



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.Soumyajit Rout
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	1.6. Factors affecting the amount of Electro Deposition.
	3rd	1.7. Factors governing the electro deposition.
	4th	1.8. State simple example of extraction of metals. 1.9. Application of Electrolysis.
3rd	1st	CHAPTER-2-ELECTRICAL HEATING 2.1. Advantages of electrical heating.
	2nd	2.2. Mode of heat transfer and Stephen's Law.
	3rd	2.2. Mode of heat transfer and Stephen's Law.
	4th	2.3. Principle of Resistance heating. (Direct resistance and indirect resistance heating.)
4th	1st	2.3. Principle of Resistance heating. (Direct resistance and indirect resistance heating.)
	2nd	2.4. Discuss working principle of direct arc furnace and indirect arc furnace.

4	3 rd	2.5. Principle of Induction heating. 2.5.1. 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	3.4. Types of arc welding. 3.5. 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	5.4. State Application of: 5.4.1. DC motor.
	2 nd	5.4.2. 3-phase induction motor. 5.4.3. 3 phase synchronous motors. 5.4.4. 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	6.4. Explain control of motor: 6.4.1. 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	6.5. Explain Braking of the following types: 6.5.1. 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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