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| **JHARSUGUDA ENGINEERING SCHOOL,JHARSUGUDA TH.4** UTILIZATION OF ELECTRICAL ENERGY & TRACTION **BY SUPRASAD PAL LESSON PLAN SESSION-2023-24** |
| **Sl.No.** | **Chapter** | **Hours** | **WEEK** | **Lecture No.** | **Topic to be covered** |
| 1 | Chapter-1 | 8 | **ELECTROLYTIC PROCESS** |
| 1 | 1 | Definition and Basic principle of Electro Deposition . |
| 1 | Important terms regarding electrolysis.Faradays Laws of Electrolysis. |
| 1 | Definitions of current efficiency, Energy efficiency. |
| 1 | Principle of Electro Deposition. |
| 2 | 4 | Factors affecting the amount of Electro Deposition.Factors governing the electro deposition.Discussing example of extraction of metals.Application of Electrolysis. |
| 2 | Chapter-2 | 8 |  | **ELECTRICAL HEATING** |
| 3 | 1 | Introduction of electrical heating and its advantages. |
| 1 | Mode of heat transfer and Stephen’s Law. |
| 1 | Discussing Principle of Resistance heating. |
| 1 | working principle of direct arc furnace and indirect arc furnace. |
| 4 | 1 | Working principle of direct core type, vertical core type and indirect core type Induction furnace. |
| 1 | Principle of coreless induction furnace and skin effect. |
| 1 | Principle of dielectric heating and its application. |
| 1 | Principle of Microwave heating and its application. |
| 3 | Chapter-3 | 8 | **PRINCIPLES OF ARC WELDING** |
| 5 | 1 | Explain principle of arc welding. |
| 1 | Discuss D. C. Arc phenomena. |
| 1 | Discuss A. C. Arc phenomena. |
| 1 | D.C.. arc welding plants of single and multi-operation type |
| 6 | 1 | A. C. arc welding plants of single and multi-operation type |
| 1 | Types of arc welding. |
| 1 | Explain principles of resistance welding |
| 1 | study of different resistance welding methods. |

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| 4 | Chapter-4 | 12 |  **ILLUMINATION** |
| 7 | 1 | Discussing Radiation and its spectrum. |
| 1 | Terms used in Illuminations. |
| 1 | Explain inverse square law , cosine law and polar curves. |
|  | 1 | Describe light distribution and Explain maintenance factor and depreciation factors. |
| 8 | 1 | Design simple lighting schemes and depreciation factor |
| 1 | Constructional feature and working of Filament lamps, effect of variation of voltage |
| 1 | Explain Discharge lamps. |
| 1 | State Basic idea about excitation in gas discharge lamps |
| 9 | 1 | State constructional factures and operation of Fluorescent lamp. (PL and PLL Lamps) |
| 1 | Sodium vapor lamps. 4.12. High pressure mercury vapor lamps. |
| 1 | Neon sign lamps. High lumen output & low consumption fluorescent |
| 1 | High lumen output & low consumption fluorescent lamps |
| 5 | Chapter-5 | 10 | 10 | **INDUSTRIAL DRIVES** |
| 1 | State group and individual drive |
| 1 | Method of choice of electric drives. |
| 1 | Explain starting and running characteristics of DC motor |
| 1 | Explain starting and running characteristics of ac motor |
| 11 | 1 | State Application of DC motor. |
| 1 | State Application of 3 phase induction motor |
| 1 | State Application of 3 phase synchronous motor |
| 1 | State Application of single phase induction motor |
| 12 | 1 | State Application of series motor |
|  | State Application of universal motor and repulsion motor |
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| 6 | Chapter 6 | 14 | 12 | **ELCTRIC TRACTION** |
| 1 | Explain system of traction |
| 1 | System of Track electrification |
| 13 | 1 | Explain control of motor |
| 1 | Tapped field control of motor |
| 1 | Rheostatic control of motor |
| 1 | Series parallel control of motor |
| 14 | 1 | Multi-unit control of motor |
| 1 | Metadyne control of motor |
| 1 | Explain Braking system |
| 1 | Regenerative Braking |
| 15 | 1 | Braking with 1-phase series motor |
| 1 | Magnetic Braking. |
| 1 | Running Characteristics of DC traction motor |
| 1 | Running Characteristics AC traction motor |