

FLORIDA STATE COLLEGE AT JACKSONVILLE

COLLEGE CREDIT COURSE OUTLINE

COURSE NUMBER: AMT 1761

COURSE TITLE: Aviation Maintenance Technology Airframe I

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 structural assembly and rigging, Aircraft non-metallics, and aircraft electrical 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. AIRCRAFT STRUCTURAL ASSEMBLY AND RIGGING	60
A. Airframes Safety	
Objectives:	
1. Discuss general safety practices.	
2. Identify safety precautions related to Airframes	
3. Discuss MSDS related to Airframes.	
B. Fuselage Construction	
Objectives:	
1. Discuss the evolution of aircraft structures.	
2. Discuss types of fuselage construction and materials used.	
3. Compare and contrast monocoque and semi-monocoque fuselage construction and usage.	
4. Identify and describe usage of truss type fuselage.	
5. Identify structural members	
6. Discuss types of doors and windows on aircraft.	
7. Discuss interior furnishings	
8. § Inspect , check, service and repair windows, doors and interior furnishings (Level 2) (App. C.I, d.13) (AF1-006)	
C. Wing Construction	
Objectives:	
1. Identify semi-cantilever wing construction.	
2. Identify cantilever construction.	
3. Discuss wood and metal construction.	
4. Identify wing structural members	
D. Empennage	
Objectives:	
1. Identify empennage components.	
2. Describe stability surfaces.	
3. Describe control surfaces.	
E. Introduction to Rotary-Wing Aircraft	
Objectives:	
1. Discuss the history of rotary wings.	
2. Explain the fundamentals and configurations of rotary-wing aircraft.	
3. Differentiate between types of rotorcraft.	
4. Discuss advantages and disadvantages of an autogiro.	

CONTACT HOURS
PER TOPIC

COURSE TOPICS (continued)

Note: S Denotes required project

F. Engine Mounts

Objectives:

1. Discuss the design and characteristics of piston-style engine mounts.
2. Discuss the design and characteristics of jet-style engine mounts.
3. Describe the purpose and construction of the firewall.

G. Landing Gear

Objectives:

1. Identify types (configurations) of landing gear.
2. Discuss landing gear classifications.

H. Basic Aerodynamics

Objectives:

1. List properties of the atmosphere that affect aircraft control and performance.
2. Discuss principles of physics that apply to flight and aerodynamics.

I. High Speed Aerodynamics

Objectives:

1. Discuss high-speed subsonic flight.
2. Define transonic flight.
3. Describe supersonic and hypersonic flight.

J. Flight Forces

Objectives:

1. List and define the four flight forces.
2. Discuss the relationship between lift and gravity (weight).
3. Discuss the relationship between thrust and drag.
4. Compare types of drag on an aircraft.

K. Axes of an Aircraft, Stability and Control

Objectives:

1. List the three axes of an aircraft.
2. Describe longitudinal stability and control.
3. Describe lateral stability and control.
4. Describe vertical stability and control.

L. Secondary and Auxiliary Controls

CONTACT HOURS
PER TOPIC

COURSE TOPICS (continued)

Note: § Denotes required project**Objectives:**

1. Discuss the design and function of each of the following types of tabs: trim, balance, servo, anti-servo, and spring.
2. Explain the function of various high lift devices on the wing's trailing edge: plain, split, slotted, Fowler, and slotted-Fowler flaps.
3. Describe the purpose of high lift devices on the wing's leading edge: slots, slats, leading edge flaps, stall strips, vortex generators, special wing tips, etc.

