LNCT University
Diploma EX, VI Semester Syllabus

ENERGY CONSERVATION & MANAGEMENT (DEX-601)

COURSE OUTCOMES:

After Completing the course student should be able to:

CO-1	Explain energy resources, conservation principles, and energy efficiency concepts
CO-2	Apply energy management principles and perform economic feasibility analysis.
CO-3	Identify and analyse energy-efficient technologies in electrical and HVAC systems.
CO-4	Conduct energy audits and interpret findings using relevant instruments.
CO-5	Explain energy policies, standards, and programs for national energy conservation.

UNIT I: FUNDAMENTALS OF ENERGY AND ENERGY CONSERVATION

Importance of energy resources and energy conservation. Classification of energy resources: Renewable and non-renewable. Energy scenario in India and globally. Principles of energy conservation. Energy conversion methods and energy efficiency.

UNIT II: ENERGY MANAGEMENT AND ECONOMIC ANALYSIS

Principles of energy management. Duties and responsibilities of an energy manager. Energy performance evaluation parameters (load factor, demand factor, etc.). Life cycle costing (LCC), Payback period, return on investment (ROI), Net present value (NPV)

UNIT III: ENERGY EFFICIENT SYSTEMS AND TECHNOLOGIES

Energy efficiency in electrical systems: Motors, transformers, lighting. Energy-efficient motor drives, soft starters, VFDs. HVAC systems and building energy efficiency. Energy conservation in pumps, fans, compressors. Power factor improvement techniques and demand-side management (DSM)

UNIT IV: ENERGY AUDIT AND INSTRUMENTS

Definition, objectives, and types of energy audit (preliminary and detailed). Methodology of conducting energy audit. Energy audit report format. Instruments used in energy auditing: Lux meter, power analyser, data logger, flow meter, etc.Case studies of energy audits in industries and commercial buildings

UNIT V: POLICIES AND STANDARDS

Bureau of Energy Efficiency (BEE) and its role. Energy Conservation Act 2001 and its features. Star rating of appliances. ISO 50001: Energy Management System (basic overview). Government initiatives and programs (PAT, ECBC, UJALA, etc.)

List of Suggestive Experiments: -

1. Comparative analysis of renewable and non-renewable energy sources (chart/presentation-based activity).
2. Study of energy consumption in household appliances and methods to reduce energy wastage.
3. Calculation of load factor, demand factor, and utilization factor for a given load profile.
4. Perform life cycle costing (LCC) and payback period calculations for replacing an old appliance with an energy-efficient one.
5. Measure and compare energy consumption of different lighting systems (LED, CFL, fluorescent).
6. Analyse motor efficiency and assess energy savings using VFD or soft starter.
7. Study and demonstration of energy audit instruments (lux meter, power analyser, data logger, etc.).
8. Perform a mini energy audit of a classroom/lab to identify wastage and suggest savings.
9. Presentation/report on the role of BEE and the Energy Conservation Act 2001.
10. Awareness activity: Design posters or leaflets on government schemes like UJALA, PAT, ECBC.

Reference Books: -

1. Energy Management, W. R. Murphy & G. McKay.
2. Energy Conservation Handbook, Frank Kreith.
3. Guidebook for National Certification Examination for Energy Managers and Auditors, BEE, Govt. of India
4. Energy Management and Conservation, Paul W. O'Callaghan