AMMT18 THERMODYNAMICS PRINCIPLES AND APPLICATIONS

UNIT-1 FIRST LAW OF THERMODYNAMICS

1.1 Thermodynamics- microscopic and macroscopic point of view- systems, properties, process, path, cycle. Units- pressure, temperature- Zeroth law.

1.2 First law- application to closed and open systems, internal energy, specific heat capacities CV and CP- enthalpy

UNIT-2 SECOND LAW OF THERMODYNAMICS

2.1 Second Law of thermodynamics- statements

2.2 Equivalents of Kelvin Plank and Clausius statements.

2.3 Reversibility- Irreversibility, reversible cycle- Carnot cycle and theorem

UNIT-3 INTERNAL COMBUSTION ENGINES

3.1 Classification of IC engine- IC engine components and functions.

3.2 Valve timing diagram and port timing diagram- Comparison of two stroke and four stroke engines, Comparison of petrol & diesel engine,

3.3 Fuel supply systems, total fuel consumption, specific fuel consumption, mechanical efficiency, BHP, IHP, FP - Ignition Systems, Lubrication system, Cooling system, MPFI, DTSI, CRDI.

UNIT-4 REFRIGERATION AND AIR-CONDITIONING

4.1 Principles of refrigeration, refrigerator& heat pump cycle, refrigerants, refrigerant properties, refrigerant selection, vapour compression refrigeration cycle, vapour absorption cycle,

4.2 Dry bulb temperature, wet bulb temperature, relative humidity, comfort air-conditioning, Psychrometric chart, humidification, de-humidification, air coolers, cooling towers.

UNIT-5 HEAT TRANSFER (Qualitative Treatment Only)

5.1 Heat transfer through conduction and convection, Fourier's law of conduction - Problems on one dimensional heat conduction through plain walls, composite walls, cylinder walls, spheres.

5.2 Extended surfaces: Fins. Problems on heat transfer through rectangular fin, triangular fin, circumferential fin, pin fin, fin efficiency, fin effectiveness.

5.3 Heat transfer through radiation, Stefan Boltzman Law, black body, grey body, shape factor. Types of Heat Exchangers.

References Books:

1. Michael A. Boles, Yunus A. Cengel, YunusCengel, "Thermodynamics", 2nd Edition, Mc Graw-Hill India, 2006.
2. Kothandaraman. C.P., Domkundwar. S. & Domkundwar. A.V., "A course in Thermal Engineering" Dhanpatrai & Co (P) Ltd, Fifth edition, 2000.
3. Kothandaraman. C.P., "Heat and Mass Transfer", New Age International (P) Publishers, 2002.