rate of welds, heat effects in base metal, residual stress and weld ability test, TIG, MIG, ultrasonic and laser welding, plasma area welding, underwater welding, friction welding, electron beam welding, electro lag and electro gas welding, Explosive welding.

Module-III

Extrusion: Classification, extrusion equipment, load displacement, characteristics, process variables and their optimization, different extrusion dies, extrusion defects, tube extrusion Hydrostatic extension, formality limit diagram.

Module-IV

MEMS: Introduction, history, development, and need of micro-electro-mechanical systems, IC fabrication processes used for MEMS; Mechanical process techniques and process models for micromachining, Introduction to nano-technology processes.

Module-V

Theoretical concepts of plasticity, Yield criteria - Tresca and Von Mises criterion of yielding, Plastic stress strain relationship, Elastic plastic problems in bending and torsion

Text Books:

1. Fundamentals of metal casting technology - P.C. Mukherjee, Oxford and IBH. (Ch. 9,10,11,12)
2. Welding technology, R. Bittle, TMH. (Chap. 3 and 4)
3. Metallurgy of welding - W.H.Bruckner, Pitam. (Chap 1, 2, 10 and12)
4. Mechanical Metallurgy, Dieter, Me Graw Hill, Kogakusha. (Chap. 18, 19, 20 and 22)

Reference Books :

1. Casting properties of metals and alloys - V. Korolkove.
2. Manufacturing properties of metals and Alloys - Alexander and Brewar, Van Nostrand.
3. Manufacturing properties of materials - Campbell, TMH.