



Course Title: ELEMENTS OF AEROSPACE ENGINEERING

Credit Units: 2

Course Code: AERO201

Course Level: UG

L	T	P/S	SW/ FW	TOTAL CREDIT UNITS
2	-	-	-	2

Course Objective

Being a foundation course for aerospace students, its objective is to provide introductory knowledge about some of the topics of aerospace engineering, such as, flight vehicles, principles of flight mechanics, propulsion systems, aerospace structures, aircraft systems, passenger comfort systems, power-actuated systems, etc.

Pre-requisites: Applied Physics - I

Course Contents/Syllabus:

	Weightage (%)
Module I : Principles of Flight Mechanics	
Descriptors/Topics Lifting and non-lifting surfaces. Lift and drag of airfoils, stalling, finite span wing, induced drag. Wing plan-form variations, forward and aft swept wings, high lift devices, use of control surfaces, elementary ideas about stability and control of airplanes.	25
Module II : Principles of Aerospace Propulsion	
Descriptors/Topics : Classification of propulsive units and their features; Fixed and variable pitch air screws, piston prop engine, turbo prop engine, turbo jet engines and its variations, ramjet, pulse jet, rockets engines; Solid and liquid propellant engine, the concept of staging of rockets, structural features in each case, Engine starting-systems.	30
Module III : Aerospace Vehicle Structure	
Descriptors/Topics : Importance of strength/weight ratio, introduction to loads on different parts of the vehicle, detailed description of the fuselage, wing and tail surfaces, wing surfaces, wing fuselage jointing methods, different types of under carriages.	20
Module IV : Power Actuated Systems	25

Descriptors/Topics : Hydraulic system: details and various components, selector and sequence, switches, electro-hydro-mechanical system, pneumatic system, fuel systems, etc.

Student Learning Outcomes:

- Identify and sketch various components of the aircraft and their applications.
- Recognize and label different parts and power actuated systems of aircraft and engine.

Pedagogy for Course Delivery: Session Plan / course material uploading, Class-room teaching followed with demonstration of cut-sections of aero-engine, fuselage & basic wind tunnel working at Aerospace Lab.

Assessment/ Examination Scheme:

Theory L/T (%)	Lab/Practical/Studio (%)	Total
100	NA	100

Theory Assessment (L&T):

Continuous Assessment/Internal Assessment - 30					End Term Examination
Components (Drop down)	A	CT	S/V/Q	HA	70
Weightage (%)	5	10	8	7	70

Text & References:

- Kermode A.C., “Mechanics of Flight”, Pitman Publication, UK, 1984.
- Kermode A.C., “Aeroplane Structures”, Pitman Publication, UK, 1986.
- Michael J. Kroes and JR Rardon, “Aircraft Basic Science” Tata McGraw-Hill.
- Michael J. Kroes and Thomas W. Wild, “Aircraft Power Plants”.
- John Anderson Jr., “Fundamentals of Aerodynamics”.
- Irewin E. Treager, “Aircraft Gas Turbine Engine Technology”.
- Haughten E.L. and Carpenter P.W., “Aerodynamics for Engineering Students”