

### Course Outline

**COURSE:** AMT 111                      **DIVISION:** 50                      **ALSO LISTED AS:**

**TERM EFFECTIVE:** Spring 2021                      **CURRICULUM APPROVAL DATE:** 10/13/2020

**SHORT TITLE:** AIRFRAME STRUCTURES

**LONG TITLE:** Airframe Structures

<u>Units</u>	<u>Number of Weeks</u>	<u>Type</u>	<u>Contact Hours/Week</u>	<u>Total Contact Hours</u>
13.5	18	Lecture:	9	162
		Lab:	13.5	243
		Other:	0	0
		Total:	22.5	405
		Total Learning Hrs:	729	

**COURSE DESCRIPTION:**

This course is an FAA Part 147 course designed to prepare the student for their FAA Airframe certificate. The course will provide the student with a thorough understanding of nonmetallic aircraft structures including wood, fabric, composite structures. Also the study of hydraulic and pneumatic power systems; landing gear systems; electrical systems; and assembly and rigging. Both theory and practical application to aircraft systems is taught. **COREQUISITE:** AMT 101, General Aircraft Technology. **ADVISORY:** Mathematics 430 or math skills equivalent to elementary algebra.

**PREREQUISITES:**

**COREQUISITES:**

AMT 101

**CREDIT STATUS:** D - Credit - Degree Applicable

**GRADING MODES**

L - Standard Letter Grade

**REPEATABILITY:** N - Course may not be repeated

## SCHEDULE TYPES:

- 02 - Lecture and/or discussion
- 03 - Lecture/Laboratory
- 04 - Laboratory/Studio/Activity
- 04A - Laboratory - LEH 0.65

## STUDENT LEARNING OUTCOMES:

By the end of this course, a student should:

1. Demonstrates the ability to meet the written test standards outlined in FAA AC 147-3 - Certification and Operation of Aviation Maintenance Technician Schools.
2. Demonstrates the ability to meet the oral/practical test standards outlined in FAA AC 147-3 - Certification and Operation of Aviation Maintenance Technician Schools.
3. Demonstrate the ability to inspect and determine if components and aircrafts meet airworthy standards outlined in FAA AC 43.13-1B - Acceptable Methods, Techniques, and Practices - Aircraft Inspection and Repair.

## CONTENT, STUDENT PERFORMANCE OBJECTIVES, OUT-OF-CLASS ASSIGNMENTS

Curriculum Approval Date: 10/13/2020

### LECTURE CONTENT:

12.5 Hours

#### WOOD STRUCTURES

CONTENT: Including defects in wood, kinds of wood and service and repair of wood.

STUDENT PERFORMANCE OBJECTIVE: Select samples of wood that would be acceptable for repair of wood aircraft structures. Identify types of wood and describe the strength characteristics which influence the selection of such materials for repair of wood aircraft structures. Judge the suitability of substitute materials. Describe the kinds of glue and gluing techniques. Read drawings pertaining to repair of wood structures.

16.5 Hours

#### FABRIC COVERING

CONTENT: Including selecting and applying fabric and fiberglass covering materials; as well as inspecting, testing and repairing.

STUDENT PERFORMANCE OBJECTIVE: Identify fabrics and seams and describe the acceptable methods of applying fabric. Compare the samples of doped and sewed seams with the specifications appearing in the publications.

12 Hours

#### AIRCRAFT FINISHES

CONTENT: Study of aircraft paint, trim design and finishes.

STUDENT PERFORMANCE OBJECTIVE: Draw registration letters and numbers and describe the application of trim and methods of touching up paint. Recognize the kind of material that was originally applied as a finish and describe which finishing materials may be applied over the original finish.

33 Hours

#### LANDING GEAR SYSTEMS

CONTENT: Study of basic landing gear to complex retractable gear systems. Includes aircraft mechanical and hydraulic brake assemblies, power brakes and emergency brake systems.

STUDENT PERFORMANCE OBJECTIVE: Describe the procedures to be followed when storing tires and other rubber aircraft products. Identify components of the mechanical and hydraulic type brake assemblies. Describe the operation of power brakes and emergency brake systems. Describe the operation of an oleo shock strut. Describe the operation of power brake and emergency brake systems. Recognize probable causes of brake malfunctions.

25 Hours

#### ASSEMBLY AND RIGGING

CONTENT: Including fixed wing aircraft and rotary wing aircraft.

STUDENT PERFORMANCE OBJECTIVE: Use nomenclature applicable to fixed wing aircraft and rotary wing aircraft. Explain the aerodynamics of flight, interpret the theories and describe the design features related to lift, thrust, stability and control of fixed wing aircraft.

