



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal - 500 043, Hyderabad, Telangana

COURSE CONTENT

ELEMENTS OF AEROSPACE ENGINEERING								
III Semester: OE								
Course Code	Category	Hours / Week		Credits	Maximum Marks			
BAEE30	Elective	L 3	T -	P -	C 3	CIA 40	SEE 60	Total 100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes: 45			
Prerequisite:								

I. COURSE OVERVIEW:

Aeronautical engineering is the specialized branch of engineering and study of science that deals with design, construction, maintenance of various aircrafts and their components. Candidates who have an inclination towards airplanes and their mechanisms can opt to study aeronautical engineering.

II. COURSE OBJECTIVES:

The students will try to learn:

- I. The Historical evaluation of Airplanes.
- II. The different component systems and functions.
- III. The various types of power plants used in aircrafts.

III. COURSE OUTCOMES:

After successful completion of the course, students will be able to:

- CO 1 Learn the history of aircraft & developments over the years
- CO 2 Understand ability to identify the types & classifications of components and control systems
- CO 3 Understand the basic concepts of flight & Physical properties of Atmosphere
- CO 4 Understand the different Newtonian law and its application in aerospace domain
- CO 5 Explain the Different types of Engines and principles of Rocket
- CO 6 Understandability to differentiate the types of fuselage and constructions

IV. COURSE CONTENT:

MODULE-I: HISTORY OF FLIGHT (09)

Balloon flight-ornithopters-Early Airplanes by Wright Brothers, biplanes and monoplanes, Developments in aerodynamics, materials, structures and propulsion over the years.

MODULE-II: AIRCRAFT CONFIGURATIONS AND ITS CONTROLS (09)

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.

MODULE-III: BASICS OF AERODYNAMICS (09)

Physical Properties and structures of the Atmosphere, Temperature, pressure and altitude relationships.

Newton's Law of Motions applied to Aeronautics-Evolution of lift, drag and moment. Aero foils, Mach number, Maneuvers.

MODULE-IV: BASICS OF PROPULSION (09)

Basic ideas about piston, turboprop and jet engines - use of propeller and jets for thrust production- Comparative merits, Principle of operation of rocket, types of rocket and typical applications, Exploration into space.

MODULE-V: BASICS OF AIRCRAFT STRUCTURES (09)

General types of construction, Monocoque, semi-monocoque and geodesic constructions, typical wing and fuselage structure. Metallic and non-metallic materials. Use of Aluminum alloy, titanium, stainless steel and composite materials. Stresses and strains-Hooke's law- stress-strain diagrams-elastic constants-Factor of Safety.

V. TEXT BOOKS:

1. Anderson, J.D., Introduction to Flight, McGraw-Hill; 8th edition, 2015
2. Stephen. A. Brandt, Introduction to aeronautics: A design perspective, AIAA Education Series, 2nd edition 2004.

VI. REFERENCE BOOKS:

1. Kermode, A.C. "Flight without Formulae", Pearson Education, 11th edition, 2011.

VII. WEB REFERENCES:

1. <http://memberfiles.freewebs.com/94/47/55224794/documents/airport%20planning%20and%20management.pdf>
2. https://books.google.co.in/books?id=RYR6cu4YSBcC&dq=Planning%20and%20Design%20of%20Airports&source=gbs_similarbooks

VIII. MATERIALS ONLINE

1. Course template.
2. Assignments.
3. Tutorial question bank.
4. Model question paper – I.
5. Model question paper – II.
6. Lecture notes.
7. Power point presentations.