4TH SEMESTER

Aero Engineering Thermodynamics

Subject code-RAE4C003

Module-I:

Basic Thermodynamics

System , Zeroth Law, First Law - Heat and work transfer in flow, Second law, Clausius and kelvin-plank statement - concept of entropy enthalpy change in non-flow processes. Carnot cycle and its specialties. Gibbs and Helmholtz function, maxwell Relation.

Module-II:

Air Cycles

Otto, Diesel, Dual combustion and Brayton combustion cycles – Air standard efficiency - Mean effective pressure – Actual and theoretical PV diagrams of two stroke and four stroke IC Engines, performance of IC Engines, classification of piston engines, cycle for Jet propulsion and Rocket Propulsion.

Module-III:

Thermodynamics Of One Dimensional Fluid Flow

Application of continuity, momentum and energy equations- Rankine cycle – Isentropic flow of ideal gases through nozzles - Principles of aircraft propulsion, Types of aircraft power plantsSimple jet propulsion system - Thrust rocket motor– Specific impulse.

Module-IV:

Fundamentals of Gas Turbine Engines

Illustration of working of gas turbine engine–The thrust equation – Factors affecting thrust – Effect of pressure, velocity and temperature changes of air entering compressor – Methods of thrust augmentation – Characteristics of turboprop, turbofan and turbojet – Performance characteristics.

Module-V:

Basics Of Heat Transfer Stoichiometry

Basics of heat transfer; conduction, convection, radiation, diffusion mass transfer basic concepts and governing equations. Stoichiometry definition and properties, dry bulb temperature, wet bulb temperature, dew point temperature, degree of saturation, adiabatic saturation temperature, Stoichiometry relation and process. Classification of fuels, Combustion reaction .fuel-air ratio.