BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE – PILANI, HYDERABAD CAMPUS
FIRST SEMESTER 2020-2021
(COURSE HANDOUT: PART-II)

Date: 17/08/2020

In addition to Part-I (a general handout for all courses appended to the time-table), this handout provides the specific details of this course.

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

1. Course Description

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.

2. Scope and Objective

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

3. Text Books:

W R Murphy, G McKay, "Energy Management", Butterworth Heinemann, 2011

4. 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

5. Course Plan

Lecture No.	Learning objectives	Topics to be covered	Chapter
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 and Demand Side Management	Ch. 1 (T1)
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	Properties, Quantities, units and dimensions; conduction; convection; radiation; thermal insulation;	Ch. 4 & 5 (T1)

	transfer media	Water; steam; thermal fluids; air -water vapour mixtures	
21-25	Heat Transfer equipments	Heat exchangers; combustion and thermal efficiency; steam plant; pressure hot water and thermal fluid plants	Ch. 6 (T1)
26-30	Energy Utilisation & Conservation	Furnaces; hydraulic power systems, compressed air; combined power and heating systems; energy conversion; district heating. Conservation in energy	Ch. 7 (T1)
31-32	Electrical Energy	Electric circuit theory; electrical measurements; lighting; motive power and power factor improvement; temperature measurement; optimal start control; industrial heating	Ch. 8 (T1)
33-38	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)
39-43	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)

6. Evaluation Scheme

Evaluation Component	Duration (minute)	Weightage (%)	Date & Time	Nature of Component
Test 1	30	15	September 10 –September 20 (during scheduled class Hour)	OB
Test 2	30	15	October 9-October 20(during scheduled class hour)	OB
Test 3	30	15	November 10-November 20 during scheduled class hour)	OB
Presentation (2 Nos)	10	10	To be announced	OB
Assignment (2 Nos)	-	10	To be announced	OB
Comprehensive Exam	120	35	To be announced	OB

7. Chamber Consultancy Hour: To be announced in the class room.

8. 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.

9. 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.

10. 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
ME F424