M. Control Cable Systems and Equipment

Objectives:

1. Identify types and usages of aircraft control cables.
2. Describe various means of attachment of aircraft control cables.
3. **§ Fabricate a control cable using the Nicopress and swaged terminal method. (Level 3)
(App. C.I, f. 25) (AF1-007)**
4. Discuss the usage of pulleys and problems caused by misuse.
5. Describe the function of fairleads.
6. Discuss the usage of pressure seals.
7. Explain the function of bellcranks.
8. Describe the function of control horns.
9. Discuss the function of push-pull rods.
10. Discuss the usage and importance of a rigging chart.
11. Describe the purpose of a tensiometer.
12. Explain the usage of a protractor and contour plates.
13. **§ Demonstrate the turnbuckle lockwire technique. (Level 3) (App. C.I, f. 26) (AF1-008)**

N. Rigging Specifications

Objectives:

1. Discuss the purpose and use of rigging specifications
2. **§ Locate rigging specifications for a helicopter and fixed wing aircraft. (Level 2)
(App. C.I, f. 22,23) (AF1-009)**

O. Assembly and Rigging Procedures

Objectives:

1. Explain the purpose and procedure for a symmetry check.
2. **§ Perform a structural alignment check. (Level 2) (App. C.I, f. 24) (AF1-010)**
3. Discuss the purpose for and procedure used to set wing dihedral angles.
4. Explain the purpose for and procedure used to set wing incidence angle.
5. Describe the purpose and procedure for wing trammeling.
6. Discuss the purpose and procedure for checking fin verticality.

COURSE TOPICS (continued)

Note: § Denotes required project

7. § Perform a fin verticality check. (Level 2) (App C.I, f. 24) (AF1-011)
8. § Remove, check balance, reinstall and adjust a primary control surface. (Level 3) (App. C.I, f. 23, 25,26) (AF1-012)
9. § Determine and list rigging requirements using a maintenance manual. (Level 2) (App. C.I, f. 22,23) (AF1-013)
10. § Rig a control system. (Level 3) (App. C.I, f. 23,26) (AF1-014)

P. Helicopter Characteristics and Rigging

Objectives:

1. Identify various types of helicopters
2. Compare and contrast rigid rotor, semi-rigid rotor, and fully articulated rotor design.
3. List and explain aerodynamic characteristics of rotor-wing aircraft.
4. Discuss causes and corrective measures for helicopter vibrations. (Level 1) (App. C.I, f. 22)
5. Discuss procedures for correcting helicopter vibrations. (Level 1) (App. C.I, f. 22)

Q. Unit Test

II. AIRCRAFT NON-METALLICS

60

A. Safety

Objectives:

1. Discuss safety precautions in working with non-metallics
2. Discuss the different chemicals used and their MSDS.

B. Types of Non-Metallic Materials

Objectives:

1. Discuss the purpose and use of non-metallic materials used in aircraft.
2. List the different non-metallic materials used in aircraft structures.
3. Discuss the different types of wood used in aircraft
4. Discuss the different types of plastics used
5. Define composite materials.
6. Discuss the different types of seal materials

C. Wood Inspection and Repairs

Objectives:

1. Discuss inspection and defects of wood structures. (Level 1) (App. C.I, a. 2,3)
2. Discuss wood structural repairs
3. Differentiate between types of wood patches and their usage. (Level 1) (App. C.I, a. 1)
4. Identify and describe various wood repairs. (Level 1) (App. C.I, a. 1)

D. Composite Materials

CONTACT HOURS
PER TOPIC

COURSE TOPICS (continued)

Note: § Denotes required project**Objectives:**

1. Match terms related to bonded structures to their correct definitions.
2. Discuss usages and characteristics of reinforcing fibers.
3. Discuss usages and characteristics of matrix materials.
4. Discuss usages and characteristics of core materials.
5. Select true statements related to types and characteristics of bonded structures.

E. Composite Manufacturing

Objectives:

1. Discuss safety practices related to composite manufacturing/repair.
2. Discuss composite manufacturing/repair techniques.
3. Discuss the various methods of applying pressure during the curing process.
4. Discuss methods of, and various equipment used in, the curing process.
5. Discuss tools, equipment, and processes used in machining composites.
6. **§ Manufacture a foam core composite structure. (Level 3) (App. C.I, d.11) (AF1-025)**
7. **§ Manufacture a honeycomb core composite structure. (Level 3) (App. C.I, d.11) (AF1-026).**

F. Composite Repairs

Objectives:

