

SYLLABUS :-

Prerequisite - Nil Introduction: Importance of solidification in metal casting processes, heat flow and heat evolution, shrinkage during cooling and solidification. Plane front solidification: Solidification of single phase alloys, directional solidification, faceted and non faceted growth and its implications in microstructure formation, crystal growth etc. Nucleation and interface kinetics: Homogeneous nucleation, heterogeneous nucleation, grain refining, lateral growth, continuous growth, instability at the solid/liquid interface Solidification microstructure: Cells, dendrites, solidification of polyphase alloys, eutectic and peritectic solidification, growth of graphite in cast iron, segregation in castings, inclusions in castings etc. Special casting techniques: Ceramic shell, investment casting, Rheo and thixocasting, squeeze casting, high and low pressure die casting, continuous casting, cast metal matrix components. Text Books: 1. M. C. Flemings: Solidification processing, McGraw-Hill, 1974. 2. Metals Handbook, Casting, vol. 15, 10th Edition, ASM International, Materials Park, Ohio, USA, 1998.