**I. COURSE TITLE:** Basic Aircraft Electricity

 **COURSE NUMBER:** 1112 **CATALOG PREFIX:** AVIT

**II. PREREQUISITE(S):**

**III. CREDIT HOURS:** 5 **LECTURE HOURS:** 3

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

**IV. COURSE DESCRIPTION:**

In this class the student will learn the basis of electron flow. The student will study the relationship between voltage, current and resistance. The student will use the understanding of Ohm’s Law and Kirkoff”s Law relating to voltage, current and resistance to solve series, parallel and complex electrical circuits. The student will be introduced to battery theory, including lead acid and nickel-cadmium and their use in aircraft. This course will cover direct and alternating currents, wiring, switches, control devices, wiring diagrams, generators, alternators, and motors used on aircraft.

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

Jeppesen Maintenance

 A&P Technician

General Textbook

**VI. COURSE OBJECTIVES:**

Students will be able to:

• Calculate and measure capacitance, inductance and electrical power (2)

• Measure voltage, current, resistance and continuity (3)

• Determine the relationship of voltage, current and resistance in electrical

 circuits (3)

• Read and interpret electrical diagrams including solid state devices and

 logic functions (3)

• Inspect and service batteries (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.

**VII. 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.

**VIII. 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.

**IX. COURSE OUTLINE:**

Weeks:

1. Discovery of electricity, the atom, electron flow, conventional flow, units of electrical measurement, static electricity, sources of electricity, magnetism.
2. Electromagnetism, current electricity, Ohm’s law, mechanical power and circuits, heat and circuits, conductors, switches, relays, protective devices, resistors.
3. Component symbology, circuit arrangement, meter usage, series DC circuits, parallel DC circuits, circuit power.

4. Complex DC circuits, voltage dividers, changing DC to AC.

Test 1

5. Primary cell batteries, secondary cell batteries, mercury cell batteries, lead-acid batteries, battery ratings, battery installation, nickel-cadmium batteries, alternating current, alternating current phase, alternating current power.

6. Inductants, series in parallel inductors, inductive reactance, capacitance, capacitors in series and parallel circuits, capacitive reactance.

7. Non electrolytic capacitors, electrolytic capacitors, variable capacitors, impedance, power factor, apparent power, true power, parallel AC circuits, resonance in an AC circuit, converting AC to DC, transformers.

8. Electron controlled devices, vacuum tubes, diodes, solid state devices, semiconductor diodes, rectifiers (half-wave, full-wave, bridge-type, three-phase), zener diodes, transistors, SCR’s, magnetic amplifiers.

Test 2

9. Photo diodes and transistors, LED’s, filters, amplifiers, oscillators, logic gates.

10. Electrical measuring instruments, ammeters, voltmeters, Ohmmeter, multi-meters, megohmmeter, measuring voltage-resistance-current, vibrating-reed frequency meters.

11. Electrical trouble shooting.

12. Generators, theory, construction, types of generators, starter generators.

 Test 3

13. Generator ratings, generator terminals, generator control, generator overhaul.

14. Alternators, alternator control, DC alternator, AC alternator, multiphase alternator, alternator overhaul.

15. DC motors, AC motor.

16. Final Exam

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

FAA-H-8083-30

 Aviation Maintenance Technician 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.