DEPARTMENT OF MECHANICAL ENGINEERING
Aligarh Muslim University, Aligarh

Course Title	:	Applied Thermodynamics
Course Number	:	MEC2210
Credits	:	03
Course Category	:	DC
Pre-requisites (s)	:	None
Contact Hours	:	2L – 1T – 0P
Type of Course	:	Theory
Course Assessment	:	Course work/Home Assignment 15%
		Mid Semester Examination (1 Hour) 25%
		End Semester Examination (2 Hours) 60%

Course Objectives:

To build basic skills for applying the concepts of thermodynamics to analyze processes used in various engineering applications.

Course Outcomes:

After taking this course students should be able to

1) Derive and apply basic thermodynamic relations to evaluate properties like enthalpy, entropy, and internal energy to solve engineering problems.
2) Evaluate thermodynamic properties of ideal gas mixtures and apply the concept for gas-vapor mixtures and psychometric processes.
3) Analyze gas power cycles and reciprocating compressors.
4) Analyze different refrigeration cycles and study the properties of refrigerants.

Syllabus:

Unit 1 : Maxwell relations, Relations involving enthalpy, internal energy, entropy, specific heats, volume expansivity, isothermal and adiabatic compressibility. Clausius-Clapeyron equation. Joule-Thomson coefficient. Ideal and real gas behavior, Real gas equations of state. Generalized charts for: compressibility, changes of enthalpy and entropy at constant temperature.

Unit 2 : Mixtures of ideal gases, Mixtures involving gases and vapors, First law applied to gas vapor mixtures, Adiabatic saturation process, Dry and wet bulb temperatures, Psychrometric chart and processes.

Unit 3 : Analysis of air-standard Carnot, Otto, Diesel, Dual, Ericsson, Stirling. Reciprocating compressors. Volumetric efficiency. Multi-staging of compressors.

Unit 4 : Basic refrigeration, Reversed Carnot, Vapour compression, Air refrigeration and Vapour absorption system. Refrigerants.

Books:

1. Claus Borgnakke and Richard Sonntag, 'Fundamentals of Thermodynamics', Seventh Edition, Wiley India Pvt. Ltd, 2008.
2. Moran et al., 'Engineering Thermodynamics', Wiley India Pvt. Ltd,
3. Cengel and Boles, 'Engineering Thermodynamics', Tata McGraw Hill,
4. Eastop and McConkey, 'Applied Thermodynamics', Pearson Education Asia, 2003.
5. C. P. Arora, 'Refrigeration and Air Conditioning', Tata McGraw Hill.

Mapping of COs, POs & PSOs

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	3	2	2							2	3	2	2
2	3	3	2	3	2							2	2	1	2
3	3	2	3	2	2	3	2	2				3	3	3	2
4	3	2	3	2	2	2						3	3	2	2