

LESSON PLAN FOR UTILIZATION OF ELECTRICAL ENERGY & TRACTION [Th4]

Discipline: Electrical Engineering	Semester:5th	Name of the Teaching Faculty: PUJA PATNAIK (PTGF in EE)
Subject UTILIZATION OF ELECTRICAL ENERGY & TRACTION	Numbers of classes per week: 4	Semester from date:01/10/2021 to date:31/01/2022 No. of weeks: 15
week	Class day	Theory
1st	1st	1. ELECTROLYTIC PROCESS: 1.1. Definition and Basic principle of Electro Deposition.
	2nd	1.2. Important terms regarding electrolysis.
	3rd	1.3. Faradays Laws of Electrolysis
	4th	1.3. Faradays Laws of Electrolysis(contd.) 1.4. Definitions of current efficiency, Energy efficiency.
2nd	1st	1.5. Principle of Electro Deposition.
	2nd	1.6. Factors affecting the amount of Electro Deposition.
	3rd	1.7. Factors governing the electro deposition. 1.8. State simple example of extraction of metals
	4th	1.9. Application of Electrolysis.
3rd	1st	2. ELECTRICAL HEATING: 2.1. Advantages of electrical heating.
	2nd	2.2. Mode of heat transfer and Stephen's Law.
	3rd	2.3. Principle of Resistance heating. (Direct resistance and indirect resistance heating.)
	4th	2.4. Discuss working principle of direct arc furnace and indirect arc furnace.
4th	1st	2.5. Principle of Induction heating. 2.5.1. Working principle of direct core type, vertical core type and indirect core type Induction furnace.
	2nd	2.5.2. Principle of coreless induction furnace and skin effect.
	3rd	2.6. Principle of dielectric heating and its application.
	4th	2.7. Principle of Microwave heating and its application.
5th	1st	3. PRINCIPLES OF ARC WELDING: 3.1. Explain principle of arc welding.
	2nd	3.2. Discuss D. C. & A. C. Arc phenomena.
	3rd	3.3. D.C. & A. C. arc welding plants of single and multi-operation type.
	4th	3.4. Types of arc welding.
6th	1st	3.4. Types of arc welding.(contd.)
	2nd	3.5. Explain principles of resistance welding
	3rd	3.6. Descriptive study of different resistance welding methods.
	4th	3.6. Descriptive study of different resistance welding methods. (contd.)
7th	1st	4. ILLUMINATION:

		4.1. Nature of Radiation and its spectrum.
	2nd	4.2. Terms used in Illuminations. [Lumen, Luminous intensity, Intensity of illumination, MHCP, MSCP, MHSCP, Solid angle, Brightness, Luminous efficiency.]
	3rd	4.3. Explain the inverse square law and the cosine law.
	4th	4.4. Explain polar curves.
8th	1st	4.5. Describe light distribution and control. Explain related definitions like maintenance factor and depreciation factors.
	2nd	4.6. Design simple lighting schemes and depreciation factor.
	3rd	4.7. Constructional feature and working of Filament lamps, effect of variation of voltage on working of filament lamps.
	4th	4.8. Explain Discharge lamps.
9th	1st	4.9. State Basic idea about excitation in gas discharge lamps.
	2nd	4.10. State constructional features and operation of Fluorescent lamp. (PL and PLL Lamps)
	3rd	4.11. Sodium vapor lamps. 4.12. High pressure mercury vapor lamps.
	4th	4.13. Neon sign lamps. 4.14. High lumen output & low consumption fluorescent lamps.
10th	1st	5. INDUSTRIAL DRIVES: 5.1. State group and individual drive.
	2nd	5.2. Method of choice of electric drives.
	3rd	5.3. Explain starting and running characteristics of DC and AC motor.
	4th	5.3. Explain starting and running characteristics of DC and AC motor.(contd.)
11th	1st	5.3. Explain starting and running characteristics of DC and AC motor.(contd.)
	2nd	5.4. State Application of: 5.4.1. DC motor.
	3rd	5.4.2. 3-phase induction motor
	4th	5.4.3. 3 phase synchronous motors.
12th	1st	5.4.4. Single phase induction, series motor, universal motor and repulsion motor.
	2nd	5.4.4. Single phase induction, series motor, universal motor and repulsion motor. (contd.)
	3rd	6. ELECTRIC TRACTION: 6.1. Explain system of traction.
	4th	6.2. System of Track electrification.
13th	1st	6.3. Running Characteristics of DC and AC traction motor
	2nd	6.3. Running Characteristics of DC and AC traction motor(contd.)
	3rd	6.4. Explain control of motor: 6.4.1. Tapped field control.

	4th	6.4.2. Rheostat control.
14th	1st	6.4.3. Series parallel control.
	2nd	6.4.4. Multi-unit control.
	3rd	6.4.5. Metaldyne control.
	4th	6.5. Explain Braking of the following types: 6.5.1. Regenerative Braking.
15th	1st	6.5.1. Regenerative Braking.(contd.)
	2nd	6.5.2. Braking with 1-phase series motor.
	3rd	6.5.2. Braking with 1-phase series motor.(contd.)
	4th	6.5.3. Magnetic Braking.