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| **Lesson plan** |
| **Name of Faculty** | Mrs. Renu Bala |
| **Discipline** | Electrical Engineering |
| **Semester** | 4th |
| **Subject** | UTILIZATION OF ELECTRICAL ENERGY |
| **Duration** | Week (From Feb 2024 to June 2024) Theory:04 |
| **Week** | **Theory** |
|  | **Lecture Day** | **Topics** |
| 1st | Day1 | **1: Electric Heating**, Advantages of electrical heating |
| Day2 | Heating methods: Resistance heating – direct and indirect resistance heating |
| Day3 | electric ovens, their temperature range, properties of resistance heating elements |
| Day4 | domestic water heaters and other heating appliances, thermostat control circuit |
| 2nd | Day1 | Induction heating; principle of core type and coreless induction furnace, their construction and applications |
| Day2 | Electric arc heating; direct and indirect arc heating |
| Day3 | construction, working and applications of arc furnace |
| Day4 | Dielectric heating, applications in various industrial fields |
| 3rd | Day1 | Infra-red heating and its applications (construction and working of two appliances) |
| Day2 | Microwave heating and its applications (construction and working of two appliances) |
| Day3 | Solar Heating |
| Day4 | Calculation of resistance heating elements (simple problems) |
| 4th | Day1 | Revision/class test |
| Day2 | **2 Electric Welding**: Advantages of electric welding |
| Day3 | Welding methods Principles of resistance welding, types – spot, projection |
| Day4 | seam and butt welding, welding equipment |
| 5th | Day1 | Principle of arc production, electric arc welding, characteristics of arc; carbon arc, |
| Day2 | Metal arc, hydrogen arc welding method and their applications. |
| Day3 | Power supply requirement. Advantages of using coated electrodes, |
| Day4 | Comparison between AC and DC arc welding, welding control circuits |
| 6th | Day1 | Welding of aluminum and copper |
| Day2 | Revision/class test |

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|  | Day3 | **3 Electrolytic Processes** :Need of electro-deposition |
| Day4 | Laws of electrolysis, process of electro-deposition |
| 7th | Day1 | clearing, operation, deposition of metals, polishing and buffing |
| Day2 | Equipment and accessories for electroplating |
| Day3 | Factors affecting electro-deposition |
| Day4 | Principle of galvanizing and its applications |
| 8th | Day1 | Principles of anodizing and its applications |
| Day2 | Electroplating of non-conducting materials |
| Day3 | Manufacture of chemicals by electrolytic process |
| Day4 | Revision/class test |
| 9th | Day1 | **4 Electrical Circuits used in Refrigeration, Air Conditioning and Water** |
|  |  | **Coolers:**Principle of air conditioning |
| Day2 | Description of Electrical circuit used in Refrigerator |
| Day3 | Air-conditioner |
| Day4 | Water cooler |
| 10th | Day1 | Revision/Assignment |
| Day2 | **5 Electric Drives**: Advantages of electric drives |
| Day3 | Characteristics of different mechanical loads |
| Day4 | Types of motors used as electric drive |
| 11th | Day1 | General idea about the methods of power transfer by direct coupling |
| Day2 | using devices like belt drive, gears |
| Day3 | By chain drives etc. |
| Day4 | Examples of selection of motors for different types of domestic loads |
| 12th | Day1 | Selection of drive for applications such as general workshop, textile mill, |
| Day2 | paper mill, steel mill |
| Day3 | printing press, crane and lift etc. |
| Day4 | Application of flywheel. |
| 13th | Day1 | Selection of motors for Domestic Appliances |
| Day2 | Revision/class test |
| Day3 | **6 Electric Traction:** Advantages of electric traction |
| Day4 | Different systems of electric traction, DC and AC systems |
| 14th | Day1 | diesel electric system, types of services |
| Day2 | urban, sub-urban |
| Day3 | and main line and their speed-time curves |
| Day4 | Different accessories for track electrification; such as overhead catenary wire, conductor rail system, current collector-pentagraph |

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| 15th | Day1 | Factors affecting scheduled speed |
| Day2 | Electrical block diagram of an electric locomotive with description of various equipment and accessories used. |
| Day3 | Types of motors used for electric traction Power supply arrangements |
| Day4 | Starting and braking of electric locomotives |
| 16th | Day1 | Introduction to EMU and metro railways |
| Day2 | Train Lighting Scheme |
| Day3 | Revision/class test |
| Day4 | Practice of old HSBTE Papers |