

**COURSE OUTLINE**

DEPARTMENT:	Aviation Maintenance Technology
CURRICULUM:	General
COURSE TITLE:	Basic Science for Aviation
COURSE NUMBER:	AMT 111
TYPE OF COURSE:	Occupational Preparatory
COURSE LENGTH:	1 quarter
CREDIT HOURS:	17
CLASS SIZE:	35 maximum for classroom lecture 25 maximum for laboratory
COURSE DESCRIPTION:	<p>AMT 111 introduces the student to the diversified field of Aviation Maintenance by providing a firm foundation for maintenance on both small and large aircraft. The course covers aircraft terminology, nomenclature, basic physics, aircraft drawing, and interpretation of diagrams as they pertain to everyday shop problems.</p> <p>Additional topics include specifications and properties of modern aircraft materials, fabrication and their use, hardware, fittings, corrosion control, cleaning, proper use of tools, precision instruments required for maintenance and overhaul practices, and aircraft, Federal Aviation Regulations, maintenance records, publications, weight and balance control and other basic information are also covered.</p>

**AMT 111**  
Course Outline

**COURSE OBJECTIVES:** Upon completion of all lecture sessions and lab assignments, the students learn and are able to:

1. Properly use various shop and hand tools in a safe manner.
2. Use basic physics principles in the performance of aircraft maintenance.
3. Perform research in Federal documents and manufacture's technical documents.
4. Describe various aircraft materials and manufacturing processes.
5. Correctly use examples of maintenance forms and documents.
6. Handle and prepare aircraft for maintenance and weighting operations.

**STUDENT LEARNING**

**OUTCOMES ADDRESSED:**

1. Information Literacy – Access information from various technical manuals and specifications.
2. Computation – Use basic math skills to compute aircraft weight and balance
3. Human Relations – Use interactive skills to work in groups.

**PREREQUISITES:** High School Completion/GED or equivalent

**REQUIRED TEXTS:** Refer to Textbook list in student information packet.

**COURSE SUBJECTS:**

1. Orientation
2. Safety Practices
3. Shop Area Maintenance
4. Basic Aircraft and Subassemblies
5. Maintenance Publications
  - i. Demonstrate ability to read, comprehend, and apply information contained in FAA and manufacturers' aircraft maintenance specifications, data sheets, manuals, publications, and related Federal Aviation Regulations, Airworthiness Directives, and Advisory material.
  - ii. Read technical data.
6. Fluid Lines and Fittings
  - i. Fabricate and install rigid and flexible fluid lines and fittings.
7. Basic Physics
  - i. Use and understand the principles of simple machines; sound, fluid, and heat dynamics; basic aerodynamics; aircraft structures; and theory of flight.

8. Maintenance Forms and Records
  - i. Write descriptions of work performed including aircraft discrepancies and corrective actions using typical aircraft maintenance records.
  - ii. Complete required maintenance forms, records, and inspection reports.
  
9. Aircraft Drawings
  - i. Draw sketches of repairs and alterations.
  - ii. Use blueprint information.
  - iii. Use graphs and charts.
  
10. Materials & Processes
  - i. Perform basic heat-treating processes.
  - ii. Identify and select aircraft hardware and materials.
  - iii. Inspect and check welds.
  - iv. Perform precision measurements.
  
11. Cleaning and Corrosion Control
  - i. Identify and select cleaning materials.
  - ii. Inspect, identify, remove, and treat aircraft corrosion and perform aircraft cleaning.
  
12. Weight and Balance
  - i. Weigh aircraft.
  - ii. Perform complete weight-and-balance check and record data.
  
13. Mechanic Privileges and Limitations
  - i. Exercise mechanic privileges within the limitations prescribed by part 65 of this chapter.
  
14. Ground Operation and Servicing
  - i. Start, ground operate, move, service, and secure aircraft and identify typical ground operation hazards.
  - ii. Identify and select fuels.

Lecture time for the program **will be** as much as  $\frac{1}{2}$  but not **less** than  $\frac{1}{4}$  of the total hours.

Laboratory/shop time **will be** as much as  $\frac{3}{4}$  but not **less** than  $\frac{1}{2}$  of the total hours. Total contact time available is 240 hours.

**AMT 111**  
**Course Outline Breakdown**

- I. Orientation
  - a. Introduction to Aviation and supporting technologies
  - b. School and shop procedures
- II. Safety Practices
- III. Shop Area Maintenance
- IV. Basic Aircraft and Subassemblies
  - a. Principles of A/C structures
  - b. Principles of basic aerodynamics and theory of flight
- V. Federal Aviation Regulations
  - a. Part 21
  - b. Part 39
  - c. Part 43
  - d. Part 65
  - e. Part 91
- VI. Basic Physics
  - a. Matter
  - b. Weight and Mass
  - c. Energy
  - d. Work and Power
  - e. Force and Motion
  - f. Vectors
  - g. Stress and Strain
  - h. Heat and Temperature
  - i. Pressure
  - j. Gas Laws
  - k. Fluid Mechanics
  - l. Vibration and Sound
  - m. Light
- VII. Maintenance Forms and Records
  - a. Required Maintenance Records
  - b. Maintenance Record Entries
  - c. Inspection Entries
  - d. Major Repair and Alteration Form 337
  - e. Malfunction or Defect Report
  - f. Inspection Reminder

**AMT 111**  
**Course Outline**

- VIII. Aircraft Drawing
  - a. Drawing Types
  - b. Views
  - c. Practices
  - d. Charts
  
