

**EE305: ENERGY MANAGEMENT**  
**CREDITS = 3 (L=3, T=0, P=0)**

**Course Objective:**

The subject aims to provide the student with:

1. The knowledge of existing and upcoming industrial utility and energy management theory that allows the student to have a solid theoretical knowledge and be able in the future to design and development of various energy management technologies.
2. The skill to identify, formulate and solve fields problem in a multi-disciplinary frame individually or as a member of a group.

**Teaching and Assessment Scheme:**

Teaching Scheme			Credit	Marks Distribution				Total Marks
L	T	P		C	Theory Marks		Practical Marks	
3	0	0	3	ESE	CE	ESE	CE	100
				70	30	0	0	

**Course Content:**

Unit No.	Topics	Teaching Hours
1	<p><b><u>General Aspects:</u></b></p> <p>Basics of electrical &amp; thermal energy, energy units and conversion.  <b>Energy Scenario:</b> Primary &amp; Secondary energy, Commercial &amp; Non Commercial energy, Nonrenewable &amp; renewable energy, Globally energy reserves and production, Energy conservation and its importance.  <b>Energy Conservation Acts:</b> 2001, 2010, Electricity act 2003, National action plan on climate changes, Integrated energy policy, Schemes under EC act 2001.</p>	05
2	<p><b><u>Energy Management &amp; Audit:</u></b></p> <p>Definition as per EC act-2001, Objective, Need, Types, Benchmarking.            Management : Top management commitment &amp; support, Energy policy &amp; planning, Evaluating Energy Performance, Management Tools for Effective Implementation- 5S, KAIZEN, TPM, TQM, ISO 50001, Financial analysis: techniques, Role of ESCOs, project management technique- critical path method, pert analysis.            Energy Monitoring &amp; Targeting: Definition, Key elements, CUSUM analysis.</p>	07

3	<b><u>Renewable Energy Sources:</u></b>	05
	Concept & Fundamental, Applications: solar-thermal, solar –electrical, wind energy, biomass energy, hydro energy, fuel cell, energy from waste, wave energy, tidal energy, geothermal energy. <b>Global energy Issues:</b> Acid rain, Ozone layer, depletion, global warming & climate change, loss of biodiversity.	
4	<b><u>Energy Efficiency And Performance Of Electrical Utilities:</u></b>	13
	Electric motor, Air compressed system, HVAC and refrigeration system, Fans & Blowers, Pumps & Pumping System, Cooling towers , Lighting system, DG, ECBC codes. Case study.	
5	<b><u>Energy Efficiency &amp; Performance Of Thermal Utilities:</u></b>	10
	Boiler, furnace, Insulation & Refractories, Heat exchangers. Case study.	
6	<b><u>Energy Audit Case Study:</u></b>	05
	Thermal Power Plant, Textile Industry, Ceramic Industry And Cement Industry.	
<hr/> <b>TOTAL</b>		<b>45</b> <hr/>

**Reference Books:**

1. General aspects of energy management and energy audit, Guide book EA-EM, BEE, India.
2. Energy efficiency in electrical utilities, Guide book EA-EM, BEE, India.
3. Energy efficiency in thermal utilities, Guide book EA-EM, BEE, India.
4. Energy performance assessment for equipment and utility systems, Guide book EA-EM, BEE, India.
5. Doty, Steven; Turner, Wayne C, Energy Management Handbook (8th Edition), Fairmont Press, Inc., 978-0-88173-707-3
6. Amlan Chakrabarti, Energy Engineering and management, PHI Publication.

**Course Outcomes (Cos):**

After learning this course the students will be able to:

- CO1. Understand the problems and solution of electrical, thermal and mechanical Industrial utilities.
- CO2. Understand how to coordinate with other engineering branches in industries.
- CO3. Understand Energy Management technologies.
- CO4. Understand application of renewable energy sources.
- CO5. Learn about environment issues due to emission from fossil fuel consumption.
- CO6. Handle administration and technical issue.