

# KIIT POLYTECHNIC, BHUBANESWAR

## LESSON PLAN

Session 2022-23

|                                        |                            |                                                                                              |
|----------------------------------------|----------------------------|----------------------------------------------------------------------------------------------|
| Discipline : Metallurgical Engineering | Semester: 5th, Winter/2022 | Name of the Faculty: Manas Ranjan Behera<br>Lecturer<br>E-mail Id: mrbeherafmt@kp.kiit.ac.in |
| Subject: Non Ferrous Metallurgy (Th.5) | No. Days/Week: 4           | Start date: 15/09/2022<br>End date: 21/01/2023                                               |
| <b>Week</b>                            | <b>Class Day</b>           | <b>Theory Topics</b>                                                                         |
| 1st                                    | 1st                        | Introduction to the non ferrous ore reserves & industries in India                           |
|                                        | 2nd                        | Discussion on non ferrous ore reserves in India                                              |
|                                        | 3rd                        | Discussion on non ferrous industries in India                                                |
|                                        | 4th                        | Discussion on possible questionnaire                                                         |
| 2nd                                    | 1st                        | Extraction of metals from Oxide ores                                                         |
|                                        | 2nd                        | Extraction of aluminium.                                                                     |
|                                        | 3rd                        | Bayer's process of alumina production.                                                       |
|                                        | 4th                        | Fused salt electrolysis of alumina by Hall Heroult process.                                  |
| 3rd                                    | 1st                        | Discussion about anode effect.                                                               |
|                                        | 2nd                        | Method of refining of aluminium.                                                             |
|                                        | 3rd                        | Uses of aluminium.                                                                           |
|                                        | 4th                        | Discussion on possible questionnaire                                                         |
| 4th                                    | 1st                        | Extraction of Tin                                                                            |
|                                        | 2nd                        | Explanation of the process of tin ore concentration.                                         |
|                                        | 3rd                        | Explanation of the process of concentrate smelting for tin extraction.                       |
|                                        | 4th                        | Process of refining of tin                                                                   |
| 5th                                    | 1st                        | Uses of tin                                                                                  |
|                                        | 2nd                        | Quiz test                                                                                    |
|                                        | 3rd                        | Extraction of metals from sulphide Ores.                                                     |
|                                        | 4th                        | Pyrometallurgical extraction of Copper                                                       |
| 6th                                    | 1st                        | Process of roasting of copper ore.                                                           |
|                                        | 2nd                        | Process of matte smelting of copper ore.                                                     |
|                                        | 3rd                        | Process of converting of copper matte.                                                       |
|                                        | 4th                        | Refining of copper.                                                                          |

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| 7th  | 1st | Uses of copper.                                                          |
|      | 2nd | Pyrometallurgical extraction of Lead                                     |
|      | 3rd | Rosting and sintering of lead ore.                                       |
|      | 4th | Extraction of lead by blast furnace smelter                              |
| 8th  | 1st | Refining of base bullion                                                 |
|      | 2nd | Pyrometallurgical and Hydrometallurgical extraction of zinc              |
|      | 3rd | Roasting of zinc ore concentrate.                                        |
|      | 4th | Extraction of zinc by vertical retort process.                           |
| 9th  | 1st | Refining of zinc                                                         |
|      | 2nd | Process of leaching and preparation of zinc base solution.               |
|      | 3rd | Electrolysis of zinc solution                                            |
|      | 4th | Uses of zinc.                                                            |
| 10th | 1st | Pyrometallurgical method of Nickel extraction.                           |
|      | 2nd | Roasting of nickel ore                                                   |
|      | 3rd | Smelting of nickel concentrate.                                          |
|      | 4th | Refining of nickel                                                       |
| 11th | 1st | Uses of nickel                                                           |
|      | 2nd | Quiz test                                                                |
|      | 3rd | Extraction of metals from Halides.                                       |
|      | 4th | Extraction of Titanium                                                   |
| 12th | 1st | Concentration of titanium ore                                            |
|      | 2nd | Treatment given to titanium ore                                          |
|      | 3rd | Process of chlorination and magnesium reduction for titanium extraction. |
|      | 4th | Process of refining of titanium.                                         |
| 13th | 1st | Uses of titanium.                                                        |
|      | 2nd | Discussion on possible questionnaire                                     |
|      | 3rd | Introduction to extraction of precious metals.                           |
|      | 4th | Extraction of gold                                                       |
| 14th | 1st | Process of cyanidation for gold extraction.                              |
|      | 2nd | Uses of gold                                                             |
|      | 3rd | Production of Secondary metals                                           |
|      | 4th | Process of production of copper and lead from scraps                     |
| 15th | 1st | Process of production of zinc and aluminium from scraps                  |
|      | 2nd | Discussion on previous year's questions                                  |

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|  | 3rd | Practice test |
|  | 4th | Practice test |

Recommended books: 1.Extraction of non ferrous metals by Ray,Sridhar&Abraham

2. Non ferrous production metallurgy by Bray J.L

Manas Ranjan Behera

Signature of the concerned teacher