- IX. Materials & Processes/Cleaning & Corrosion Control
  - a. Metals
  - b. Nonmetal Materials
  - c. Metal Heat Treatment
  - d. Nondestructive Inspection
  - e. Aircraft Hardware
  - f. Measuring Devices
  
- X. Weight and Balance
  - a. Theory
  - b. Documentation
  - c. Weighing the Aircraft
  - d. Locating Center of Gravity
  - e. Single-engine Aircraft Weight and Balance Computations
  - f. Twin-engine Airplane Weight and Balance Computations
  - g. Adverse-loaded CG checks
  - h. Center of Gravity Change After Repair or Alterations
  - i. Determination of Needed Ballast
  - j. Large Aircraft Weight and Balance Computations
  - k. Weight and Balance Computations with an Electronic Computer
  
- XI. Mechanic Privileges and Limitations
  - a. Maintenance Classifications
  - b. Classification of Maintenance Airman
  
- XII. Ground Operation and Servicing
  - a. Fire Protection
  - b. Safety in the Shop and on the Flight Line
  - c. Aviation Fuels
  - d. Aircraft Fueling
  - e. Aircraft Movement
  - f. Aircraft Tie-down
  - g. Jacking and Hoisting
  - h. Icing Protection
  - i. Engine Operation

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 variable credits
CLASS SIZE:	30 maximum for classroom lecture 25 maximum per instructor for lab time
COURSE DESCRIPTION:	<p>This course introduces the student to the basic concepts of electricity and magnetism, along with the circuit properties of resistance, inductance and capacitance.</p> <p>Methods of power generation for alternating and direct current systems and power utilization are studied.</p> <p>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.</p> <p>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.</p>
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:

1. Safety (112-Gen)
2. Mathematics (112-Gen)
  - i. Extract roots and raise numbers to a given power.
  - ii. Determine areas and volumes of various geometrical shapes.
  - iii. Solve ratio, proportion, and percentage problems.
  - iv. Perform algebraic operations involving addition, subtraction, multiplication, and division of positive and negative numbers.
3. Basic Electricity (112-Gen)
  - i. Calculate and measure capacitance and inductance.
  - ii. Calculate and measure electrical power.
  - iii. Measure voltage, current, resistance, and continuity.
  - iv. Determine the relationship of voltage, current, and resistance in electrical circuits.
  - v. Read and interpret aircraft electrical circuit diagrams, including solid state devices and logic functions.
  - vi. Inspect and service batteries.
4. Drawings and Schematics (112-Gen)
  - i. Use aircraft drawings, symbols, and system schematics.
  - ii. Use graphs and charts.
5. Testing/NDT (112-Gen)
  - i. Identify and select appropriate nondestructive testing methods.
  - ii. Perform dye penetrant, eddy current, ultrasonic, and magnetic particle inspections.
6. Aircraft Electrical Systems (112-AF)
  - i. Repair and inspect aircraft electrical system components; crimp and splice wiring to manufacturers' specifications; and repair pins and sockets of aircraft connectors.
  - ii. Install, check, and service airframe electrical wiring, controls, switches, indicators, and protective devices.
  - iii. Inspect, check, troubleshoot, service, and repair alternating and direct current electrical systems.
  - iv. Inspect, check, and troubleshoot constant speed and integrated speed drive generators.
7. Engine Electrical Systems (112-PP)
  - i. Repair engine electrical system components.
  - ii. Install, check, and service engine electrical wiring, controls, switches, indicators, and protective devices.

Lecture time for **the program** will be as much as  $\frac{1}{2}$  but not less than  $\frac{1}{4}$  of the total hours.

**Laboratory/shop** time will be as much as  $\frac{3}{4}$  but not less than  $\frac{1}{2}$  of the total hours. Total contact time available is 240 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. Electron 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
- 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

- XI. ELECTRICAL SYSTEMS COMPONENTS AND PRACTICES (112-Gen)
  - 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-Gen)
  - 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 generator control units (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

**COURSE OUTLINE**

DEPARTMENT: Aviation Maintenance Technology

CURRICULUM: Airframe Maintenance Technology

COURSE TITLE: Airframe Structure and Repair

COURSE NUMBER: AMT 113

TYPE OF COURSE: Occupational Preparatory

COURSE LENGTH: 1 quarter

CREDIT HOURS: 17

CLASS SIZE: 25 maximum

COURSE DESCRIPTION: In AMT 113 students will gain knowledge and/or experience working with five types of aircraft structure materials: wood, fabric, composite/fiberglass, plastic and metal. Student projects in each of these areas, in combination with classroom lectures, will provide realistic exposure to approved airframe structural repair practices.

Assigned project areas will include the inspection and repair of various aircraft structure materials. Installing common fasteners in composite and metal structures. Forming, heat treating and fabricating metal structures and an introduction to brazing, gas and arc welding of steel, magnesium and titanium.

AMT 113  
Course Outline

**COURSE SUBJECTS:** Upon completion of all lecture sessions and lab assignments, the students learn and are able to:

1. Identify and describe the various materials used in aircraft structures.
2. Perform inspections, NDT, and repair operations on aircraft structures.
3. Determine the proper type of finish and condition of the finish on aircraft structures.
4. For a given structural material, select and remove and replace special fasteners.
5. Perform inspection, servicing, and repair operations on transparent enclosures.
6. Fabricate an aircraft component using techniques for sheet metal construction.
7. Identify and perform solder, brazing, and welding construction operations on various metal alloys.

