

For Syllabus, Question Papers, Notes & many More

## **AT6401 APPLIED THERMODYNAMICS AND HEAT**

### **TRANSFER**

#### **DETAILED SYLLABUS**

##### **UNIT I GAS POWER CYCLES**

Air standard cycles- Otto-Diesel-Dual-Work output, Efficiency and MEP calculations – comparison of the cycles for same compression ratio and heat addition, same compression ratio and heat rejection, same peak pressure, peak temperature and heat rejection, same peak pressure and heat input, same peak pressure and work output, Brayton cycle.

##### **UNIT II RECIPROCATING AIRCOMPRESSORS & REFRIGERATION CYCLES**

Single acting and double acting air compressors, work required, effect of clearance volume, volumetric efficiency, isothermal efficiency, free air delivery, Fundamentals of refrigeration, C.O.P., reversed carnot cycle, simple vapour compression refrigeration system, T-S, P-H diagrams, simple vapour absorption refrigeration system, desirable properties of an ideal refrigerant.

##### **UNIT III CONDUCTION**

Basic Concepts – Mechanism of Heat Transfer – Conduction, Convection and Radiation – General Differential equation of Heat Conduction – Fourier Law of Conduction – Cartesian – One Dimensional Steady State Heat Conduction – Conduction through Plane Wall, Cylinders and Spherical systems – Composite Systems – Conduction with Internal Heat Generation – Extended Surfaces – Unsteady Heat Conduction – Lumped Analysis – Use of Heislers Chart.

##### **UNIT IV CONVECTION**

Basic Concepts – Convective Heat Transfer Coefficients – Boundary Layer Concept – Types of Convection – Forced Convection – Dimensional Analysis – External Flow – Flow over Plates, Cylinders and Spheres – Internal Flow – Laminar and Turbulent Flow – Flow over Bank of tubes – Free Convection – Dimensional Analysis – Flow over Vertical Plate.

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## **UNIT V RADIATION**

Basic Concepts, Laws of Radiation – Stefan Boltzman Law, Kirchoff Law –Black Body Radiation – Grey body radiation Shape Factor Algebra – Electrical Analogy – Radiation Shields –Introduction to Gas Radiation.

### **TEXT BOOKS**

1. Rajput. R.K. “Applied Thermodynamics”, Laxmi Publishing Co., New Delhi, 2007
2. Holman. J.P. “Heat Transfer”, Tata McGraw –Hill, 2003.

### **REFERENCES**

1. Nag. P.K.”Basic and applied Thermodynamics” Tata McGraw–Hill Publishing Co. Ltd, New Delhi, 2004.
2. Nag. P.K. “Heat Transfer”, Tata McGraw-Hill, New Delhi, 2002.
3. Kothandaraman.C.P “Fundamentals of Heat and Mass Transfer” New Age International, New Delhi, 1998.

### **OBJECTIVES**

To familiarize the students to understand the applied thermodynamics and heat transfer. (Use of Standard and approved Steam Table, Mollier Chart, Compressibility Chart and Psychrometric Chart permitted).