1. Discuss classification and types of composite damage.
2. Discuss inspection and testing methods of primary and secondary composite structures.
3. **§ Inspect bonded honeycomb structure. (Level 2) (App. C.I, d.11) (AF1-027)**
4. Discuss general composite repair operations and procedures.
5. Discuss causes for composite repair failures.
6. Discuss the importance of cleaning prior to repairs
7. Discuss typical composite repair procedures.
8. Discuss delaminations and their repairs.
9. Discuss damage and repairs to laminate structures.
10. Discuss damage and repairs to sandwich structures.
11. Discuss damage and repairs to honeycomb structures.
12. **§ Remove damage from bonded honeycomb with a router. (Level 3) (App. C.I, d. 12) (AF1-028)**
13. **§ Perform core replacement and fiberglass, Kevlar or graphite overlay on bonded honeycomb. (Level 3) (App. C.I, b.5, d.12) (AF1-029)**
14. Discuss selection, installation, and removal of special fasteners for metallic, bonded, and composite structures.
15. **§ Select, install and remove special fasteners for bonded and composite structures. (Level 2) (App. C.I, d.10) (AF1-030)**

G. Plastics

Objectives:

1. Discuss characteristics of acrylic and cellulose acetate plastic material.

COURSE TOPICS (continued)

Note: § Denotes required project

2. Discuss storage and handling of transparent plastics.
3. Discuss forming, sawing, drilling, and cementing transparent plastics.
4. Discuss repairing transparent plastics.
5. Discuss how to protect plastics during handling and repair operations.
6. **§ Repair surface scratches in transparent plastic laminates. (Level 2) (App. C.I, d. 12) (AF1-031)**
7. **§ Repair a crack in plastic. (Level 2)(App. C.I, d. 12) (AF1-032)**

H. Unit Test

III. AIRCRAFT ELECTRICAL

60

A. Safety and Terms

Objectives:

1. List and practice safety precautions related to aircraft wiring, motors and generators.
2. Define terms related to aircraft wiring, electrical components, motors and generators.

B. Aircraft Wiring

Objectives:

1. Discuss types of wire and insulation.
2. Discuss wire size selection
3. Interpret and use a wire/cable size chart.

C. Wiring Diagrams

Objectives:

1. Discuss block diagrams.
2. Discuss pictorial diagrams.
3. Interpret schematic diagrams.
4. Discuss avionics circuits.
5. Describe landing gear circuits.
6. Explain the master switch circuit.

D. Wiring Installations

Objectives:

1. Identify aircraft wire markings.
2. Compare single and double wire installation
- 3 **§ Select proper wire for various applications. (Level 3) (App. C.II, g. 49) (AF1-038)**
4. Determine proper wire grouping, bundles, and routing.
5. **§ Lace and tie wire bundles. (Level 3) (App. C.II, g. 49) (AF1-039)**
6. **§ Install terminal ends and splices. (Level 3) (App. C.II, g. 48, 49, 50a) (AF1-040)**
7. **§ Prepare and install frame ground. (Level 3) (App. C.II, g.49) (AF1-041)**

COURSE TOPICS (continued)

Note: § Denotes required project

8. Differentiate between conduit and shielding.
9. § Inspect and repair aircraft connector pins and sockets. (Level 2) (App. C.II, g. 48)(AF1-042)

E. Circuit Protective Devices

Objectives:

1. Identify aircraft fuses.
2. Identify aircraft circuit breakers.
3. § Interpret circuit protector charts. (Level 3) (App. C.II, g. 49) (AF1-043)

F. Circuit Controls

Objectives:

1. Discuss types and usage of switches.
2. § Interpret switch de-rating chart. (Level 3) (App. C.II, g. 49) (AF1-044)
3. Discuss switch installation.
4. Identify relay and solenoid construction, operation, and applications.
5. § Install and check airframe electrical wiring, controls, switches, indicators, and protective devices. (Level 3) (App. C.II, g. 49) (AF1-045)

G. Soldering

Objectives:

1. Discuss soldering safety.
2. Describe soldering practices, procedures, and techniques.
3. § Assemble components using approved soldering procedures.(Level 3) (C.II, g.49)(AF1-046)

H. Electrical System Troubleshooting

Objectives:

1. Discuss troubleshooting techniques.
2. Describe the installation of various electrical system components.
3. § Determine normal circuit operation using schematic diagrams, and equipment charts. (Level 3) (App. C.II, g. 50a) (AF1-047)
4. § Troubleshoot an airframe AC and DC electrical system for an open wire. (Level 3) (App. C.II, g. 50a) (AF1-048)

I. Generator Theory

Objectives:

1. Discuss magnetism in relation to electromechanical generation.
2. Identify generator parts and their functions.
3. Discuss the three types of generators and methods of control.
4. Discuss methods of controlling armature reactance.

