



**Alabama**  
**Department of**  
**Postsecondary Education**

**Representing Alabama's Public Two-Year College System**

**AMT 101**  
**Basic Electricity**  
**Plan of Instruction**

Effective Date: 2022      Version Number: Base Document

**AMT 101 Basic Electricity**      135 Hours    Theory 45    Laboratory 90

**COURSE DESCRIPTION:** This course provides a study in electricity. Emphasis is placed on alternating current (AC) and direct current (DC) circuits and controls, electrical measurements, electrical test equipment, aircraft batteries, fundamental electronics, and semi-conductor devices. Upon completion, students should be able to solve problems associated with electrical measurements, use basic electrical test equipment, and service aircraft batteries.

**This is a CORE course.**

**CONTACT/CREDIT HOURS** (applicable if entire course is taught in a career/technical education degree or non-degree program)

Theory Contact/Credit Hours	3/3 hours	45 hours (1:1)
Lab Contact/Credit Hours	6/2 hours	90 hours (3:1)
Total Contact/Credit Hours	9/5 hours	135/5 hours

NOTE: Colleges may schedule lab hours as manipulative (3:1) or experimental (2:1). Adjustments in contact hours must be made accordingly.

**PREREQUISITE COURSES** (applicable if entire course is taught in a career/technical education degree or non-degree program)

Determined by college unless stated otherwise.

**CO-REQUISITE COURSES** (applicable if entire course is taught in a career/technical education degree or non-degree program)

Determined by college unless stated otherwise.

**INDUSTRY COMPETENCIES**

AM.I.A, Fundamentals of electricity and Electronics

AM.I.A.K1 – K27    Ability to Demonstrate understanding of Electricity and Electronics in Aviation

AM.I.A.R1 – R4    Ability to identify, assess, and mitigate risks associated with Electricity in Aviation

AM.I.A.S1 – S14    Ability to Demonstrate skills associated with Electricity in Aviation.

AM.I.E.K7          Knowledge of soldering practices

**COURSE OBJECTIVES** The cognitive objective of this course is for each student to comprehend foundational knowledge needed to perform stated entry-level industry competencies.

The performance objective of this course is for each student to apply foundational knowledge and risk management to practical problems and exercises encountered in class.

## **COURSE CONTENT OUTLINE FAA AUTHORITY 147**

### **SUBJECT A Fundamentals of Electricity and Electronics**

- AM.I.A.K1 Electron theory (conventional flow vs. electron flow).
- AM.I.A.K2 Magnetism.
- AM.I.A.K6 Direct current (DC) electrical circuits.
- AM.I.A.K7 Electrical laws and theory.
  - AM.I.A.K7a a. Ohm's Law
  - AM.I.A.K7b b. Kirchhoff's Laws
  - AM.I.A.K7c c. Watt's Law
- AM.I.A.K8 Electrical measurement tools, principles, and procedures.
- AM.I.A.K9 Voltage.
  - AM.I.A.K9a a. Regulation
- AM.I.A.K10 Current.
- AM.I.A.K11 Resistance.
  - AM.I.A.K11b b. Resistance in series
  - AM.I.A.K11c c. Resistance in parallel

#### **101 AM.I.A Practical 1 (DC Series & Parallel Circuit Theory & Solutions)**

- AM.I.A.K11d d. Total resistance
- AM.I.A.K12 Power.
- AM.I.A.K26 Complex/combined circuits.

#### **101 AM.I.A Practical 2 (DC Complex Circuit Theory & Solutions)**

- AM.I.A.K17 Circuit continuity.
- AM.I.A.K20 Resistor types and color coding.
- AM.I.A.R1 Taking voltage, current, resistance, and capacitance measurements.
- AM.I.A.S1 Perform circuit continuity test.
- AM.I.A.S2 Measure voltage.
- AM.I.A.S3 Measure current.
- AM.I.A.S4 Measure resistance.
- AM.I.A.S5 Test a switch or relay.
- AM.I.A.S6 Test a fuse or circuit breaker.
- AM.I.A.S11 Measure voltage drop across a resistor.
- AM.I.A.R3 High-voltage circuits (e.g., strobe lighting).

#### **101 AM.I.A Practical 3 (Analyze circuits and components with a DMM)**

#### **AMT101 Exam 1**

- AM.I.A.K3 Capacitance in a circuit.
- AM.I.A.K4 Inductance in a circuit.
- AM.I.A.K5 Alternating current (AC) electrical circuits.
- AM.I.A.K7d d. Faraday's Law
- AM.I.A.K7e e. Lenz's Law
- AM.I.A.K11a a. Impedance
- AM.I.A.K13 Series circuits.
- AM.I.A.K14 Parallel circuits.
- AM.I.A.K16 Transformers.

**101 AM.I.A Practical 4 ( AC Circuit Theory and Solutions)**

**AMT101 Exam 2**

- AM.I.E.K7 Soldering preparation, types of solder, and flux usage.

**101 AM.I.E Practical 1**

- AM.I.A.K7f f. Right-hand motor rule
- AM.I.A.K15 Aircraft batteries.
- AM.I.A.K18 Controlling devices, including switches and relays.
- AM.I.A.K19 Protective devices, including fuses, circuit breakers, and current limiters.
- AM.I.A.K21 Semiconductors, including diodes, transistors, and integrated circuits.
- AM.I.A.K22 Digital logic, including RAM, ROM, NVRAM, logic gates, inverter, rectifier, and flip flop.
- AM.I.A.K23 Binary numbers.
- AM.I.A.K24 Electrostatic discharge.
- AM.I.A.K25 Electrical circuit drawings.
- AM.I.A.K27 AC and DC motors.
- AM.I.A.R2 Handling, storage, and inspection of different types of batteries (i.e., lead acid, NiCad, lithium ion, gel cell).
- AM.I.A.R4 Working around batteries.
- AM.I.A.S7 Read and interpret aircraft electrical circuit diagrams, and symbols, including solid state devices and logic functions.
- AM.I.A.S8 Troubleshoot a circuit.
- AM.I.A.S9 Identify symbols used in electrical and electronic schematic diagrams (e.g., grounds, shields, resistors, capacitors, fuses, circuit breakers, batteries, diodes, transistors, and integrated circuits).
- AM.I.A.S10 Demonstrate how to test for short-circuit and open-circuit conditions.
- AM.I.A.S12 Determine or measure for open electrical circuits.
- AM.I.A.S13 Inspect an aircraft battery.
- AM.I.A.S14 Service an aircraft battery.

**101 AM.I.A Practical 5 (Electrical Troubleshooting, Circuit Components, Solid State Components)**

**101 AM.I.A Practical 6 (Servicing Aircraft Batteries)**

**AMT101 Exam 3**

**AMT101 Final Examination**