

ELEMENTS OF AEROSPACE ENGINEERING

III Semester: COMMON FOR ALL BRANCHES																													
Course Code	Category	Hours /Week			Credits	Maximum Marks																							
BAEC30	Elective	L	T	P	C	CIA	SEE	Total																					
		3	-	-	3	30	70	100																					
Contact Classes: 45		Tutorial Classes: Nil		Practical Classes: Nil			Total Classes: 45																						
<p>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.</p> <p>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</p> <p>III. COURSE OUTCOMES: After successful completion of the course, students will be able to:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">CO</th> <th style="width: 70%;">Outcome</th> <th style="width: 20%;">Understand</th> </tr> </thead> <tbody> <tr> <td>CO 1</td> <td>Learn the history of aircraft & developments over the years</td> <td style="text-align: center;">Understand</td> </tr> <tr> <td>CO 2</td> <td>Understand ability to identify the types & classifications of components and control systems</td> <td style="text-align: center;">Understand</td> </tr> <tr> <td>CO 3</td> <td>Understand the basic concepts of flight & Physical properties of Atmosphere</td> <td style="text-align: center;">Understand</td> </tr> <tr> <td>CO 4</td> <td>Understand the different Newtonian law and its application in aerospace domain</td> <td style="text-align: center;">Understand</td> </tr> <tr> <td>CO 5</td> <td>Explain the Different types of Engines and principles of Rocket</td> <td style="text-align: center;">Understand</td> </tr> <tr> <td>CO 6</td> <td>Understand ability to differentiate the types of fuselage and constructions</td> <td style="text-align: center;">Understand</td> </tr> </tbody> </table> <p>IV. COURSE SYLLABUS: MODULE-I: HISTORY OF FLIGHT (07) Balloon flight-ornithopters-Early Airplanes by Wright Brothers, biplanes and monoplanes, Developments in aerodynamics, materials, structures and propulsion over the years.</p> <p>MODULE-II: AIRCRAFT CONFIGURATIONS AND ITS CONTROLS (08) 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.</p> <p>MODULE-III: BASICS OF AERODYNAMICS (06) 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. Aerofoils, Mach number, Maneuvers.</p> <p>MODULE-IV: BASICS OF PROPULSION (06) 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.</p>									CO	Outcome	Understand	CO 1	Learn the history of aircraft & developments over the years	Understand	CO 2	Understand ability to identify the types & classifications of components and control systems	Understand	CO 3	Understand the basic concepts of flight & Physical properties of Atmosphere	Understand	CO 4	Understand the different Newtonian law and its application in aerospace domain	Understand	CO 5	Explain the Different types of Engines and principles of Rocket	Understand	CO 6	Understand ability to differentiate the types of fuselage and constructions	Understand
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MODULE-V: BASICS OF AIRCRAFT STRUCTURES (06)

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-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:

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

VII. WEBREFERENCES:

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. E-TEXTBOOKS:

<https://nptel.ac.in/courses/101/101/101101079/>