

## Department of Electrical & Electronics Engineering

### Utilization of Electrical Energy & electric Traction Theory (ETEE 304)

#### ACADEMIC PLAN FOR SEMESTER-VI2022 & 2023

S.No.	TOPICS TO BE COVERED	Total No. of Lectures (42)	CO
<b>UNIT-I(Illumination)</b>			
1	Introduction, Terms used in Illumination.	2	CO1
2	Laws of Illumination, Polar Curves	2	
3	Photometry, Integrating Sphere.	2	
4	Sources of Light: Discharge Lamps, Mercury Vapour and Sodium Vapour Lamps, Performance Comparison between Tungsten Filament, Fluorescent Tubes, CFL and LED Lights.	3	
5	Basic Principles of Light control; Types and Design of Lighting Schemes and Flood Lighting.	2	
<b>UNIT-II (Electrical Heating, Welding)</b>			
6	Principle and Application of Resistance, Induction and Dielectric Heating, Infrared or Radiant Heating.	2	CO2
7	High Frequency Eddy current heating, Arc Furnace, Induction Furnace. Electric supply for high frequency heating applications.	3	
8	Resistance Welding, Arc Welding, Comparison between Resistance and Arc welding	2	
9	Welding Generator and Welding Transformer.	2	
10	Properties of Arcing Electrode, Comparison between A.C. and D.C welding.	2	

<b>After Mid Term</b>			
<b>UNIT-III(Electrical Traction)</b>			
11	Advantages of Electric Traction, Requirements of an Ideal Traction System, Different Systems of Electric Traction.	2	CO3
12	Comparison between D.C. and A.C systems of Railway Electrification; speed- time curves.	2	
13	Different types of Traction Motors and their characteristics; parallel operation of Traction Motors.	2	
14	Starting and Speed Control of 3-phase Induction Motors	2	
15	Braking; Advantages and Disadvantages of regenerative braking, Calculation of Energy returned during regeneration.	2	
<b>UNIT-IV(Electroplating, Energy Storage Devices)</b>			
16	Principles and Applications of Electrolysis, Faraday's Law of Electrolysis.	2	CO4
17	Electroplating; Calculation of current required for depositing given amount of metal.Current Efficiency,voltage- energy efficiency.	2	
18	Extraction of metals electro deposition, factors governing deposition process.	2	
19	Constructional Details, Principle of Operation of Rechargeable Alkaline, Ni-Cd, Nickel- Metal Hydride, Lithium ion and Lead – Acid batteries, their comparison and applications.	3	
20	Charging of batteries and rating, Fuel cells and use of electric double layer capacitor (super capacitor) as battery bank.	2	

### Course Objectives

C.304.1	Demonstrate Laws of Illumination and Lighting Schemes.
C.304.2	Principles and Operations of Electrical Heating and Welding.
C.304.3	Characteristics and Operation of various traction motors.
C.304.4	Demonstrate Electrolysis and design of batteries.

