1. **COURSE TITLE\*: Aircraft Fuel, Hydraulics, and Gear**
2. **CATALOG – PREFIX/COURSE NUMBER/COURSE SECTION\*: AVIT 2302**
3. **PREREQUISITE(S)\*: COREQUISITE(S)\*:**
4. **COURSE TIME/LOCATION/MODALITY: (*Course Syllabus – Individual Instructor Specific*)**
5. **CREDIT HOURS\*: 4 LECTURE HOURS\*: 2**

**LABORATORY HOURS\*: 2 (2.75 contact hrs) OBSERVATION HOURS\*:0**

1. **FACULTY CONTACT INFORMATION: *(Course Syllabus – Individual Instructor Specific)***
2. **COURSE DESCRIPTION\*:**

This course will introduce the student to hydraulic, pneumatic, and landing gear and fuel systems used in a variety of different types of aircraft. Students will inspect, check, service, and repair aircraft landing gear systems and their component. Student will remove, disassemble, inspect, and replace hydraulic and pneumatic systems components uses in different aircraft systems. Students will understand different types of fuel, fuel tanks and associated components of these systems

1. **LEARNING OUTCOMES\*:**

Students will have knowledge of the following:

1. Hydraulic system components and fluids.
2. Hydraulic system operation
3. Hydraulic system servicing requirements
4. Hydraulic system inspection, check, servicing, and troubleshooting
5. Pneumatic system types and components
6. Pneumatic system servicing requirements
7. Types of hydraulic/pneumatic seals and fluid/seal compatibility
8. Hoses, lines, and fittings.
9. Pressure regulators, restrictors, and valves.
10. Fuel system types.
11. Fuel system components, including filters and selector valves.
12. Aircraft fuel tanks/cells
13. Fuel flow.
14. Fuel transfer, fueling, and defueling.
15. Fuel jettisoning/dump systems.
16. Fuel system maintenance and inspection
17. Fuel quantity indication.
18. Fixed and retractable landing gear systems.
19. Landing gear strut servicing/lubrication.
20. Brake assembly servicing and inspection.
21. Anti-skid system components and operation
22. Wheel, brake, and tire construction
23. Landing gear and tire and wheel safety and inspection
24. Brake actuating systems.
25. Alternative landing gear systems
26. **ADOPTED TEXT(S)\*:**

FAA-H-8083-31A (Airframe Vol 1&2)

Aviation Maintenance Technician Handbook AC 43.13-1B

<https://www.faa.gov/sites/faa.gov/files/regulations_policies/handbooks_manuals/aviation/amt_airframe_hb_vol_1.pdf>

<https://www.faa.gov/handbooksmanuals/aviation/aviation-maintenance-technician-handbook-airframe-volume-2>

<https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_43.13-1B_w-chg1.pdf>

**9a: SUPPLEMENTAL TEXTS APPROVED BY FULL TIME DEPARTMENTAL FACULTY (INSTRUCTOR MUST NOTIFY THE BOOKSTORE BEFORE THE TEXTBOOK ORDERING DEADLINE DATE PRIOR TO ADOPTION) \*\*\*.**

1. **OTHER REQUIRED MATERIALS: (SEE APPENDIX C FOR TECHNOLOGY REQUEST FORM.)\*\***
2. **GRADING SCALE\*\*\*:**

Grading will follow the policy in the catalog. The scale is as follows:

A: 90 – 100

B: 80 – 89

C: 70 – 79

D: 60 – 69

F: 0 – 59

Grades of 69 and below will not meet the requirements of the FAA for Mechanic

Certificate.

1. **GRADING PROCEDURES OR ASSESSMENTS: (*Course Syllabus – Individual Instructor Specific)***

Test count – 40% of Final Grade

Quizzes count – 10% of Final Grade

Lab Grade counts – 50% of Final Grade

Class and lab attendance will be graded, two points will be deducted from the grade for each day missed. Quizzes cannot be made up. No test can be taken late without prior approval of the instructor.

1. **COURSE METHODOLOGY: *(Course Syllabus – Individual Instructor Specific)***

May included but not limited to lecture and problems solving, group and lab projects, in-class and home assignments, quizzes and tests. Lab project will be individual and group. Attendance to class and lab is required.

