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DEPARTMENT OF ELECTRICAL ENGINEERING

Govt. Polytechnic, Balasore

LESSON PLAN FOR ACADEMIC SESSION – 2024-25

UTILIZATION OF ELECTRICAL ENERGY & TRACTION

Course Code : Th.4	**Semester : 5th**
Total Periods : 60 Periods	**Examination : 3 Hours**
Theory Periods : 4 P/Week	**Internal Assessment : 20 Marks**
Tutorial : -	**End Semester Examination : 80 Marks**
Maximum Marks : 100	
Semester From Date : 01/07/2024	**To Date : 16/12/2024**
Name of Teaching Faculty: Er. Radha Rani Panda	

WEEK	PERIOD	TOPIC
1st	1st	**ELECTROLYTIC PROCESS:** Definition and Basic principle of Electro Deposition.
	2nd	Important terms regarding electrolysis.
	3rd	Faradays Laws of Electrolysis.
	4th	Definitions of current efficiency, Energy efficiency.
2nd	1st	Principle of Electro Deposition.
	2nd	Factors affecting the amount of Electro Deposition.
	3rd	Factors governing the electro deposition.
	4th	State simple example of extraction of metals. Application of Electrolysis.
3rd	1st	**ELECTRICAL HEATING:** Advantages of electrical heating.
	2nd	Mode of heat transfer and Stephen's Law.
	3rd	Principle of Resistance heating. (Direct resistance and indirect resistance heating.)
	4th	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	Principle of coreless induction furnace and skin effect.
	3rd	Principle of dielectric heating and its application.
	4th	Principle of Microwave heating and its application.
5th	1st	**PRINCIPLES OF ARC WELDING:** Explain principle of arc welding.
	2nd	Discuss D. C. & A. C. Arc phenomena.
	3rd	D.C. & A. C. arc welding plants of single and multi-operation type.
	4th	Types of arc welding.
6th	1st	Types of arc welding.
	2nd	Explain principles of resistance welding.
	3rd	Descriptive study of different resistance welding methods.
	4th	Descriptive study of different resistance welding methods.
7th	1st	**ILLUMINATION:** Nature of Radiation and its spectrum.
	2nd	Terms used in Illuminations. [Lumen, Luminous intensity, Intensity of illumination, MHCP, MSCP, MHSCP, Solid angle, Brightness, Luminous efficiency.]
	3rd	Explain the inverse square law and the cosine law.
	4th	Explain polar curves.
8th	1st	Describe light distribution and control. Explain related definitions like maintenance factor and depreciation factors.
	2nd	Design simple lighting schemes and depreciation factor.
	3rd	Constructional feature and working of Filament lamps, effect of variation of voltage on working of filament lamps.
	4th	Explain Discharge lamps. State Basic idea about excitation in gas discharge lamps.
9th	1st	State constructional factures and operation of Fluorescent lamp. (PL and PLL Lamps)
	2nd	Sodium vapor lamps. High pressure mercury vapor lamps.
	3rd	Neon sign lamps.
	4th	High lumen output & low consumption fluorescent lamps.
10th	1st	**INDUSTRIAL DRIVES:** State group and individual drive.
	2nd	Method of choice of electric drives.
	3rd	Explain starting and running characteristics of DC motor
	4th	Explain starting and running characteristics of AC motor.

11th	1st	State Application of: DC motor.
	2nd	State Application of: 3-phase induction motor.
	3rd	State Application of: 3 phase synchronous motors.
	4th	State Application of: Single phase induction, series motor
12th	1st	State Application of: Universal motor
	2nd	State Application of: Repulsion motor.
	3rd	**ELECTRIC TRACTION:** Explain system of traction.
	4th	System of Track electrification.
13th	1st	Running Characteristics of DC traction motor.
	2nd	Running Characteristics of AC traction motor.
	3rd	Explain control of motors.
	4th	Tapped field control.
14th	1st	Rheostatic control.
	2nd	Series parallel control.
	3rd	Multi-unit control.
	4th	Metadyne control.
15th	1st	Explain Braking of the following types: Regenerative Braking.
	2nd	Braking with 1-phase series motor.
	3rd	Magnetic Braking.
	4th	Magnetic Braking.