

EE-404B**UTILIZATION OF ELECTRICAL ENERGY
(OPEN ELECTIVE)****L T P C
4 - - 3****COURSE OBJECTIVES:**

1. To know about the different types of lamps & lighting schemes.
2. To know about the different types electric heating methods.
3. To know the design heating elements such as furnaces and ovens.
4. To know to utilize the electrical energy for production of heat and welding process.
5. To provide specific knowledge on Principles and characteristics of storage batteries.

COURSE OUTCOMES:**After successful completion of the course, the students are able to**

1. get overall idea for the different types of lamps & lighting schemes.
2. know about the different types electric heating methods.
3. know the designing of heat elements such as furnaces and ovens.
4. know how to utilize the electrical energy for production of heat and welding process.
5. gain knowledge on principles and characteristics of storage batteries.

UNIT I*Text Book - 1 (12)***Illumination** :Introduction- terms used in illumination-laws of illumination - Square law methods of calculation.

Gas discharge lamps - Fluorescent lamps - Arc lamps - Filament lamps - Comparison between filament and fluorescent lamps.

UNIT II*Text Book - 1 (12)***Lighting schemes & Introduction to Electric heating** : Factory lighting - flood lighting and street lighting-design of lighting schemes-introduction to Compact Fluorescent Lamps.

Introduction-Modes of heat transfer - Stefan's law - Classification of electric heating methods

UNIT III*Text Book - 1 (12)***Electric Heating element Design and types of furnaces** : Design of heating element - Construction and working of different types of induction furnaces -resistance furnace - arc furnaces.

Dielectric heating, Dipole formation, generation of dielectric heat and applications.

UNIT IV*Text Book - 1 (12)***Welding** : Introduction- Types of welding - resistance and arc welding -Characteristics of Carbon and metallic arc welding - comparison, welding equipment.

Requirements of good weld, comparisons of A.C and D.C weld (Excluding electronic controls)

UNIT V*Text Book - 2 (12)***Storage batteries** : Types of cells. Lead acid cell, Nickel Iron cell, Chemical changes during charging and discharging. Applications - rating - classification-dry cell and wet cells.**Methods of charging & common troubles** : Charging and discharging of lead acid cells, methods of charging lead acid batteries - over discharging common troubles with lead acid batteries and remedies - Nickel cadmium batteries.

LEARNING RESOURCES:

TEXT BOOK(s):

1. J.B. Gupta - Utilization Electric Power and Electric Traction, Katson books publishers, Tenth Edition, 2012.
2. Utilization, generation & conservation of electrical energy by Sunil S Rao, Khanna publishers, Sixth Edition, 2005.

REFERENCE BOOK(s):

1. Partab H - Art and Science of Utilization of Electrical Energy, Dhanpat Rai and Sons, New Delhi, Second Edition, 2009.
2. R.K.Rajput - Utilization of Electric Power, Laxmi publications Private Limited, Second Edition, 2013.
3. G.C.Garg - Utilization of Electric Power and Traction, Kanna publishers, Ninth Edition, 2014.

WEB RESOURCES:

1. <http://nptel.iitm.ac.in/video.php?subjectId=108105060>
2. <http://web.mit.edu/lienhard/www/ahttv201.pdf>
3. <http://www.comp-as.com/pdf/Article03.pdf>
4. www.srmuniv.ac.in/downloads/welding.doc