Gautam Buddha University; Greater Noida

School of Engineering (Mechanical Engineering)

Degree	Course Name	Course Code	Marks:100
M. Tech. in Thermal Engg.	Energy Engineering and Management	MET 603	SM+MT+ET 25+25+50
Semester	**Credits**	**L-T-P**	**Exam.**
III	3	3-0-0	3 Hours

Unit - I

Energy Management Principle: General energy problem; Energy uses patterns and scope of conversion; Organizing and managing an energy management program. Energy auditing: Elements and concepts; Type of energy audits instruments used in energy auditing. **(06 Hours)**

Unit – II

Energy Conservation: Technologies for energy conservation; Design for conservation of energy materials; Energy flow networks; Critical assessment of energy usage; Formulation of objectives and constraints; Synthesis of alternative options and technical analysis of options; Process integration.

(08 Hours)

Unit – III

Social and Economic Benefits: Energy accounting and analysis; Pollution control impact; Life cycle costing; Payback period; Energy management in deregulated environment. **(07 Hours)**

Unit – IV

Thermodynamics of Energy Conservation: Energy conservation in boilers and furnace; Energy conservation in stream and condensate system; Cogeneration-concepts; Type of cogeneration system; Performance evaluation of a cogeneration system. **(08 Hours)**

Unit – V

Waste Heat Recovery: Potential; Benefit; Waste heat recovery equipments. Space heating; Ventilation air conditioning (HVAC) and water heating of building; Transfer of heat; Space heating methods; Ventilation and air conditioning; Heat pumps; Insulation; Cooling load; Electric water heating systems; Electric energy conversation methods. **(08 Hours)**

Unit – VI

Energy Conservation in Electric Utility and Industry: Energy cost and two - part tariff; Energy conservation in utility by improving load factor; Load curve analysis; Energy efficient motors; Energy conservation in illuminating system; Importance of power factor in energy conservation - Power factor improvement methods; Energy conservation in industries. **(08 Hours)**

Recommended Books:

1. Energy Engineering and Management; Amlan Chakrabarti; Prantice Hall of India; 1st Edition; 2011.
2. Electrical Energy Utilization and Conservation ; S.C. Tripathy; Tata McGraw-Hill; 1991.
3. Energy Management Handbook; Wayne C. Turner & Steve Doty; CRC Press Publications 6th Edition; 2007.
4. Industrial Energy Conservation: A Handbook for Engineers and Managers; D.A. Reay; Pergamon Press; 2nd Edition; 1979.
5. Computer Based Energy Management Systems: Technology and Applications; Chun H. Cho; Academic Press; 1st Edition; 1984.