KIIT POLYTECHNIC, BHUBANESWAR

LESSON PLAN

Sesson:-2022-2023

Discipline : Metallurgy	**Semester:6th,S/2023**	**Name of the Teaching Faculty: Pramod Kumar Sethi. Sr.Lecturer.** **Email Id :-**pksethifmt@kp.kiit.ac.in
Subject; Foundry Technology.(Th.1)	No. Of Days/Week:-5	Starting date:-13/02/2023 Ending date:- 23/05/2023
Week	**Class Day**	**Theory Topics**
1st	1st	Define casting as a process of manufacturing
	2nd	State principles of casting
	3rd	State the basic steps involved in making a casting
	4th	Mention advantages &disadvantages of metal casting
	5th	Define pattern. Differentiate between pattern and casting
2nd	1st	State the reason for selection of pattern materials. Describe different pattern materials
	2nd	Explain different types of pattern giving examples
	3rd	Explain different types of pattern allowances
	4th	State the basis and merits of pattern colors giving examples.
	5th	Mention the utilities of storing and preservation of patterns.
3rd	1st	State different sources of molding sand. State different types of molding sand.
	2nd	Discussion on possible questionnaire.
	3rd	Give different ingredients of moldings sand. State the classification of moldings sand in two different ways.
	4th	Classification of sand based upon grain size and grain shape.
	5th	State the properties desired for molding sand and Differentiate between facing sand and backing sand.
4th	1st	Differentiate between sand preparation and sand conditioning. State the functions of sand preparation/conditioning.
	2nd	State the reasons of sand reclamation and Explain different sand reclamation techniques.
	3rd	Explain different types of Testing of molding sand and describe the procedure for moisture content test of molding sand.
	4th	Derive an expression for AFS grain fineness number of molding sand and describe the procedure for clay content test of molding sand.

	5th	Describe the procedure for mould hardness test and derive an expression for permeability number of molding sand.
5th	1st	Describe the procedure for compression strength of moldings sand.
	2nd	State the functions of binder and explain different types of clay binders.
	3rd	State the function of additives and explain the different types of additives.
	4th	Differentiate between facing materials and coarse materials and describe the utilities of different cushion materials giving examples.
	5th	Explain the functions of special additives giving examples.
6th	1st	Quiz Test.
	2nd	State essential characteristics of core and explain different types of core with sketches.
	3rd	Describe the steps involved for core making and explain various methods of core baking.
	4th	Explain different core baking machines.
	5th	Define mould.

7th	1st	Discussion on possible questionnaire.
	2nd	State different characteristics of mould.
	3rd	State different characteristics of mould.
	4th	Explain with sketches different types of mould.
	5th	Discussion on possible questionnaire
8th	1st	Explain bench Moulding method.
	2nd	Explain Floor Moulding method.
	3rd	Explain Machine Moulding method.
	4th	Explain Pit Moulding method
	5th	Describe the different methods of ramming: such as hard ramming, squeezing, Jolting and Sand slinging.
9th	1st	Name special molding processes and explain the molding method in permanent mould.
	2nd	Describe the method of shell molding giving sketch.
	3rd	Give the essential feature of investment mould and describe the carbon dioxide molding process.
	4th	State different types of furnaces with sketches that are used in foundry for melting of ferrous and non-ferrous metals.
	5th	Describe Induction furnace of coreless high frequency type.
10th	1st	Discussion on possible questionnaire
	2nd	Explain the construction and operation of cupola used for cast iron melting.

	3rd	Estimate the different quantities of raw material to get a specific grade of C.I. with the help of simple charge calculation.
	4th	State the advantages and limitation of cupola. Mention modern development of cupola.
	5th	Explain different electric arc furnaces such as direct and indirect type.
11th	1st	Highlight recent trends in melting techniques.
	2nd	Quiz Test.
	3rd	State functions of a riser and describe different types of riser with sketches.
	4th	Explain the importance of size and shape of riser in metal casting and justify the location of riser in the gating system.
	5th	Define directional solidification and describe progressive and directional solidification and use of chills.
12th	1st	State the factors which increase the efficiency of riser such as; use of insulating material , use of exothermic materials, use of chills, use of padding, use of chaplets , use of molding materials of different chill capacities, use of topping up, use of electric arc feeding and riser head design.
	2nd	State the factors which increase the efficiency of riser such as; use of insulating material , use of exothermic materials, use of chills, use of padding, use of chaplets , use of molding materials of different chill capacities, use of topping up, use of electric arc feeding and riser head design
	3rd	Discussion on possible questionnaire.
	4th	Explain shake out and fettling. Classify fettling operation in two stages namely a. Removal of cores b. Cleaning of canting surfaces and compare between sand blasting and shot blasting.
	5th	Describe the process of chemical cleaning.
13th	1st	Explain different methods or removal of gates and risers etc. such as: a. Chipping by hammers b. Flogging c. Sheering d. Sawing e. Abrasive wheel slitting f. Machining g. Flame cutting h. Plasma cutting i. Grinding j. Gouging k. Trimming and sizing.
	2nd	Explain different methods or removal of gates and risers etc. such as: a. Chipping by hammers b. Flogging c. Sheering d. Sawing e. Abrasive wheel slitting f. Machining g. Flame cutting h. Plasma cutting i. Grinding j. Gouging k. Trimming and sizing.
	3rd	Explain the die casting techniques and processes such as a. Gravity die casting b. Pressure die casting c. Vacuum die casting d. Cold chamber process e. Hot chamber process
	4th	Explain the die casting techniques and processes such as a. Gravity die casting b. Pressure die casting c. Vacuum die casting d. Cold chamber process e. Hot chamber process
	5th	Explain the following centrifugal casting techniques a. True centrifugal casting having b. The De Lavaud process c. Moore casting system d. Semi centrifugal casting e. Centrifuging.

14th	1st	11.2 Explain the following centrifugal casting techniques a. True centrifugal casting having b. The De Lavaud process c. Moore casting system d. Semi centrifugal casting e. Centrifuging
	2nd	Mention the advantages of die casting and centrifugal casting .
	3rd	Explain investment casting process.
	4th	Discussion on possible questionnaire
	5th	Mention different types of casting defects with example and their remedies: Defects caused by patterns and molding box, Defects caused by improper molding and core making, Defects caused by improper mixing and distribution.

15th	1st	Mention different types of casting defects with example and their remedies: Defects caused by improper molding core making and gating Defects due to improper mold drying and core baking Defects occurring while closing and Pouring in the moulds, Defects caused by molten metal.
	2nd	Mention different types of casting defects with example and their remedies: Defects caused by molten metal, Defects occurring during fettling, Defects due to faulty heat treatment, Solidification Shrinkage of cast metal and Warpage.
	3rd	Discussion on possible questionnaire
	4th	Discussion on possible questionnaire
	5th	Discussion on possible questionnaire

Recommended books: 1. Foundry Technology by Lal & Khanna

2. Foundry Technology by Raghu Vansi