**14. COURSE OUTLINE: *(Course Syllabus – Individual Instructor Specific)***

***(Insert sample course outline with learning outcomes tied to assignments / topics.)***

**Below is an example of how you might fill-in the course outline of classwork, assignments, tests, et al…**

|  |  |  |
| --- | --- | --- |
| **WEEK** | **DESCRIPTION** | **LEARNING OUTCOMES #** |
| WEEK 1 | Hydraulic fluid, viscosity, flash point, fire point, types of hydraulic fluid, basic hydraulic systems, open hydraulic systems, closed hydraulic systems.  Basic aircraft hydraulic systems, double-acting actuators, two-way selector valves, engine-driven pump and pump-control valve, hand pump and standpipe, filters and thermal relief valves, open-center systems, hydraulic power pack systems. | 1, 2 |
| WEEK 2 | Hydraulic system components, reservoirs, filters, pumps, valves. Hydraulic fuses, pressure regulators, pressure reducers, accumulators. | 1, 2 |
| WEEK 3 | Hydraulic fuses, pressure regulators, pressure reducers, accumulators. Air valves, actuators, seals, large-aircraft hydraulic systems. | 3, 4 |
| WEEK 4 | Aircraft pneumatic systems, high-pressure systems, medium-pressure systems, low-pressure systems.  Pneumatic system components, relief valves, control valves, check valves, moisture separators, filters, shuttle valves, emergency backup systems. | 5, 6, 7 |
| WEEK 5 | Landing gear types, landing gear arrangement, fixed or retractable landing gear, shock absorbing and non-absorbing landing gear, aircraft wheels.  Wheel inspection, nose wheel steering systems on small and large aircraft, shimmy dampers, landing gear alignment, support and retraction for small aircraft. | 18, 19 |
| WEEK 6 | Landing gear alignment, support and retraction for large aircraft, emergency extension systems, landing gear safety devices, landing gear rigging and adjustment.  Types of aircraft brakes, brake construction, brake actuating systems, emergency brake system. | 22, 24, 25 |
| WEEK 7 | Brake inspection and service, off aircraft servicing, replacement of brake linings.  Brake malfunctions and damage, anti-skid brake control systems, tire classification, tire types, tire construction.  Tire inspection on the aircraft, tire removal, tire inspection off of the aircraft, tire repair and retreading, tire storage, aircraft tubes, tire mounting, tire balancing. | 20, 21, 23 |
| WEEK 8 | Test 2  Fuel identification, turbine engine fuels, types of turbine engine fuels, problems with water in turbine fuel, fuel contamination. | 10, 11 |
| WEEK 9 | Basic fuel system requirements, single-engine aircraft fuel systems, gravity-feed systems, and pump-feed systems. | 12, 13 |
| WEEK 10 | High-wing airplane using a fuel injection system, small multi-engine aircraft fuel systems, large reciprocating-engine aircraft fuel systems.  Jet transport aircraft fuel systems.  Helicopter fuel systems, types of fuel tanks | 12, 13 |
| WEEK 11 | Fuel caps, fuel lines, and fuel valves.  Hand operated fuel valves, motor operated fuel valves, and solenoid operated fuel valves. | 13 |
| WEEK 12 | Fuel pumps, hand operated pumps, centrifugal pumps, and fuel ejector pumps.  Pulsating fuel pumps, vane-type fuel pumps, fuel filters, fuel heaters.  Fuel quantity indicating systems, flowmeters, fuel temperature gauges, fuel | 16 |
| WEEK 13 | Pressure gauges, fuel dumps systems.  Fuel tank repair and testing, fuel leak classification. | 8, 9, 15 |
| WEEK 14 | Fuel system servicing, fuel system contaminants, surfactants, microorganism | 17 |
| WEEK 15 | Fueling procedures, pressure fueling, fuel storage, defueling aircraft. | 14 |
| WEEK 16 | Final Exam |  |

