LNCT University
Diploma EX, V Semester Syllabus

UTILIZATION OF ELECTRICALENERGY (DEX-502)

COURSE OUTCOMES:

After Completing the course student should be able to:

CO-1	Understand the classification, availability, and environmental impact of energy sources, and recognize the global need for transitioning to renewable energy.
CO-2	Explain the principles of solar radiation, and describe the working and applications of solar thermal and photovoltaic systems.
CO-3	Analyze wind energy potential and describe the construction, operation, and limitations of wind energy conversion systems.
CO-4	Classify biomass resources and explain biogas generation and biomass conversion technologies along with their applications.
CO-5	Describe the basic working principles, applications, and challenges of other renewable sources such as small hydro, geothermal, tidal, wave, and hydrogen energy.

UNIT I: ELECTRIC HEATING
Advantages of electric heating, modes: resistance heating - direct and indirect, arc heating - direct and indirect, induction heating - core type and coreless, dielectric heating - principle and applications, applications of electric heating in industry.

UNIT II: ELECTRIC WELDING
Principles of electric welding, types of welding: resistance welding (spot, seam and projection), arc welding (ac and dc) and welding equipment: transformers, generators, rectifiers, comparison of welding methods, safety and precautions in electric welding.

UNIT III: ILLUMINATION ENGINEERING
Fundamentals of illumination – terms: luminous flux, intensity, efficacy, lux, depreciation, laws of illumination, types of lamps: incandescent, fluorescent, mercury vapour, sodium vapour, LED, design of lighting schemes: factory, street, residential, commercial lighting.

UNIT IV: ELECTRIC TRACTION
Introduction to electric traction systems, types of traction systems - ac, dc and composite, traction motors: requirements and types (dc series, 3-phase induction motors), starting and braking methods in electric traction, speed-time curves, schedule speed, average speed, electrification systems and overhead equipment.

UNIT V: ELECTRIC DRIVES AND INDUSTRIAL APPLICATIONS
Concept and classification of electric drives, factors affecting the choice of electric drives, types of loads: constant torque, variable torque, selection of motors for different applications: elevators, pumps, cranes, compressors, machine tools, speed control of electric motors, basics of energy conservation in electrical systems.

Reference Books: -

1. Utilization of Electrical Energy, E. Openshaw Taylor.
2. Utilization of Electric Power, R. K. Rajput.
3. Art & Science of Utilization of Electrical Energy, H. Partab.
4. Electric Drives and Control, S. K. Pillai.
5. Modern Electric Traction, H. Partab.