

Lesson plan		
Name of Faculty	Sh. Pawan Kumar	
Discipline	Electrical Engineering	
Semester	5th	
Subject	UTILIZATION OF ELECTRICAL ENERGY	
Duration	Week (From Sept2023 to Jan2024) 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

	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

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