

GOVT. POLYTECHNIC MAYURBHANJ LESSON PLAN

| Discipline : Metallurgy ENGG. | | Semester: 6th Sem | | Name of the Teaching Faculty : Ananya Anupam | |
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| Subject : FT | | No. of Days / per week class allotted : 04 | | Semester From date : 14.02.2023 | To Date : 23.05.2023 |
| MONTH | Week | Day | Unit | Topics | |
| FEBRUARY | 3rd | 2nd | UNIT-1 | Introduction to Foundry as a Manufacturing Process | |
| | | 3rd | | Define casting as a process of manufacturing State principles of casting | |
| | 4th | 2nd | UNIT-2 | State the basic steps involved in making a casting. | |
| | | 3rd | | Mention advantages & disadvantages of metal casting. | |
| | | 2nd | | Pattern and Pattern Making | |
| | | 3rd | | Define pattern Differentiate between pattern and casting | |
| | 5th | 2nd | | State the reason for selection of pattern materials. Describe different pattern materials. | |
| | | 3rd | | Explain different types of pattern giving examples. Explain different types of pattern allowances. | |
| | | 2nd | | State the basis and me its of pattern colours given examples. | |
| | | 3rd | | Mention the utilities of storing and preservation of patterns. | |
| MARCH | 2nd | | UINT-3 | Moulding Materials | |
| | 3rd | 2nd | | State different sources of moulding sand. State different types of moulding sand | |
| | | 3rd | | Give different ingredients of moulding sand.State the classification of moulding sand in two different ways namely: | |
| | | 2nd | | Classification based upon grain size Classification base upon grain shape.State the properties desired for moulding sand | |
| | | 3rd | | Differentiate between facing sand and backing sand.Differentiate between sand preparation and sand conditioning. | |
| | 4th | 2nd | | State the functions of sand preparation/conditioning.State the reasons of sand reclamation. Explain different sand reclamation techniques | |
| | | 3rd | | Testing of moulding sand. Derive an expression for AFS grain fineness number of moulding sand | |
| | | 2nd | | Describe the procedure for clay content test of moulding sand. Describe the procedure for mould hardness test. | |
| | | 3rd | | Derive an expression for permeability number of moulding sand.Describe the procedure for compression strength of moulding sand | |

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| | 5th | 2nd | | Binders and Additives. |
| | | 3rd | | State the functions of binder Explain different types of clay binders.State the function of additives State the different types of additives. |
| | | 2nd | | Describe the utilities of different cushion materials giving examples.Explain the functions of special additives giving examples. |
| | | 3rd | | Core and Core Making |
| | 6th | 2nd | | Define core State different functions of core.State essential characteristics of core and explain different types of core with sketches. |
| APRIL | 1st | 3rd | | Describe the steps involved for core making.Explain various methods of core baking Explain different core baking machines. |
| | | 2nd | UNIT-4 | Moulds and Mould Making |
| | | 3rd | | Define mould.State different characteristics of mould.Explain with sketches different types of mould. |
| | 2nd | 2nd | | Describe different moulding methods such as: a. Bench Moulding b. Floor Moulding c. Pit Moulding d. Machine Moulding. |
| | | 3rd | | Special moulding process |
| | | 2nd | | Describe the different methods of ramming: 1. Hard ramming 2. Squeezing3. Jolting 4. Sand slinging |
| | 3rd | 3rd | UNIT-5 | giving sketch |
| | | 2nd | | Give the essential feature of investment mould.Describe the carbon dioxide moulding process. |
| | | 3rd | | Melting Practices |
| | | 2nd | | State different types of furnaces with sketches that are used in foundry for melting of ferrous and non-ferrous metals. |
| | 4th | 3rd | | Describe Induction furnace of coreless high frequency type. |
| | | 2nd | UNIT-6 | Explain the working principle of induction furnace. |
| | | 3rd | | INTERNAL-I |
| | | 2nd | | Estimate the different quantities of raw material to get a specific grade of C.I. with the help of simple charge calculation. |
| | 5th | 3rd | | State the advantages and limitation of cupola.Highlight recent trends in melting techniques. |
| | | 2nd | | Mention modern development of cupola. Explain different electric arc furnaces namely a. Direct Arc type b. Indirect Arc type |
| | | 3RD | UNIT-7 | Methods of Pouring and Feeding |
| | | 4TH | | Explain gating system. State elements of gating system with sketch.State function of a riser. Describe different types of riser with sketches |
| | 1st | 3rd | | Explain the importance of size and shape of riser in metal casting.Justify the location of riser in the gating system |
| | | 2nd | | Define directional solidification. Describe progressive and directional solidification and use of chills. |
| | 2nd | 3rd | | State the factors which increase the efficiency of riser a. Use of insulating material b. Use of exothermic materials c. Use of chills d. Use of padding e. Use of chaplets |
| | | 2nd | | f. Use of moulding materials of different chill capacities. g. Use of topping up h. Use of electric arc feeding i. Riser head design |
| | | 3rd | | State Chvorinov's rule. Mention the effects of poring temp. on the quality of casting. |
| | | 2nd | UNIT-8 | Cleaning of Casting |

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| MAY | | 3rd | | Explain shake out Explain fettling. Classify fettling operation in two stages namely a. Removal of cores b. Cleaning of casting surfaces. Compare between sand blasting and shot blasting |
| | 3rd | 2nd | | Describe the process of chemical cleaning. Explain different methods of removal of gates and risers etc. such as: a. Chipping by hammers. b. Flogging c. Shearing d. Sawing e. Abrasive wheel slitting f. Machining g. Flame cutting. h. Plasma cutting i. Grinding j. Gouging k. Trimming and sizing. |
| | | 3rd | | Special Casting Techniques |
| | | 2nd | | Explain the following die casting techniques and processes a. Gravity die casting b. Pressure die casting. c. Vacuum die casting d. Cold chamber process e. Hot chamber process. 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 |
| | | 3rd | | Mention the advantages of die casting. Mention the advantages of centrifugal casting Explain investment casting process |
| | 4th | 1st | | Casting Defects |
| | | 2nd | | Mention different types of casting defects with example and their remedies a. Defects caused by patterns and moulding box. b. Defects caused by improper moulding and core making. c. Defects caused by improper mixing and distribution. d. Defects caused by improper moulding core making and gating |
| | | 3rd | | e. Defects due to improper mold drying and core baking f. Defects occurring while closing and Pouring in the moulds |
| | | 2nd | | g. Defects caused by molten metal h. Defects occurring during fettling i. Defects due to faulty heat treatment j. Solidification Shrinkage of cast metal. k. Warpage |