

Discipline <b>Electrical Engg.</b>	Semester:- <b>5<sup>th</sup></b>	Name of the Teaching Faculty:- <b>AMIYA RANJAN DAS</b>
Subject:- UTILIZATION OF ELECTRICAL ENERGY AND TRACTION(TH-4)	No of Days/per Week Class Allotted :- <b>04</b>	Semester From:- 0 1.10.2021 To:-08.01.2022  No of Weeks:- <b>15</b>
<b>Week</b>	<b>Class Day</b>	<b>Theory/ Practical Topics</b>
<b>1<sup>st</sup></b>	1 <sup>st</sup>	<b>1. ELECTROLYTIC PROCESS</b> Definition and Basic principle of Electro Deposition.
	2 <sup>nd</sup>	Important terms regarding electrolysis. Faradays Laws of Electrolysis.
	3 <sup>rd</sup>	1.4 Definitions of current efficiency, Energy efficiency.
	4 <sup>th</sup>	1.5 Principle of Electro Deposition.
<b>2<sup>nd</sup></b>	1 <sup>st</sup>	1.6 Factors affecting the amount of Electro Deposition.
	2 <sup>nd</sup>	1.7 Factors governing the electro deposition.
	3 <sup>rd</sup>	1.8 State simple example of extraction of metal
	4 <sup>th</sup>	1.9 Application of Electrolysis
<b>3<sup>rd</sup></b>	1 <sup>st</sup>	<b>2. ELECTRICAL HEATING</b> Advantages of electrical heating.
	2 <sup>nd</sup>	2.2. Explain mode of heat transfer and Stephen's Law.
	3 <sup>rd</sup>	Discuss principle of Resistance heating. Direct Resistance heating. Indirect Resistance heating
	4 <sup>th</sup>	2.4. Explain working principle of direct arc furnace and indirect arc furnace
<b>4<sup>th</sup></b>	1 <sup>st</sup>	2.5. Principle of Induction heating.
	2 <sup>nd</sup>	2.6. Working principle of direct core type, vertical core type and indirect Core type Induction furnace
	3 <sup>rd</sup>	2.7. Principle of coreless induction furnace and skin effect
	4 <sup>th</sup>	Principle of dielectric heating and its application. Principle of Microwave heating and its application
<b>5<sup>th</sup></b>	1 <sup>st</sup>	<b>3. PRINCIPLES OF ARC WELDING</b> Explain principle of arc welding.
	2 <sup>nd</sup>	3.2 Discuss D. C. & A. C. arc phenomena
	3 <sup>rd</sup>	3.3 D.C. & A. C. arc welding plants of single and multi-operation type
	4 <sup>th</sup>	3.3 D.C. & A. C. arc welding plants of single and multi-operation type (Contd..)
<b>6<sup>th</sup></b>	1 <sup>st</sup>	3.4 Types of arc welding
	2 <sup>nd</sup>	3.5 Explain principles of resistance welding
	3 <sup>rd</sup>	3.6 Descriptive study of different resistance welding methods
	4 <sup>th</sup>	3.6 Descriptive study of different resistance welding method (Contd....)
<b>7<sup>th</sup></b>	1 <sup>st</sup>	<b>4. ILLUMINATION</b> 4 .1 Nature of Radiation and its spectrum
	2 <sup>nd</sup>	4 .2 Terms used in Illuminations. i. Luminous intensity ii. Lumen iii. Intensity of illumination iv. MHCP v. MSCP vi. MHSCP vii. Brightness viii. Solid angle ix. Luminous efficiency
	3 <sup>rd</sup>	4 .3 Explain the inverse square law and the cosine law.4 .4 Explain polar curves.
	4 <sup>th</sup>	4 .5 Describe light distribution and control. Explain related definitions like maintenance factor and depreciation factors.

8 <sup>th</sup>	1 <sup>st</sup>	4 .6 Design simple lighting schemes and depreciation factor. 4 .7 Constructional feature and working of Filament lamps, effect of variation of voltage on working of filament lamps.
	2 <sup>nd</sup>	4 .8 Explain Discharge lamps
	3 <sup>rd</sup>	4 .9 State Basic idea about excitation in gas discharge lamps.
	4 <sup>th</sup>	4 .10 State constructional factures and operation of: - Fluorescent lamp. (PL and PLL Lamps)
9 <sup>th</sup>	1 <sup>st</sup>	4 .11 Sodium vapor lamps
	2 <sup>nd</sup>	4 .12 High pressure mercury vapour lamps.
	3 <sup>rd</sup>	4 .13 Neon sign lamps.
	4 <sup>th</sup>	4 .14 High lumen output & low consumption fluoresent lamps
10 <sup>th</sup>	1 <sup>st</sup>	<b>5. INDUSTRIAL DRIVES</b> 5 .1 State group and individual drive
	2 <sup>nd</sup>	5 .2 Method of choice of electric drives.
	3 <sup>rd</sup>	5 .2 Method of choice of electric drives.(Contd..)
	4 <sup>th</sup>	5 .3 Explain starting and running characteristics of DC and AC motor.
11 <sup>th</sup>	1 <sup>st</sup>	5 .4 State Application of : 5.4.1 DC motor
	2 <sup>nd</sup>	5.4.2 3 phase induction motor
	3 <sup>rd</sup>	5.4.3 3 phase synchronous motors
	4 <sup>th</sup>	5.4.3 3 phase synchronous motors.(Contd..)
12 <sup>th</sup>	1 <sup>st</sup>	5.4.4 Single phase induction, series motor, universal motor and repulsion motor
	2 <sup>nd</sup>	5.4.4 Single phase induction, series motor, universal motor and repulsion motor(Contd..)
	3 <sup>rd</sup>	<b>6. ELECTRIC TRACTION</b> 6. 1. Explain system of traction.
	4 <sup>th</sup>	6. 2. System of Track electrification.
13 <sup>th</sup>	1 <sup>st</sup>	6. 2. System of Track electrification. (Contd..)
	2 <sup>nd</sup>	6. 3. Running Characteristics of DC and AC traction motor.
	3 <sup>rd</sup>	6. 4. Explain control of motor 6.4.1 Tapped field control
	4 <sup>th</sup>	6.4.2 Rheostatic control
14 <sup>th</sup>	1 <sup>st</sup>	6.4.3 Series parallel control
	2 <sup>nd</sup>	6.4.4 Metadyne control
	3 <sup>rd</sup>	6. 5. Explain Braking of the following types.
	4 <sup>th</sup>	6.5.1 Regenerative Braking
15 <sup>th</sup>	1 <sup>st</sup>	6.5.1 Regenerative Braking(Contd..)
	2 <sup>nd</sup>	6.5.2 Braking with 1-phase series motor
	3 <sup>rd</sup>	6.5.3 Magnetic Braking
	4 <sup>th</sup>	6.5.3 Magnetic Braking(Contd..)