1. **COURSE TITLE\*: Fundamentals of Electricity and Electronics**
2. **CATALOG – PREFIX/COURSE NUMBER/COURSE SECTION\*: AVIT 1104**
3. **PREREQUISITE(S)\*: None COREQUISITE(S)\*: None**
4. **COURSE TIME/LOCATION/MODALITY: (*Course Syllabus – Individual Instructor Specific*)**
5. **CREDIT HOURS\*: 3 LECTURE HOURS\*: 2**

**LABORATORY HOURS\*: 1 (1.5contact hours) OBSERVATION HOURS\*: 0**

1. **FACULTY CONTACT INFORMATION: *(Course Syllabus – Individual Instructor Specific)***
2. **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.

1. **LEARNING OUTCOMES\*:**
2. Calculate and measure capacitance, inductance and electrical power
3. Measure voltage, current, resistance and continuity
4. Determine the relationship of voltage, current and resistance in electrical circuits
5. Read and interpret electrical diagrams including solid state devices andlogic functions
6. Inspect and service batteries
7. **ADOPTED TEXT(S)\*:**

FAA-H-8083-30A (General)

Aviation Maintenance Technician Handbook 43.13-1B

<https://www.faa.gov/sites/faa.gov/files/regulations_policies/handbooks_manuals/aviation/amt_general_handbook.pdf>

<https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_43.13-1B_w-chg1.pdf>

**9a: SUPPLEMENTAL TEXTS APPROVED BY FULL TIME DEPARTMENTAL FACULTY (INSTRUCTOR MUST NOTIFY THE BOOKSTORE BEFORE THE TEXTBOOK ORDERING DEADLINE DATE PRIOR TO ADOPTION) \*\*\*.**

1. **OTHER REQUIRED MATERIALS: (SEE APPENDIX C FOR TECHNOLOGY REQUEST FORM.)\*\***
2. **GRADING SCALE\*\*\*:**

Grading will follow the policy in the catalog. The scale is as follows:

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.

1. **GRADING PROCEDURES OR ASSESSMENTS: (*Course Syllabus – Individual Instructor Specific)***

Test count – 40% of Final Grade

Quizzes count – 10% of Final Grade

Lab Grade counts – 50% of Final Grade

Class and lab attendance will be graded, two points will be deducted from the grade for each day missed. Quizzes cannot be made up. No test can be taken late without prior approval of the instructor.

1. **COURSE METHODOLOGY: *(Course Syllabus – Individual Instructor Specific)***

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.

**14. COURSE OUTLINE: *(Course Syllabus – Individual Instructor Specific)***

***(Insert sample course outline with learning outcomes tied to assignments / topics.)***

|  |  |  |
| --- | --- | --- |
| **WEEK** | **DESCRIPTION** | **LEARNING OUTCOMES #** |
| WEEK 1 | Discovery of electricity, the atom, electron flow, conventional flow, units of electrical measurement, static electricity, sources of electricity, magnetism. | 1, 2, 3 |
| WEEK 2 | Electromagnetism, current electricity, Ohm’s law, mechanical power and circuits, heat and circuits, conductors, switches, relays, protective devices, resistors. | 1, 2, 3 |
| WEEK 3 | Component symbology, circuit arrangement, meter usage, series DC circuits, parallel DC circuits, circuit power. | 1, 2, 3 |
| WEEK 4 | Complex DC circuits, voltage dividers, changing DC to AC. | 1, 2, 3 |
| WEEK 5 | **Test 1**  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. | 5 |
| WEEK 6 | Inductants, series in parallel inductors, inductive reactance, capacitance, capacitors in series and parallel circuits, capacitive reactance. | 3 |
| WEEK 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. | 3, 4 |
| WEEK 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. | 3, 4 |
| WEEK 9 | Photo diodes and transistors, LED’s, filters, amplifiers, oscillators, logic gates. | 3, 4 |
| WEEK 10 | Electrical measuring instruments, ammeters, voltmeters, Ohmmeter, multi-meters, megohmmeter, measuring voltage-resistance-current, vibrating-reed frequency meters. | 3, 4 |
| WEEK 11 | Electrical trouble shooting. | 4 |
| WEEK 12 | Generators, theory, construction, types of generators, starter generators. | 1, 2, 3 |
| WEEK 13 | **Test 2**  Generator ratings, generator terminals, generator control, generator overhaul. | 1, 2, 3 |
| WEEK 14 | Alternators, alternator control, DC alternator, AC alternator, multiphase alternator, alternator overhaul. | 1, 2, 3 |
| WEEK 15 | DC motors, AC motor. | 1, 2, 3 |
| WEEK 16 | **Final Exam** |  |

* + Discovery of electricity, the atom, electron flow, conventional flow, units of electrical measurement, static electricity, sources of electricity, magnetism.
  + Electromagnetism, current electricity, Ohm’s law, mechanical power and circuits, heat and circuits, conductors, switches, relays, protective devices, resistors.
  + Component symbology, circuit arrangement, meter usage, series DC circuits, parallel DC circuits, circuit power.
  + Complex DC circuits, voltage dividers, changing DC to AC.
  + Test 1
  + 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.
  + Inductants, series in parallel inductors, inductive reactance, capacitance, capacitors in series and parallel circuits, capacitive reactance.
  + 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.
  + 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.
  + Photo diodes and transistors, LED’s, filters, amplifiers, oscillators, logic gates.
  + Electrical measuring instruments, ammeters, voltmeters, Ohmmeter, multi-meters, megohmmeter, measuring voltage-resistance-current, vibrating-reed frequency meters.
  + Electrical trouble shooting.
  + Generators, theory, construction, types of generators, starter generators.
  + Test 2
  + Generator ratings, generator terminals, generator control, generator overhaul.
  + Alternators, alternator control, DC alternator, AC alternator, multiphase alternator, alternator overhaul.
  + DC motors, AC motor.
  + Final Exam

**15. SPECIFIC MANAGEMENT REQUIREMENTS\*\*\*:**

Class and lab attendance will be graded. Quizzes cannot be made up. No test can be taken late without prior approval of the instructor.

**16. FERPA:\***

Students need to understand that their 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.

**17. ACCOMMODATIONS: \***

Students requesting accommodations may contact Ryan Hall, Accessibility Coordinator at rhall21@sscc.edu or 937-393-3431, X 2604.

Students seeking a religious accommodation for absences permitted under Ohio’s Testing Your Faith Act must provide the instructor and the Academic Affairs office with written notice of the specific dates for which the student requires an accommodation and must do so no later than fourteen (14) days after the first day of instruction or fourteen (14) days before the dates of absence, whichever comes first. For more information about Religious Accommodations, contact Ryan Hall, Accessibility Coordinator at [rhall21@sscc.edu](mailto:rhall21@sscc.edu) or 937-393-3431 X 2604.

**18. OTHER INFORMATION\*\*\*:**

**SYLLABUS TEMPLATE KEY**

**\*** Item cannot be altered from that which is included in the master syllabus approved by the Curriculum Committee.

**\*\*** Any alteration or addition must be approved by the Curriculum Committee

**\*\*\*** Item should begin with language as approved in the master syllabus but may be added to at the discretion of the faculty member.