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**LESSON PLAN**

A)

<b>PROGRAMME: DIPLOMA ENGINEERING</b>	<b>COURSE: ELECTRICAL ENGINEERING</b>
<b>TEACHER NAME: SUDIPTI SUPRITI SAHOO</b>	<b>SEMESTER : 5<sup>TH</sup></b>
<b>SUBJECT NAME: UTILIZATION OF ELECTRICAL ENERGY &amp; TRACTION</b>	<b>THEORY NO: 4</b>
<b>COURSE AREA/ DOMAIN :</b>	<b>CONTACT HOURS: 1Hr.</b>
<b>CORRESPONDING LAB PRACTICAL NO(IF ANY):</b>	<b>LAB COURSE NAME:</b>

**B) Course Outcomes:****At the end of the course, the students will be able to:**

- 1.To acquire knowledge of principle of ionic dissociation and electrolysis and loss involving in the process, usage of this process.
2. To acquire knowledge of types of electrical heating as employed in the electrical oven, induction furnaces and arc furnaces and dielectrically ovens.
3. To acquire knowledge of principle of arc welding and resistant welding,
4. To define various terms used in illumination engineering to design lighting schemes with specific attention to laws of illumination to explain the working and construction and use of fluorescent lamp, SV lamp, H.P. MV, Neon lamps and energy saving lamps.
5. To classify various types of industrial drives and their application.
6. To classify various methods of traction and traction motor with their control and types of braking.

**C) Text Books:**

<b>Sl.No.</b>	<b>Prescribed Books</b>	<b>Author</b>
<b>01</b>	<i>Utilization of Electrical Energy by Traction</i>	<i>G. C. Garg</i>
<b>02</b>	<i>Utilization of Electrical Energy</i>	<i>E. I. Taylor</i>



## D) Course Plan:

<i>Planning</i>				
Week No.	Lecture No.	Chapter No.	Article(s) from the Syllabus	Topics to be taught (Brief Description of the title from the Prescribed Book)
1	1 2 3 4	1	1.1 1.2 1.3 1.4	Definition and Basic principle of Electro Deposition. Important terms regarding electrolysis. Faradays Laws of Electrolysis. Definitions of current efficiency, Energy efficiency
2	5 6 7 8 8	1	1.5 1.6 1.7 1.8 1.9	Principle of Electro Deposition. Factors affecting the amount of Electro Deposition. Factors governing the electro deposition. State simple example of extraction of metals. Application of Electrolysis
3	9 10 11 12	2	2.1 2.2 2.3 2.4	Advantages of electrical heating. Mode of heat transfer and Stephen's Law. Principle of Resistance heating. (Direct resistance and indirect resistance heating.) Discuss working principle of direct arc furnace and indirect arc furnace.
4	13 14 15 16	2	2.5 2.5.1 2.5.2 2.6	Principle of Induction heating. Working principle of direct core type, vertical core type and indirect core type Induction furnace. Principle of coreless induction furnace and skin effect. Principle of dielectric heating and its application.
5	17	2	2.7	Principle of Microwave heating and its application.
5	18 19 20	3	3.1 3.2 3.3	Explain principle of arc welding. Discuss D. C. & A. C. Arc phenomena. D.C. & A. C. arc welding plants of single and multi-operation type.
6	21-22 23 24	3	3.4 3.5 3.6	Types of arc welding. Explain principles of resistance welding. Descriptive study of different resistance welding methods.
7	25 26 27 28	4	4.1 4.2 4.3 4.4	Nature of Radiation and its spectrum. Terms used in Illuminations. [Lumen, Luminous intensity, Intensity of illumination, MHCP, MSCP, MHSCP, Solid angle, Brightness, Luminous efficiency.] Explain the inverse square law and the cosine law. Explain polar curves
8	29 30 31 32	5	4.5 4.6 4.7 4.8	Describe light distribution and control. Explain related definitions like maintenance factor and depreciation factors. Design simple lighting schemes and depreciation factor. Constructional feature and working of Filament lamps, effect of variation of voltage on working of filament lamps. Explain Discharge lamps



9	33 34 35 36	4	4.9 4.10 4.11 4.12	State Basic idea about excitation in gas discharge lamps. State constructional features and operation of Fluorescent lamp. (PL and PLL Lamps) Sodium vapor lamps. High pressure mercury vapor lamps.
10	37 38	4	4.13 4.14	Neon sign lamps. High lumen output & low consumption fluorescent lamps.
10	39 40		5.1 5.2	State group and individual drive. Method of choice of electric drives.
11	41 42 43-44	5	5.3 5.4 5.4.1	Explain starting and running characteristics of DC and AC motor. State Application of: DC motor.
12	45 46 47-48	5	5.4.2 5.4.3 5.4.4	3-phase induction motor. 3 phase synchronous motors. Single phase induction, series motor, universal motor and repulsion motor.
13	49 50 51 52	6	6.1 6.2 6.3 6.4 6.4.1	Explain system of traction. System of Track electrification. Running Characteristics of DC and AC traction motor. Explain control of motor: Tapped field control
14	53 54 55 56	6	6.4.2 6.4.3 6.4.4 6.4.5	Rheostatic control. Series parallel control. Multi-unit control. Metadyne control
15	57 58 59 60	6	6.5 6.5.1 6.5.2 6.5.3	Explain Braking of the following types: Regenerative Braking. Braking with 1-phase series motor. Magnetic Braking.

*Faculty*

*HOD*

*Academic Convener*

*Principal*