

Course code	Course Name	L-T-P - Credits	Year of Introduction
AO482	FLIGHT AGAINST GRAVITY	3-0-0-3	2016
Prerequisite : Nil			
Course Objectives <ul style="list-style-type: none">To introduce the basic concepts of aerospace engineering and the current developments in the field.			
Syllabus: History of aeronautics – helicopters – aircraft propulsion – aircraft configurations – Atmosphere and atmospheric flight – space flight – aircraft structures and materials – rockets.			
Text Book: Anderson, J.D., “Introduction to Flight”, McGraw-Hill, 1995.			
Reference: Kermode, A.C., “Flight without Formulae”, McGraw-Hill, 1997.			
Syllabus &Course Plan			
Module	Contents	Hours	End Sem. Exam Marks
I	Historical Developments in Aeronautical Activities: Early air vehicles: Balloons, Biplanes and Monoplanes	3	15%
	Helicopters; Developments in aerodynamics, aircraft materials, aircraft structures & aircraft propulsion.	3	
II	Aircraft Configurations: Different types of flight vehicles and their classifications;	2	15%
	Components of fixed wing airplane and their functions;	2	
	Airfoils, wings and other shapes.	2	
FIRST INTERNAL EXAMINATION			
III	Principles of Atmospheric Flight: Physical properties and structure of the atmosphere:	3	15%
	The Standard Atmosphere, Temperature, Pressure and Altitude relationships, Mach number	2	
	Evolution of theory of lift and drag, Maneuvers, Concepts of stability and control.	3	
IV	Introduction to Space Flight: Introduction to basic concepts, the upper atmosphere	3	15%
	Space vehicle trajectories-some basic concepts, Kepler’s Laws of planetary motion.	3	
SECOND INTERNAL EXAMINATION			
V	Introduction to airplane structures and materials : General types of construction, Monocoque, semi-monocoque.	3	20%
	Typical wing and fuselage structure. Metallic and non-metallic materials	2	
	Use of aluminium alloy, titanium, stainless steel and composite materials.	2	
VI	Power plants used in airplanes : Basic ideas about piston, turboprop and jet engines.	3	20%

	Comparative merits, Principles of operation of rocket, types of rockets and typical applications,	3	
	Exploration into space.	2	
END SEMESTER EXAM			

Question Paper Pattern

Maximum marks: 100 Exam duration: 3 hours

The question paper shall consist of three parts

Part A

4 questions uniformly covering modules I and II. Each question carries 10 marks
Students will have to answer any three questions out of 4 (3X10 marks =30 marks)

Part B

4 questions uniformly covering modules III and IV. Each question carries 10 marks
Students will have to answer any three questions out of 4 (3X10 marks =30 marks)

Part C

6 questions uniformly covering modules V and VI. Each question carries 10 marks
Students will have to answer any four questions out of 6 (4X10 marks =40 marks)

Note: In all parts, each question can have a maximum of four sub questions, if needed.