AVIONICS

PROFESSIONAL ELECTIVE - VI

VIII Semester

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
A5ME59	PCC	3	0	0	3	30	70	100

COURSE OBJECTIVES:

The purpose of this subject is to provide the students with the theoretical background and engineering applications.

1. Overview on Aviation using Electronics
2. Basic understanding about major electronics systems used for communication
3. Basic understanding about major devices, display and flight controls used in aircraft

UNIT-I AVIONICS TECHNOLOGY

Evolution of electronics. 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

UNIT-II AIRCRAFT INSTRUMENTATION - SENSORS AND DISPLAYS

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

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 SYSTEMS

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

UNIT-V AIRBORNE RADAR, ASTRIONICS

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 and telemetry systems

Text Books:

Moir, I. and Seabridge, A., Civil Avionics Systems, AIAA Education Series, AIAA, 2002, ISBN 56347589-8.

Reference Books:

1. 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.
4. Henderson, M. F., Aircraft Instruments & Avionics for A &P TechniCIEns, Jeppesen Sanderson Training Products,
1993, ISBN 0-89100-422-X

COURSE OUTCOMES:

At the end of the course the students are able to:

1 Illustrates the architecture of the avionics.
2 Explain the flight deck display systems used in the aircraft.
3 Describe the communication and navigation systems.
4 Discuss the Navigation and flight management systems.
5 explain the telemeter systems used in the space craft.