NIRMA UNIVERSITY

Institute:	**Institute of Technology, School of Engineering**
Name of Programme:	**B. Tech. in Electrical Engineering**
Semester:	**VII**
Course Code:	4EE205DE25
Course Title:	**Energy Audit and Policy**
Course Type:	**Disciplinary Minor - (Elective Course-II)**
Year of Introduction:	**2025 – 26**

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Course Learning Outcomes (CLOs):

At the end of the course, the students will be able to -

1. comprehend various regulations/policies related to energy conservation (BL3)
2. appraise the concept of demand side management (BL3)
3. demonstrate the significance of energy audit and related concepts (BL4)
4. apply the different methods used for the performance assessment and financial analysis of equipment (BL5)

Unit	Contents	Teaching hours (Total 45)
Unit I	**Energy Scenario and its Implications on Climate Change** Classification of energy, Indian energy scenario, sector-wise energy consumption (domestic, industrial and other sectors), energy needs of a growing economy, long-term energy scenario, energy pricing, energy security, energy sector reforms, climate change, energy security, energy conservation and its importance, energy strategy for the future, energy conservation act and related policies (Electricity Act, Integrated Energy Policy, National Action Plan on Climate Change, Carbon Credits, Paris Climate Agreement, National Determined Contribution, ECBC Code for Building, etc.) and its features	10
Unit II	**Demand Side Management** Scope of demand side management (DSM), difference between energy efficiency and DSM, evolution of DSM, DSM strategy, planning, implementation and its application, customer acceptance & its implementation issues, end use energy conservation, tariff options for DSM, government initiatives for DSM	09
Unit III	**Energy Audit** Energy audit concepts, scope of energy audit, types of energy audit, general procedure for a detailed energy audit, various energy audit methodologies, matching energy use to requirement, maximising system efficiencies, optimising input energy requirements, fuel and energy substitution, instruments and metering for energy audit, preparation of detailed energy audit report, benefits of energy audit,	12

	case studies on energy audit in different industrial organisations / electrical utilities	
Unit IV	**Energy Performance Assessment for Equipment and Utility Systems** Boilers - direct and indirect testing methods, efficiency calculation, factors affecting boiler performance. Furnaces - furnace heat balance method, factors affecting furnace performance. Pumps and compressors - field testing and determination of efficiency. Building and commercial establishments - determination of EPI and AAHEPI, significance of building envelope, assessment of HVAC and lighting system. Financial analysis - fixed and variable costs, interest charges, simple payback period, discounted cash flow methods	14

Self-Study:
The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents.

Tutorial Session:
This shall consist of at least 6 tutorials based on the above syllabus.

Suggested Readings:

1. Smith C. B., *Energy Management Principles*, Pergamon Press, New York.
2. Wayne C. Turner, Steve Doty, *Energy Management Handbook*, Taylor and Francis Ltd., CRC Press.
3. Frank Kreith, Goswami D. Yogi, *Energy Management and Conservation Handbook*, Taylor and Francis Ltd., CRC Press.
4. Albert Thumann, Terry Niehus, William J. Younger, *Handbook of Energy Audits*, Taylor and Francis Ltd., CRC Press.
5. Rajiv Shanker, *Energy Auditing in Electrical Utilities*, Viva Book Pvt. Limited, New Delhi.
6. *General Aspects of Energy Management and Energy Audit, Bureau of Energy Efficiency*, New Delhi.
7. James P Doorian and Fereidun Fesharaki, *International Issues in Energy Policy,* Development, and Economics, Routledge.