

22MTE30	FOUNDRY METALLURGY		L	T	P	C
			3	0	0	3
Course Objectives:						
1.	To know the basic concept of metal casting technology					
2.	To apply the concept to produce new materials					
UNIT I	SOLIDIFICATION OF METALS AND ALLOYS:		9	+	0	
Solidification of Castings, Effect of Solidification Range on Freezing Pattern, effect of Moulding Materials and Cooling Rate on Freezing Pattern, Shrinkage of Casting and Directional Solidification of Castings, Fluidity, Definition, Factors Affecting and Measurement Fluidity.						
UNIT II	CAST IRONS		9	+	0	
Graphitization, types and Sizes of Graphite for Grey Cast Iron and S.G.Iron, effect of normal elements and Alloying Elements in Cast Irons, Compositional Aspects and Properties of Austenitic Cast Irons, High Silicon Cast Irons, High Chrome Cast Iron and Ni-Hard Cast Irons, Production of S.G Iron, Austempered SG Iron, CG Iron, Malleable Cast Iron and Alloy Cast Irons, brief introduction on Indian and ASTM Standards for Grey Cast Iron and SG Iron.						
UNIT III	METALLURGY OF STEELS:		9	+	0	
Effect of Alloying Elements on Castability of Steels, Compositional Aspects and Properties of Alloy Steels, Specifications of Cast Steels, Low Alloy Steels and Stainless Steels. Stresses - Origin, Effects and Stress Relieving Operations, Precautions to be taken in Moulding and Melting of Steels, Gating and Riser Design for Steel Casting, Grain Refinement of Steels. Defects in Castings- appearance, their Causes and Remedies.						
UNIT IV	METALLURGY OF NON-FERROUS CAST ALLOYS:		9	+	0	
Specifications, Composition, Properties and Phase Diagrams of Copper, Aluminium, Magnesium, Zinc Alloys and Nickel base Alloys, Modification and Grain Refinement -Defects in Castings- appearance, their Causes and Remedies.						
UNIT V	MELTING PROCEDURE AND COMPOSITION CONTROL		9	+	0	
Cast Irons Plain Carbon Steels, Stainless Steels, Al Alloys. Mg alloys, Nickel alloys. Zinc alloys and Copper alloys, Slag-Metal Reactions, Desulphurization, Dephosphorisation, inoculation and inoculating techniques-Gases in Metals and Degassing Technique.						
Total (L+T) = 45 Hours						
Course Outcomes:						
Upon completion of this course, the students will be able to:						
CO1	:	Explain the solidification of casting, effect of solidification range, fluidity and factors affecting fluidity				
CO2	:	Discuss the cast iron categories, their types and different heat treatment methods like graphitization, spheroidization etc and denote the ASTM standards for all the varieties				
CO3	:	Discuss the alloying element effect on the steels and mention the precaution to be taken in moulding and melting of steels				
CO4	:	Describe the casting methods employed for fabrication of non-ferrous alloys				
CO5	:	Mention the melting procedure that is adopted for the various alloys like steels, stainless steels, discuss the slag-metal reactions				

Text Books:	
1.	Heine R W., Loper, C.R.Rosenthal, P.C., "Principles of Metal Casting" ,Tata-McGraw Hill Publishing Co Ltd, New Delhi, 2018.
2.	Beeley,P.R., Foundry Technology, Butterworths, London, 2016.
3.	Srinivasan N K.,"Foundry Engineering", Khanna Tech Publications, New Delhi, 2018.
Reference Books:	
1.	ASM Metals hand Book, Vol 15, "Casting" ASM International, 10th edition, 2001.
2.	Flinn,R.A., Fundamentals of Metal Casting, Addison Wesley Inc., 1983.
3.	Murphy,A.J., Ed., Non Ferrous Foundry Metallurgy, 1984
4.	The Foseco Foundryman's Hand book, Pergamon Press, 10 th edition, 1995.

CO PO MAPPING

CO/P O	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO 4
CO1	2	1	2	2	3	2	0	3	3	2	3	2	3	3	3	
CO2	2	3	2	3	3	2	2	0	2	1	3	2	3	3	3	
CO3	2	2	3	3	2	1	0	0	0	3	3	2	2	2	3	
CO4	2	2	0	0	3	3	3	2	0	2	3	3	3	1	3	
CO5	2	3	3	3	3	0	1	0	1	2	3	2	3	3	3	1
Total	2	2.2	2.2	2.2	2.8	1.6	1.2	1	1.2	2	3	2.2	2.8	2.4	3	.2

1- Faintly, 2- Moderately, 3- Strongly