**PREREQUISITES:** Successful completion of AMT 111 and 112 or by permission of Unit Administrator and instructor.

**REQUIRED TEXTS:** Required texts (see booklist in student information packet)

**ADDITIONAL REFERENCES:** Texts suggested by instructor.

AMT 113  
Course Outline

COURSE SUBJECTS:

1. Wood Structures
  - i. Service and repair wood structures.
  - ii. Identify wood defects.
  - iii. Inspect wood structures.
2. Aircraft Covering
  - i. Select and apply fabric and fiberglass covering materials.
  - ii. Inspect, test, and repair fabric and fiberglass.
3. Aircraft Finishes
  - i. Apply trim, letters, and touchup paint.
  - ii. Identify and select aircraft finishing materials.
  - iii. Apply finishing materials.
  - iv. Inspect finishes and identify defects.
4. Sheet metal and non-metallic structures
  - i. Select, install, and remove special fasteners for metallic, bonded, and composite structures.
  - ii. Inspect bonded structures.
  - iii. Inspect, test, and repair fiberglass, plastics, honeycomb, composite, and laminated primary and secondary structures.
  - iv. Inspect, check, service, and repair windows, doors, and interior furnishings.
  - v. Inspect and repair sheet-metal structures.
  - vi. Install conventional rivets.
  - vii. Form, lay out, and bend sheet metal.
5. Welding
  - i. Weld magnesium and titanium.
  - ii. Solder stainless steel.
  - iii. Fabricate tubular structures.
  - iv. Solder, braze, gas-weld, and arc-weld steel.
  - v. Weld aluminum and stainless steel.

Lecture time for the program **will be** as much as  $\frac{1}{2}$  but not **less** than  $\frac{1}{4}$  of the total hours.

Laboratory/shop time **will be** as much as  $\frac{3}{4}$  but not **less** than  $\frac{1}{2}$  of the total hours. Total contact time available is 240 hours.

- I. WOOD
  - a. Types
  - b. Evaluation of use
  - c. Preparation
  - d. Gluing
  - e. Spar repair
  - f. Rib repair
  - g. Plywood
  - h. Inspection
  - i. Protection
  
- II. FABRIC
  - a. Covering methods
  - b. Organic fabrics
  - c. Inorganic fabrics
  - d. Approval for use
  - e. Supplemental Type Certificates
  - f. FAA field approval
  - g. Structure preparation
  - h. Fabric testing
  - i. Coatings
  - j. Attachment technique
  - k. Patch repair
  - l. Inspection
  
- III. AIRCRAFT FINISHES
  - a. Metal Finishing
  - b. Paint removal
  - c. Paint preparation
  - d. Primers
  - e. Finishing systems
  - f. Fabric finishing organic fabric finishes
  - g. Inorganic finishes
  - h. Finish problems
  - i. Paint and dope application
  - j. Finishing equipment
  - k. Safety equipment
  - l. Inspection

**COURSE OUTLINE**

**DEPARTMENT:** Aviation Maintenance Technology

**CURRICULUM:** Aviation Powerplant Technology

**COURSE TITLE:** Airframe Systems

**COURSE NUMBER:** AMT 214

**TYPE OF COURSE:** Occupational Preparatory

**COURSE LENGTH:** 1 Quarter

**CREDIT HOURS:** 17 credits

**CLASS SIZE:** 25 Students maximum

**COURSE DESCRIPTION:** The student will be introduced to five basic airframe systems: Hydraulic-pneumatic power, landing gear, ice and rain control, cabin environmental control, and fuel systems and management. Assigned projects in these areas on mock-ups or assigned aircraft components and sub-compounds.

**COURSE OBJECTIVES:** Completion of all lecture sessions and lab assignments will enable students to accomplish the following tasks to appropriate levels in a safe and efficient manner, utilizing both standard and aircraft specific sources of approved maintenance data:

1. Identify and select the correct hydraulic fluids for a particular system or sub-system.
2. Check hydraulic and pneumatic system components correct operation.
3. Select tubing and hose for various plumbing arrangements, attach end fittings and install.
4. Inspect, test, service, and repair hydraulic and pneumatic systems.
5. Inspect, test, service, and repair landing gear systems, including retract and steering mechanisms, shimmy dampeners, shock struts, tires, wheel and brake system.
6. Inspect and service ice and rain control systems.
7. Inspect, check, service, troubleshoot and repair air conditioning system, air cycle machines, oxygen, and pressurization system.
8. Inspect, check, and service fuel systems, fuel dump systems, and pressure fueling systems including tanks, valves and plumbing.

AMT 214  
Course Outline

STUDENT LEARNING OUTCOMES

1. Technology – Select and use appropriate testing equipment.
2. Personal Responsibility – Practice safety procedures.
3. Critical Thinking and Problem Solving – Locate and evaluate aircraft system schematics and troubleshoot systems in accordance with published specifications.

PREREQUISITES: Successful completion of AMT 111, 112, and 113, or by permission of Unit Administrator and instructor.

REQUIRED TEXTS: Textbooks listed in the student information packet.

