

COURSE OUTLINE

DEPARTMENT: Aviation Maintenance Technology

CURRICULUM: General

COURSE TITLE: Basic Electricity for Aviation

COURSE NUMBER: AMT 112

TYPE OF COURSE: Occupational Preparatory

COURSE LENGTH: 1 quarter

CREDIT HOURS: 17 credits

CLASS SIZE: 30 maximum for classroom lecture
25 maximum per instructor for lab time

COURSE DESCRIPTION: This course introduces the student to the basic concepts of electricity and magnetism, along with the circuit properties of resistance, inductance and capacitance.

Methods of power generation for alternating and direct current systems and power utilization are studied.

The theory is taught by use of texts, lectures, audio-visual methods and classroom demonstrations. Emphasis is placed on principles and practical application, keeping mathematics to a minimum.

The practical application is taught in the shop or laboratory where the student repairs and adjusts generators, alternators, motors and control units. He/she learns how to read schematics, fabricate and install complete circuits, troubleshoot and repair malfunctioning systems and components.

COURSE OBJECTIVES: Upon completion of the course, the student learns and is able to read and interpret electrical schematics and diagrams, employ basic troubleshooting procedures, use electrical instruments for the measurement of voltage, current, resistance, power and perform the electrical service work required of an aviation maintenance technician.

PREREQUISITES: AMT 111 or permission of the instructor.

REQUIRED TEXT: Required texts (see book list in student information packet)

COURSE SUBJECTS:	I.	Safety	(112-Gen)
	II.	Mathematics	(112-Gen)
	III.	Theory	(112-Gen)
	IV.	Magnetism	(112-Gen)
	V.	Electrical Circuits	(112-Gen)
	VI.	Meters and Test Equipment	(112-Gen)
	VII.	Batteries	(112-Gen)
	VIII.	Testing/NDT	(112-Gen)
	IX.	Electrical System Components and Practices	(112-AF)
	X.	Rotating Machinery	(112-PP)

Lecture time for **the program** will **be as** much as **1/2** but not **less** than **1/4** of the total hours. **Laboratory/shop** time will **be as** much as **3/4** but not less than **1/2** of the total hours. Total contact time available is 265 hours.

- I. SAFETY (112-Gen)
- II. MATHEMATICS (112-Gen)
 - 1. Basic skills math review
 - 2. Areas and Volumes
 - 3. Elementary Algebra
 - 4. Whole Numbers
- III. THEORY (112-Gen)
 - A. Energy
 - B. Structure of matter
 - C. Atomic theory
 - D. Electron theory
 - E. Electrical charges
 - F. Concept of current
 - G. Potential difference
 - H. Conductors, semiconductors
 - I. Sources of electricity
- VI. MAGNETISM (112-Gen)
 - A. Natural magnetism
 - B. Artificial magnetism
 - C. The magnetic circuit
 - D. Permanent, temporary magnets
 - E. Permeability, retentivity
 - F. Reluctance, hysteresis
 - G. Residual magnetism
 - H. Electromagnetic induction
- V. ELECTRICAL CIRCUITS (112-Gen)
 - A. Definitions and terminology
 - B. Series circuits (Ohm's Law introduction)
 - C. Parallel circuits (Kirchoff's Law introduction)
 - D. Compound circuits
 - E. Bridge circuits
 - F. Voltage dividers
 - G. Resistance, inductance, capacitance, and their measurements
 - H. Power and its measurements
 - I. Direct and alternating current circuit calculations

VI. METERS AND TEST EQUIPMENT (112-Gen)

- A. Meter movements
- B. Sensitivity and limitations of meters
- C. Voltmeter, ammeter, ohmmeter, load meter
- D. Multimeter
- E. The wheatstone bridge
- F. Inductance, capacitance measuring meters
- G. Shunts, multipliers

VII. BATTERIES (112-Gen)

- A. Electro-chemical action
- B. Primary cells
- C. Secondary cells
- D. Electrolytes and alkalines
- E. The lead-acid battery
- F. The nickel-cadmium battery
- G. Maintenance and charging of batteries
- H. Battery installation and inspection
- I. Selection and rating of batteries
- J. Safety practices

VIII. TESTING/NDT (112-Gen)

- A. Penetrate type inspection
- B. Magnetic particle inspection
- C. Eddy current inspection
- D. Ultrasonic inspection

IX. ELECTRICAL SYSTEMS COMPONENTS AND PRACTICES (112-AF)

- A. Wires and their selection
- B. Switches, solenoids, relays
- C. Bonding, shielding, conduit
- D. Busses, junction boxes, terminal strips
- E. Circuit protective devices
- F. Selection of terminal wires
- G. Special tools and installations practices

X. ROTATING MACHINERY (112-PP)

- A. Direct current generators (12 & 24 volt system)
- B. Inspection and maintenance
- C. DC generator control units
- D. Reverse, differential reverse current relays
- E. AC generators (12 & 24 volt system)
- F. AC generator control units
- G. Installation and field maintenance
- H. Alternators (115/208 volt system)
- I. Constant speed drives and integrated speed drive generators
(inspect, check and troubleshoot)
- J. Alternator control units
- K. Motors
- L. Inverters, converters, dynamotors
- M. Inspection of motors