

Course code	Course Name	L-T-P-Credits	Year of Introduction
AO306	AVIONICS AND CONTROL SYSTEMS	3-0-0-3	2016
Prerequisite : Nil			
Course Objectives <ul style="list-style-type: none"> To introduce the basic of avionics and its need for civil and military aircrafts To impart knowledge about the avionic architecture and various avionics data buses To gain more knowledge on various avionics subsystems employed in modern aircrafts. 			
Syllabus Introduction to digital computer and memories – Avionics - Avionics system architecture - Data buses - display technology- Civil and Military Electrical Power requirement standards- Radio navigation - Inertial Navigation Systems (INS)- Inertial sensors, Satellite navigation systems, GPS- Air data quantities- Mach warning, Altitude warning. Auto pilot -Fiber optic cables and their characteristics, -Avionics fiber optic data buses-Multiplexing schemes for onboard avionics- Fiber optic gyro.			
Expected Outcome The students will be able to <ol style="list-style-type: none"> Build Digital avionics architecture and various displays. Design Navigation system Design and perform analysis on air system. 			
Text Books: <ol style="list-style-type: none"> Albert Helfrick.D., "Principles of Avionics", Avionics Communications Inc., 2004 Collinson.R.P.G. "Introduction to Avionics", Chapman and Hall, 1996. 			
Reference: <ol style="list-style-type: none"> Middleton, D.H., Ed., "Avionics systems, Longman Scientific and Technical", Longman Group UK Ltd., England, 1989. Spitzer, C.R. "Digital Avionics Systems", Prentice-Hall, Englewood Cliffs, N.J.,U.S.A. 1993. Spitzer. C.R. "The Avionics Hand Book", CRC Press, 2000 S.C.Gupta, "Optoelectronic devices and Systems", Prentice Hall of India, New Delhi, 2005. 			
Course Plan			
Module	Contents	Hours	End Sem. Exam Marks
I	Need for avionics in civil and military aircraft and space systems.	1	15%
	Integrated avionics and weapon systems.	1	
	Typical avionics subsystems, design, technologies.	2	
	Introduction to digital computer and memories.	2	
	Avionics system architecture.	1	15%

II	Data buses - MIL-STD-1553B.	3	
	ARINC – 429.	2	
	ARINC – 629	4	
FIRST INTERNAL EXAM			
III	Trends in display technology, Alphanumeric displays, character displays etc.	2	15%
	Civil and Military aircraft cockpits, MFDs, MFK, HUD, HDD, HMD, DVI, HOTAS.	1	
	Synthetic and enhanced vision, situation awareness, Panoramic/big picture display, virtual cockpit.	3	
	Civil and Military Electrical Power requirement standards.	1	
IV	Radio navigation – ADF, DME, VOR, LORAN, DECCA, OMEGA, ILS, MLS.	1	15%
	Inertial Navigation Systems (INS).	2	
	Inertial sensors, INS block diagram.	2	
	Satellite navigation systems – GPS.	2	
SECOND INTERNAL EXAM			
V	Air data quantities – Altitude, Air speed, Vertical speed, Mach Number, Total air temperature.	1	20%
	Mach warning, Altitude warning.	1	
	Auto pilot – Basic principles.	1	
	Longitudinal and lateral auto pilot.	2	
VI	Types of Fiber optic cables and their characteristics, fiber optic sources and detectors.	2	20%
	Avionics fiber optic data busses: IEEE std 1393, MIL STD 1773 etc.	1	
	Multiplexing schemes for onboard avionics,	1	
	Fiber optic gyro.	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.