

MSE-316 Foundry Engineering (3 CH)

Pre-requisites: None

Course Contents

1. Casting versus other shaping/forming processes. Types of foundries. Flow of foundry operations. Pattern making, type and properties of molding sands, bonding materials, testing of sands, cores and core materials. Foundry moulds' classification and their manufacturing, sand and permanent molding processes, permanent and expendable pattern mould types, melting furnaces and their types, characteristics of liquid metals, solidification and heat transfer, metal flow, shrinkage and contraction, flow of metals in molds, gating and riser systems and design, metal gas interaction, cleaning of casting, casting defects, inspection and quality assurance, ferrous and non-ferrous casting techniques, alloy making. Casting techniques: sand molding, plaster molding, CO₂ molding, V-process, magnetic molding, investment casting, evaporative pattern casting, centrifugal casting, die casting, continuous casting, squeeze casting, casting of single crystals. Use of Solidcast for modeling and simulation of solidification.

Suggested Books

1. Richard W. Heine, Carl R. Loper, Philip C. Rosenthal, Principles of metal casting, 2nd Edition, Tata McGraw-Hill, (2001)
2. Peter Beeley, Foundry Technology, 2nd Edition, Butterworth Heinemann (BH), (2001)
3. Howard F. Taylor, Foundry engineering, Wiley, (1959) (Digitized in 2007)