

▪ SEMETSER:- II

▪ COURSE NO.:- FE-123

▪ COURSE TITLE:- ENERGY GENERATION AND  
CONSERVATION

▪ CREDIT:- 3(2+1)

➤ THEORY

NO. OF UNITS	TOPICS	NO. OF LECTURES
1	<i>Units and dimensions, Basic concepts : systems, processes, cycles, energy, The zeroth Law of Thermodynamics</i>	3
2	<i>Ideal gases: Equation of state, Compression and expansion of gases</i>	2
3	<i>The first Law of Thermodynamics: Internal energy, enthalpy</i>	2
4	<i>Renewable energy sources like solar, wind and biogas and their utilization in food processing</i>	3
5	<i>Related equipment and machineries to renewable energy sources</i>	2
6	<i>Fuels: Chemical properties, air for combustion, calorific value and its determination, burners, firing of fuels.</i>	3
7	<i>Properties of steam: Wet, dry saturated, superheated steam, use of steam tables.</i>	2
8	<i>Steam generators: Fire tube boilers, Water tube boilers</i>	2
9	<i>Boiler mountings and Boiler accessories</i>	2
10	<i>Measurement of height of boiler chimney</i>	2
11	<i>Condensers- Principle and Types</i>	2
12	<i>Layout of pipe-line and expansion joints</i>	2
13	<i>Boiler trial: Codes, Indian Boiler Regulation acts.</i>  <i>Air Compressors : Reciprocating, Single and two stage air compressors</i>	3
	<b>TOTAL</b>	<b>30</b>

## ➤ PRACTICALS

NO. OF UNITS	TOPICS	NO. OF EXPT.
1	<i>Application of thermodynamics in engineering problems</i>	2
2	<i>Determination of dryness fraction of steam</i>	2
3	<i>To study the boiler installed in Model Plant, Water softening plant, Babcock and Wilcox boiler, Electrode boiler, Boiler mounting and steam-line layout and steam traps</i>	6
4	<i>Visit to sugar mill or rice mill plant with steam utilization</i>	3
5	<i>Study of solar water heater and biogas plants and appliances</i>	2
	<b>TOTAL</b>	<b>15</b>

➤ *Reference Books:*

- *Engineering Thermodynamics* C.P. Gupta & Rajendra Prakash  
(1991), Nemi Chand and Sons, Roorkee
- *Elements of Heat Engines* N.C. Pandya & C.S. Shah. (1990)  
Charotar Publishing House, Anand
- *Indian Boiler Regulation Codes. (1991)*
- *Dairy Plant Engg. and Management* Tufail Ahmed (1996), Kitab Mahal  
New Delhi
- *Thermal Engineering* Mathur and Mehta
- *Renewable Energy Sources* G.D. Rai