

COURSE CODE	COURSE TITLE	L	T	P	C
1154EC101	AVIONICS	3	0	0	3

Course Category:

University Elective

Preamble:

This course provides an introduction to the role of electronics in aircraft systems and to acquire Knowledge to analyze the technical data's in various airborne systems.

a. Prerequisite Courses:

Basic Electronics Engineering

b. Related Courses:

Digital Communication Techniques
Digital System Design

Course Educational Objectives:

The students should be made to

- Know the needs for avionics for both Civil and military aircraft
- Understand the various digital electronic principles and working operations of aviation based on digital circuits.
- Be exposed on integration of the digital electronics with cockpit equipments
- Understand the communication and onboard navigation system.

c. 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	Explain the needs for avionics for both Civil and military aircraft	K2
CO2	Explain the various digital electronic principles and working operations of aviation based digital circuit.	K2
CO3	Describe the integration of the digital electronics with cockpit equipments	K2
CO4	Explain the concept of communication and navigation equipment related to aviation.	K2
CO5	Explain the concept of onboard navigation system.	K2

d. Correlation of COs with POs :

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	M										L
CO2	M	M										L
CO3	M	M										L
CO4	M	M										L
CO5	M	M										L

e. Course Content :**UNIT I INTRODUCTION TO AVIONICS 9**

Basics of Avionics-Basics of Cockpits-Need for Avionics in civil and military aircraft and space systems – Integrated Avionics Architecture –Military and Civil system – Typical avionics System and Sub systems – Design and Technologies.

UNIT II DIGITAL AVIONICS BUS ARCHITECTURE 9

Avionics Bus architecture–Data buses MIL–RS 232- RS422-RS 485-AFDX/ARINC-664-MIL STD 1553 B–ARINC 429–ARINC 629- Aircraft system Interface

UNIT III FLIGHT DECK AND COCKPITS 9

Control and display technologies CRT, LED, LCD, EL and plasma panel - Touch screen - Direct voice input (DVI) – ARINC 818-Civil cockpit and military cockpit: MFDS, PFDS-HUD, HMD, HMI

UNIT IV AVIONICS SYSTEMS 9

Communication Systems-Navigation systems- Flight control systems-Radar electronic Warfare- Utility systems Reliability and maintainability Fundamentals- Certification-Military and civil aircrafts.

UNIT V ON BOARD NAVIGATION SYSTEMS

Introduction to GPS -system description -basic principles -position and velocity determination- Over view of navigational aids, Flight planning, Area navigation, required time of arrival,

RNAV architecture , performance aspects, approach and landing challenges, regulatory and safety aspects, INS, GPS and GNSS characteristics.

f.Learning Resources

Text Books:

1. R.P.G. Collinson, “Introduction to Avionics”, Chapman & Hall Publications,1996.

Reference:

1. Cary R .Spitzer, “The Avionics Handbook”, CRC Press,2000.
2. Middleton,D.H.“AvionicsSystems”,LongmanScientificandTechnical,LongmanGroupUK Ltd., England, 1989.
3. Spitzer, C.R. “Digital Avionics Systems”, Prentice Hall, Englewood Cliffs, N.J., U.S.A.,1987.
4. Brain Kendal, “Manual of Avionics”, The English Book House, 3rdEdition, New Delhi,1993
5. Jim Curren, “Trend in Advanced Avionics”, IOWA State University,1992.

Online resources

1. <http://en.wikipedia.org/wiki/Avionics>
2. http://en.wikipedia.org/wiki/Integrated_modular_avionics
3. http://www.airliners.net/aviation-forums/general_aviation/read.main/2329714/
4. <http://en.wikipedia.org/wiki/Cockpit>
5. http://en.wikipedia.org/wiki/Air_navigation
6. <http://virtualskies.arc.nasa.gov/navigation/4.html>