

13.801 ENERGY MANAGEMENT (MP)

Teaching Scheme: 2(L) - 1(T) - 0(P)

Credits: 3

Course Objectives:

- *To provide students with a general awareness on the importance of energy and its conservation, its impact on society, various energy sources, energy conversion processes, energy management, energy audit and energy conservation measures.*

Module – I

Energy resources, Energy conversion processes and devices – Energy conversion plants – Conventional - Thermal, Hydro, Nuclear fission , and Non – conventional – Solar, Wind Biomass, Fuel cells, Magneto Hydrodynamics and Nuclear fusion.

Energy from waste, Energy plantation.

Module – II

Energy storage and Distribution – Electrical energy route – Load curves – Energy conversion plants for Base load , Intermediate load, Peak load and Energy displacement – Energy storage plants.

Energy Scenario – Global and Indian –Impact of Energy on economy, development and environment, Energy policies, Energy strategy for future.

Module – III

Energy Management – Definitions and significance – objectives –Characterising of energy usage – Energy Management program – Energy strategies and energy planning Energy Audit – Types and Procedure – Optimum performance of existing facilities – Energy management control systems – Computer applications in Energy management.

Module – IV

Energy conservation – Principles – Energy economics – Energy conservation technologies – cogeneration – Waste heat recovery – Combined cycle power generation – Heat Recuperators – Heat regenerators – Heat pipes – Heat pumps – Pinch Technology

Energy Conservation Opportunities – Electrical ECOs – Thermodynamic ECOs in chemical process industry – ECOs in residential and commercial buildings – Energy Conservation Measures.

References:

1. Amlan Chakrabarti, *Energy Engineering and Management*, Prentice Hall India, 2011.
2. Eastop T. D. and D. R. Croft, *Energy Efficiency for Engineers & Technologists*, Longman, 1990.
3. Albert Thumann P. E. and W. J. Younger, *Handbook of Energy Audits*, Fairmont Press, 2008.
4. Doty S. and W. C. Turner, *Energy Management Hand book*, 7/e, Fairmont Press, 2009.
5. Rao S. and B. B. Parulekar, *Energy Technology*, Khanna Publishers, 2005.
6. Rai G. D., *Non-conventional Energy Sources*, Khanna Publishers, 2011.

Internal Continuous Assessment (Maximum Marks-50)

50% - Tests (minimum 2)

30% - Assignments (minimum 2) such as home work, problem solving, quiz, literature survey, seminar, term-project, software exercises, etc.

20% - Regularity in the class

University Examination Pattern:

Examination duration: 3 hours

Maximum Total Marks: 100

The question paper shall consist of 2 parts.

Part A (20 marks) - Ten Short answer questions of 2 marks each. All questions are compulsory. There should be at least two questions from each module and not more than three questions from any module.

Part B (80 Marks) - Candidates have to answer one full question out of the two from each module. Each question carries 20 marks.

Course Outcome:

After completion of this course

- *The students shall have an understanding of the impact of energy on society , the need for sustainable energy, global and Indian energy policies .*
- *They would have gained knowledge on various techniques of energy management and conservation. They would also have gained the basic ideas of conducting an energy audit*