

4TH SEMESTER
AIRCRAFT MATERIAL
Subject code-RAE4D002

Module-I

Introduction to Aircraft Materials:

General properties of materials, Definition of terms, Requirements of aircraft materials, Testing of aircraft materials, Inspection methods, Application and trends in usage in aircraft structures and engines, Introduction to smart materials and nanomaterials; Selection of materials for use in aircraft.

Module-II

Aircraft Metal Alloys and Super alloys:

Aluminium alloys, Magnesium alloys, Titanium alloys, Plain carbon and Low carbon Steels, Corrosion and Heat resistant steels, Maraging steels, Copper alloys, Producibility and Surface treatments aspects for each of the above; Super alloys, Nickel based super alloys, Cobalt based super alloys, and Iron based super alloys, manufacturing processes associated with super alloys, Heat treatment and surface treatment of super alloys.

Module-III

Polymers, Polymeric Materials & Plastics and Ceramics & Glass:

Knowledge and identification of physical characteristics of commonly used polymeric material: plastics and its categories, properties and applications; commonly used ceramic, glass and transparent plastics, properties and applications, adhesives and sealants and their applications in aircraft.

Introduction to Composite Materials

Basics of composite materials, classification of composite materials, Fabrication of composite materials, metal matrix composite, polymer matrix composite, ceramic matrix composite, Applications of composite materials.

Module-IV

Ablative and Super Conducting Materials:

Ablation process, ablative materials and applications in aerospace; Phenomenon of super conduction, super conducting materials and applications in aerospace.

Aircraft Wood, Rubber, Fabrics & Dope And Paint:

Classification and properties of wood, Seasoning of wood, Aircraft woods, their properties and applications, Joining processes for wood, Plywood; Characteristics and definition of terminologies pertaining to aircraft fabrics and their applications, Purpose of doping and commonly used dopes;

Module-V

High Energy Materials: Materials for rockets and missiles. Types of propellants and its general and desirable properties, insulating materials for cryogenic engines. Types of solid propellants: Mechanical characterization of solid propellants using uni-axial, strip-biaxial and tubular tests.