COURSE SUBJECTS:

1. Hydraulic-Pneumatic Power
  - i. Repair hydraulic and pneumatic power systems components.
  - ii. Identify and select hydraulic fluids.
  - iii. Inspect, check, service, troubleshoot, and repair hydraulic and pneumatic power systems.
2. Landing Gear Systems
  - i. Inspect, check, service, and repair landing gear, retraction systems, shock struts, brakes, wheels, tires, and steering systems.
3. Ice and Rain Control Systems
  - i. Inspect, check, troubleshoot, service, and repair airframe ice and rain control systems.
4. Cabin Atmosphere Control Systems
  - i. Inspect, check, troubleshoot, service, and repair heating, cooling, air conditioning, pressurization systems, and air cycle machines.
  - ii. Inspect, check, troubleshoot, service, and repair heating, cooling, air-conditioning, and pressurization systems.
  - iii. Inspect, check, troubleshoot, service and repair oxygen systems.
5. Aircraft Fuel Systems
  - i. Check and service fuel dump systems.
  - ii. Perform fuel management transfer, and defueling.
  - iii. Inspect, check, and repair pressure fueling systems.
  - iv. Repair aircraft fuel system components.
  - v. Inspect and repair fluid quantity indicating systems.
  - vi. Troubleshoot, service, and repair fluid pressure and temperature warning systems.
  - vii. Inspect, check, service, troubleshoot, and repair aircraft fuel systems.
6. Position and Warning Systems
  - i. Inspect, check, and service speed and configuration warning systems, electrical brake controls, and anti-skid systems.
  - ii. Inspect, check, troubleshoot, and service landing gear position indicating and warning systems.

Total Hours of Instruction 240. Lecture time for the program will be as much as ½ but not less than ¼ of the total hours. Laboratory/shop time will be as much as ¾ but not less than ½ of the total hours.



- I. HYDRAULIC-PNEUMATIC POWER
  - a. Basic principles and applications of hydraulic power.
    - 1. Simple manual systems-area relationships
    - 2. Safety precautions in handling fluids
    - 3. Seals
    - 4. Lines, fittings, and hoses
  - b. Hydraulic power systems
    - 1. Power control valve
    - 2. Open-center
    - 3. Closed-center
  - c. Hydraulic system components
    - 1. Pumps
    - 2. Pressure regulators
    - 3. Selector valves
    - 4. Actuators
    - 5. Reservoirs, filters, accumulators
    - 6. Flow regulating devices
  - d. Hydraulic sub-systems
    - 1. Accessory systems
  - e. Hydraulic systems servicing and maintenance
    - 1. Standard of cleanliness
    - 2. Ground power hookup
    - 3. Fault isolation and correction
    - 4. Leak detection
  - f. Pneumatic power application
    - 1. Sources of pressure
    - 2. System components and layout
    - 3. System servicing and maintenance

II. LANDING GEAR SYSTEMS

a. Shock absorbers

1. Shock cord
2. Spring gear
3. Rubber donuts
4. Spring oleos
5. Air oleos
6. Bottled gas safety practices

b. Wheels – Tires

1. Tailwheels-steering
2. Nosewheels-steering
3. Shimmy dampening
4. Wheel disassembly and maintenance
5. Tire and tube maintenance
6. Wheel alignment balancing

c. Brakes

1. Shoe-drum
2. Single disk
3. Expander tube
4. Multiple disk
5. Master cylinders
6. Power brake controls
7. Deboosters and locknuts.
8. Anti-skid systems.

d. Retraction systems

1. Hydraulic
2. Electric
3. Pneumatic
4. Position warning
5. Hand powered

**III. ICE AND RAIN CONTROL**

- a. Ice formation on aircraft
- b. Anti-ice and de-ice methods
  - 1. Alcohol
  - 2. Expansion boots
  - 3. Heated boots
  - 4. Heated leading edges
- c. Boot installation and maintenance
  - 1. Mechanically attached
  - 2. Cement-on
  - 3. Cleaning, coating, patching, testing for correct operation
- d. Windshield/window anti-ice and rain control
  - 1. Electric heating
  - 2. Bleed-air
  - 3. Alcohol-rain repellent
  - 4. Windshield wiper maintenance

**IV. CABIN ENVIRONMENTAL CONTROL**

- a. Altitude-human factors
  - 1. Effects of oxygen on the human body and impact of level resulting from altitude
  - 2. Regulations for oxygen requirements
  - 3. Aviators breathing oxygen defined
- b. Oxygen supply systems
  - 1. Carry-on bottles, masks, low-pressure systems
  - 2. High-pressure systems, regulators
  - 3. Regulations for installation and maintenance of oxygen systems
  - 4. Safety precautions for handling oxygen
  - 5. Maintenance, servicing and troubleshooting of systems and components

- c. Cabin heating systems
  - 1. Exhaust muffers
  - 2. Combustion heaters
  - 3. Bleed-air heating
  - 4. Electric heating
  - 5. Heating system testing and maintenance
  
- d. Cabin cooling systems
  - 1. Vapor cycle
  - 2. Air cycle
  - 3. Inspection testing, troubleshooting, servicing and repairing of cooling systems.
  - 4. Safety precautions in handling Freon
  
- e. Cabin pressurization systems
  - 1. Sources of pressure
  - 2. Pressure control devices
  - 3. Pressure limiting components
  - 4. Pressurization systems servicing

## V. FUEL SYSTEMS

- a. Light aircraft systems
  - 1. Gravity-fed
  - 2. Pressure-fed
  - 3. Servicing and maintenance
  
- b. Large aircraft systems
  - 1. Fuel transfer/defueling/dump systems
  - 2. Fueling procedures
  - 3. Fuel indicating systems
  - 4. Inspection, checking, servicing, repair and performance of fuel dump and pressure fueling systems
  - 5. Valves and fuel control components

**COURSE OUTLINE**

**DEPARTMENT:** Aviation Maintenance Technology

**CURRICULUM:** Aviation Powerplant Technology

**COURSE TITLE:** Advanced Airframe

**COURSE NUMBER:** AMT 215

**TYPE OF COURSE:** Occupational Preparatory

**COURSE LENGTH:** 1 Quarter

**CREDIT HOURS:** 17 credits

**CLASS SIZE:** 25 Students maximum

**COURSE DESCRIPTION:** The student will refine basic skills and concepts learned in earlier airframe courses in addition to performing rigging and assembly, testing, evaluation of aircraft instrument systems, advanced electrical systems, communication and navigation systems, and aircraft inspections for conformity and airworthiness in accordance with approved procedures.

