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. NIRANJAN BARIK
Branch :-ELECTRICAL ENGG
Semester :- 5th
Session :-2024-25
Examination :-2024 (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	9
2	Electrical Heating.	8	10
3	Principles of Arc Welding.	8	10
4	Illumination.	12	17
5	Industrial Drives.	10	11
6	Electric Traction.	14	15
	Total Period:	60	72

SIGN OF FACULTY

SIGN OF H.O.D

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	1.5. Principle of Electro Deposition.
	$_3$rd	1.6. Factors affecting the amount of Electro Deposition.
	$_4$th	1.7. Factors governing the electro deposition.
$_3$rd	$_1$st	State simple example of extraction of metals. Application of Electrolysis.
	$_2$nd	**CHAPTER-2-ELECTRICAL HEATING** 2.1. Advantages of electrical heating.
	$_3$rd	2.2. Mode of heat transfer and Stephen's Law.
	$_4$th	2.2. Mode of heat transfer and Stephen's Law.
$_4$th	$_1$st	2.3. Principle of Resistance heating. (Direct resistance and indirect resistance heating.)
	$_2$nd	2.3. Principle of Resistance heating. (Direct resistance and indirect resistance heating.)
	$_3$rd	2.4. Discuss working principle of direct arc furnace and indirect arc furnace.
	$_4$th	Principle of Induction heating. Working principle of direct core type, vertical core type and indirect core type Induction furnace.

Week	Class Day	Theory / Practical Topics
5th	1st	2.5.2. Principle of coreless induction furnace and skin effect.
	2nd	2.6. Principle of dielectric heating and its application
	3rd	2.7. Principle of Microwave heating and its application.
	4th	**CHAPTER-3-PRINCIPLES OF ARC WELDING** 3.1. Explain principle of arc welding.
6th	1st	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.
7th	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	Types of arc welding. Explain principles of resistance welding.
	4th	3.6. Descriptive study of different resistance welding methods.
8th	1st	3.6. Descriptive study of different resistance welding methods.
	2nd	**CHAPTER-4- ILLUMINATION** 4.1. Nature of Radiation and its spectrum.
	3rd	4.2. Terms used in Illuminations. [Lumen, Luminous intensity, Intensity of illumination, MHCP, MSCP, MHSCP, Solid angle, Brightness, Luminous efficiency.]
	4th	4.2. Terms used in Illuminations. [Lumen, Luminous intensity, Intensity of illumination, MHCP, MSCP, MHSCP, Solid angle, Brightness, Luminous efficiency.]

Week	Class Day	Theory / Practical Topics
9th	1st	4.3. Explain the inverse square law and the cosine law.
	2nd	4.3. Explain the inverse square law and the cosine law.
	3rd	4.4. Explain polar curves.
	4th	4.5. Describe light distribution and control. Explain related definitions like maintenance factor and depreciation factors.
10th	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	4.7. Constructional feature and working of Filament lamps, effect of variation of voltageon working of filament lamps.
11th	1st	4.8. Explain Discharge lamps.
	2nd	4.9. State Basic idea about excitation in gas discharge lamps.
	3rd	4.10. State constructional factures and operation of Fluorescent lamp. (PL and PLL Lamps)
	4th	4.10. State constructional factures and operation of Fluorescent lamp. (PL and PLL Lamps)
12th	1st	4.11. Sodium vapor lamps. 4.12. High pressure mercury vapor lamps.
	2nd	4.13. Neon sign lamps. 4.14. High lumen output & low consumption fluorescent lamps.
	3rd	**CHAPTER-5- INDUSTRIAL DRIVES** 5.1. State group and individual drive.
	4th	5.2. Method of choice of electric drives.
13th	1st	5.2. Method of choice of electric drives.
	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.

Week	Class Day	Theory / Practical Topics
14th	1st	5.3. Explain starting and running characteristics of DC and AC motor.
	2nd	State Application of: DC motor.
	3rd	3-phase induction motor. 3 phase synchronous motors.
	4th	3-phase induction motor. 3 phase synchronous motors.
15th	1st	3-phase induction motor. 3 phase synchronous motors.
	2nd	**CHAPTER-6 ELECTRIC TRACTION:** 6.1. Explain system of traction.
	3rd	6.2. System of Track electrification
	4th	6.2. System of Track electrification
16th	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.
17th	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.
18th	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

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