Aeronautics

Overview

Sacramento City College maintains a Federal Aviation Administration-approved two-year program organized to train students as airframe and powerplant maintenance technicians. The program is designed to meet the needs of students who desire technical training to qualify for the Federal Aviation tests.

The Aeronautics program is governed by regulations established by the Federal Aviation Administration (FAA). This FAA-approved program fulfills all the requirements under CFR 14, Federal Aviation Regulation part 147.

Completion of this program will allow the graduate to test for the FAA Airframe & Powerplant Mechanic Certificate. Upon passing these Federal examinations, the graduate is certificated to work on aircraft as a technician and to supervise the work of others on such craft.

Aeronautics
Dean
Donnetta Webb ([about-us/contact-us/faculty-and-staff-directory/donnetta-webb](mailto:donnetta-webb@scs.losrios.edu))
Department Chair
Phillip B. Cypret ([about-us/contact-us/faculty-and-staff-directory/phillip-b-cypret](mailto:phillip-b-cypret@scs.losrios.edu))
Meta-Major
Business and Industry ([academics/meta-majors/business-and-industry](http://academics/meta-majors/business-and-industry))
Email
CypretP@scc.losrios.edu ([mailto:CypretP@scc.losrios.edu](mailto:CypretP@scc.losrios.edu))

A.S. in Airframe

Sacramento City College maintains a Federal Aviation Administration-approved two-year program organized to train students as airframe and powerplant maintenance technicians. The program is designed to meet the needs of students who desire technical training to qualify for the Federal Aviation tests.

The Aeronautics program is governed by regulations established by the Federal Aviation Administration. This Federal Aviation Administration (FAA) approved program fulfills all of the requirements under CFR 14, Federal Aviation Regulation part 147. Completion of this program will allow the graduate to test for the FAA Airframe Mechanic Certificate.

Upon passing the appropriate Federal examinations, the graduate is certificated to work on aircraft as a technician and to supervise the work of others on such craft.

Program Costs: In addition to the normal student expenses, minimal lab expenses may be incurred.

Recommended High School Preparation: English, mathematics, electronics, science, computers, and industrial shop.

Catalog Date: June 1, 2020

Degree Requirements

<table>
<thead>
<tr>
<th>COURSE CODE</th>
<th>COURSE TITLE</th>
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<td>AERO 300</td>
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<td>AERO 301</td>
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The Airframe Associate in Science (A.S.) degree may be obtained by completion of the required program, plus general education requirements, plus sufficient electives to meet a 60-unit total. See SCC graduation requirements.

Enrollment Eligibility

To be eligible for enrollment in the program, the student must meet the following criteria:

- Transfers from another Federal Aviation Administration Part 147 approved airframe and powerplant school must provide an official transcript and catalog for evaluation by the department.

Student Learning Outcomes

Upon completion of this program, the student will be able to:
- demonstrate the knowledge and skills to qualify for the General and Airframe portion of the Federal Aviation Administration Airframe Mechanic exam to include the written, oral, and practical tests.
- demonstrate the knowledge and skills to inspect, maintain, repair, and modify airframe structures.

Career Information

The Department of Advanced Transportation Technology currently offers courses and/or certificate programs in Aeronautics, Flight Technology, and Non-Destructive Testing. This department focuses on new and emerging transportation-related courses, as well as traditional training, which may lead directly to employment in local, state, and nationally recognized fields. Airframe Technicians are employed by major/regional airlines, certificated repair stations, fixed based operators, charter services, flight schools, corporate flight departments, agricultural aircraft operators, and helicopter operations as well as government agencies and the military. Many experienced technicians opt to operate their own aviation businesses.

A.S. in Combined Airframe and Powerplant

Sacramento City College maintains a Federal Aviation Administration-approved two-year program organized to train students as airframe and powerplant maintenance technicians. The program is designed to meet the needs of students who desire technical training to qualify for the Federal Aviation tests.

The Aeronautics program is governed by regulations established by the Federal Aviation Administration. This Federal Aviation Administration (FAA) approved program fulfills all the requirements under CFR 14, Federal Aviation Regulation part 147. Completion of this program will allow the graduate to test for the FAA Airframe & Powerplant Mechanic Certificate.

