

| Discipline: Metallurgical Engineering | | Semester: 5th semester | Name of the Teaching Faculty: SUSHREE SUBHASHREE DAS | | |
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| Subject: FERROUS METALLURGY II Sub code: | | No of days /week class allotted: 05 | Semester from Date: _____ to _____ | | |
| Month | week | Class Day | Theory topics | %covered | Remark |
| July | 4th | 1 st | Introduction and History of steel making | | |
| | | 2 nd | Routes of steel making | | |
| | | 3 rd | Classification major commercial steel making processes | | |
| | | 4 th | Explanation of steel making processes with suitable sketch | | |
| | | 5 th | Different reactions involved in steel making | | |
| | 5th | 1 st | Differentiate between acid process & basic process of steel making | | |
| | | 2 nd | Explain the principles and conditions required in removal of P, S, Si, Mn and C in steel making | | |
| | | 3 rd | List the different Raw materials required for steel making | | |
| | | 4 th | State the different raw materials available in India | | |
| Aug | 1st | 1 st | Different types of furnace used in steel making processes like Bessemer, open hearth furnace, EAF, LD Converter etc | | |
| | 2nd | 1 st | Introduction of open hearth furnace: Design and shops | | |
| | | 2 nd | Mention the general principles of open hearth steel making | | |
| | | 3 rd | Types of open hearth practice: acidic open hearth practice, basic open hearth practice | | |
| | | 4 th | Describe the operational chemistry and steps involved in basic open hearth process: duplexing, ladle Desiliconisation, active mixture practice, flux slag practice | | |
| | | 5 th | Thermal efficiency and oxidizing medium of open hearth furnace | | |
| | 3rd | 1 st | Products of basic open hearth steel making | | |
| | | 2 nd | Characteristics of open hearth practice | | |
| | | 3 rd | Reasons for decline of open hearth process | | |
| | | 4 th | Modification of open hearth practices using consumable lance, water cooled lance, twin hearth process | | |
| | 4th | 1 st | Introduction of Steel making by LD process | | |
| | | 2 nd | Characteristics of LD process, process economy | | |
| | | 3 rd | Give different raw materials of LD process | | |
| | | 4 th | Explain the construction and operation of LD converter or vessel | | |
| | 5th | 1 st | Detail description of oxygen lance: lance design, multi-nozzle lance | | |
| | | 2 nd | Describe the refining reaction in LD converter with reference to decarburization and dephosphorization. | | |
| | | 3 rd | One heat of LD process with suitable figure | | |
| | | 4 th | Explanation of impurities elimination curve of LD process (with graph diagram) | | |
| | | 5 th | Mention the quality of steel and composition of slag in LD process | | |

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| Sept | 1st | 1 st | Give the advantages and limitations of LD process | | |
| | | 2 nd | Description of different development of LD process : Bottom, top and combined blowing | | |
| | 2nd | 1 st | Development of LD with multi-nozzle | | |
| | | 2 nd | Automation and process control | | |
| | | 3 rd | Sub lances use in LD process | | |
| | | 4 th | Explain OLP or LDAC process | | |
| | 3rd | 1 st | Explain the principles, types of slag prepared by electric arc furnace | | |
| | | 2 nd | Explain the steps of EAF heating to produce steel | | |
| | | 3 rd | Mention advantages of EAF process | | |
| | | 4 th | Explain the steel making induction furnace | | |
| | | 5 th | Mention advantages and limitations of induction furnace process | | |
| | 4 th | 1 st | Brief study of other recent processes of steel making | | |
| | | 2 nd | Describe Ajax process | | |
| | | 3 rd | Describe OBM /Q-BOP process | | |
| | | 4 th | Describe spray steel making process | | |
| | 5th | 1 st | Future of OBM | | |
| Oct | 1st | 1 st | Metallurgical superiority of Hybrid Processes | | |
| | | 2 nd | Hybrid process at TATA steel | | |
| | | 3 rd | Deoxidation of liquid steel; deoxidation practice | | |
| | 3 rd | 1 st | Explain different de-oxidizers and their uses | | |
| | | 2 nd | Differentiate between killed steel, semi-killed steel and rimming steel | | |
| | | 3 rd | Clean steel and inclusion control | | |
| | | 4 th | Casting pit design | | |
| | | 5 th | Preparation of teeming ladle | | |
| | 4 th | 1 st | Describe different types of teeming methods ; direct pouring Tundish teeming and Bottom teeming, | | |
| | | 2 nd | Mechanism of solidification | | |
| | | 3 rd | Ingot moulds: mould material, hot top, bottom plate, mould life, mould preparation | | |
| | | 4 th | Describe different ingot defects, their causes and remedies | | |
| | | 5 th | Explain the principle and operation of continuous casting | | |
| | 5th | 1 st | Types of continuous casting machine | | |
| | | 2 nd | Details of continuous casting machine | | |
| | | 3 rd | Describe about the moulds and mould maintenance in continuous casting | | |
| | | 4 th | Discuss advantages of continuous casting | | |
| NOV | 1st | 1 st | Recent trends in continuous casting | | |
| | 2nd | 1 st | Introduction of secondary steel making, process varieties (ladle metallurgy) | | |
| | | 2 nd | Stirring techniques, synthetic slag refining | | |
| | | 3 rd | Explain the principles operation and advantages of secondary steel making process | | |
| | | 4 th | VAD Process | | |
| | | 5 th | VOD Process | | |
| | 3rd | 1 st | AOD Process | | |
| | | 2 nd | Vacuum treatment of liquid steel | | |
| | | 3 rd | Degassing Processes | | |
| | 4th | 1 st | Ladle degassing, stream degassing | | |
| | | 2 nd | Pollution control & waste management | | |