30 Hours

#### HYDRAULIC AND PNEUMATIC SYSTEMS

CONTENT: Aircraft basic hydraulics, study of hydraulic brake systems, anti-skid systems and pneumatic systems.

STUDENT PERFORMANCE OBJECTIVE: Identify and select hydraulic fluids. Explain the simulated operation of anti-skid takeoff warning systems. Interpret and describe the operation of a pneumatic power system. Solve problems involving force, areas and pressure. Interpret reference information pertaining to operation of a basic hydraulic system. Compare constant pressure and open center types of hydraulic systems. Identify and describe the operation of constant and variable displacement hydraulic pumps.

9 Hours

#### COMMUNICATIONS AND NAVIGATION

CONTENT: Study of autopilot and approach control systems.

STUDENT PERFORMANCE OBJECTIVE: Explain the purposes and operation of an autopilot system, including the operating principles of the sensing devices. Describe the purpose and operation of servos or servomotors. Describe the function of position transmitters and trim indicators and the purpose and operation of an approach control system. Discuss the FCC regulations pertaining to aircraft radio operation. Identify and describe the purpose of static dischargers.

8 Hours

#### FIRE

CONTENT: Study of aircraft fire detection and protection systems.

STUDENT PERFORMANCE OBJECTIVE: Describe how smoke is detected by photoelectric and visual methods. Explain how air sampling is accomplished for smoke detection. Discuss the uses of chemical type CO detector buttons.

Select and operate fire extinguishers.

8 Hours

#### ICE AND RAIN CONTROL SYSTEMS

CONTENT: Study of ice and rain control systems.

STUDENT PERFORMANCE OBJECTIVE: Describe the principles of installation, operation, deicing and anti-icing systems.

6 Hours

#### AIRFRAME INSPECTION

CONTENT: Airframe conformity and airworthiness inspections.

STUDENT PERFORMANCE OBJECTIVE: Describe the procedures, nomenclature and technical terms used to perform a 100 hour or annual inspection.

2 Hours

Final

**LAB CONTENT:**

18 Hours

**AIRCRAFT FINISHES**

LAB PROJECTS: Apply trim, letters and touchup paint. Identify finishing materials and thinners. Prepare the surface for painting and apply primers and paints by spraying. Apply dope by brush and spray application. Apply surface tapes, drain grommets and reinforcing patches as a part of the doping procedure. Inspect finishes and recognize defects.

65 Hours

**LANDING GEAR SYSTEMS**

LAB PROJECTS: Clean an aircraft tire, removing oils and other deteriorating materials. Inspect, demount, repair and reinstall tires on wheels. Remove, inspect, service and reinstall a wheel assembly on the axle. Disassemble components and reassemble mechanical and hydraulic type brake assemblies. Replace a brake actuating cylinder. Adjust clearance on a shoe, multiple-disc and single-disc shoe. Inspect, repair and operationally check a master cylinder. Inspect and service the operation of power brakes and emergency brake systems. Bleed air from a hydraulic brake system. Service, repair and troubleshoot landing gear oleo struts. Operate, inspect and adjust a retractable landing gear. Check landing gear alignment. Inspect, adjust and service nose and tail wheel steering and damping mechanisms.

46.5 Hours

**ASSEMBLY AND RIGGING**

LAB PROJECTS: Check and verify alignment of structures. Assemble aircraft components. Identify aircraft control cable. Install swaged cable terminals. Verify correct control response. Install and tension a control cable and inspect a cable control system. Check static balance of a control system. Inspect and adjust push-pull control systems. Utilize the appropriate equipment, ballast and follow procedures to raise and lower the aircraft.

57.5 Hours

**HYDRAULIC AND PNEUMATIC SYSTEMS**

LAB PROJECTS: Repair hydraulic and pneumatic power system components. Identify, remove and install a hydraulic selector valve. Remove and install pressure regulators. Inspect and service hydraulic reservoirs. Check, inspect, troubleshoot, remove and install hydraulic power pumps. Remove, install, inspect, service and check a hydraulic accumulator. Troubleshoot and determine the cause of low, high or fluctuating system hydraulic pressure. Inspect, check and service a hydraulically operated flap system.

12 Hours

**COMMUNICATIONS AND NAVIGATION**

LAB PROJECTS: Inspect, check and service aircraft electronic communication and navigational systems. Repair or replace aircraft antennas and related electronic equipment.

10 Hours

**FIRE**

LAB PROJECTS: Inspect, check, service, troubleshoot and repair aircraft fire detection and extinguishing systems. Select and operate fire extinguishers.