Upon passing the appropriate Federal examinations, the graduate is certified to work on aircraft as a technician and to supervise the work of others on such craft.

Program Costs: In addition to the normal student expenses, minimal lab expenses may be incurred.

Recommended High School Preparation: English, mathematics, electronics, science, computers, and industrial shop.

Catalog Date: June 1, 2020

Degree Requirements

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Total Units: 66

The Combined Airframe and Powerplant Associate in Science (A.S.) degree may be obtained by completion of the required program, plus general education requirements, plus sufficient electives to meet a 60-unit total. See SCC graduation requirements.

Enrollment Eligibility

To be eligible for enrollment in the program, the student must meet the following criteria:
- Transfers from another Federal Aviation Administration Part 147 approved airframe and powerplant school must provide an official transcript and catalog for evaluation by the department.

Student Learning Outcomes

Upon completion of this program, the student will be able to:
- demonstrate the knowledge and skills to qualify for the General, Airframe and Powerplant portion of the Federal Aviation Administration Airframe and Powerplant Mechanics exam to include the written, oral, and practical tests.
- demonstrate the knowledge and skills to inspect, maintain, repair, and modify airframe structures.
- demonstrate the knowledge and skills to inspect, maintain, repair, and modify reciprocating and turbine engines.

Career Information

The Department of Advanced Transportation Technology currently offers courses and/or certificate programs in Aeronautics, Flight Technology, and Non-Destructive Testing. This department focuses on new and emerging transportation-related courses, as well as traditional training, which may lead directly to employment in local, state, and nationally recognized fields. Airframe and Powerplant Technicians are employed by major/regional airlines, certificated repair stations, fixed based operators, charter services, flight schools, corporate flight departments, agricultural aircraft operators, and helicopter operations, as well as government agencies and the military. Many experienced technicians opt to operate their own aviation businesses.
A.S. in Powerplant

Sacramento City College maintains a Federal Aviation Administration-approved two-year certificate and degree program organized to train students as airframe and powerplant maintenance technicians. The program is designed to meet the needs of students who desire technical training to qualify for the Federal Aviation tests.

The Aeronautics program is governed by regulations established by the Federal Aviation Administration. This Federal Aviation Administration (FAA) approved program fulfills all of the requirements under CFR 14, Federal Aviation Regulation part 147. Completion of this program will allow the graduate to test for the FAA Powerplant Mechanic Certificate.

Upon passing the appropriate Federal examinations, the graduate is certificated to work on aircraft as a technician and to supervise the work of others on such craft.

Program Costs: In addition to normal student expenses, minimal lab expenses may be incurred.

Recommended High School Preparation: English, mathematics, electronics, science, computers, and industrial shop.

Catalog Date: June 1, 2020

Degree Requirements

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Total Units: 42

The Powerplant Associate in Science (A.S.) degree may be obtained by completion of the required program, plus general education requirements, plus sufficient electives to meet a 60-unit total. See SCC graduation requirements.

Enrollment Eligibility

To be eligible for enrollment in the program, the student must meet the following criteria:

- Transfers from another Federal Aviation Administration Part 147 approved airframe and powerplant school must provide an official transcript and catalog for evaluation by the department.

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- demonstrate the knowledge and skills to qualify for the General and Powerplant portion of the Federal Aviation Administration Powerplant Mechanics exams to include the written, oral, and practical tests.
- demonstrate the knowledge and skills to inspect, maintain, repair, and modify reciprocating and turbine engines.

Career Information

The department of Advanced Transportation Technology currently offers courses and/or certificate programs in Aeronautics, Flight Technology, and Non-Destructive Testing. This department focuses on new and emerging transportation related courses, as well as traditional training, which may lead directly to employment in local, state, and nationally recognized fields. Powerplant Technicians are employed by major/regional airlines, certificated repair stations, fixed based operators, charter services, flight schools, corporate flight departments, agricultural aircraft operators, and helicopter operations, as well as government agencies and the military. Many experienced technicians opt to operate their own aviation businesses.

