Lesson Plan

Department of Metallurgical Engineering UGIE Rourkela

|  |  |  |  |
| --- | --- | --- | --- |
| UTKALMANI GOPABANDHU INSTITUTE OF ENGINEERING, ROURKELA  Session: 2021-22 | | | |
| Discipline: **Metallurgical Engineering** | Semester: **4th** | Name of the Teaching Faculty: **SUMEETA RANI SARAP** | |
| Subject: **Principle of extractive metallurgy(TH-03)** | No. of days/per week class allotted:**4** | Semester from Date: **10. 03. 2022** to Date: **10.06.2022**  No. of weeks: 13 | |
| **Week** | **Class No.** | **Module** | **Lecture Topics** |
| 1 | 1 | Chapter -1: Definition of metallurgical terms | Ores and minerals |
| 2 | slag , flux , gangue |
| 3 | Matte, speiss, metals and alloys |
| 4 | -do- |
| 2 | 5 | Chapter -2: Principle of pre-treatment of ores for metal extractions | Drying and calcination |
| 6 | Agglomeration processes |
| 7 | -do- |
| 8 | -do- |
| 3 | 9 | -do- |
| 10 | -do- |
| 11 | Chapter-3: General Methods of Extraction | Pyro metallurgical processes |
| 12 | Roasting, different roasting  methods |
| 4 | 13 | Ellingham diagram |
| 14 | -do- |
| 15 | -do- |
| 16 | -do- |
| 5 | 17 | smelting and different smelting practices |
| 18 | Flash smelting , matte  smelting , hearth smelting |
| 19 | -do- |
| 20 | distillation and sublimation |
| 6 | 21 | process of converting of matte  and pig iron |
| 22 | hydrometallurgical |

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  | process |
| 23 | Flow diagram of  hydrometallurgical extraction |
| 24 |  | leaching and different leaching  methods |
| 7 | 25 | -do- |
| 26 | Electrometallurgical process |
| 27 | -do- |
| 28 | Electrolysis, Faraday’s law of electrolysis |
| 8 | 29 | -do- |
| 30 | EMF series |
| 31 | -do- |
| 32 | electro wining |
| 9 | 33 | electro refining |
| 34 | Chapter-7: Basic approaches to refining | Refining process |
| 35 | -do- |
| 36 | Chapter-5:Principle of metal extractions | Metallurgical thermodynamics |
| 10 | 37 | -do- |
| 38 | -do- |
| 39 | Zeroth law of thermodynamics |
| 40 | 1st law of thermodynamics |
| 11 | 41 | 2nd law of thermodynamics |
| 42 | 3rd law of thermodynamics |
| 43 | Internal Energy |
| 44 | enthalpy |
| 12 | 45 | Entropy , entropy change |
| 46 | Free energy |
| 47 | Henry’s law |
| 48 | Sivert’s Law |
| 13 | 49 | -do- |
| 50 | Reaction Kinetics |
| 51 | -do- |
| 52 | Chapter-6: Reaction Kinetics | first order reaction |
| 14 | 53 | -do- |
| 54 | Half-life period |
| 55 | Significance of first order  reaction |
| 56 | application of first order reaction |
| 15 | 57 |  | Revision class |
| 58 |  | Revision class |
| 59 |  | Revision class |
| 60 |  | Important question discussion |