AIRCRAFT SYSTEMS

ENAS 352

Lecture	**: 3**	**Year : III**
Tutorial	**: 1**	**Part : II**
Practical	**: 3/2**	

Course Objectives:

The objective of this course is to provide knowledge relevant to aircraft systems. After completion of this course the students will be able to understand the components and systems that help an aircraft or spacecraft function in air and space, while ensuring human safety.

1 Airframe Structure (4 hours)

1.1 Aircraft fuselage: Structure and function
1.2 Aircraft wing: Structure and function
1.3 Aircraft tail: Structure and function
1.4 Structure and function of landing gear: Structure and function

2 Ice and Rain Protection System (4 hours)

2.1 De-icing system
2.2 Anti-icing system
2.3 Rain eliminating system
2.4 Ground de-icing system
2.5 Drain heaters

3 Hydraulic and Pneumatic Power System (6 hours)

3.1 Aircraft hydraulic system
3.2 Hydraulic fluids types and filters
3.3 Reservoir
3.4 Pressure regulation
3.5 Selector valves
3.6 Actuating cylinder
3.7 Aircraft pneumatic system
3.8 Pneumatic system components

4 Landing Gear Systems (4 hours)

4.1 General structure
4.2 Steering system
4.3 Brake system
4.4 Aircraft landing wheels

4.5 Anti-skid system
4.6 Emergency extension system
4.7 Auto brake system

5 Fire Protection System (4 hours)

5.1 Types of fires and fire zones
5.2 Fire detection system
5.3 Extinguishing agent characteristics and system
5.4 Fixed fire extinguishing system
5.5 Turbojet fire protection system
5.6 Lavatory fire protection system
5.7 Fire Prevention and protections
5.8 Smoke detection system
5.9 Cockpit and cabin interior

6 Fuel System (6 hours)

6.1 System layout
6.2 Fuel tanks
6.3 Supply system
6.4 Dumping, venting and draining
6.5 Longitudinal balance fuel systems
6.6 Cross feed and transfer

7 Air Conditioning and Cabin Pressurization System (4 hours)

7.1 Air supply
7.2 Air conditioning
7.3 Pressurization

8 Water and Waste System (2 hours)

8.1 Water system
8.2 Toilet system
8.3 Corrosion aspect

9 Aircraft Electrical System (4 hours)

9.1 Aircraft battery
9.2 AC/DC/emergency power generation
9.3 Voltage regulation
9.4 Power distribution
9.5 Circuit protection
9.6 External/ground power
9.7 Aircraft lightening system

10 On Board Systems (4 hours)

10.1 Central maintenance computers
10.2 Data loading system
10.3 Electronic library system

11 Equipment and Furnishing (2 hours)

11.1 Equipment layout
11.2 Cabin furnishing installation
11.3 Cabin entertainment equipment
11.4 Galley installation
11.5 Cargo handling and retention equipment; Airstairs

Tutorial (15 hours)

1. Application of ICAO phonetic alphabet and radiotelephony protocols in aviation communication
2. Case study on aircraft fixed fire protection and suppression systems
3. Analysis of aircraft landing gear systems and associated failure mechanisms
4. Study of anti-icing and de-icing systems in ATR 72 aircraft
5. Principles and operational mechanisms of air-to-air refueling in fighter aircraft

Practical (22.5 hours)

Aircraft observation and presentation: Students will participate in an aircraft or airline facility to observe various aircraft systems, including flight control, hydraulic, electrical, and avionics systems. During the observation, students will also gain exposure to fuel systems, environmental control systems, and basic maintenance practices. This activity is intended to enhance students' understanding of system integration, operational safety, and real-world aircraft operations. Students should prepare and deliver a presentation based on their observations.

Final Exam

The questions will cover all the chapters in the syllabus. The evaluation scheme will be as indicated in the table below:

Chapters	Hours	Mark distribution*
1 and 2	8	12
3 and 4	10	12
5 and 6	10	12
7, 8 and 11	8	12
9 and 10	8	12
Total	**45**	**60**

* There may be minor deviation in marks distribution.

References

1. Forenz, T., Gibson, K. C., Rodriguez, C.L., Vosbury, P. (2018). Aviation maintenance technician certification series. Avotek Information Resources.
2. McKinley, J. L., Bent, R.D. (1993). Aircraft power plants (Latest Edition). McGraw-Hill, Inc.
3. Moir, I., Seabridge, A. (2011). Aircraft systems: Mechanical, electrical, and avionics subsystems integration. John Wiley & Sons Ltd.
4. Pallett, E.H.J. (2009). Aircraft instruments: Principles and applications. Pearson Education India.
5. U.S. Department of Transportation, Federal Aviation Administration. (2023). Aviation maintenance technician handbook—Airframe (FAA-H-8083-31B). Federal Aviation Administration.