

20PE012 - ENERGY CONSERVATION SYSTEMS

UNIT - I

L- 08

Basic Principles of Energy Management : Energy scenario - Energy Management - strategies - Energy conservation - Energy audit – definitions, concept, types of audit, energy index, cost index, pie charts, 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

L- 08

Co-generation, Tri-generation & Waste Energy Recovery: Co-generation & Tri-generation: Definition, need, application, advantages, classification, 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

L- 08

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 lighting fittings(luminaries) – flood lighting – White light LED and conducting Polymers – Energy conservation measures.

UNIT - IV

L- 08

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 improvement, location of capacitors, Pf 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

L- 08

Energy Efficiency in Space Heating and Ventilation: Ventilation, Air – Conditioning (HVAC) and Water Heating: Introduction- Heating of buildings-Transfer of Heat- space heating methods- Ventilation and air – conditioning- Insulation – cooling load – Electric water heating systems- Energy conservation methods.

TEXT BOOKS:

1. Energy management by W. R. Murphy & F. McKay Butter worth, Elsevier publications. 2012.
2. Energy efficient electric motors by John. C. Andreas, Marcel Inc Ltd- 2nd edition. 1995.

REFERENCES:

1. Electric Energy Utilization and Conservation by S C Tripathy, Tata McGraw hill publishing company Ltd. New Delhi.
2. Energy management by Paul o' Callaghan, Mc- graw Hill Book company- 1st edition, 1998
3. V.K Mehta and Rohit Mehta, "Principles of Power Systems", 1st ed.,S.Chand & Company Ltd., New Delhi, 2009.
4. Reay, D. A., "Industrial energy conservation", Pergamon Press, 1st edition, 2003.
5. White, L. C., "Industrial Energy Management and Utilization", Hemisphere Publishers, 2002.
6. Beggs, Clive, "Energy – Management, supply and conservation", Taylor and Francis, 2nd edition, 2009.
7. Smith, C.B., Energy "Management Principles", Pergamon Press, 2006.