

COURSE OUTLINE

DEPARTMENT: Aviation Maintenance Technology

CURRICULUM: Airframe Maintenance Technology

COURSE TITLE: Airframe Systems

COURSE NUMBER: AMT 214

TYPE OF COURSE: Occupational Preparatory

COURSE LENGTH: 1 quarter

CREDIT HOURS: 17 variable credits

CLASS SIZE: 25 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 that will familiarize students with each system operation, 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.

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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 systems.
8. Inspect, check, and service fuel systems, fuel dump systems, and pressure fueling systems including tanks, valves and plumbing.

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 student information packet

COURSE SUBJECTS:

- I. Hydraulic-Pneumatic Power
- II. Landing Gear Systems
- III. Ice and Rain Control
- IV. Cabin Environmental Control
- V. Fuel Systems

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.

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
 - a. Mechanically attached
 - b. Cement-on
 - c. 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

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- 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