NILASAILA INSTITUTE OF SCIENCE & TECHNOLOGY
SERGARH-756060, BALASORE (ODISHA)
(Approved by AICTE& affiliated to SCTE&VT, Odisha)

LESSON PLAN

SUBJECT: Th-4 (UTILIZATION OF ELECTRICAL ENERGY & TRACTION)

Name Of The Faculty :- Er. RANJAN KUMAR PADHI
Branch :-ELECTRICAL ENGG **Semester** :- 5th
Session :-2025-26 **Examination** :-2025 (W)

CHAPTER WISE DISTRIBUTION OF PERIODS

Sl.No.	Name of the chapter as per the Syllabus	No of Periods as per the syllabus	No. of periods actually needed
1	Electrolytic Process	8	8
2	Electrical Heating.	8	8
3	Principles of Arc Welding.	8	8
4	Illumination.	12	12
5	Industrial Drives.	10	10
6	Electric Traction.	14	14
	Total Period:	60	60

Padhi
10.7.25

SIGN OF FACULTY

10/07/25

SIGN OF H.O.D

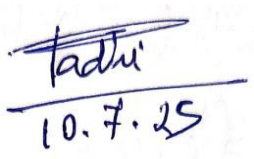
Name of the programme: Diploma in EE	Semester: 5TH	**Name of the Teaching Faculty:** Er. RANJAN KUMAR PADHI	
		Academic Year : 2025-26 **Examination :** 2025 (W)	
Course Code: TH:4	**Course Year:** Third Year	**No. of Classes Alloted Per Week :**	4
		Planned Classes Required to Complete the Course	60

Week	Class Day	Theory / Practical Topics
1st	1st	**CHAPTER-01- 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	1.4. Definitions of current efficiency, Energy efficiency.
2nd	1st	1.5. Principle of Electro Deposition.
	2nd	1.5. Principle of Electro Deposition.
	3rd	1.6. Factors affecting the amount of Electro Deposition.
	4th	1.7. Factors governing the electro deposition.
3rd	1st	**CHAPTER-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	Principle of Induction heating. 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.

Week	Class Day	Theory / Practical Topics
5th	1st	**CHAPTER-3-PRINCIPLES OF ARC WELDING** 3.1. Explain principle of arc welding.
	2nd	3.2. Discuss D. C. & A. C. Arc phenomena.
	3rd	3.2. Discuss D. C. & A. C. Arc phenomena.
	4th	3.3. D.C. & A. C. arc welding plants of single and multi-operation type.
6th	1st	3.3. D.C. & A. C. arc welding plants of single and multi-operation type.
	2nd	Types of arc welding. 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.
7th	1st	**CHAPTER-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 voltageon 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 factures 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.

Week	Class Day	Theory / Practical Topics
10th	1st	**CHAPTER-5- INDUSTRIAL DRIVES** 5.1. State group and individual drive.
	2nd	5.2. Method of choice of electric drives.
	3rd	5.2. Method of choice of electric drives.
	4th	5.2. Method of choice of electric drives.
11th	1st	5.3. Explain starting and running characteristics of DC and AC motor.
	2nd	5.3. Explain starting and running characteristics of DC and AC motor.
	3rd	5.3. Explain starting and running characteristics of DC and AC motor.
	4th	State Application of: DC motor.
12th	1st	3-phase induction motor. 3 phase synchronous motors. Single phase induction, series motor, universal motor and repulsion motor.
	2nd	3-phase induction motor. 3 phase synchronous motors. Single phase induction, series motor, universal motor and repulsion motor.
	3rd	**CHAPTER-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.
	3rd	Explain control of motor: Tapped field contro
	4th	6.4.2. Rheostatic control.
14th	1st	6.4.3. Series parallel control.
	2nd	6.4.4. Multi-unit control.
	3rd	6.4.5. Metadyne control.
	4th	Explain Braking of the following types: Regenerative Braking.

Week	Class Day	Theory / Practical Topics
15th	1st	Explain Braking of the following types: Regenerative Braking.
	2nd	6.5.2. Braking with 1-phase series motor.
	3rd	6.5.2. Braking with 1-phase series motor.
	4th	6.5.3. Magnetic Braking.



Sign of Faculty

Sign of H.O.D.