GOVERNMENT OF TAMILNADU

DIRECTORATE OF TECHNICAL EDUCATION, CHENNAI

STATE PROJECT COORDINATION UNIT

(Established under Canada India Institutional Cooperation Project)

CURRICULUM

Course Name	**FOUNDRY TECHNOLOGY**
Course Code	ME/2020/ 034
Course Duration	80 Hours
Minimum Eligibility Criteria	ITI/10th/+2/Diploma/Graduates
Pre-requisites (if any)	-
Course Objectives	Training module has been designed to provide the participants to • Understand of the basics of Manufacturing • Understand of various processes for making casting products • Gain of Hazards, safety instructions and precautions • Understand of Tools and test equipment used for sand Testing, Molten Metal preparation • Learn of the pattern making, core making and mould making process • Gain awareness on knockout, Fettling and shot blasting
Course Outcomes	At the end of training, the trainees will be able to • Describe the various concept of Manufacturing, safety process and handling of Personal protective equipments. • Enumerate the types of pattern making techniques • Choose the suitable process for core making and mould making • Apply the correct melting equipment and process • Select the appropriate post casting process for achieved desired quality
Expected Job Roles	Technician and Foundry Engineer.

TEACHING AND SCHEME OF EXAMINATION						
Course Code	Course Name	Hours		Assessment Marks		Duration of the Examination
				Min	Max	
ME/2020/034	**FOUNDRY TECHNOLOGY**	Theory	30	10	20	3 Hours
		Practical	50	40	80	
		Total	80	50	100	

ME/2020/034 - FOUNDRY TECHNOLOGY

DETAILED SYLLABUS

Unit No.	Modules	No. of Hours	
		Theory	Practical
I	**Introduction to Foundry Process and Safety**	**12 Hours**	
1.1	Introduction - Types of manufacturing process - Foundry processes - Activities in foundry-	06	-
1.2	Industrial safety - PPES -safety education- Plant maintenance		
1.3	Introduction - difference between pattern and casting - function of a pattern - pattern materials - wood, cast Iron and aluminum - advantages and Limitations.		
1.4	**Practical** ➢ Safety Practices/Demonstration in Foundry Industry ➢ 5S / Maintenance Procedure ➢ Pattern making process	-	06
II	**Core making**	**10 Hours**	
2.1	Different functions of cores, requirements of cores and core sands, core binders, types of cores - core making procedure, Core venting, core baking, core coatings, assembly and setting.	04	-
2.2	**Practical** ➢ Prepare a core using Half core box ➢ Prepare a core using Dump core box ➢ Prepare a core using left and right hand core box	-	06
III	**Mould making**	**28 Hours**	
3.1	Moulding Materials, Properties of Moulding Sands, Type of Moulding Sands, Bonding Materials and Additives, Mould surface coating. Preparation of Moulding sand mixture, Classification of Sand Moulding Processes.	08	-
3.2	**Practical** ➢ Determination of Moisture content of foundry sand ➢ Permeability test for moulding sand ➢ Sieve analysis test for moulding sand ➢ Mouldablity test for moulding sand ➢ Green compression strength and shear strength test for moulding sand ➢ Clay content test for moulding sand ➢ Mould hardness test ➢ Compactablity test for moulding sand ➢ Shatter Index test for moulding sand	-	20

IV	Melting	30 Hours	
4.1	Melting: types of melting techniques Melting furnaces – principle and operation of Cupola and Induction furnaces. Charge materials, Inoculation and ladle	12	-
4.2	**Practical** ➢ Melting practice for Steel ➢ Melting practice for Grey Iron ➢ Melting practice for SG Iron ➢ Microstructure analysis of Grey Cast Iron and S.G. Iron and malleable Cast Iron ➢ Microstructure analysis of low, medium and high carbon steels ➢ Microstructure analysis of stainless steel and Hardened steels	-	18
	Total Theory and Practical hours	**30**	**50**
	Total hours	**80**	

HARDWARE REQUIREMENTS

S.NO.	LIST OF TOOLS /EQUIPMENTS
1	Core making Tools
2	Molding Boxes & Molding Tools
3	Muffle Furnace
4	Moisture Content Tester
5	Permeability Tester
6	AFS grain fineness Tester
7	Green Compressive and shear tester
8	Mold/Core hardness Tester
9	Shatter Index Tester
10	Mouldability Tester
11	Clay Content Tester
12	Compactability Tester
13	Sieve analysis Tester
14	Disc Polishing Machine
15	Metallurgical Microscope

REFERENCE BOOKS

S. No.	Name of the Book	Author	Publisher & Year
1	Principles of Foundry Technology	Jain P L	Tata McGraw Hill Publishing Company Ltd., 2017
2	Foundry Technology	Dharmendra Kumar and Jain S K	CBS Publishers and Distributors, 2015
3	Metal Casting Principles and Practice	Ramana Rao T V	New Age International Pvt. Ltd. Publishers, 2017
4	Casting Technology and Cast Alloys	Chakrabarti A K	Prentice Hall of India, 2016

ASSESSMENT AND CERTIFICATION

S. No.	Criteria for Assessment
1.	A trainee will be assessed based on the performance in End Examination for Theory and Practical conducted internally in the Project Polytechnic College for a duration of 3 hours
2.	A trainee must have 75% of attendance to appear for End examination in Theory and Practical.
3.	The assessment for theory part will be based on the marks scored in the end examination on the knowledge bank of questions (1 word/objective type questions)
4.	The assessment for practical part will be based on the marks scored in the end examination conducted by the Project Polytechnic and assessed by the Examiners approved by Strategic Plan Implementation Committee (SPIC) of the project polytechnic.
5.	The passing criteria for successful completion of training is every trainee should score 50% of marks in theory and practical examination.
6.	On successful completion of training, Certificate will be issued to the participants by the Directorate of Technical Education through the Project Polytechnics.

END EXAMINATION

ALLOCATION OF MARKS

S.NO	Description	Max.Marks
1.	Theory Examination	20
2.	Practical Examination	
	a)Aim and Procedure	20
	b)Demonstration / Execution	25
	c) Result & Viva Voce	15
	d)Record	20
	Total Marks	**100**

THEORY MODEL QUESTION PAPER

ME/2020/ 034 - FOUNDRY TECHNOLOGY

(Maximum Marks: 20)

[N.B: Answer any **twenty** questions]

20 x 1 = 20 Marks

1. What is manufacturing process?
2. Write the activities of foundry.
3. What is importance of industrial safety?
4. Define the purpose of PPEs.
5. What is preventive maintenance?
6. What you meant by 5S?
7. Write the function of pattern.
8. List the pattern materials.
9. How the hollow surface to be produced in casting?
10. Define solidification.
11. What are binders used in making core?
12. List the types of cores.
13. Mention the purpose of core venting.
14. Define core baking
15. Which of the machine are used in green sand moulding?
16. Define permeability
17. What is the importance of mould hardness?
18. Classify moulding processes.
19. What are the materials is melted in cupola?
20. Classify Furnace.
21. What is melting?
22. Define inoculation.
23. What is Pouring?
24. How the molten metal temperature is measured?
25. Classify ladles.