# AMT A182: AVIONICS INSTALLATION PRACTICES

| Item | Value |
|---|---|
| Curriculum Committee Approval Date | 12/08/2021 |
| Top Code | 095040 - Aircraft Electronics (Avionics) |
| Units | 4 Total Units |
| Hours | 108 Total Hours (Lecture Hours 54; Lab Hours 54) |
| Total Outside of Class Hours | 0 |
| Course Credit Status | Credit: Degree Applicable (D) |
| Material Fee | No |
| Basic Skills | Not Basic Skills (N) |
| Repeatable | No |
| Grading Policy | Standard Letter (S) |

## Course Description

Schematic reading, use of multimeter, Series and parallel circuits. Avionics terminology, system interfacing, Avionics install standard practices. Diagnostic test equipment and fault finding logic tree techniques to a systems level. ADVISORY: AMT A151. Transfer Credit: CSU.

## Course Level Student Learning Outcome(s)

1. List and locate the electrical, electronics, and avionics sections in an aircraft and identify an assigned component of that system.
2. Explain an avionics system schematic and be able to locate system components.
3. Install circuit protection devices and connectors by crimping and soldering.
4. Discuss aircraft and reference materials explaining cockpit electrical, avionics controls and functions.

## Course Objectives

- 1. Demonstrate knowledge and understanding of Ohms Law as applied to complex circuits
- 2. Demonstrate proficiency in the use of analog and digital multimeters
- 3. Demonstrate ability to troubleshoot circuit opens and shorts
- 4. Demonstrate knowledge of avionics circuit components
- 5. Demonstrate knowledge of aircraft wiring practices
- 6. Demonstrate ability to locate avionics components on aircraft
- 7. Perform wire terminations and interconnects.
- 8. Describe operation of switches, relays and circuit protective devices.
- 9. Assemble antenna coaxial cables
- 10. Create a functioning electrical circuit schematic.
- 11. Explain the Federal Aviation Regulations as they apply to avionics systems

## Lecture Content

Lecture Topics: Electrical basic concepts Ohms law Series circuits: Fault diagnosis Open Short Parallel circuits Fault diagnosis Open Short Continuity check of coaxial cables. Resistors Color code Series circuits Multimeter Parallel circuits Multimeter Complex circuits Multimeter Incandescent lamps Series Multimeter Voltage division Current limiting Parallel Multimeter Current division Voltage Switches SPST, SPDT, DPDT Multimeter Complex circuits Lamps and switch complex circuits Assembly Operation Data recording Fault diagnosis Wiring diagrams Diodes Rectifier Multimeter DMM diode test VOM diode test Complex circuits Lamps, switches Assembly Operation Data recording Fault diagnosis Wiring diagrams (ATA20) Diode logic gate OR gate Soldering Complex circuits Perforation board point to point soldering Operational test Fault diagnosis and repair Coaxial wire repair Splices Alternating current Peak, RMS Power factor 26VAC aircraft buss Synchro power source Inductor Resistance, reactance, i mpedance Low pass filter Noise filter DMM functional test Bipolar transistors lighting controls Electro static discharge Precautions Logic Gates AND gate, OR gate, inverter, JK flip flop Electro static discharge (ESD) prevention Marker beacon receiver Block diagram, functional description using factory service documentation Bench test Cables, connectors Ramp test in aircraft Procedure documentation for applying power to aircraft Safety procedures Over voltage protection Test set operation Marker beacon receiver Installation procedures Fabrication of connectors and wire harness for aircraft installation Antennas BNC crimp connector to RG 58 coaxial cable Install/repair/replace antenna and cable in aircraft Polarization Quarter/half wave Duplexer

## Lab Content

students will: 1. Demonstrate knowledge and understanding of Ohms Law as applied to complex circuits 2. Demonstrate proficiency in the use of analog and digital multimeters 3. Demonstrate ability to troubleshoot circuit opens and shorts 4. Demonstrate knowledge of avionics circuit components 5. Demonstrate knowledge of aircraft wiring practices 6. Demonstrate ability to locate avionics components on aircraft 7. Perform wire terminations and interconnects. 8. Describe operation of switches, relays and circuit protective devices. 9. Assemble antenna coaxial cables 10. Create a functioning electrical circuit schematic. 11. Explain the Federal Aviation Regulations as they apply to avionics systems

## Method(s) of Instruction

- Lecture (02)
- Lab (04)

## Instructional Techniques

Instructional methodologies will include, but not necessarily be restricted to, the following: 1. Detailed multimedia lectures of each topic covered, which include A.C. and D.C. principles., digital logic circuits. 2. Student feedback during each lecture 3. Detailed illustrative discussion of textbook examples 4. Concentration on schematic reading and system operation fault diagnosis 5. Practical troubleshooting applied methodologies to Ohms law 6. Laboratory exercises pertaining to subjects discussed during which students work singly or in small groups

## Reading Assignments

Assigned from instructional textbooks

## Writing Assignments

Written examinations - Three written examinations (written/ multiple choice and essay type), will be used to test the Students mastery of the

material.Laboratory examinations - Students will be evaluated on their performance on an assigned midterm laboratory project.

## Out-of-class Assignments

Requires two (2) hours of independent work outside of class for each unit/weekly lecture hour

## Demonstration of Critical Thinking

Discussions - Students will answer the instructors oral questions

## Required Writing, Problem Solving, Skills Demonstration

Written examinations - Three written examinations (written/ multiple choice and essay type), will be used to test the Students mastery of the material.Laboratory examinations - Students will be evaluated on their performance on an assigned midterm laboratory project.

## Textbooks Resources

1. Required Eismin, Thomas R.. Aircraft Electricity Electronic, 6th ed. New York: Glencoe/McGraw-Hill, 2013 Rationale: latest 2. Required Federal Aviation Administration. AC - 43.13 1B/2B - Acceptable Methods, Techniques and Practices of Aircraft Inspection and Repair , 2009 ed. FAA, 2009 Rationale: latest