

UTILIZATION OF ELECTRICAL ENERGY (Professional Elective- VI)

Course Code: 19EE1168

L T P C

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Prerequisites: Power Electronic, Power Electronic Converter Fed Drives

Course Outcomes: At the end of the course, the student will be able to

CO1: Identify a right drive for a particular application.

CO2: Distinguish between various types of heating methods and Welding methods.

CO3: Design Illumination systems for various applications.

CO4: Summarize different types of electrical traction systems.

CO5: Describe and calculate tractive power and specific energy consumption.

UNIT-I:

10 Lectures

ELECTRIC DRIVES

Type of electric drives, choice of motor, starting and running characteristics, speed control, temperature rise, Particular applications of electric drives, Types of industrial loads, continuous, Intermittent and variable loads, load Equalization.

Learning Outcome: The student will be able to

1. Understand types of electric drives and its applications (L2)
2. Understand choice of motor, starting and running characteristics (L2)
3. Analyze Types of industrial loads, continuous, Intermittent, variable loads and load Equalization.(L4)

UNIT-II:

10

Lectures

ELECTRIC HEATING

Advantages and methods of electric heating, resistance heating, induction heating and dielectric heating.

ELECTRIC WELDING

Electric welding, resistance and arc welding, electric welding equipment, comparison between A.C. and D.C. Welding.

Learning Outcome: The student will be able to

1. Understand different methods of electrical heating.(L2)
2. Analyze advantages of electrical heating.(L4)
3. Evaluate comparison between A.C. and D.C. Welding.(L5)

UNIT-III:**10****Lectures****ILLUMINATION FUNDAMENTALS & VARIOUS ILLUMINATION METHODS**

Introduction, terms used in illumination, laws of illumination, polar curves, photometry, integrating sphere, sources of light. Discharge lamps, MV and SV lamps – comparison between tungsten filament lamps and fluorescent tubes, Basic principles of light control, Types and design of lighting and flood lighting.

Learning Outcome: The student will be able to

1. Analyze terms used in illumination, laws of illumination(L4)
2. Analyze comparison between tungsten filament lamps and fluorescent tubes (L4)
3. Understand Basic principles of light control (L2)

UNIT-IV:**10****Lectures****ELECTRIC TRACTION I**

System of electric traction and track electrification. Review of existing electric traction systems in India. Special features of traction motor, methods of electric braking-plugging, rheostatic braking and regenerative braking, Mechanics of train movement. Speed-time curves for different services – trapezoidal and quadrilateral speed time curves.

Learning Outcome:

1. Understand System of electric traction and track electrification (L2)
2. Analyze methods of electric braking-plugging, rheostatic braking and regenerative braking.(L4)
3. Apply Speed-time curves for different services. (L3)

UNIT-V:**10****Lectures****ELECTRIC TRACTION II**

Calculations of tractive effort, power, specific energy consumption for given run, effect of varying acceleration and braking retardation, adhesive weight and braking retardation adhesive weight and coefficient of adhesion.

Learning Outcome:

1. Analyze Calculations of tractive effort, power, specific energy consumption for given run.(L2)
2. Understand effect of varying acceleration and braking retardation .(L2)
3. Understand the concept of coefficient of adhesion. (L2)

TEXT BOOKS:

1. E. Openshaw Taylor: Utilization of Electric Energy, Orient Longman, Reprint 2010. (UnitS I, II, III)
2. J.B. Gupta, Rajeev Manglik, RohitManglik, “Utilization of Electric Energy and Traction”, Kataria & Sons Publishers, Delhi, 2014 Edition, (reprint) (Units I.II.III.IV.V).

REFERENCES:

1. C.L. Wadhwa, “Generation, Distribution and Utilization of electrical Energy”, New Age International (P) Limited Publishers, 3rd Edition, 2010. Semester - VI 220 G V P College of Engineering (Autonomous) 2016 EEE
2. N.V. Suryanarayana, “Utilization of Electrical Power including Electric drives and Electric traction”, New Age International (P) Limited Publishers, 1st Edition,1994.
3. H. Partab: Art & Science of Utilisation of Electric Energy, DhanpatRai & Sons, Reprint 2011.