

Department: Dairy Engineering

Course No. - DTE- 121

Credit Hrs-2 (1+1)

Course Title: Thermodynamics

Course Teacher: Dr. Jahangir Badshah

Theory

S. No.	Topics to be covered	No. of Classes
1	Importance and applications of thermodynamics in Dairy/Food processing.	01
2	Basic concepts: Thermodynamic systems, properties, state, Intensive and extensive properties.	01
3	Thermodynamics processes, cycles, energy, The Zeroth Law of Thermodynamics.	01
4	Properties and laws of perfect gases, gas constants and Universal gas Constants and Numericals solution.	02
5	Ideal gases: Equation of state, Compression and expansion of gases. Numerical solution.	01
6	The first Law of Thermodynamics: Internal energy, enthalpy.	01
7	Analysis of non-flow and flow processes. Numerical Solutions.	01
8	The second Law of Thermodynamics: Thermodynamic temperature scale & Carnot cycle.	01
9	Heat engine, entropy, reversibility, availability. Examples and Numerical Solution.	02
10	Air Cycles: Otto cycles and Diesel cycles derivation and their efficiencies and Numerical solutions.	02
11	Dual cycles derivations, their efficiencies and Numerical solutions.	01
12	Plotting the air cycles on P-V, T-S diagrams etc. with Numerical Solutions.	02
13	Plotting of p-h diagram with Numerical Solutions.	01
14	I.C. Engines: Concepts, Classification, Working of two stroke cycle	01
15	Working of four stroke cycle S.I. engines and C.I. engines.	01
16	Parts of I.C. engine and difference in design and working of Two stroke and four stroke engines.	01
17	Performance of IC engines and Efficiencies of I. C. Engines.	01
18	Numerical on work done and efficiencies of I.C. Engines.	01
	Total	22

Practical (DTE-121)

S. No.	Practical to be covered	No. of Classes
1	A visit to dairy/ food processing plant showing the thermodynamics systems.	01
2	Study of working 2-stroke and 4-strokes IC engines.	01
3	Study of Parts of Heat Engine.	01

4	Study of parts and working of VCR cycle as an application.	01
5	Study of working of S.I. and C.I. engines working.	01
6	Study of modern fuel injection systems of I.C. engines.	01
7	Study of diesel fuel supply system (pump and fuel injector) of I.C.engines.	01
8	Study of fuel supply system of a petrol engine.	01
9	Study of cooling system of an I.C. engine (air cooling and water)	01
10	Study of lubrication system of I.C. engine.	01
11	Study of Solar water heater.	01
12	Study of biogas plants and appliances.	01
13	Study of applications in boiler for steam generation.	01
14	Visit to spark ignition engine and their dismantling and assembly.	01
15	Visit to compression ignition engine, their dismantling and assembly.	01
16	Visit to different types of Compressors, Blowers and fans.	01
17	Visit to boiler plants for understanding applications in Dairy Industry.	01
	Total	17

Suggested Reading:

1. A Text Book of Thermal Engineering by R.S. Khurmi and J. K. Gupta (2004), S. Chand & Company Ltd., Ram Nagar, New Delhi -110055.
2. Basic Thermodynamics Paperback by P.B. Nagaraj(2005), New Age International Publisher
3. Textbook of Thermodynamic by Epstein Paul S, Andesite Press Publisher.