STATE INSTITUTE OF ENGINEERING & TECHNOLOGY

Department of Electrical Engineering

LESSON PLAN

Subject Name: Electrical Energy Conservation and Auditing
Subject Code: EEP-306A
Year: 3rd Year **Semester: 6th**

Lecture No	Unit No	Topic	COs Covered
L 1	Unit-I	Introduction of the Subject: Energy Conservation and Audit	CO1
L 2		Energy Scenario: Commercial and Non-commercial energy, primary energy resources, commercial energy production, final energy consumption	
L 3		Discussion on energy needs of growing economy, Important terms - energy policy, energy planning, Audit, energy security, Energy Efficiency	
L 4		Energy conservation and Important Aspects of energy conservation	
L 5		Restructuring of the energy supply sector	
L 6		Energy strategy for the future	
L 7		Air pollution, climate change	
L 8		Energy conservation Act 2001: Objectives, features and its amendments	
L 9		Salient features of Energy Conservation Building Code (ECBC)	
L 10		Salient features of Energy Conservation Building Code (ECBC) and Eco Niwas Samhita Code (ENS)	
L 11	Unit-II	Introduction to Electricity Tariff	CO2
L 12		Types of Electricity Tariff - (simple, flat, block rate , two-port, maximum demand tariff)	
L 13		Definition and objectives of load management, Load curve and its significance, Daily load curve, annual load curve	
L 14		Methods of load management	
L 15		Meaning of maximum demand, causes, indicators, Methods of maximum demand control	
L 16		Concepts and Causes of low power factor	
L 17		Power Factor Improvement Methods, Selection and Location of Capacitors, Benefits	
L 18		Introduction to thermal systems, Types of fuels: solid, liquid, gaseous Properties of good fuel, Classification and applications of fuels	
L 19		Thermal Energy Content of Fuel, Calorific value (HCV and LCV), its measurement, Units	

L 20	Unit-II	Numerical on calculation of load current, power factor improvement	CO2
L 21		Discussion of related terms - Temperature and Pressure, Heat Capacity etc.	
L 22	Unit-III	Introduction to Energy Audit, Need and Benefits of Energy Audit	CO3
L 23		Types of Energy audit and Instruments used for energy audit	
L 24		Energy Management and Audit Approach – Overview	
L 25		Understanding Energy Costs and Benchmarking of Energy Consumption	
L 26		Energy performance analysis, Monitoring and targeting techniques, and Matching Energy Use to Requirement	
L 27		Roles and responsibilities of energy Manager and Accountability	
L 28		Electricity billing process, Tariff categories (domestic, commercial, industrial), Reading and interpretation of electricity bills	
L 29		Electrical Load Management and Maximum Demand Control	
L 30		Power Factor and its Improvement	
L 31	Unit-IV	Introduction to Electric Motors - Basic principle, classification, application	CO4
L 32		Types of Electric Motors, Industrial Application of motors	
L33		Losses in Induction Motors and Motor efficiency	
L34		Factors Affecting Motor Performance	
L35		Introduction and Types of Cooling Towers	
L36		Performance Evaluation of Cooling Towers	
L 37		Efficient Cooling Tower Operation	
L 38		Flow Control Strategies of Cooling Towers	
L 39		Energy Saving Opportunities	
L 40		Assessment of cooling towers.	

Text Books:

1. Albert : Plant Engineers & Managers Guide to Energy Conservation.
2. Wayne C. Turner Energy management handbook, John Wiley and Sons.
3. Guide to Energy Management, Cape Hart, Turner and Kennedy
4. Cleaner Production – Energy Efficiency Manual for GERIAP, UNEP, Bangkok prepared by National Productivity Council

References:

1. M.K.Lahiri : Saving of Electricity by System Management. M.K. Lahiri Publication
2. Guide books for National Certification Examination for Energy Manager / Energy Auditors Book-1, General Aspects (available online)

Web resources:

1. https://onlinecourses.swayam2.ac.in/e-learning/preview/ntr25_ed50
2. https://onlinecourses.nptel.ac.in/e-learning/preview/noc25_ar10