

<b>6<sup>th</sup> Semester</b>	<b>Solidification and Casting of Metals and Alloys</b>	<b>L-T-P 3-0-0</b>	<b>3 CREDITS</b>
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**Module I:****(10 Hours)**

Introduction: Casting as a process of Manufacturing. Advantages of casting over other forming processes. A brief mention about mould and its components etc. with special reference to mould factors in metal flow and moulding factors in casting design.

Special Casting Methods: Investment casting, Die casting, Centrifugal casting, Full mould casting, Vacuum sealed casting etc.

**Module II:****(10 Hours)**

Industrial melting practices as adopted for a few metals and alloys such as; Cast-iron; Steel; Copper; Aluminium, etc.

Principles of Gating and Riser: Types of gates and Risers; Chowrinov rule; Gating ratio, Wlodawer system of determining feeder head requirements.

Casting Yield: Various considerations for improving casting yield

**Module III:****(12 Hours)**

Solidification of Metals and Alloys: Crystallisation, Liberation of energy and solute redistribution. Nucleation and growth processes; planar growth and factors hindering planar growth; Dendritic growth; Cellular growth; Independent nucleation; Eutectic freezing, Peritectic reactions..

**Module IV:****(6 Hours)**

Casting Defects and Their Remedies: Various casting Defects; Their causes and remedial measures.

**Books:**

- [1] Solidification Processing by M.C. Flemings, McGraw Hill.
- [2] Physical Metallurgy edited by R.W.Cahn and P.Hassen, North Holland.
- [3] Casting by J. Campbell, Butterworth - Haneman, London
- [4] Principles of Metal Casting by Hein R.W., Loper C. R. & Rosenthal P.C, T.M.H.
- [5] Foundry Engineering by Taylor H.F., Flemming M.C. & Wulff, Wiley Eastern.
- [6] Foundry Technology by Beeley P.R., Butterworth, London.

**Digital Learning Resources:**

Course Name: **Solidification and Casting process**  
 Course Link: <https://nptel.ac.in/courses/113/104/113104073/>  
 Course Instructor: course instructor- Prof. Shashank Shekar