

FLORIDA STATE COLLEGE AT JACKSONVILLE

COLLEGE CREDIT COURSE OUTLINE

COURSE NUMBER: AMT 1763

COURSE TITLE: Aviation Maintenance Technology Airframe III

PREREQUISITE(S): None

COREQUISITE(S): None

STUDENT ADVISING NOTES: Completion of General I through IV

CREDIT HOURS: 6

CONTACT HOURS/WEEK: 16

CONTACT HOUR BREAKDOWN:

Lecture/Discussion:	8
Laboratory:	8
Other <u>lecture/lab combination</u> :	

FACULTY WORKLOAD POINTS: 8

STANDARDIZED CLASS SIZE ALLOCATION: 25 (FAA Limited)

COURSE DESCRIPTION: This course is designed to introduce skills and the necessary knowledge and understanding of aircraft hydraulics and pneumatics, landing gear systems, and aircraft atmospheric and climate control systems.

SUGGESTED TEXT(S):	<u>TITLE</u>	<u>NUMBER</u>
	Jeppesen A&P Technician Airframe Textbook	ISBN # 0-88487-205-1
	Jeppesen A&P Technician Airframe Workbook	ISBN # 0-88487-295-5
	Jeppesen A&P Technician Airframe Test Guide	ISBN # 0-88487-297-1
	FAA AC 43.13-1B/2A Acceptable Methods, Techniques & Practices	ISBN #0-89100-306-1
	FAR Handbook for Aviation Maintenance Technicians	ISBN #0-88487-314-5
	Aviation Mechanic Handbook, by Dale Crane	#ASA-M-HB1

IMPLEMENTATION DATE: Summer Term, 2006 (20063)

REVIEW OR MODIFICATION DATE: Fall Term, 2008 (20091) - Outline Review 2007

COURSE TOPICS	CONTACT HOURS <u>PER TOPIC</u>
Note: § Denotes required project	

I. HYDRAULICS AND PNEUMATICS

60

A. Fundamentals of Hydraulics Systems

Objectives:

1. Define general terms related to aircraft hydraulic systems.
2. Explain the basic principles of hydraulics.
3. Discuss different types of hydraulic systems.
4. Compare the construction and operation of open and closed-centered hydraulic systems.
5. State methods for the safe handling of hydraulic fluids according to MSDS.
6. Discuss FAR's related to hydraulics.
7. List advantages of using hydraulic systems.
8. **§ Calculate pressure, force, area, and volume for basic hydraulic systems using appropriate formulas. (Level 2) (App. C. II, b. 32) (AF2-001)**
9. Discuss the selection and identification of aircraft hydraulic fluids.
10. **§ Select and identify aircraft hydraulic fluids. (Level 3) (App. C.II, b. 31) (AF2-002)**
11. Discuss aircraft hydraulic systems' seals and their correct usage.
12. **§ Fabricate "O" ring seal installation and removal tool. (Level 2) (App. C.II, b. 30) (AF2-003)**
13. List possible causes of hydraulic fluid contamination and preventive measures that may be taken.
14. Demonstrate hydraulic fluid analysis
15. Discuss procedures for flushing aircraft hydraulic systems.
16. Identify and discuss the purpose and operation of hydraulic system components; hydraulic valves, reservoirs, filters, actuators, accumulators and pumps.
17. Discuss the purpose of and differentiate between pressure control and flow control devices.

B. Basic Hydraulic System Maintenance and operation.

Objectives:

1. Discuss the purpose and operation of hydraulic system components; hydraulic valves, reservoirs, filters, actuators, accumulators and pumps.
2. Discuss hydraulic servicing procedures.
3. Describe the purpose and operation of an aircraft hydraulic flap system.
4. Discuss the purpose and operation of the nose wheel steering system.
5. Compare the components and operation of landing gear retraction systems for small and large aircraft.
6. **§ Service a hydraulic reservoir. (Level 3) (App. C.II, b. 32) (AF2-004)**
7. **§ Service a hydraulic system accumulator. (Level 3) (App. C.II, b. 32) (AF2-005)**
8. Discuss proper techniques for component removal, replacement and maintenance.
9. **§ Remove, disassemble, inspect and reinstall hydraulic system filters. (Level 3) (App. C.II, b. 32) (AF2-006)**
10. **§ Disassemble, clean, and reassemble hydraulic system components. (Level 3) (App. C.II, b. 30,32) (AF2-007)**
11. **§ Remove and replace o-rings on a hydraulic system component. (Level 3) (App. C.II, b. 32) (AF2-008)**

CONTACT HOURS
PER TOPIC

COURSE TOPICS (continued)

Note: § Denotes required project

12. § Determine system pressure and adjust pressure relief valve in hydraulic system. (Level 3) (App. C.II, b. 32) (AF2-009)
13. § Operate and check hydraulic selector valves. (Level 3) (App. C.II, b. 32) (AF2-010)
14. § Operate and check a hydraulically operated system. (Level 3) (App. C.II, b. 32) (AF2-011)
15. § Troubleshoot, repair, and purge air from a hydraulic system. (Level 3) (App. C.II, b. 32)(AF2-012)