**COURSE OBJECTIVES:** Upon completion of all lecture sessions and lab assignments, the student learns and are able to:

1. Inspect, check and troubleshoot electrical systems and components on assigned aircraft.
2. Inspect electronic communication and navigation equipment.
3. Check and repair pitot-static systems to conform to current FAR requirements.
4. Rig aircraft controls to manufacturer's specifications.
5. Inspect an aircraft for conformity and airworthiness.

AMT 215  
Course Outline

STUDENT LEARNING

- OUTCOMES:
1. Technology – Select and use appropriate aircraft technical data.
  2. Human Relations – Use interpersonal skills to work in teams.
  3. Critical Thinking and Problem solving – Evaluate inspection date and perform maintenance on aircraft.

PREREQUISITES: Successful completion of AMT 111, 112, 113, and 214, or by permission of Unit Administrator and the instructor.

REQUIRED TEXTS: Textbooks listed in the student information packet.

COURSE SUBJECTS:

1. Airframe Inspection
  - i. Perform airframe conformity and airworthiness inspections.
2. Assembly and Rigging
  - i. Rig rotary-wing aircraft.
  - ii. Rig fixed-wing aircraft.
  - iii. Check alignment of structures.
  - iv. Assemble aircraft components, including flight control surfaces.
  - v. Balance, rig, and inspect movable primary and secondary flight control surfaces.
  - vi. Jack aircraft.
3. Door and Interior furnishings
  - i. Inspect, check, service, and repair doors and interior furnishings.
4. Aircraft instrument Systems
  - i. Inspect, check, service, troubleshoot, and repair electronic flight instrument systems and both mechanical and electrical heading, speed, altitude, temperature, pressure, and position indicating systems to include the use of built-in test equipment.
  - ii. Install instruments and perform a static pressure system leak test.
5. Communication and Navigation Systems
  - i. Inspect, check, and troubleshoot autopilot, servos and approach coupling systems.
  - ii. Inspect, check, and service aircraft electronic communication and navigation systems, including VHF passenger address interphones and static discharge devices, aircraft VOR, ILS, LORAN, Radar beacon transponders, flight management computers, and GPWS.
  - iii. Inspect and repair antenna and electronic equipment installations.
6. Fire Protection Systems
  - i. Inspect, check, and service smoke and carbon monoxide detection systems.
  - ii. Inspect, check, service, troubleshoot, and repair aircraft fire detection and extinguishing systems.
7. Aircraft Electrical Systems.

Total Hours of Instruction 240.

Lecture time for the program **will be** as much as  $\frac{1}{2}$  but not **less** than  $\frac{1}{4}$  of the total hours.

**Laboratory/shop** time **will be** as much as  $\frac{3}{4}$  but not **less** than  $\frac{1}{2}$  of the total hours.

- I. Aircraft Inspection
  - a. Applicable F.A.A. Regulations
  - b. Conformity-Airworthiness Inspection procedures
  - c. AD Note compliance
  - d. Inspection records
  
- II. Assembly and Rigging
  - a. Assembly and rigging of fixed-wing aircraft
  - b. Assembly and rigging of rotary-wing aircraft
  - c. Structural alignment of components
  - d. Cable and pulley maintenance
  
- III. Door and Interior furnishings
  
- IV. Aircraft Instrument Systems
  - a. Pitot-Static Systems
    - i. Applicable F.A.A Regulations
    - ii. Basic principles of pitot-static systems
    - iii. System testing and repair
    - iv. Inspection, servicing, troubleshooting and repair of electrical flight instrument systems, mechanical and electrical heading, speed, altitude, temperature, pressure and position indicating systems.
  
- V. Aircraft Communication and Navigation Systems
  - a. Applicable F.A.A and F.C.C. Regulations
  - b. Basic ILS and Radio navigation Systems/VOR/ILS/Loran/Radar Beacon transponders/flight management computers, GPWS, electronic communication and navigation systems, VHF passenger address system and interphones and static discharge devices.
  - c. Installation of electronic equipment and antennas
  - d. Magnetic heading indicators
  - e. Principles of gyro instruments
  - f. Handling and installations of gyro instruments
  - g. Troubleshooting instrument air systems
  - h. Principles of autopilot servos and approach coupling systems.
  
- VI. Fire Protection and Detection Systems
  - a. Inspect, check and service smoke and carbon monoxide detection systems
  - b. Inspect, check, service, troubleshoot and repair fire detection and extinguishing systems.
  
- VII. Airframe Electrical Systems
  - a. Inspect, check and repair as necessary, electrical system and components as assigned.

**COURSE OUTLINE**

**DEPARTMENT:** Aviation Maintenance Technology  
**CURRICULUM:** Aviation Powerplant Technology  
**COURSE TITLE:** Powerplant Theory and Maintenance  
**COURSE NUMBER:** AMT 133  
**TYPE OF COURSE:** Occupational Preparatory  
**COURSE LENGTH:** 1 Quarter  
**CREDIT HOURS:** 17 credits  
**CLASS SIZE:** 25 Students maximum

**COURSE DESCRIPTION:** This course is designed to cover three areas. The first area is an in-depth study of theory, operation and maintenance of the internal combustion reciprocating engine. It will include dismantling, inspection, repair or replacement of parts and partial re-assembly of an aircraft powerplant.

