Course Type	Course Code	Name of Course	L	T	P	Credit
DE	NFMD508	Energy Conservation Processes	3	0	0	3

Prerequisites: Basics of Thermodynamics, Fluid Mechanics, Heat & Mass Transfer.

CourseObjective
The main aim of the course is to give detailed information about various energy conservation Methods and their significance in plant operations.
LearningOutcomes
At the end of the course, students will be able to identify wastage of energy from various units and ways to minimize them.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Introduction, definition, Need for Energy management, general principles of Energy management, planning for energy management, Energy Basics for Energy manager, starting of Energy management program, world Energy Utilization.	5	Students shall earn about the necessity of energy management and energy recovery.
2	High-temperature recovery systems, ceramic radianttubes, boilers. Energy efficient utilization system. Thermal insulation, pipeline insulation, insulation materials. Insulation on the thermal system and its effect on economics.	9	Students shall earn about the thermal energy recovery systems and their theoretical aspects.
3	Heat exchangers for waste heat recovery. Heat pipes, liquid coupled and gas coupled indirect heat exchangers. Rotating regenerators, plate heat exchangers, economizers, recuperators, waste heat boilers, heat pumps, performance and application of waste heat recovery system. Design of waste heat recovery systems. Ideal heat pump cycles.	9	Students will gain knowledge about thermal energy recovery from diverse industrial units..
4	Energy conservation in thermal power plants, cokeovens, Fertilizer, chloro-alkali industry, etc.	7	Students shall earn about the energy recovery from various industrial units.
5	Factors influencing the efficiency of energy conservation systems. Efficient heat distribution & utilization. Reduction & recovery of excess energy. Performance and application of waste heat recovery system. Industrial wastesas sources of energy. Capital and operational cost for different alternatives on economics sensitivity analysis.	8	Students shall learn about the energy audit for various industrial units.
6	Introduction to Energy Storage. Fundamentals of Battery used for energy storage.	4	Students shall earn about the various energy storage options available now.
Total		**42**	

TextBook:

1. Energy management principle- Applications, benefits, savings by Craig B.Smith Pergamon Press.

ReferenceBooks:

1. Guide to energy management, Barney L Capehart, Wayne C Tarner, William J Kennedy
2. Energy Efficiency in Electrical Utilities: Guide Book National Certification Examination for Energy Manager and Energy Auditors, Bureau of Energy Efficiency, NewDelhi