

ADVANCED METAL CASTING

CourseCode	20ME6403	Year	II	Semester	II
Course Category	HONORS	Branch	ME	Course Type	Theory
Credits	4	L – T – P	3 – 1 – 0	Prerequisites	
Continuous Internal Evaluation	30	Semester End Evaluation	70	Total Marks	100

Course Outcomes: Upon successful completion of the course, the student will be able to

	Statement	Skill	BTL	Units
CO1	Illustrate Basics of casting and associated elements in casting.	Understand Communication	L2	1,2,3,4,5
CO2	Express methods of pattern and core making	Apply, Communication	L3	2
CO3	Design feeder, gating system for metal casting processes	Apply, Communication	L3	3,4
CO4	Perform economic and castability analysis using and design for casting.	Apply, Communication	L3	5

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:High, 2: Medium, 1:Low)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3		3								3	2
CO2	3	2	2		2					2			3	2
CO3	3	2	3		3								2	3
CO4	3	2	2		2					2			1	3

Syllabus

UNIT	Contents	Mapped COs
I	Metal casting-overview: Applications and production, historical perspective, casting processes. inspection of castings- analysis of casting defects Design of molds: Functional requirements of molding materials, type of sands Properties of molding sand, sand testing techniques, Effect of molding on sand properties, Bonding material, Mould surface coating, Sand design and control, Thermal aspect of molding sand, mould wall movement.	CO1
II	Pattern, mould, and core making: Machines and Tools for Patternmaking, Allowances and Other Technological Considerations, Metal Patterns Life Expectancy of Patterns, Pattern Storage and Repair, Core Sands and Core making.	CO1, CO2
III	Feeder design and analysis: Casting solidification, solidification time and rate, feeder location and shape, feeder and neck design, feed aid design, solidification analysis, vector element method, optimization and validation.	CO1, CO3

IV	Gating design and analysis: Mould filling, gating system and types, gating channel layout, optimal filling time, gating element design, mould filling analysis, numerical simulation, optimization and validation.	CO1, CO3
V	Process planning and costing: Casting process selection, process steps and parameters, tooling cost estimation, material cost estimation, and conversion cost estimation. Design for castability: Product design for castability, process-friendly design, and castability analysis.	CO1, CO4

Learning Resources

Text books

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| <p>3.Ravi, "Metal casting: CAD and Analysis", PH Publication, 2014.</p> <p>2.P.L.Jain, "Principles of Foundry Technology", 2012</p> <p>3.Kalpakjian. S, "Manufacturing Engineering and Technology", Pearson Education India Edition, 2010.</p> |
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Reference books

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| <p>1.A.K.Chakrabarti, Casting Technology and Cast Alloys, Prentice –Hall Of India Ltd, 2005.</p> <p>2.Beely, Foundry Technology, Newnes-Butterworths, 1979.</p> |
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E- Resources & other digital material
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| <p>1.https://onlinecourses.nptel.ac.in/noc22_me57/preview</p> |
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