* + Hydraulic fluid, viscosity, flash point, fire point, types of hydraulic fluid, basic hydraulic systems, open hydraulic systems, closed hydraulic systems.
  + Basic aircraft hydraulic systems, double-acting actuators, two-way selector valves, engine-driven pump and pump-control valve, hand pump and standpipe, filters and thermal relief valves, open-center systems, hydraulic power pack systems.
  + Hydraulic system components, reservoirs, filters, pumps, valves. Hydraulic fuses, pressure regulators, pressure reducers, accumulators.
  + Hydraulic fuses, pressure regulators, pressure reducers, accumulators. Air valves, actuators, seals, large-aircraft hydraulic systems.
    - Test 1
  + Aircraft pneumatic systems, high-pressure systems, medium-pressure systems, low-pressure systems.
  + Pneumatic system components, relief valves, control valves, check valves, moisture separators, filters, shuttle valves, emergency backup systems.
  + Landing gear types, landing gear arrangement, fixed or retractable landing gear, shock absorbing and non-absorbing landing gear, aircraft wheels.
  + Wheel inspection, nose wheel steering systems on small and large aircraft, shimmy dampers, landing gear alignment, support and retraction for small aircraft.
  + Landing gear alignment, support and retraction for large aircraft, emergency extension systems, landing gear safety devices, landing gear rigging and adjustment.
  + Types of aircraft brakes, brake construction, brake actuating systems, emergency brake system.
  + Brake inspection and service, off aircraft servicing, replacement of brake linings.
  + Brake malfunctions and damage, anti-skid brake control systems, tire classification, tire types, tire construction.
  + Tire inspection on the aircraft, tire removal, tire inspection off of the aircraft, tire repair and retreading, tire storage, aircraft tubes, tire mounting, tire balancing.
    - Test 2
  + Fuel identification, turbine engine fuels, types of turbine engine fuels, problems with water in turbine fuel, fuel contamination.
  + Basic fuel system requirements, single-engine aircraft fuel systems, gravity-feed systems, and pump-feed systems.
  + High-wing airplane using a fuel injection system, small multi-engine aircraft fuel systems, large reciprocating-engine aircraft fuel systems.
  + Jet transport aircraft fuel systems.
  + Helicopter fuel systems, types of fuel tanks
  + Fuel caps, fuel lines, and fuel valves.
  + Hand operated fuel valves, motor operated fuel valves, and solenoid operated fuel valves.
  + Fuel pumps, hand operated pumps, centrifugal pumps, and fuel ejector pumps.
  + Pulsating fuel pumps, vane-type fuel pumps, fuel filters, fuel heaters.
  + Fuel quantity indicating systems, flowmeters, fuel temperature gauges, fuel
  + Pressure gauges, fuel dumps systems.
  + Fuel tank repair and testing, fuel leak classification.
  + Fuel system servicing, fuel system contaminants, surfactants, microorganism
  + Fueling procedures, pressure fueling, fuel storage, defueling aircraft.
    - Final exam

**15. SPECIFIC MANAGEMENT REQUIREMENTS\*\*\*:**

Class and lab attendance will be graded. Quizzes cannot be made up. No test can be taken late without prior approval of the instructor.

**16. FERPA:\***

Students need to understand that their work may be seen by others. Others may see your work when being distributed, during group project work, or if it is chosen for demonstration purposes. Students also need to know that there is a strong possibility that your work may be submitted to other entities for the purpose of plagiarism checks.

**17. ACCOMMODATIONS: \***

Students requesting accommodations may contact Ryan Hall, Accessibility Coordinator at rhall21@sscc.edu or 937-393-3431, X 2604.

Students seeking a religious accommodation for absences permitted under Ohio’s Testing Your Faith Act must provide the instructor and the Academic Affairs office with written notice of the specific dates for which the student requires an accommodation and must do so no later than fourteen (14) days after the first day of instruction or fourteen (14) days before the dates of absence, whichever comes first. For more information about Religious Accommodations, contact Ryan Hall, Accessibility Coordinator at [rhall21@sscc.edu](mailto:rhall21@sscc.edu) or 937-393-3431 X 2604.

**18. OTHER INFORMATION\*\*\*:**

**SYLLABUS TEMPLATE KEY**

**\*** Item cannot be altered from that which is included in the master syllabus approved by the Curriculum Committee.

**\*\*** Any alteration or addition must be approved by the Curriculum Committee

**\*\*\*** Item should begin with language as approved in the master syllabus but may be added to at the discretion of the faculty member.