



**C. U. SHAH UNIVERSITY**  
**Wadhwan City**

**FACULTY OF:** Technology & Engineering  
**DEPARTMENT OF:** Electrical Engineering  
**BRANCH:** Electrical & Electronics Engineering  
**SEMESTER:** VIII  
**CODE:**4TE08EMA1  
**NAME** –Energy Management & Audit

**Teaching & 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	
4TE08EMA1	Energy Management & Audit	4	0	2	6	5	30	1.5	70	3	--	20	30	<b>150</b>

**Objectives**

- To study various industrial electrical devices namely transformer, dc motor, ac motor, and high voltage devices energy scenario.
- To study industrial electrical and mechanical energy management and approach the methodology of energy used
- To study the optimization, performance and approach the used of energy calculation and audit.

**Prerequisites**

- Basics and fundamental of Energy Management and Audit of Industrial Applications.

**Course Outlines**

Sr. No.	Course Contents	Hours
1	<b>Energy Scenario :</b> Commercial and Non-Commercial Energy, Primary Energy Resources, Commercial Energy Production, Final Energy Consumption, Energy Needs of Growing Economy, Long Term Energy Scenario, Energy Pricing, Energy Sector Reforms, Energy and Environment: Air Pollution, Climate Change, Energy Security, Energy Conservation and its Importance, Energy Strategy for the Future, Energy Conservation Act-2001 and its Features.	12
2	<b>Energy Management &amp; Audit:</b> Definition, Energy audit-need, Types of energy audit, Energy management (audit) approach-understanding energy costs, Bench marking, Energy performance,	10

	Matching energy use to requirement, Maximizing system efficiencies, Optimizing the input energy requirements, Fuel and energy substitution, Energy audit instruments	
3	<b>Energy Action Planning:</b> Key elements, Force field analysis, Energy policy purpose, perspective, Contents, Formulation, Ratification, Organizing –location of energy management, Top management support, Managerial function, Roles and responsibilities of energy manager, Accountability. Motivating-motivation of employees: Information system-designing barriers, Strategies; Marketing and communicating-training and planning.	10
4	<b>Energy Performance Assessment of HVAC Systems:</b> Introduction, Purpose of the Performance Test, Performance Terms and Definitions, Preparatory for Measurements, Procedure, Measurements to be Recorded During the Test, Examples	12
5	<b>Electrical system:</b> Electricity billing, Electrical load management and maximum demand control, Power factor improvement and its benefit, Selection and location of capacitors, Performance assessment of PF capacitors, Distribution and transformer losses. <b>Energy Efficient Technologies in Electrical Systems:</b> Maximum demand controllers, Automatic power factor controllers, Energy efficient motors, Soft starters with energy saver, Variable speed drives, Energy efficient transformers, Electronic ballast, Occupancy sensors, Energy efficient lighting controls, Energy saving potential of each technology.	12

### Learning Outcomes

The students would be able to study and mathematical analysis of electrical and mechanical energy, optimizing the input energy requirements, Fuel and energy substitution, Energy audit instruments. It also provides foundation to understand energy management and audit.

### Books Recommended

- 1 Electrical Energy Conservation Modules of AIP-NPC, Chennai
- 2 Energy Management Handbook, John Wiley and Sons - Wayne C. Turner
- 3 Guide to Energy Management, Cape Hart, Turner and Kennedy