

GUJARAT TECHNOLOGICAL UNIVERSITY
AERONAUTICAL ENGINEERING
B. E. SEMESTER: VII

Subject Name: **Advanced Avionics (Department Elective - I)**
Subject Code: **170105**

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	University Exam (E)		Mid Sem Exam (Theory) (M)	Practical (Internal)
				Theory	Practical		
4	0	2	6	70	30	30	20

Sr. No	Course Content	Total Hrs.
1.	Defining The Avionics Systems Requirements-1 Aircraft and its mission drive the avionics system design Impact of FAR 25.672 on control system design, Maintenance by Who, When, Where. Specifying the interfaces with the aircraft	3
2.	Designing The Avionics System Fault tolerant software, Evaluating systems designs, Examples of current and future architectures	4
3.	Matching The System To The Aircraft Packaging the avionics – ARINC Style, Packaging the avionics – DOD-STD Style, Keeping avionics cool, Laying out the cockpit	3
4.	Hardware Assessment And Validation FARs Guide the certification of civil digital avionics systems, Safety assessment, environmental qualification, software assurance, Fault tree analysis is a proven and accepted technique, Failure modes and effects analysis Criticality and damage modes and effects analyses, Computer based reliability modeling and prediction, Putting equipment to test :DO-160, MIL-STD-810 military avionics test.	9
5.	Software Technology, Assessment, And Validation Essentials of software development, DO-178, DOD-STD-2167, Using Ada, MIL-STD-1750 standardizes computer instructions.	8
6.	Avionics Systems Essentials li: Cockpit Displays And I/O Devices CRTs are versatile display devices, Luminous flat panels, A look at liquid crystal displays, Multi-Function keyboards Save Space, Offer Flexibility,	4

	Voice interactive systems are another way to communicate	
7.	Avionics systems essentials iii: POWER MIL-STD-704 Applies to Military Aircraft, DO-160 Prescribes Civil Aircraft electrical power quality, Comparing the military and civil requirements, Tips on power system design	4
8.	Making Maintenance Easier Designing for easy maintenance, BITE and CFDS are big helps Automatic test equipment speeds maintenance, ATLAS: a giant of a test language	3
9.	Figuring the costs of avionics Introduction, Some underlying principles, Life cycle costs for civil avionics, Cash flow analysis for civil avionics, Life cycle cost for military avionics, Software costs, Establishing the spares level, Establishing the spares level	5
10.	Electronic Warfare Role description, ECM, ECCM, ESM, Signal Intelligence, Key performance characteristics, systems architecture	3
11.	Night Vision Goggles NVG as part of avionics suite, Fundamentals, Applications & examples	3
12.	Speech Recognition & Synthesis Introduction & how it works, Recent applications & Flight deck applications	2
13.	Human Factors Engineering & Flight Deck Design Introduction & fundamentals, Additional considerations	3
14.	Synthetic Vision Introduction & application	1
15.	Enhanced Situation Awareness Enhanced ground proximity warning system, Fundamentals of terrain avoidance warning, Operating modes	2
16.	Traffic Collision Avoidance System Introduction, components, surveillance, Protected airspace, collision avoidance logic, cockpit presentation	3

Text Books:

1. Digital Avionics Systems by C R Spitzer
2. Avionics Handbook compiled by C R Spitzer
3. Principles of Avionics by Albert Helfrick

Reference Books:

1. Avionics Systems by D H Middleton
2. Military Avionics by Ian Moir & Allan Seabridge