



**GOVT. POLYTECHNIC KORAPUT
DEPARTMENT OF ELECTRICAL ENGG.**

LESSON PLAN

Discipline: Electrical	Semester: 5 th	Name of the Teaching Faculty: Ruhia Hansda
Subject: UTILIZATION OF ELECTRICAL ENERGY AND TRACTION	No. of days/per week class allotted : 4p/week	Semester From: No. of weeks:15 weeks
Week	Class Day	Theory Topics
1 st	1 st	1. ELECTROLYTIC PROCESS 1.1 Definition and Basic principle of Electro Deposition
	2 nd	1.2 Important terms regarding electrolysis.
2 nd	1 st	1.3 Faradays Laws of Electrolysis
	2 nd	1.4 Definitions of current efficiency, Energy efficiency
	3 rd	1.5 Principle of Electro Deposition
	4 th	1.6 Factors affecting the amount of Electro Deposition.
3 rd	1 st	1.7 Factors governing the electro deposition.
	2 nd	1.8 State simple example of extraction of metals.
	3 rd	1.9 Application of Electrolysis.
	4 th	2. ELECTRICAL HEATING 2.1. Advantages of electrical heating 2.2. Explain mode of heat transfer and Stephen's Law.
4 th	1 st	2.3. Discuss principle of Resistance heating. 2.3.1 Direct Resistance heating 2.3.2 Indirect Resistance heating
	2 nd	2.4. Explain working principle of direct arc furnace and indirect arc furnace
	3 rd	2.5. Principle of Induction heating.
	4 th	2.6. Working principle of direct core type, vertical core type and indirect core type Induction furnace
5 th	1 st	2.7. Principle of coreless induction furnace and skin effect
	2 nd	2.8. Principle of dielectric heating and its application
	3 rd	2.9. Principle of Microwave heating and its application
	4 th	3. PRINCIPLES OF ARC WELDING 3.1 Explain principle of arc welding.
6 th	1 st	3.2 Discuss D. C. & A. C. arc phenomena
	2 nd	3.3 D.C. & A. C. arc welding plants of single and multi-operation type.
	3 rd	3.4 Types of arc welding.
	4 th	3.5 Explain principles of resistance welding.
7 th	1 st	3.6 Descriptive study of different resistance welding methods
	2 nd	4. ILLUMINATION 4 . 1 Nature of Radiation and its spectrum
	3 rd	4 . 2 Terms used in Illuminations. i. Luminous intensity ii. Lumen iii. Intensity of illumination iv. MHCP v. MSCP



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	4 th	vi. MHSCP vii. Brightness viii. Solid angle ix. Luminous efficiency
8 th	1 st	4 . 3 Explain the inverse square law and the cosine law.
	2 nd	4 . 4 Explain polar curves.
	3 rd	4 . 5 Describe light distribution and control. Explain related definitions like maintenance factor and depreciation factors.
	4 th	4 . 6 Design simple lighting schemes and depreciation factor.
9 th	1 st	4 . 7 Constructional feature and working of Filament lamps, effect of variation of voltage on working of filament lamps.
	2 nd	4 . 8 Explain Discharge lamps.
	3 rd	4 . 9 State Basic idea about excitation in gas discharge lamps.
	4 th	4 . 9 State Basic idea about excitation in gas discharge lamps.
10 th	1 st	4 . 10 State constructional factures and operation of: - Fluorescent lamp. (PL and PLL Lamps)
	2 nd	4 . 10 State constructional factures and operation of: - Fluorescent lamp. (PL and PLL Lamps)
	3 rd	4 . 11 Sodium vapor lamps.
	4 th	4 . 11 Sodium vapor lamps.
11 th	1 st	4 . 12 High pressure mercury vapour lamps.
	2 nd	4 . 13 Neon sign lamps.
	3 rd	4 . 14 High lumen output & low consumption fluoresent lamps.
	4 th	4 . 14 High lumen output & low consumption fluoresent lamps.
12 th	1 st	5. INDUSTRIAL DRIVES 5 . 1 State group and individual drive.
	2 nd	5 . 2 Method of choice of electric drives.
	3 rd	5 . 3 Explain starting and running characteristics of DC and AC motor.
	4 th	5 . 4 State Application of : 5.4.1 DC motor
13 th	1 st	5.4.2 phase induction motor
	2 nd	5.4.3 phase synchronous motors.
	3 rd	5.4.4 Single phase induction, series motor, universal motor and repulsion motor.
	4 th	6. ELECTRIC TRACTION 6. 1. Explain system of traction
14 th	1 st	6. 2. System of Track electrification.
	2 nd	6. 3. Running Characteristics of DC and AC traction motor.(cont..)
	3 rd	6. 3. Running Characteristics of DC and AC traction motor
	4 th	6. 4. Explain control of motor
15 th	1 st	6.4.1 Tapped field control
	2 nd	6.4.2 Rheostatic control
	3 rd	6.4.3 Series parallel control
	4 th	6.4.4 Metadyne control
16 th	1 st	6. 5. Explain Braking of the following types.
	2 nd	6.5.1 Regenerative Braking
	3 rd	6.5.2 Braking with 1-phase series motor
	4 th	6.5.3 Magnetic Braking

(HOD Electrical)