ENERGY CONSERVATION AND AUDIT
(Elective-II)

Course Code: 13ME2316

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Pre requisites: Thermal Engineering and Heat Transfer

Course Educational Objectives:

To make the student understand

1. the principles and importance of energy conservation
2. the role of energy managers in industries
3. the methodology and auditing of energy in process industries
4. the performance of various components associated with industries related to thermal engineering
5. the role of instrumentation in energy conservation systems
6. the importance of energy management and energy economics.

Course Outcomes:

The student will be able to

1. explain the principles and importance of energy conservation
2. know the role of energy managers in industries and importance of energy management
3. and energy economics
4. apply the methodology and auditing of energy in process industries
5. calculate performance of various components associated with industries
6. know the role of instrumentation in energy conservation systems

UNIT-I

Introduction – Energy scenario, principles, and imperatives of energy conservation, energy consumption pattern, resource availability, role of energy managers in industries.

Energy auditing, methodology with respect to process industries, characteristic method employed in energy intensive industries.

UNIT-II

Energy efficiency in thermal utilities –boilers, steam systems, furnaces, insulation, refractory, cogeneration, waste heat recovery.

Energy efficiency in compressed air system, refrigeration systems, fans, blowers, pumps and pumping system, cooling towers.

UNIT-III

Concept of total energy, advantages and limitations, total energy system and application, various possible schemes.

Role of instrumentation in energy conservation, prime movers used in total energy systems, potential and economics of total energy systems.

UNIT-IV

Potential areas for electrical conservation in various industries, energy management opportunities in electrical heating, lighting system and electric motors and variable speed drives.

UNIT-V

Importance of energy management, energy economics, discount rate, internal rate of return and life cycle costing.

TEXT BOOKS:

1. Goswami and Kreith, "*Energy Conversion"*, CRC Press, 2007.

2. Umesh Rathod, "Energy management", S.K. Kataria & Sons,

REFERENCES:

1. Y.P. Abbi, "Energy audit, thermal power, combined cycle and cogeneration plants", Teri Publishers, 2012.

2. W.C. Turner., "*Energy management hand book"*, CRC Press Publications.