C. Fundamentals of Pneumatic Systems

Objectives:

1. Define terms related to aircraft pneumatic system components.
2. Discuss FAR's related to aircraft pneumatics.
3. List components and describe the operation and usages of aircraft pneumatic systems.
4. § Service a pneumatic system filter. (Level 2) (App. C.II, b. 30) (AF2-013)
5. Compare high, medium, and low-pressure pneumatic systems.
6. Discuss advantages of pneumatic systems over hydraulic or electrical systems.
7. Identify various types and designs of air compressors, and match them with their components.
8. Describe the principles of operation for a typical pneumatic system and components.
9. § Inspect, check, service, troubleshoot, and repair a pneumatic power system. (Level 3) (App. C.II, b. 32) (AF2-014)

D. Unit Test

II. LANDING GEAR SYSTEMS

80

A. Landing Gear Basics

Objectives:

1. Discuss safety relating to aircraft landing gear.
2. Discuss the evolution of aircraft landing gear.
3. Identify various configurations of landing gear and give advantages.
4. State the type of landing gear arrangement used on modern aircraft.
5. Define terms related to aircraft landing gear.

B. Landing Gear Systems.

Objectives:

1. List and explain the different components in large and small aircraft landing gear systems.
2. Compare small and large aircraft landing gear and load absorbing components.
3. Discuss the attachment of the main landing gear to the aircraft structure
4. § Perform a landing gear alignment check. (Level 3) (App. C.II, a. 29) (AF2-015)
5. Discuss landing gear maintenance and inspection procedures.
6. Discuss aircraft steering systems in large and small aircraft.
7. Discuss types, purposes and servicing of shimmy dampers.

CONTACT HOURS
PER TOPIC

COURSE TOPICS (continued)

Note: § Denotes required project

8. § Service nose gear shimmy damper. (Level 3) (App. C.II, a. 29) (AF2-016)
9. § Check and adjust steering linkage. (Level 3) (App. C.II, a.29) (AF2-017)
10. § Operate and check retractable landing gear, position indicating and warning systems. (Level 3) (App. C.I, f. 27;C.II, a.29; h. 52) (AF2-018)

C. Aircraft Wheels, Tires and Shock Strut Service and Maintenance

Objectives:

1. Describe types of aircraft wheels and their construction.
2. List methods of repair and inspection of aircraft wheels.
3. Classify types of tires and their design features.
4. Explain the procedure for removing, balancing, and installing tires and tubes.
5. Discuss repair, re-treading, and storage of aircraft tires.
6. Explain repair and storage of tubes.
7. § Remove, inspect build-up, install and service aircraft wheel and tire assemblies. (Level 3) (App. C.I, f. 27;C.II, a. 29) (AF2-019)
8. Discuss the oleo shock strut assembly and its operation.
9. Discuss the servicing of the oleo shock strut
10. § Remove, clean, disassemble, inspect, repair, reassemble, reinstall and service an air-oleo shock strut. (Level 3) (App. C.I, f. 27;C.II, a. 29) (AF2-020)

D. Aircraft Brake Systems and Maintenance

Objectives:

1. List types and construction of aircraft brakes.
2. Discuss the operation, inspection and repair of aircraft brakes.
3. List causes for brake malfunction.
4. Describe how to repair and bleed brakes on small and large aircraft.
5. § Remove and install new linings in hydraulically operated single-disc brakes. (Level 3) (App. C.II, a. 29) (AF2-021)
6. § Troubleshoot, repair and service a brake system. (Level 3) (App. C.II, a. 29) (AF2-022)
7. Discuss inspection and adjustment of multi-disk brakes
8. Discuss the operating principles of hydraulic brake antiskid systems.
9. § Demonstrate the operation of an anti-skid system. (Level 2) (App. C.II, h. 51) (AF2-023)

E. Unit Test

III. AIRCRAFT ATMOSPHERIC AND CLIMATE CONTROL SYSTEMS

50

A. Atmospheric Conditions and Requirements

Objectives:

1. Discuss characteristics of the atmosphere.
2. Describe the purpose and requirements of a pressurization system. (Level 1) (App. C.II, c. 33,34)

CONTACT HOURS
PER TOPIC

COURSE TOPICS (continued)

Note: § Denotes required project

3. List components of a pressurization system. (Level 1) (App. C.II, c. 33,34)
4. Discuss the operation and control of a typical pressurization system. (Level 1) (App. C.II, c. 33,34)
5. Give aircraft structural requirements for pressurization.
6. Discuss Removal and inspection of an outflow valve. (Level 1) (App. C.II, c. 33,34)

B. Air Conditioning Systems

Objectives:

1. Describe the construction and operation of an air cycle machine - (AMC); including components. (Level 1) (App. C.II, c. 33)
2. Discuss the operation of a cabin temperature control system.
3. State the principle of operation of a vapor cycle air conditioning system. (Level 1) (App. C.II, C. 33,34)
4. List components of a vapor cycle system and their functions. (Level 1) (App. C.II, c. 33,34)
5. Discuss Inspection, checking, troubleshooting, and servicing of a vapor cycle system. (Level 1) (App. C.II, c. 33,34)