The second area of study is theory, operation and overhaul of gas turbine engines. Current maintenance practices are introduced, along with inspection of the compressor section, burner section and turbine section.

The third area of study is the inspection, repair and servicing of aircraft internal combustion cooling, exhaust and induction systems used on reciprocating and gas turbine engines.



AMT 133  
Course Outline

COURSE OBJECTIVES: Students learn and are able to:

1. Demonstrate tool safety precautions along with safe shop practices.
2. Explain basic understanding of operational theory for reciprocating and gas turbine engines.
3. Perform basic maintenance and overhaul processes on reciprocating and turbine engines.
4. Inspect, repair and service the aircraft internal combustion engine cooling, exhaust, and induction systems.
5. Use the FAR, library and manufacturer's service bulletins.

PREREQUISITES: Successful completion of AMT 111 and AMT 112 or by permission of Unit Administrator and the instructor.

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

COURSE SUBJECTS:

1. Reciprocating Engines
  - i. Inspect and repair a radial engine.
  - ii. Overhaul reciprocating engine.
2. Turbine Engines
  - i. Overhaul turbine engine.
3. Engine Cooling Systems
  - i. Repair engine cooling system components.
  - ii. Inspect, check, troubleshoot, service, and repair engine cooling systems.
4. Engine Exhaust and Reverser Systems
  - i. Repair engine exhaust system components.
  - ii. Inspect, check, troubleshoot, service, and repair engine exhaust systems.
  - iii. Troubleshoot and repair engine thrust reverser systems and related components.
5. Induction and Engine Airflow Systems
  - i. Inspect, check, service, troubleshoot and repair heat exchangers, superchargers, and turbine engine airflow and temperature control systems.
  - ii. Inspect, check, service, and repair carburetor air intake and induction manifolds.
6. Unducted Fans
  - i. Inspect and troubleshoot unducted fan systems and components.

Lecture time for the program **will be** as much as  $\frac{1}{2}$  but not **less** than  $\frac{1}{4}$  of the total hours. Laboratory/shop time **will be** as much as  $\frac{3}{4}$  but not **less** than  $\frac{1}{2}$  of the total hours. Total contact time available is 240 hours.

## RECIPROCATING ENGINES

- I. SAFETY PRACTICES
- II. THEORY
  - a. History
  - b. External and internal combustion
  - c. Engine types
  - d. Constant volume cycle
  - e. Horsepower
  - f. Thermal efficiency
  - g. Volumetric efficiency
  - h. Piston Displacement
  - i. Compression Ratio
  - j. Ignition timing
  - k. Firing Order
- III. INSPECTION PRACTICES
  - a. Visual inspection
  - b. Non-destructive testing
  - c. Dimensional inspection technique
  - d. Engine data
  - e. Type certification
  - f. Service bulletins
  - g. Airworthiness Directives
- IV. OVERHAUL PRACTICES
  - a. Disassembly
  - b. Cylinders
  - c. Valves
  - d. Valve guides
  - e. Valve seats
  - f. Valve springs
  - g. Pistons
  - h. Piston pins
  - i. Piston rings
  - j. Connecting rods
  - k. Crankshaft
  - l. Camshaft
  - m. Valve lifters
  - n. Pushrods
  - o. Rocker arms
  - p. Crankcase
  - q. Bearings
  - r. Reassembly

- V. COOLING SYSTEMS
  - a. Pressure cooling
  - b. Cooling fins
  - c. Cooling baffles
  - d. Baffle seals
  - e. Augmentor tubes
  - f. Cowl flaps
  - g. Cowling
  - h. Inspection practices
  
- VI. EXHAUST SYSTEMS
  - a. Exhaust stacks
  - b. Crossover tubes
  - c. Collector systems
  - d. Alternate air provisions
  - e. Mufflers
  - f. Augmentor tubes
  - g. Power recovery devices
  - h. Carbon monoxide detection
  - i. Inspection practices
  
- VII. INDUCTION SYSTEMS
  - a. Intake scoops
  - b. Air filters
  - c. Alternate air door
  - d. Atmospheric considerations
  - e. Effects on volumetric efficiency
  
- VIII. THEORY
  - a. History
  - b. Constant pressure cycle
  - c. Physics of gas flow
  - d. Bernoulli's principle
  - e. Thrust
  - f. Engine pressure ratio
  - g. Compressor pressure ratio
  - h. Bypass ratio
  - i. Engine types
  - j. Propulsive efficiency

IX. OVERHAUL PRACTICES

- k. Station designations
- l. Section designations
- m. Disassembly
- n. Inlet duct
- o. Centrifugal compressors
- p. Axial flow compressors
- q. Compressor blades
- r. Diffuser section
- s. Multiple can combustors
- t. Can-annular combustors
- u. Annular combustors
- v. Reverse-flow annular combustors
- w. Fuel nozzles
- x. Turbine inlet guide vanes
- y. Turbine blades
- z. Turbine nozzles
- aa. Reassembly

X. INSPECTION PRACTICES

- a. Visual inspection
- b. Borescope
- c. Dimensional inspection technique
- d. Data plate information
- e. Manufactures service information
- f. Airworthiness directives

