**I. COURSE TITLE:** Aircraft Instrumentation, Navigation and Communication

 **COURSE NUMBER:** 2241 **CATALOG PREFIX:** AVIT

**II. PREREQUISITE(S):**

**III. CREDIT HOURS:** 4 **LECTURE HOURS:** 3

 **LABORATORY HOURS:** 1 (2 contact) **OBSERVATION HOURS:**

**IV. COURSE DESCRIPTION:**

This course will introduce the student to aircraft instrumentation, communication radios, navigation equipment, and position/warning systems. The students will understand how to inspect, check, troubleshoot, and service aircraft flight instrumentations systems both mechanical and electronic. Students will learn about the different types of position and warning systems for landing gear, airspeed, takeoff, landing, brake control, and wheel anti-skid. Students will investigate VHF and HF communication radios, navigation equipment, and GPS used on today’s aircraft. In lab students will remove and install flight instrument radio equipment and perform pitot-static system leak checks. Students will test and service stall warning, gear warming, and anti-skid brake systems.

**V. GRADING**

A= 90-100

 B= 80-89

 C= 70-79

 D= 60-69

 F= 0-59

Grades of 69 and below will not meet the requirements of the FAA for Mechanic

Certificate .

See catalog for description of other possible grades.

**VI. ADOPTED TEXT(S):**

Jeppesen Maintenance

 A&P Technician

Airframe Textbook

**VII. COURSE OBJECTIVES:**

Students will be able to:

• Inspect, check, service, troubleshoot, and repair electronic flight

 instrument systems and both mechanical and electrical heading, speed,

 altitude, temperature, pressure, and position indicating systems to include

 the use of built-in test equipment (1)

• Install instruments and perform a static pressure system leak test (2)

• Inspect, check, and troubleshoot autopilot, servos and approach coupling

 systems (1)

• Inspect, check, and service aircraft electronic communication and

 navigation systems, including VHF passenger address interphones and

 static discharge devices, aircraft VOR, ILS, LORAN, radar beacon

 transponders, flight management computers, and GPWS (1)

• Inspect and repair antenna and electronic equipment installations (2)

• Inspect, check, and service speed and configuration warning systems,

 electrical brake controls, and anti-skid systems (2)

• Inspect, check, troubleshoot, and service landing gear position indicating

 and warning systems (3)

 Objective levels:

Level 1 requires:

Knowledge of general principles, but no practical application.

No development of manipulative skill.

Instruction by lecture, demonstration, and discussion.

Level 2 requires:

Knowledge of general principles, and limited practical application.

Development of sufficient manipulative skill to perform basic operations. Instruction by lecture, demonstration, discussion, and limited practical application.

Level 3 requires:

Knowledge of general principles, and performance of a high degree of practical application.

Development of sufficient manipulative skills to simulate return to service.

Instruction by lecture, demonstration, discussion, and a high degree of practical application.

**VIII. COURSE METHODOLOGY:**

May included but not limited to lecture and problems solving, group and lab projects, in-class and home assignments, quizzes and tests. Lab project will be individual and group. Attendance to class and lab is required.

**IX. COURSE OUTLINE:**

Weeks:

1. Principles of pressure measurement, pressure-measuring instruments, absolute pressure, gauge pressure, differential pressure, manifold pressure gauge, pressure switches, altimeters.

2. Airspeed indicators, machmeter, temperature-measuring instruments, nonelectrical temperature instruments, electrical temperature indicators.

3. Mechanical movement measurement, gyroscopic instruments, direction-indicating instruments, magnetic compass.

4. Instrument pneumatic systems, venturl systems, vacuum pump systems, instrument system servicing, positive pressure systems, pitot-static system, static system testing.

Test 1

5. Fuel quantity indicating systems, mechanical indicators, direct current electrical indicators, capacitance fuel quantity systems, fuel system monitoring instruments, fuel pressure indicators, electronic instruments, EFIS, EADI, EHSI, ECAM, EICAS, auxiliary instruments.

6. Instrument system installation and maintenance practices, panel layout, equipment and instrument mounting, range markings, compass swing, pitot-static system test.

7. Avionics that use radio waves, radio operating principles, basic radio components, antennas.

8. Speakers and microphones, communications radios, intercom and interphone systems, SATCOM, SELCAL, navigational systems, VOR equipment check for IFR operations.

Test 2

9. Distance measuring equipment (DME), area navigation, inertial navigation system, global positioning system (GPS), transponders, instrument landing system (ILS).

10. Emergency locator transmitters (ELT), cockpit voice recorders and flight data recorders, radar altimeter, ground proximity warning system (GPWS), weather radar, Stormscope, TCAS -airborne collision avoidance system, types of antennas.

11. Autopilots and flight directors, types of autopilots, basic autopilot operation, autopilot components, flight management system (FMS).

12. Thrust management computer (TMC), control wheel steering (CWS), flight director, autopilot maintenance.

Test 3

13. Installation and maintenance of avionics, cleaning of electronic equipment, switches and circuit breakers, bonding and shielding, static dischargers, installation methods, antenna installations.

14. Antiskid brake control systems, antiskid system components, antiskid system test, antiskid system maintenance.

15. Indicating and warning systems, stall warning indicator, angle-of-attack indicators, remote position indicating systems, configuration warning systems, mach airspeed warning systems, GPWS, EICAS.

16. Final exam

**X. OTHER REQUIRED TEXTS, SOFTWARE, AND MATERIALS:**

FAA AC-65-15A

Airframe and Powerplant Mechanics

Airframe Handbook

 FAA-AC-43.13-1B/2B

Acceptable methods, Techniques, and practices of aircraft inspection and Repair

**XI. EVALUATION:**

Test count – 40% of Final Grade

 Quizzes count – 10% of Final Grade

 Lab Grade counts – 50% of Final Grade

**XII. SPECIFIC MANAGEMENT REQUIREMENTS:**

Class and lab attendance is mandatory. Students are required to be in class and lab to satisfy the time requirement of the FAA. Quizzes cannot be made up. No test can be taken late without prior approval of the instructor.

**XIII. OTHER INFORMATION:**

**FERPA:** Students need to understand that your work may be seen by others. Others may see your work when being distributed, during group project work, or if it is chosen for demonstration purposes. Students also need to know that there is a strong possibility that your work may be submitted to other entities for the purpose of plagiarism checks.

**DISABILITIES:** Students with disabilities may contact the Disabilities Service Office, Central Campus, at 800-628-7722 or 937-393-3431.