C. Heating Systems

Objectives:

1. Discuss the operating principles of a surface combustion heater. (Level 1) (App. C.II, c. 33,34)
2. List the protective control circuits of combustion heaters. (Level 1) (App. C.II, c. 33,34)
3. Describe an exhaust gas heat exchanger. (Level 1) (App. C.II, c. 33,34)
4. List inspection requirements of an exhaust gas heat exchanger. (Level 1) (App. C.II, c. 33,34)
5. Discuss inspection and operation of a combustion heater. (Level 1) (App. C.II, c. 33,34)

D. Oxygen Systems

Objectives:

1. Discuss safety precautions for oxygen systems
2. Discuss the operating principles of an oxygen system.
3. Give characteristics of oxygen stored under pressure.
4. List components of an oxygen system and their functions.
5. Discuss inspection requirements of oxygen systems.
6. Describe a liquid oxygen system.
7. **§ Inspect, check, troubleshoot, repair and service and oxygen system. (Level 2) (App. C.II, c. 35) (AF2-024)**

E. Unit Test

IV. AIRFRAME III REMEDIATION, REVIEW, AND TESTING

50

PROGRAM TITLE: Aviation Maintenance Management
COURSE TITLE: Aviation Maintenance Technology Airframe III
CIP NUMBER: 1649.010401

LIST PERFORMANCE STANDARD ADDRESSED:

NUMBER(S): TITLES(S):

- 25.0 MAINTAIN AIRCRAFT LANDING-GEAR SYSTEMS--The student will be able to:
25.01 Inspect, check, service, and repair landing gear, retraction systems, shock struts, brakes, wheels, tires, and steering systems. [FAA FAR Part 147, Level 3]
- 26.0 MAINTAIN HYDRAULIC AND PNEUMATIC POWER SYSTEMS--The student will be able to:
26.01 Repair hydraulic and pneumatic power system components. [FAA FAR Part 147, Level 2]
26.02 Identify and select hydraulic fluids. [FAA FAR Part 147, Level 3]
26.03 Inspect, check, service, troubleshoot, and repair hydraulic and pneumatic power systems. [FAA FAR Part 147, Level 3]
26.04 Identify and utilize appropriate hydraulic and pneumatic tools and equipment.
- 27.0 MAINTAIN CABIN ATMOSPHERE-CONTROL SYSTEMS--The student will be able to:
27.01 Inspect, check, troubleshoot, service, and repair heating, cooling, air-conditioning, pressurization systems, and air-cycle machines. [FAA FAR Part 147, Level 1]
27.02 Inspect, check, troubleshoot, service, and repair oxygen systems. [FAA FAR Part 147, Level 2]



NOTE: Use either the Tab key or mouse click to move from field to field. The box will expand to accommodate your entry.

Section 1 COURSE PREFIX AND NUMBER: <u>AMT 1763</u>	SEMESTER CREDIT HOURS: <u>6</u>
COURSE TITLE: <u>Aviation Maintenance Technology Airframe 3</u>	

Section 2
 TYPE OF COURSE: (Click on the box to check all that apply)

<input type="checkbox"/> AA Elective	<input checked="" type="checkbox"/> AS Required Professional Course	<input type="checkbox"/> College Prep
<input type="checkbox"/> AS Professional Elective	<input checked="" type="checkbox"/> AAS Required Professional Course	<input type="checkbox"/> Technical Certificate
<input type="checkbox"/> Other _____		
<input type="checkbox"/> General Education: (For General Education courses, you must also complete Section 3 and Section 7)		

Section 3 (If applicable)
 INDICATE BELOW THE DISCIPLINE AREA FOR GENERAL EDUCATION COURSES:

<input type="checkbox"/> Communication	<input type="checkbox"/> Social & Behavioral Sciences	<input type="checkbox"/> Mathematics
<input type="checkbox"/> Natural Sciences	<input type="checkbox"/> Humanities	

Section 4
 INTELLECTUAL COMPETENCIES:

<input checked="" type="checkbox"/> Reading	<input type="checkbox"/> Speaking	<input type="checkbox"/> Critical Analysis	<input type="checkbox"/> Quantitative Skills	<input type="checkbox"/> Scientific Method of Inquiry
<input checked="" type="checkbox"/> Writing	<input checked="" type="checkbox"/> Listening	<input type="checkbox"/> Information Literacy	<input type="checkbox"/> Ethical Judgment	<input checked="" type="checkbox"/> Working Collaboratively

Section 5 LEARNING OUTCOMES	METHOD OF ASSESSMENT
• Troubleshoot and repair hydraulic systems	Practical test based on FAA Practical Test Standards
• Disassemble, clean and reassemble hydraulic system components	Practical test based on FAA Practical Test Standards
• Operate and inspect retractable landing gear systems	Practical test based on FAA Practical Test Standards
• Troubleshoot, repair and service brake systems	Practical test based on FAA Practical Test Standards
• Repair and service an oxygen system,	Practical test based on FAA Practical Test Standards
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Section 6
 Name of Person Completing This Form: Richard Rozanski