



C. U. SHAH UNIVERSITY

Wadhwan City

FACULTY OF: - Technology and Engineering
DEPARTMENT OF: - Mechanical Engineering
SEMESTER: - VIII
CODE: - 4TE08ECA1
NAME: – Energy Conservation and Audit

Teaching and Evaluation Scheme:-

Subject Code	Name of the Subject	Teaching Scheme (Hours)				Credits	Evaluation Scheme							
		Th	Tu	Pr	Total		Theory				Practical (Marks)			Total
							Sessional Exam		University Exam		Internal		University	
							Marks	Hrs	Marks	Hrs	Pr/Viva	TW	Pr	
4TE08ECA1	Energy Conservation and Audit	3	0	2	5	4	30	1.5	70	3	—	20	30	150

Objectives:

- To make students understand basic energy conversion, conservation and management principles.
- To enable students identify sources of energy loss and target savings
- To make students understand design of waste heat recovery systems, efficient power cycles and power generation systems

Prerequisite:

Basic knowledge of Thermodynamics , Heat and mass transfer.

Sr. No.	Course Content	Hours
1	Energy Management: Concept of energy management, energy demand and supply, economic analysis; Duties and responsibilities of energy managers	05
2	Energy Conservation: Basic concept, energy conservation in Household, Transportation, Agricultural, service and Industrial sectors, Lighting, HAVC.	05
3	Energy Audit: Definition, need and types of energy audit: Energy management(Audit) approach, Understanding energy cost, bench marking, energy performance, matching energy to requirement, maximizing system efficiencies, optimizing the input energy requirement: Duties and responsibly of energy manager and auditors.	10
4	Material energy balance: Facility as an energy system; Method for preparing process flow Material and energy balance diagrams, Energy action Planning.	08
5	Monitoring and Targeting: Definition monitoring & targeting; Data and information analysis. Electrical Energy Management: energy conservation in motors, pumps and fan systems; energy efficient motors.	07
6	Thermal energy management : Energy conservation in boilers, steam turbine and industrial heating system; Application of FBC; Cogeneration and waste heat recovery; Thermal insulation; Heat exchangers and heat pump ; Building Energy Management	10

Learning Outcomes:

Upon completion of this course the student shall be able to

1. Design and develop energy efficient, building, heating & lighting systems.
2. Conduct energy audits and formulate & implement energy conservation strategies.
3. Reduce energy & fuel consumption and wastage in existing facilities through effective metering, cost allocation and cost analysis.

Books Recommended:

1. Energy Auditing and Conservation; Methods, Measurements, Management & Case Study by **Hamies**, Hemisphere Publishing , Washington, 1980.
2. Energy Engineering and Management by **Amlan Chakrabarti**, Prentice hall India 2011
3. Energy Management Principles by **CB Smith**, Pergamon Press, New York,

Reference Books:-

1. Handbook on Energy Efficiency, TERI, New Delhi, 2009
2. Industrial Energy Management & Utilization, Write, Larry C Hemisphere Publishers, Washington, 1998.
3. Energy Conservation In Process Industry by **W. F. Kenny**
4. Bureau of energy efficiency –Hand outs New Delhi