XI. COOLING SYSTEMS

- a. Primary airflow
- b. Secondary airflow
- c. Guide vane cooling
- d. Turbine blade cooling
- e. Turbine Case Clearance Control
- f. Metal fatigue

XII. EXHAUST

- a. Exhaust gas temperature
- b. Noise suppressors
- c. Thrust reversers
- d. Afterburners
- e. Exhaust cones

**COURSE OUTLINE**

DEPARTMENT: Aviation Maintenance Technology  
CURRICULUM: Aviation Powerplant Technology  
COURSE TITLE: Powerplant Theory and Maintenance  
COURSE NUMBER: AMT 234  
TYPE OF COURSE: Occupational Preparatory  
COURSE LENGTH: 1 Quarter  
CREDIT HOURS: 17 credits  
CLASS SIZE: 25 Students maximum

COURSE DESCRIPTION: This course is designed to cover six areas. The first section covers the engine fuel system and fuel metering system, and a study of carburetion and fuel injection. The second section is the ignition system for both reciprocating engines and turbine engines. The third section turbine engine electrical starting systems. The fourth section of the course is a study of powerplant lubrication systems. The fifth section covers electrical and mechanical indicating systems. The sixth section will cover powerplant ice and rain control systems.

COURSE OBJECTIVES:

1. The student will learn related safety precautions along with shop safety practice.
2. The student will learn correct procedures for inspection, overhaul, and test of fuel, ignition, electrical starting, lubrication, electrical and mechanical indicating systems and ice and rain control systems.

AMT 234  
Course Outline

PREREQUISITES: Successful completion of AMT 111 and AMT 112 or by permission of Unit Administrator and the instructor.

REQUIRED TEXTS: Refer to booklist in the student information packet.

ADDITIONAL REFERENCES: Text suggested by instructor

COURSE SUBJECTS:

1. Engine Fuel Systems
  - i. Repair engine fuel system components.
  - ii. Inspect, check, service, troubleshoot, and repair engine fuel systems.
  
2. Fuel Metering Systems
  - i. Troubleshoot and adjust turbine engine fuel metering systems and electronic engine fuel controls.
  - ii. Overhaul carburetor.
  - iii. Repair engine fuel metering system components.
  - iv. Inspect, check, service, troubleshoot, and repair reciprocating and turbine engine fuel metering systems.
  
3. Ignition and Starting Systems
  - i. Overhaul magneto and ignition harness.
  - ii. Inspect, service, troubleshoot, and repair reciprocating and turbine engine ignition systems and components.
  - iii. Inspect, service, troubleshoot, and repair turbine engine electrical starting systems.
  - iv. Inspect, service, and troubleshoot turbine engine pneumatic starting systems.
  
4. Lubrication Systems
  - i. Identify and select lubricants.
  - ii. Repair engine lubrication system components.
  - iii. Inspect, check, service, troubleshoot, and repair engine lubrication systems.
  
5. Engine Instrument Systems
  - i. Troubleshoot, service, and repair electrical and mechanical fluid rate-of-flow indicating systems.
  - ii. Inspect, check, service, troubleshoot, and repair electrical and mechanical engine temperature, pressure, and RPM indicating systems.
  
6. Ice and Rain Control Systems
  - i. Inspect, check, troubleshoot, service, and repair engine ice and rain control systems.

Lecture time for the program **will be** as much as  $\frac{1}{2}$  but not **less** than  $\frac{1}{4}$  of the total hours.

Laboratory/shop time **will be** as much as  $\frac{3}{4}$  but not **less** than  $\frac{1}{2}$  of the total hours. Total contact time available is 240 hours.

I. RECIPROCATING ENGINE FUEL SYSTEMS

- a. Safety Practices
- b. Flammable material handling
- c. Shop practices
- d. Design
- e. Strainers
- f. Lines and fittings
- g. Fuel heaters
- h. Fuel pumps

II. FUEL METERING SYSTEMS

- a. Safe Practices
- b. Carburetion Theory
- c. Venturi principle
- d. Fuel/air mixtures
- e. Safety practices
- f. Carburetor types
- g. Pressure injection
- h. Bendix constant flow fuel system
- i. Continental constant flow fuel system
- j. Anti-detonation injection

III. TURBINE FUEL SYSTEMS

- a. Safety Practices
- b. Fuel control unit types
- c. Functions and characteristics
- d. Compressor inlet temperature
- e. Compressor RPM
- f. Burner pressure
- g. Turbine inlet temperature
- h. Burner blowout
- i. Manifold drain
- j. Fuel pressurization and dump valve
- k. Fuel nozzles
- l. Water injection

IV. RECIPROCATING ENGINE IGNITION SYSTEMS

- a. Safety Practices
- b. High tension
- c. Low tension
- d. Magneto theory and operation
- e. Battery ignition systems
- f. Impulse couplings
- g. Induction vibrators
- h. Boosters
- i. Spark plugs
- j. Engine ignition timing
- k. Ignition harness
- l. Ignition troubleshooting.