10 Hours

**ICE AND RAIN CONTROL SYSTEMS**

LAB PROJECTS: Inspect, check, troubleshoot, service and repair airframe ice and rain control systems. Replace, inspect and check operation of electrically operated air scoop and pilot static vent anti-icing.

24 Hours

**AIRFRAME INSPECTION**

LAB PROJECTS: Perform a 100 hour or annual inspection of the aircraft and record the conditions disclosed as a result of the inspection.

**METHODS OF INSTRUCTION:**

lecture, demonstration, audio-visual, guided practice

**METHODS OF EVALUATION:**

Writing assignments

Percent of total grade: 30.00 %

Percent range of total grade: 20% to 40% Written Homework, Lab Reports, Term or Other Papers  
Problem-solving assignments

Percent of total grade: 20.00 %

Percent range of total grade: 15% to 30% Homework Problems, Quizzes, Exams  
Skill demonstrations

Percent of total grade: 10.00 %

Percent range of total grade: 10% to 20% Class Performance/s  
Objective examinations

Percent of total grade: 40.00 %

Percent range of total grade: 35% to 50% Multiple Choice, True/False, Matching Items

**OUT OF CLASS ASSIGNMENTS:**

Required Outside Hours: 25

Assignment Description:

WOOD STRUCTURES

Homework: Complete reading assignments and answer question sheets.

Required Outside Hours: 33

Assignment Description:

FABRIC COVERING

Homework: Complete reading assignments and answer question sheets.

Required Outside Hours: 24

Assignment Description:

AIRCRAFT FINISHES

Homework: Complete reading assignments and answer question sheets.

Required Outside Hours: 66

Assignment Description:

LANDING GEAR SYSTEMS

Homework: Complete reading assignments and answer question sheets.

Required Outside Hours: 50

Assignment Description:

ASSEMBLY AND RIGGING

Homework: Complete reading assignments and answer question sheets.

Required Outside Hours: 60

Assignment Description:

HYDRAULIC AND PNEUMATIC SYSTEMS

Homework: Complete reading assignments and answer question sheets.

**OUT OF CLASS ASSIGNMENTS [CONTINUED]:**

Required Outside Hours: 18

Assignment Description:

COMMUNICATIONS AND NAVIGATION

Homework: Complete reading assignments and answer question sheets.

Required Outside Hours: 16

Assignment Description:

FIRE

Homework: Complete reading assignments and answer question sheets.

Required Outside Hours: 16

Assignment Description:

ICE AND RAIN CONTROL SYSTEMS

Homework: Complete reading assignments and answer question sheets.

Required Outside Hours: 16

Assignment Description:

AIRFRAME INSPECTION

Homework: Complete reading assignments and answer question sheets.

**REPRESENTATIVE TEXTBOOKS:**

F.A.A.. Acceptable Methods, Techniques, and Practices - Aircraft Inspection and Repair AC43.13-1B/2B. ASA,2008.

Latest version of FAA standard

ISBN: ISBN: 978-1-56027-728-6

Reading Level of Text, Grade: Reading level of text, Grade: 12th Verified by: Verified by: MS Word

F.A.A.. Airframe and Powerplant Mechanics - Airframe Volume 1: FAA-H-8083-31A. Aircraft Technical Book Company,2018.

FAA released new version

ISBN: 978-1619548268

Reading Level of Text, Grade: Reading level of text, Grade: 12th Verified by: Verified by: MS Word

F.A.A.. Airframe and Powerplant Mechanics - Airframe Volume 2: FAA-H-8083-31A. ASA,2012.

FAA released a new version

ISBN: 978-1619548312

Reading Level of Text, Grade: Reading level of text, Grade: 12th Verified by: Verified by: MS Word

**ARTICULATION and CERTIFICATE INFORMATION**

Associate Degree:

CSU GE:

IGETC:

CSU TRANSFER:

Transferable CSU, effective 199050

UC TRANSFER:

Not Transferable

**SUPPLEMENTAL DATA:**

Basic Skills: N

Classification: Y

Noncredit Category: Y

Cooperative Education:

Program Status: 1 Program Applicable

Special Class Status: N

CAN:

CAN Sequence:

CSU Crosswalk Course Department:

CSU Crosswalk Course Number:

Prior to College Level: Y

Non Credit Enhanced Funding: N

Funding Agency Code: Y

In-Service: N

Occupational Course: B

Maximum Hours:

Minimum Hours:

Course Control Number: CCC000235617

Sports/Physical Education Course: N

Taxonomy of Program: 095010