Certificates of Achievement

Airframe Certificate

Sacramento City College maintains a Federal Aviation Administration-approved two-year program organized to train students as airframe and powerplant maintenance technicians. The program is designed to meet the needs of students who desire technical training to qualify for the Federal Aviation tests.

The Aeronautics program is governed by regulations established by the Federal Aviation Administration. This Federal Aviation Administration (FAA) approved program fulfills all of the requirements under CFR 14, Federal Aviation Regulation part 147. Completion of this program will allow the graduate to test for the FAA Airframe Mechanic Certificate.

Upon passing the appropriate Federal examinations, the graduate is certificated to work on aircraft as a technician and to supervise the work of others on such craft.

Program Costs: In addition to the normal student expenses, minimal lab expenses may be incurred.

Recommended High School Preparation: English, mathematics, electronics, science, computers, and industrial shop.

Catalog Date: June 1, 2020
Certificate Requirements

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Total Units: 50

Enrollment Eligibility

To be eligible for enrollment in the program, the student must meet the following criteria:

- Transfers from another Federal Aviation Administration Part 147 approved airframe and powerplant school must provide an official transcript and catalog for evaluation by the department.

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- demonstrate the knowledge and skills to qualify for the General and Airframe portion of the Federal Aviation Administration Airframe Exam to include the written, oral and practical tests.
- demonstrate the knowledge and skills to inspect, maintain, repair, and modify airframe structures.

Career Information

The department of Advanced Transportation Technology currently offers courses and/or certificate programs in Aeronautics, Flight Technology, and Non-Destructive Testing. This department focuses on new and emerging transportation related courses, as well as traditional training, which may lead directly to employment in local, state, and nationally recognized fields. Airframe Technicians are employed by major/regional airlines, certificated repair stations, fixed based operators, charter services, flight schools, corporate flight departments, agricultural aircraft operators, and helicopter operations, as well as government agencies and the military. Many experienced technicians opt to operate their own aviation businesses.

Combined Airframe and Powerplant Certificate

Sacramento City College maintains a Federal Aviation Administration-approved two-year program organized to train students as airframe and powerplant maintenance technicians. The program is designed to meet the needs of students who desire technical training to qualify for the Federal Aviation tests.

The Aeronautics program is governed by regulations established by the Federal Aviation Administration. This Federal Aviation Administration (FAA) approved program fulfills all the requirements under CFR 14, Federal Aviation Regulation part 147. Completion of this program will allow the graduate to test for the FAA Airframe & Powerplant Mechanic Certificate.

Program Costs: In addition to the normal student expenses, minimal lab expenses may be incurred.

Recommended High School Preparation: English, mathematics, electronics, science, computers, and industrial shop.

Catalog Date: June 1, 2020

Certificate Requirements

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Enrollment Eligibility

To be eligible for enrollment in the program, the student must meet the following criteria:

- Transfers from another Federal Aviation Administration Part 147 approved airframe and powerplant school must provide an official transcript and catalog for evaluation by the department.

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- demonstrate the knowledge and skills to qualify for the General, Airframe and Powerplant portion of the Federal Aviation Administration Airframe and Powerplant mechanics exam to include the written, oral, and practical tests.
- demonstrate the knowledge and skills to inspect, maintain, repair, and modify airframe structures.
- demonstrate the knowledge and skills to inspect, maintain, repair, and modify reciprocating and turbine engines.

Career Information

The department of Advanced Transportation Technology currently offers courses and/or certificate programs in Aeronautics, Flight Technology, and Non-Destructive Testing. This department focuses on new and emerging transportation related courses, as well as traditional training, which may lead directly to employment in local, state, and nationally recognized fields. Airframe and Powerplant Technicians are employed by major/regional airlines, certificated repair stations, fixed based operators, charter services, flight schools, corporate flight departments, agricultural aircraft operators, and helicopter operations, as well as government agencies and the military. Many experienced technicians opt to operate their own aviation businesses.