COURSE TOPICS (continued)

Note: § Denotes required project

J. Basic Generator Inspection and Testing

Objectives:

1. Discuss visual inspections of generator components.
2. Determine inspection procedures for armatures using a growler.
3. Explain inspection and testing procedures for field circuits.
4. Discuss procedures for correcting brush arcing.
5. § Disassemble, inspect, troubleshoot and reassemble a generator. (Level 2)(App. C.II, g. 50b)
(AF1-049)

K. 12-Volt Shunt-Wound Generator System

Objectives:

1. Discuss the operation of a three-unit control panel.
2. Explain the installation and removal of an aircraft generator.
3. Discuss parallel DC charging systems.

L. 24-Volt Compound-Wound Generator System

Objectives:

1. Discuss the operation of a carbon pile voltage regulator.
2. Identify interpoles and series windings and discuss their usage.
3. Troubleshoot, inspect, and adjust a carbon pile voltage regulator.
4. Discuss the operation of differential reverse current relay. (DRCR)
5. Discuss generator paralleling circuits.

M. 12/24 Volt Alternators

Objectives:

1. Discuss alternator parts and their functions.
2. Compare generators and alternators.
3. Explain alternator controls.
4. Discuss alternator service and maintenance.
5. § Set up and test an alternator. (Level 3) (App. C.II, g. 50a) (AF1-050)

N. 120/208 VAC Generators

Objectives:

1. Discuss brush type AC generators and voltage regulation.
2. Discuss brushless AC generators and voltage regulation.
3. Describe the purpose and operation of constant and integrated speed drives. (Level 1) (App. C.II, g. 50b)

O. Inverters and Rectifiers

CONTACT HOURS
PER TOPIC

COURSE TOPICS (continued)

Objectives:

1. Explain rotary type inverters.
2. Discuss solid-state inverters.
3. Discuss methods of rectification.
4. Discuss transformer / rectifier units

P. Power Distribution

Objectives:

1. Discuss simple power systems.
2. Explain the difference between parallel and split bus systems.
3. Discuss bus tie systems (split bus).

Q. Synchronous Servos

Objectives:

1. Discuss stepper motors.
2. Discuss autosyn systems.
3. Explain synchronous systems.

R. Unit Test

IV. EMPLOYABILITY SKILLS FOR AIRFRAME MAINTENANCE TECHNICIAN 25

A. Conducting Job Search

1. Media and agency information sources.
2. Exploring websites, career development centers, publications, and resource documents.
3. Personal documents required when applying.

B. Job Application

1. Application forms.
2. Resume writing.
3. Punctuation and spelling.

C. Interview Skills

1. Types of interviews
2. Etiquette required.
3. Presentation skills.

D. On the Job Behaviors

1. Response to criticism.
2. Work habits.
3. Interpersonal relationships.

E. Job Changes

1. Promotions.

COURSE TOPICS (continued)	CONTACT HOURS <u>PER TOPIC</u>
2. Inter-department. 3. New companies.	
F. Right-to-Know Law 1. Florida statutes. 2. Exceptions.	
V. AIRFRAME I REMEDIATION, REVIEW, AND TESTING	35

Airframe Block I Final Exam

PROGRAM TITLE: Aviation Maintenance Management

COURSE TITLE: Aviation Maintenance Technology Airframe I

CIP NUMBER: 1649.010401

LIST PERFORMANCE STANDARD ADDRESSED:

NUMBER(S): TITLES(S):

