Birla Institute of Technology & Science, Pilani
Hyderabad Campus

FIRST SEMESTER 2023-2024

Course Handout Part II

Date: 11-08-2023

In addition to part-I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course.

Course No. : **ME F424**
Course Title : **ENERGY MANAGEMENT**
Instructor-in-Charge : **SANDIP DESHMUKH**

Scope and Objective of the Course:

World and Indian energy scenario; energy policy; energy management principles; energy conservation; energy auditing; analysis; formulation of energy management options; economic evaluation, implementation & control; energy conservation techniques – conservation in energy intensive industries; choice of fuels and stoichiometry, steam generation, distribution systems, and electrical systems; integrated resource planning; demand-side management; cogeneration; total energy schemes; thermal insulation; energy storage; economic evaluation of conservation technologies; analysis of typical applications.

- To learn the principles of energy efficiency in organizations
- To learn the energy management techniques for various utilities
- To learn the methodologies for monitoring energy efficiency in industries

Textbooks:

1. W R Murphy, G McKay, “Energy Management”, Butterworth Heinemann, 2011

Reference books

1. Rajan G. G, Optimising Energy Efficiencies in Industry, New Delhi, Tata McGraw Hill, 2001
2. Thumann A, P E, Plant Engineers and Managers Guide to Energy Conservation, New York, Van Nostrand Reinhold Co, 1993
3. Kreith F, West R E (Eds) Handbook of Energy Efficiency, London, CRC Press, 2001

Course Plan:

Lecture No.	Learning objectives	Topics to be covered	Chapter in the Text Book
1-4	Energy Management & Auditing	Energy Management, Energy Auditing, Level of Responsibility, Internal Control Questionnaire, Energy Conservation Schemes, Industrial Energy Use, Energy Conversion, Energy Index, Energy Costs, Cost Index, Energy Surveying and Auditing, Integrated Resource Planning	Ch. 1 (T1)

		and Demand Side Management	
5-8	Energy Sources	Energy Sources, Energy Consumption, World Energy Reserves, Energy Prices, Energy Policies, Fuel Production and Processing, Choice of Fuels, Cycle Efficiency	Ch. 2 (T1)
9-12	Energy Economics	Energy Economics, Costing Techniques, Financial Appraisal and Profitability, Cost Optimization	Ch. 3 (T1)
13-20	Heat Transfer theory & Heat transfer media	Properties, Quantities, units and dimensions; conduction; convection; radiation; thermal insulation; Water; steam; thermal fluids; air -water vapour mixtures	Ch. 4 & 5 (T1)
21-24	Heat Transfer equipments	Heat exchangers; combustion and thermal efficiency; steam plant; pressure hot water and thermal fluid plants	Ch. 6 (T1)
25-28	Energy Utilisation & Conservation	Furnaces; hydraulic power systems, compressed air; combined power and heating systems; energy conversion; district heating. Conservation in energy	Ch. 7 (T1)
29-30	Electrical Energy	Electric circuit theory; electrical measurements; lighting; motive power and power factor improvement; temperature measurement; optimal start control; industrial heating	Ch. 8 (T1)
31-36	Building construction and Air conditioning	Space heating; condensation; heat gain and space cooling; Load characteristics and calculations; supply and removal of heat; the efficient use of energy	Ch. 9 & 10 (T1)
37-41	Heat Recovery and Energy Storage	Sources of waste heat and its potential applications; heat recovery systems; incinerators; regenerators and recuperators; waste heat boilers; energy storage systems	Ch. 11 (T1)

Evaluation Scheme:

Component	Duration	Weightage (%)	Date & Time	Nature of Component
Mid Semester Test	90	25	11/10 - 11.30 - 1.00PM	CB
Surprize Quiz (6 out 8)		15	To be announced in the Class	OB
Assignments (In-class & Take-home)		20		OB

Comprehensive Exam[#]	180	40	12/12 AN	CB

Chamber Consultation Hour: To be announced in the class room.

Notices: All notices concerning this course shall be displayed on the CMS (the Institute's web-based course management system). Besides this, students are advised to visit regularly CMS for latest updates.

Make-up Policy: Make-up shall be given only to the genuine cases with prior confirmation. Request for the make-up tests, duly signed by the students, should reach the under signed well before the scheduled test.

Academic Honesty and Integrity Policy: Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

INSTRUCTOR-IN-CHARGE