

Branch Name:	Mechanical Engineering (Production Technology)
Program Code:	ET209
Course Name:	Advance Casting Technology
Course Code:	2ET2090101T
Pre-requisite Course:	Foundry Technology

Course Objectives:

1. To enhance the knowledge and practice regarding different Foundry processes and their industrial importance.
2. To understand foundry practice, metal casting and process of solidification of metals and alloys.
3. To realize the designing of molds, gating system, casting defects, inspection and testing of castings and modernization of foundries.

Teaching and Examination Scheme:

Credit	Teaching Scheme Hours per week				Evaluation Scheme (Marks)								
					Theory (Marks)				Practical (Marks)				Total (Marks)
	L	T	P	Total	SEE		CCA		SEE		CCA		
					Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
3	3	-	-	3	24	60	16	40	-	-	-	-	100

Subject Contents			
Sr. No	Topic	Total Hours	Weightage (%)
1	Introduction: Casting Processes; classification, characteristics of sand casting processes, metal mould casting processes and casting processes using other mould/core materials, Pattern materials, types of patterns, Mould and core making materials and their characteristics.	03	10
2	Advanced Casting Types: Foundry equipment and processing, Casting techniques; Magnetic Moulding, Metal Injection Moulding, Centrifugal Casting, Evaporative Pattern Casting, Hybrid Evaporative Pattern Casting Process, Vacuum Sealed Molding Process, Ceramic Shell Investment Casting Process, Stir casting, Organic processes, Fluid sand processes, Graphite Moulding Process.	08	30
3	Non Ferrous Foundry Practices: Property of liquid metal and then significations in casting, fluxing, degassing, grain refinement and modification of nonferrous alloys.	06	30
4	Cast iron Casting Practices: Types of Cast iron, Fe-C-Si Phase diagram, Graphitization theory, under cooling theory, types of inoculation, Role of inoculation, Inoculation techniques.	03	10

5	Casting Design: Solidification of metal and alloys. Solidification, Nucleation and grain growth, Solidification of pure metals, short and long freezing range alloys. Rate of solidification. Gating system and its function, Riser design of castings, Design and positioning of risers, Factors affecting casting designs. Calculate the effect of various parameters on casting Design.	Master of Technology (Semester I/ First Year) In Effect from Academic Year 2023-24	06	20
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Review Presentation: The student is expected to spend minimum 2 hours per week (as mentioned in the teaching and evaluation scheme) to refer at least two peer reviewed journal papers related to this domain/subject. The student is expected to identify issues/challenges and emerging trends in the domain/subject. Student is supposed to explore various video lectures (e.g. NPTEL) available in the domain/subject. Student is required to make a review-presentation on the work carried out for the same. Recommended sites for journal papers are (1) asmedigitalcollection.asme.org (2) springer.com (3) sciencedirect.com (4) ieeexplore.ieee.org (5) scholar.google.co.in or others of similar repute.

List of Reference Books:

1. P.N. Rao, "Manufacturing Technology" Vol 1, McGraw Hill India.
2. A. K. Chakrabarti, "Casting Technology and Cast Alloys", 1st Edition, PHI Learning Pvt. Ltd.
3. B.Ravi, "Metal Casting- Computer Aided Design and Analysis", PHI Learning Pvt. Ltd.
4. S.N.Tiwari, "Cast Iron Technology Vol-1", CBS Publishers & Distributors.
5. Peter Beeley, "Foundry Technology", 2nd Revised edition, Butterworth-Heinemann Ltd.

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Understand the basic to advanced casting processes.	2 Understanding
CLO2	Apply advanced knowledge of casting for different range of materials.	3 Applying
CLO3	Illustrate foundry techniques for pattern making, mold making, Core making and Inspection of defects.	3 Applying 5 Evaluating
CLO4	Learn the melting practices of different metals.	5 Evaluating
CLO5	Demonstrate metal casting processes for any component.	3 Applying 6 Creating
CLO6	Learn and implementation testing of cast components.	2 Understanding 1 Remembering

Mapping of CLOs with POs & PSOs:

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes (PSOs)	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CLO1	H		M		M						L			M
CLO2		M	M			M		L				L	H	
CLO3	H			M			L		L				M	
CLO4		M			M					L				M
CLO5	M		H				M		M					H
CLO6		M			H						M		H	

H: High, M: Medium, L: Low