- 18.0 MAINTAIN WOOD STRUCTURES--The student will be able to:
- 18.01 Service and repair wood structures. [FAA FAR Part 147, Level 1]
 - 18.02 Identify wood defects. [FAA FAR Part 147, Level 1]
 - 18.03 Inspect wood structures. [FAA FAR Part 147, Level 1]
- 23.0 PERFORM ASSEMBLY AND RIGGING--The student will be able to:
- 23.01 Rig rotary-wing aircraft. [FAA FAR Part 147, Level 1]
 - 23.02 Rig fixed-wing aircraft. [FAA FAR Part 147, Level 2]
 - 23.03 Check alignment of structures. [FAA FAR Part 147, Level 2]
 - 23.04 Assemble aircraft components, including flight control surfaces. [FAA FAR Part 147, Level 3]
 - 23.05 Balance, rig, and inspect movable primary and secondary flight control structures. [FAA FAR Part 147, Level 3]
 - 23.06 Jack aircraft. [FAA FAR Part 147, Level 3]
 - 23.07 Identify and utilize appropriate rigging tools and equipment.
- 31.0 INSPECT AND REPAIR AIRCRAFT ELECTRICAL SYSTEMS--The student will be able to:
- 31.01 Repair and inspect aircraft electrical system components; crimp and splice wiring to manufacturers' specifications; and repair pins and sockets of aircraft connectors. [FAA FAR Part 147, Level 2]
 - 31.02 Install, check, and service airframe electric wiring, controls, switches, indicators, and protective devices. [FAA FAR Part 147, Level 3]
 - 31.03 Inspect, check, troubleshoot, service, and repair alternating and direct current electrical systems. [FAA FAR Part 147, Level 3]
 - 31.04 Inspect, check, and troubleshoot constant and integrated speed- drive generators. [FAA FAR Part 147, Level 1]
 - 31.05 Identify and utilize appropriate electrical tools and equipment.
- 35.0 DEMONSTRATE KNOWLEDGE OF FEDERAL AVIATION ADMINISTRATION AIRFRAME LICENSING REQUIREMENTS--The student will be able to:
- 35.01 Explain the requirements for obtaining FAA authorization to take the FAA Airframe examinations.
- 36.0 DEMONSTRATE EMPLOYABILITY SKILLS AS AN AVIATION MAINTENANCE TECHNICIAN (AMT) WITH AN FAA AIRFRAME RATING--The student will be able to:
- 36.01 Conduct a job search for an AMT with FAA airframe rating position.
 - 36.02 Secure information about the requirements for an AMT with FAA airframe rating in a particular firm.

LIST PERFORMANCE STANDARD ADDRESSED: (continued)

NUMBER(S):

TITLES(S):

- 36.03 Identify documents that may be required when applying for an AMT with FAA airframe rating position.
- 36.04 Complete a job-application form correctly.
- 36.05 Demonstrate competency in job-interview techniques.
- 36.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other employees.
- 36.07 Identify or adopt acceptable work habits.
- 36.08 Demonstrate knowledge of how to make job changes appropriately.
- 36.09 Demonstrate acceptable employee health habits.
- 36.10 Demonstrate knowledge of the "Right-to-Know" law.



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

<i>Section 1</i> COURSE PREFIX AND NUMBER: <u>AMT 1761</u>	SEMESTER CREDIT HOURS: <u>6</u>
COURSE TITLE: <u>Aviation Maintenance Technology Airframe 1</u>	

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

<input type="checkbox"/> AA Elective	X	AS Required Professional Course	<input type="checkbox"/> College Prep
<input type="checkbox"/> AS Professional Elective	X	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:

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

<i>Section 5</i> LEARNING OUTCOMES	METHOD OF ASSESSMENT
• Rig an aircraft flight control system	Practical test based on FAA Practical Test Standards
• Manufacture a honeycomb core composite structure	Practical test based on FAA Practical Test Standards
• Determine normal circuit operation using electrical schematics	Written test created from FAA Test Bank of Questions
• Inspect and repair electrical connectors	Practical test based on FAA Practical Test Standards
• Interpret circuit protector charts	Written test created from FAA Test Bank of Questions
• Demonstrate employability skills related to AMT profession	Simulated job interview
•	

Section 6
Name of Person Completing This Form: Richard Rozanski