AVIONICS

(CORE COURSE-V)

II Semester: AEROSPACE ENGINEERING

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
B27607	CC	3	-	-	3	30	70	100
Contact Classes: 60	Tutorial Classes:	Practical Classes:				Total Classes: 60		

AIM:
The students are introduced to different aspects of avionics systems
OUTCOME: The students will have necessary knowledge in understanding and analysis of the avionics systems on aircraft

UNIT-I	**AVIONICS TECHNOLOGY:**	**Classes: 12**

Evolution of electronics. The nature of microelectronic devices- processors, memory devices. Introduction to avionics- systems integration– need- data bus systems – MIL STD 1553 bus system, ARINC 429 / ARINC 629 bus systems, optical data bus systems. Integrated modular avionics architectures – commerCIEl off the shelf systems. Avionics packaging

UNIT-II	**AIRCRAFT INSTRUMENTATION - SENSORS AND DISPLAYS:**	**Classes: 12**

Air data sensors, magnetic sensing, inertial sensing, radar sensors. The electromechanical instrumented flight deck, early flight deck instruments, attitude direction indicator, horizontal situation indicator, altimeter, airspeed indicator. Advanced flight deck display system architectures, display systems, display media, future flight deck displays..

UNIT-III	**COMMUNICATION AND NAVIGATION AIDS:**	**Classes: 12**

Radio frequency spectrum, communication systems, HF, VHF, satellite communications; ATC transponder, traffic collision avoidance system. Navigational aids. Automatic Direction Finding, VHF Omni Range, Distance Measuring Equipment; TACAN, VORTAC. Satellite navigation systems – the GPS. Instrument landing system, transponder landing system, microwave landing system. Hyperbolic navigation systems

UNIT-IV	**NAVIGATION:**	**Classes: 12**

Basic navigation, radio, inertial navigations, satellite navigation- GPS, differential GPS, wide area augmentation systems, local area augmentation system, GPS overlay programme. Integrated navigation, sensor usage. Flight management system (FMS). FMS control and display unit. Lateral navigation, area navigation, terminal navigation, vertical navigation, four dimensional navigation, full performance based navigation. FMS procedures. Standard terminal arrival routes.ILS approach..

UNIT-V	**AIRBORNE RADAR, ASTRIONICS - AVIONICS FOR SPACECRAFT**	**Classes: 12**

Propagation of Radar waves- functional elements of radar- antenna- transmitter; Types of Radar- Pulse Doppler- civil aviation applications, military applications; Attitude determination & control of spacecraft- Magnetometers, sun sensors, star trackers, earth and horizon sensors. Command and telemetry systems

Text Books:

1. *Moir, I. and Seabridge, A*., Civil Avionics Systems, AIAA Education Series, AIAA, 2002, ISBN 1-56347589-8.
2. *Collinson, R.P.G*., Introduction to Avionics Systems, second edition, Springer, 2003, ISBN 978-81-8489-795-1

3. *Moir, I., Seabridge, A. & Jukes, M.*, Military Avionics Systems (Aerospace), Wiley, 2006, ISBN-10: 0470016329, ISBN-13: 9780470016329
4. *Middleton, D.H. (Ed),*Avionics Systems, Longman Scientific & Technical, 1989, ISBN 0-582-01881-1

Reference Books

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Kayton, M., & Fried, W.R., Avionics Navigation Systems, Wiley, 1997, ISBN 0-471-54795-6.
2. Helfrick, A., Principles of Avionics, Avionics Communications Inc. Leesburg, 2000, VA 20177, USA, ISBN 1-
885544-10-3.
2. Moir, I. and Seabridge, A.,Aircraft Systems: Mechanical, Electrical and Avionics Subsystems Integration, AIAA
Education Series, AIAA, 2001, ISBN 1-56347506-5.
3. Harris, D., Ground Studies for Pilots: Flight Instruments and Automatic Flight Control Systems, sixth edition,
Blackwell Science, 2004, ISBN 0-632-05951-6.
4. Henderson, M. F., Aircraft Instruments & Avionics for A &P TechniCIEns, Jeppesen Sanderson Training Products,
1993, ISBN 0-89100-422-X.
5. Avionics Systems – Operation & Maintenance, 1994, Wasson, J. W., Jeppesen Sanderson Training Products,
ISBN 0-89100-436-X.
6. Pallett, E.H.J.,Aircraft Instruments & Integrated Systems, 1996, Longman Scientific & Technical