

For Syllabus, Question Papers, Notes & many More

## **AE6302 ELEMENTS OF AERONAUTICS**

### **DETAILED SYLLABUS**

#### **UNIT I HISTORY OF FLIGHT**

Balloon flight – ornithopters - early airplanes by wright brothers, biplanes and monoplanes, developments in aerodynamics, materials, structures and propulsion over the years.

#### **UNIT II BASICS OF FLIGHT MECHANICS**

Physical properties and structure of the atmosphere, temperature, pressure and altitude relationships, newton's law of motions applied to aeronautics - evolution of lift, drag and moment. aerofoils, mach number, maneuvers.

#### **UNIT III AIRCRAFT CONFIGURATIONS**

Different types of flight vehicles, classifications. components of an airplane and their functions. conventional control, powered control, basic instruments for flying - typical systems for control actuation.

#### **UNIT IV AIRPLANE STRUCTURES AND MATERIALS**

General types of construction, monocoque, semi-monocoque and geodesic constructions, typical wing and fuselage structure. metallic and non-metallic materials, use of aluminium alloy, titanium, stainless steel and composite materials. stresses and strains – hooke's law – stress - strain diagrams – elastic constants.

#### **UNIT V POWER PLANTS**

Basic ideas about piston, turboprop and jet engines - use of propeller and jets for thrust production - comparative merits, principles of operation of rocket, types of rockets and typical applications, exploration into space.

#### **TEXT BOOKS**

1. Anderson, J.D., "Introduction to Flight", McGraw-Hill, 1995.
2. Stephen. A. Brandt, "Introduction to Aeronautics: A design perspective" American Institute of Aeronautics & Astronautics, 1997.

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**REFERENCES**

1. Kermode, A.C., "Mechanics of Flight", Himalayan Book, 1997.

**OBJECTIVES**

To introduce the concepts of flying, International standard atmosphere, structural aspects of airplanes, brief description of systems, instruments and power plants used in airplanes.