

COURSE CODE	COURSE TITLE	L	T	P	C
1151AE217	AVIONICS	2	0	2	3

Course Category:

Programme

a. Preamble:

This course Avionics provides an introduction to the basic concepts of electronics, working of communication and navigation systems in aircraft. It introduces the applications of digital electronic systems and flight control systems. This subject helps to understand basic Digital Avionics Architecture, GPS and modern Auto-pilot system. It introduces students to cognitive learning in applied electronics and develops problem solving skills with both theoretical and engineering oriented problems.

b. Prerequisite Courses:

- Aircraft Systems and Instruments

c. Related Courses:

- Navigation guidance and control

d. Course Educational Objectives:

- To introduce the basic concepts of ILS & Autopilot Systems.
- To introduce the basic concepts of cockpit digital instruments, digital avionic interfaces communication and navigation systems.

e. Course Outcomes:

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

CO Nos.	Course Outcomes	Knowledge Level (Based on revised Bloom's Taxonomy)
CO1	Discuss the basic concepts of Avionics & subsystems.	K2
CO2	Describe the working principle of ILS & its subsystems and Demonstrate the programming skill in microprocessor and micro controller	K2, S3
CO3	Describe the principles of Avionics System architecture and Demonstrate MIL – STD – 1553 Avionics data buses	K2, S3
CO4	Describe the principles of Instruments in flight deck	K2
CO5	Illustrate the working principle navigation & communication systems.	K2

f. Correlation of COs with POs:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H				H		H			H		
CO2	H	H			H	H	H		H	H		

CO3	H	H		H	H		H			H		
CO4	H						H			H		
CO5	H			H			H		H	H		

H- High; M-Medium; L-Low

g. Course Content:

UNIT-I-INTRODUCTION TO AVIONICS

L-6

Need for Avionics in civil and military aircraft and space systems – Integrated Avionics and Weapon system – Typical avionics sub systems – Design and Technologies.

UNIT-II-DIGITAL, RANGING AND LANDING SYSTEMS

L-6

Digital Computers – Microprocessors – Memories – Aircraft communication systems, VHF Omni range – VOR receiver principles – distance maturity equipment – principles of operation – Instrument landing system – localizer and glide slope

UNIT-III DIGITAL AVIONICS ARCHITECTURE

L-6

Avionics system architecture–Data buses MIL–STD 1553 B–ARINC 429–ARINC 629

UNIT-IV FLIGHT DECK AND COCKPITS

L-6

Control and display technologies CRT, LED, LCD, EL and plasma panel - Touch screen - Direct voice input (DVI) - Civil cockpit and military cockpit: MFDS, HUD, MFK, HOTAS.

UNIT-V-INTRODUCTION TO AVIONICS SYSTEM

L-6

Navigation systems - Flight control systems - Radar electronic warfare - Utility Systems Reliability and maintainability - Certification.

Total: 30 Periods

h. LIST OF EXPERIMENTS

1. Programming in digital electronics training kit
2. Programming in microprocessor and micro controller
3. Simple programs using Arduino microcontroller
4. MIL-Std – 1553 Data Buses Configuration with Message transfer.
5. MIL-Std – 1553 Remote Terminal Configuration.

Total: 30 Periods

i. Learning Resources

i. Text Books:

1. Collinson R.P.G. “Introduction to Avionics”, Chapman and Hall, 1996.
2. Malcrno A.P. and Leach, D.P., “Digital Principles and Application”, Tata McGraw-Hill, 1990.
3. Gaonkar, R.S., “Microprocessors Architecture – Programming and Application”, Wiley and Sons Ltd., New Delhi, 1990.

ii. Reference:

1. Middleton, D.H., Ed., "Avionics Systems, Longman Scientific and Technical", Longman Group UK Ltd., England, 1989.
2. Spitzer, C.R., "Digital Avionic Systems", Prentice Hall, Englewood Cliffs, N.J., USA. 1987.
3. Spitzer. C.R. "The Avionics Hand Book", CRC Press, 2000
4. Brain Kendal, "Manual of Avionics", The English Book House, 3rd Edition, New Delhi, 1993