

20PE019 - ENERGY AUDIT, CONSERVATION AND MANAGEMENT

UNIT - I

L - 9

BASIC PRINCIPLES OF ENERGY MANAGEMENT : Energy scenario, Energy management, Strategies, Energy conservation, Energy audit, Types of audit, Sankey diagrams, Load profiles, Energy conservation schemes and energy saving potential, Energy Instruments, Watt-hour meter, Data loggers, Thermocouples, Pyrometers, Lux meters, Tong testers, Power analyzer.

UNIT - II

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CO-GENERATION, TRI-GENERATION AND WASTE HEAT RECOVERY: Co-generation and tri-generation, Need, Application, Advantages, Classification and saving potential, Waste heat recovery - Concept of conversion efficiency, Energy waste, Waste heat recovery classification, Advantages and applications, Commercially viable waste heat recovery devices.

UNIT - III

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ENERGY EFFICIENT LIGHTING : Modification of existing systems, Replacement of existing systems, Priorities, Definition of terms and units, luminous efficiency, Polar curve, Calculation of illumination level, Illumination of inclined surface to beam, Luminance or brightness, Types of lamps, Types of lighting, Electric light fittings (luminaries), Flood lighting, White light LED and conducting polymers, Energy conservation measures.

UNIT - IV

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ENERGY EFFICIENCY IN ELECTRICAL APPLIANCES: Power factor, Causes of low p.f., Methods of Improving p.f. - Static Capacitors, Synchronous condensers phase advancer; Most economical p.f. for constant KW load and constant KVA type loads, Numerical problems, Location of capacitors, p.f. with non-linear loads, Effect of harmonics on p.f., Motor controllers, Energy efficient motors (basic concepts), Load scheduling and shifting, Demand side management.

UNIT - V

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ENERGY EFFICIENCY IN SPACE HEATING AND VENTILATION: Ventilation, Air-conditioning (HVAC) and water heating, Heating of buildings, Transfer of heat, Space heating methods, Insulation, Cooling load, Electric water heating systems, Energy conservation methods.

TEXT BOOKS:

1. W. R. Murphy and F. Mc Kay Butter wort, "Energy Management", 1st edition, Elsevier Publications, 2012.
2. John. C. Andreas, "Energy Efficient Electric Motors", 2nd edition, Marcel Inc. Ltd., 1995.

REFERENCE BOOKS:

1. Paul O' Callaghan, "Energy Management", 1st edition, Mc-Graw Hill Book Company, 1998.
2. V.K Mehta and Rohit Mehta, "Principles of Power Systems", 1st edition, S. Chand & Company Ltd., 2009.
3. Reay, D.A., "Industrial Energy Conservation", 1st edition, Pergamon Press, 2003.
4. White, L.C., "Industrial Energy Management and Utilization", 1st edition, Hemisphere Publishers, 2002.