NATIONAL INSTITUTE OF TECHNOLOGY, HAMIRPUR (HP) – 177 005

B.Tech. Mechanical Engineering, First Year [1st Semester]

Sr. No.	Course No.	Subject	L	T	P	Hours	Credits
1.	[AM-111]	Engineering Mathematics – I	3	1	0	4	4
2.	[AC-101]	Engineering Chemistry	3	1	0	4	4
3.	[MSE-101]	Material Science & Engineering	3	1	0	4	4
4.	[EC-101]	Basic Electronics Engineering	3	1	0	4	4
5.	[ME-101]	Basic Thermodynamics	3	1	0	4	4
6.	[CE-101]	Engineering Graphics with AUTOCAD	1	0	4	5	3
7.	[AC-101 P]	Engineering Chemistry Lab	0	0	3	3	2
8.	[MSE-101 P]	Material Science & Engg. Lab	0	0	2	2	1
9.	[EC-101 P]	Basic Electronics Engineering Lab.	0	0	2	2	1
10.	[WS-121]	Workshop – II	1	0	3	4	3
					Total =	36	30

BASIC THERMODYNAMICS

ME-101   L   T   P/D   Cr
                                              3   1   0   4

1. **BASIC CONCEPT:-** Dimensions and units, thermodynamic systems, thermodynamic properties and process, thermodynamic equilibrium, energy-kinetic, potential and internal, heat and work, zeroth law, concept of temperature, temperature scale, definition of ideal gas, laws and properties of ideal gas.

2. **FIRST LAW OF THERMODYNAMICS:-** First law for control mass (closed system), internal energy as a property, enthalpy, specific heats, non-flow processes of idea1 gases, cyclic process, first law for control volume (open system), general energy equation, one dimensional steady flow, examples of control mass and control volume energy analysis, simple problems.

3. **SECOND LAW OF THERMODYNAMICS:-** Limitations of first law of thermodynamics, Kelvin-Planck and Clausius statements, their equivalence, reversible processes, reversible cycles, and carnot cycle, corollaries of the second law, thermodynamics temperature scale, Clausius inequality, entropy, principle of increase of entropy, availability and irreversibility.

4. **PROPERTIES OF STEAM:-** Phase transformation, phase diagram, generation of steam, condition of steam- saturated steam, dry-saturated steam, wet steam, superheated steam, dryness fraction, property of steam, steam tables, methods of determination of dryness fraction of steam, use of Mollier charts , process of vapours and various process.

5. **GAS AND VAPOUR POWER CYCLE: -** General terms, Otto cycle, diesel cycle, dual cycle, working of 4 stroke petrol & diesel engines, working of 2 stroke petrol engine. Brayton cycle, Rankine cycle.

6. **MIXTURES OF GASES AND VAPOUR:-** Introduction, Ideal gas mixtures, The gibbs Dalton law, General relationships, illustrative examples, volumetric and Gravimetric analysis, Mixture of gas and vapour, Psychrometric terms, Thermodynamic Wet Bulb temperature, Temperature of adiabatic Saturation Enthalphy of moist air.

BOOKS RECOMMENDED:-
1. Engineering Thermodynamics   P.K. Nag
2. Engineering Thermodynamics   Gupta .& Prakash
3. Heat Engineering   Vasandani and D.S.Kumar

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