



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)

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	10
3	Principles of Arc Welding.	8	5
4	Illumination.	12	18
5	Industrial Drives.	10	5
6	Electric Traction.	14	14
	Total Period:	60	60

Discipline: ELECTRICAL ENGINEERING	Semester: 5th	Name of the Teaching Faculty: Er.NIRANJAN BARIK
Week	Class Day	Theory / Practical Topics
1 st	1 st	CHAPTER-01- ELECTROLYTIC PROCESS 1.1. Definition and Basic principle of Electro Deposition.
	2 nd	1.2. Important terms regarding electrolysis.
	3 rd	1.3. Faradays Laws of Electrolysis
	4 th	1.4. Definitions of current efficiency, Energy efficiency.
2 nd	1 st	1.5. Principle of Electro Deposition.
	2 nd	1.6. Factors affecting the amount of Electro Deposition.
	3 rd	1.7. Factors governing the electro deposition.
	4 th	State simple example of extraction of metals. Application of Electrolysis.
3 rd	1 st	CHAPTER-2-ELECTRICAL HEATING 2.1. Advantages of electrical heating.
	2 nd	2.2. Mode of heat transfer and Stephen's Law.
	3 rd	2.2. Mode of heat transfer and Stephen's Law.
	4 th	2.3. Principle of Resistance heating. (Direct resistance and indirect resistance heating.)
th	1 st	2.3. Principle of Resistance heating. (Direct resistance and indirect resistance heating.)
	2 nd	2.4. Discuss working principle of direct arc furnace and indirect arc furnace.

4	3 rd	Principle of Induction heating. Working principle of direct core type, vertical core type and indirect core type Induction furnace.
	4 th	2.5.2. Principle of coreless induction furnace and skin effect.
5 th	1 st	2.6. Principle of dielectric heating and its application
	2 nd	2.7. Principle of Microwave heating and its application.
	3 rd	CHAPTER-3-PRINCIPLES OF ARC WELDING 3.1. Explain principle of arc welding.
	4 th	3.2. Discuss D. C. & A. C. Arc phenomena.
6 th	1 st	3.3. D.C. & A. C. arc welding plants of single and multi-operation type.
	2 nd	Types of arc welding. Explain principles of resistance welding.
	3 rd	3.6. Descriptive study of different resistance welding methods.
	4 th	CHAPTER-4- ILLUMINATION 4.1. Nature of Radiation and its spectrum.
7 th	1 st	4.2. Terms used in Illuminations. [Lumen, Luminous intensity, Intensity of illumination, MHCP, MSCP, MHSCP, Solid angle, Brightness, Luminous efficiency.]
	2 nd	4.2. Terms used in Illuminations. [Lumen, Luminous intensity, Intensity of illumination, MHCP, MSCP, MHSCP, Solid angle, Brightness, Luminous efficiency.]
	3 rd	4.3. Explain the inverse square law and the cosine law.
	4 th	4.4. Explain polar curves.
	1 st	4.5. Describe light distribution and control. Explain related definitions like maintenance factor and depreciation factors.

8 th	2 nd	4.5. Describe light distribution and control. Explain related definitions like maintenance factor and depreciation factors.
	3 rd	4.6. Design simple lighting schemes and depreciation factor.
	4 th	4.7. Constructional feature and working of Filament lamps, effect of variation of voltage on working of filament lamps.
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	4.10. State constructional features and operation of Fluorescent lamp. (PL and PLL Lamps)
10 th	1 st	4.10. State constructional features and operation of Fluorescent lamp. (PL and PLL Lamps)
	2 nd	4.11. Sodium vapor lamps.
	3 rd	4.12. High pressure mercury vapor lamps.
	4 th	4.13. Neon sign lamps.
11 th	1 st	4.14. High lumen output & low consumption fluorescent lamps.
	2 nd	CHAPTER-5- INDUSTRIAL DRIVES 5.1. State group and individual drive.
	3 rd	5.2. Method of choice of electric drives.
	4 th	5.3. Explain starting and running characteristics of DC and AC motor.

12 th	1 st	State Application of: DC motor.
	2 nd	3-phase induction motor. 3 phase synchronous motors. Single phase induction, series motor, universal motor and repulsion motor.
	3 rd	CHAPTER-6 ELECTRIC TRACTION: 6.1. Explain system of traction.
	4 th	6.2. System of Track electrification
13 th	1 st	6.3. Running Characteristics of DC and AC traction motor.
	2 nd	Explain control of motor: Tapped field contro
	3 rd	6.4.2. Rheostatic control.
	4 th	6.4.3. Series parallel control.
14 th	1 st	6.4.4. Multi-unit control.
	2 nd	6.4.5. Metadyne control.
	3 rd	Explain Braking of the following types: Regenerative Braking.
	4 th	6.5.2. Braking with 1-phase series motor.
15 th	1 st	6.5.3. Magnetic Braking.
	2 nd	CLASS TEST
	3 rd	CLASS TEST

	4 th	CLASS TEST
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