V. TURBINE ENGINE IGNITION SYSTEMS

- a. Safety Practices
- b. Ignition types and characteristics
- c. Exciters
- d. Igniters

VI. TURBINE ENGINE START SYSTEMS.

- a. Safety Practices
- b. Electrical
- c. Air-start

VII. POWERPLANT LUBRICATION SYSTEMS

- a. Safety Practices
- b. Sources
- c. Classification
- d. Processes
- e. Properties
- f. Synthetic lubricants
- g. Special lubricants
- h. Types of friction
- i. Federal Aviation Regulations
- j. Powerplant oil system types



VIII. ELECTRICAL AND MECHANICAL INDICATING SYSTEMS

- a. Safety Practices
- b. Fuel
- c. Oil RPM
- d. Pressure
- e. Temperature

IX. ICE AND RAIN CONTROL

- a. Safety Practices

**COURSE OUTLINE**

**DEPARTMENT:** Aviation Maintenance Technology  
**CURRICULUM:** Aviation Powerplant Technology  
**COURSE TITLE:** Advanced Powerplant  
**COURSE NUMBER:** AMT 235  
**TYPE OF COURSE:** Occupational Preparatory  
**COURSE LENGTH:** 1 Quarter  
**CREDIT HOURS:** 17 credits  
**CLASS SIZE:** 25 maximum

**COURSE DESCRIPTION:** This course provides the student with a sound knowledge of aircraft propellers used with both small and large piston or turboprop engines. The area of study will also include engine fire detection and extinguishing, engine electrical systems and turbine engine pneumatic starting systems. Reciprocating and turbine engine test run, run-in and troubleshooting are covered in depth, along with powerplant inspection methods and techniques.

This is the final phase of powerplant technology. Reviews are given in carburetion, ignition, basic powerplants, lubrication, propellers, electrical systems and weight/balance control. Emphasis is placed on F.A.A. Regulations, airworthiness concepts, safety, personal and technical ethics.

Home study and research assignment will be made throughout the course allowing maximum use of shop time in order to complete all required projects.

**COURSE OBJECTIVES:**

The student will develop a sound foundation in the advanced stages of powerplant and propeller overhaul, testing, troubleshooting and safety practices.

AMT 235  
Course Outline

STUDENT LEARNING  
OUTCOMES:

1. Communication – Speak and write effectively for all aircraft form and records.
2. Critical Thinking and Problem Solving – Think critically in troubleshooting various engine problems.
3. Technology – Read and apply engine reference data to analyze and solve engine malfunctions.

PREREQUISITES:

Successful completion of AMT 111, 112, 133 and AMT 234 or by permission of Unit Administrator and the instructor.

REQUIRED TEXTS:

Refer to required textbook list provided

ADDITIONAL  
REFERENCES:

Text suggested by instructor

COURSE SUBJECTS:

1. Propellers
  - i. Inspect, check, service, and repair propeller synchronizing and ice control systems.
  - ii. Identify and select propeller lubricants.
  - iii. Balance propellers.
  - iv. Repair propeller control system components.
  - v. Inspect, check, service, and repair fixed-pitch, constant-speed, and feathering propellers, and propeller governing systems.
  - vi. Install, troubleshoot, and remove propellers.
  - vii. Repair aluminum alloy propeller blades.
2. Engine Electrical Systems
  - i. Repair engine electrical system components.
3. Engine Fire Protection Systems
  - i. Inspect, check, service, troubleshoot, and repair engine fire detection and extinguishing systems.
4. Reciprocating Engines
  - i. Inspect, check, service, and repair reciprocating engines and engine installations.
  - ii. Install, troubleshoot, and remove reciprocating engines.
5. Turbine Engines
  - i. Inspect, check, service, and repair turbine engines and turbine engine installations.
  - ii. Install, troubleshoot, and remove turbine engines.
6. Engine Inspection
  - i. Perform Powerplant conformity and air worthiness inspections.
7. Auxiliary Power Units
  - i. Inspect, check, service, and troubleshoot turbine-driven auxiliary power units.

Lecture time for the program **will be** as much as  $\frac{1}{2}$  but not **less** than  $\frac{1}{4}$  of the total hours.  
Laboratory/shop time **will be** as much as  $\frac{3}{4}$  but not **less** than  $\frac{1}{2}$  of the total hours. Total contact time available is 240 hours.

- I. PROPELLER SYSTEMS
  - a. Safety
  - b. Theory
  - c. Material processes
  - d. Fixed pitch
  - e. Constant speed
  - f. Full-feathering
  - g. Hydromatic
  - h. Governor systems
  - i. Synchronizing systems
  - j. Anti-ice systems
  - k. Removal and installation
  - l. Inspection
  - m. Servicing, troubleshooting and repair
  - n. Limitation of repair
  - o. FAR requirements.
  
- II. ELECTRICAL COMPONENTS, ENGINE
  - a. Electrical engine accessories
  
- III. ENGINE FIRE DETECTION AND EXTINGUISHING
  - a. Safety
  - b. Theory
  - c. Types
  - d. Operation
  - e. Installation and test
  - f. Inspection
  - g. Servicing, troubleshooting and repair
  - h. Replacement
  - i. FAR requirements
  
- IV. RECIPROCATING ENGINES
  - a. Safety
  - b. Advanced overhaul practices
  - c. Engine removal
  - d. Engine installation
  - e. Engine control rigging
  - f. Advanced test and run-up
  - g. Advanced inspection
  - h. Servicing, troubleshooting and repair
  - i. Storage procedures

V. TURBINE ENGINES

- a. Safety
- b. Advanced overhaul practices
- c. Engine removal
- d. Engine installation
- e. Engine control rigging
- f. Advanced test and run-up procedures
- g. Advanced inspection
- h. Servicing, troubleshooting and repair
- i. Engine Indication and Crew Alert (EICAS)
- j. Built in test equipment (BITE)
- k. Fault isolation procedures

VI. INSPECTION AND TROUBLESHOOTING

- a. Advanced troubleshooting technique
- b. Powerplant conformity
- c. Airworthiness inspection
- d. Documentation technique
- e. FAR research