Powerplant Certificate

Sacramento City College maintains a Federal Aviation Administration-approved two-year certificate and degree program organized to train students as airframe and powerplant maintenance technicians. The program is designed to meet the needs of students who desire technical training to qualify for the Federal Aviation tests.

The Aeronautics program is governed by regulations established by the Federal Aviation Administration. This Federal Aviation Administration (FAA) approved program fulfills all of the requirements under CFR 14, Federal Aviation Regulation part 147. Completion of this program will allow the graduate to test for the FAA Powerplant Mechanic Certificate.

Upon passing the appropriate Federal examinations, the graduate is certificated to work on aircraft as a technician and to supervise the work of others on such craft.

Program Costs: In addition to normal student expenses, a minimal lab expense may be incurred.

Recommended High School Preparation: English, mathematics, electronics, science, computers, and industrial shop.

Catalog Date: June 1, 2020

Certificate Requirements

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Enrollment Eligibility

To be eligible for enrollment in the program, the student must meet the following criteria:

- Transfers from another Federal Aviation Administration Part 147 approved airframe and powerplant school must provide an official transcript and catalog for evaluation by the department.

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- demonstrate the knowledge and skills to qualify for the General and Powerplant portion of the Federal Aviation Administration Powerplant Mechanics exam to include the written, oral, and practical tests.
- demonstrate the knowledge to inspect, maintain, repair, and modify reciprocating and turbine engines.
Aeronautics (AERO) Courses

AERO 200 Certificated Aircraft Mechanic Preparation

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<td>June 1, 2020</td>
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This is a self-paced course in aeronautics tailored to individual student needs in cooperation with the Federal Aviation Administration (FAA). This course meets, in part, the certification requirements of Part 147 of the Federal Aviation Regulations covering Airframe and Powerplant Mechanics. The amount of credit awarded is based on the total number of hours completed (18 hours=1 unit). Credit is earned in one-unit increments over the four semesters. This course will prepare the student for oral, practical, and written portions of the general, powerplant, and airframe sections of the Federal Aviation Administration test.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- calculate and measure capacitance and inductance, calculate and measure electrical power, determine relationship of Ohms law to volts, amps, and ohms, and inspect batteries.
- interpolate graphs and charts, decipher blueprint information, and interpret technical drawings.
- calculate aircraft weight and balance, determine positions within the envelope, and adjust weight and balance for equipment installation.
- identify and select appropriate non-destructive test methods, to include ultrasonic, eddy current, and magnetic particle inspection criteria.
- identify, inspect, and select appropriate hardware and materials, and perform precision measurements.
- write descriptions of work performed including discrepancies and corrective actions required.
- demonstrate ability to analyze specifications data sheets and air worthiness directives.
- inspect, check, and determine service for turbine engine installation.
- troubleshoot electronic engine fuel control utilizing schematic diagrams.
- calculate carburetor air intake and induction manifold temperature and pressure.
- troubleshoot an engine thrust reverser system utilizing maintenance manual schematics.
- identify and inspect wood structure defects. Select and test fiberglass covering materials for use in high use area.
- select special fasteners for metallic, bonded, and composite structures.
- analyze conventional rivet layout for strength requirements.
- design oxyacetylene, aluminum, magnesium, and titanium repair plan concerning a welded structural member.
- calculate alignment of primary control movement limits.
- select proper maintenance and repair manual for both rotary wing and fixed wing aircraft.
- identify and select proper hydraulic fluids for various hydraulic system components.
- interpolate and deduce proper manufacturer specifications for electrical wiring, connectors, and protective devices.
- determine proper repair procedure for FAA approval, manufacture compliance, and practicality of construction.
- complete required maintenance forms.

AERO 300 General Airframe and Powerplant

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<td>General Education:</td>
<td>AA/AS Area II(b)</td>
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<tr>
<td>Catalog Date:</td>
<td>June 1, 2020</td>
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This course provides an introduction to sheet metal fabrication, aircraft drawings, fluid lines and fittings, materials and processes (including aircraft hardware identification, gas welding and precision measurement), and aviation math and physics, including theory of flight for fixed wing and rotary wing aircraft. Minimum attendance is mandated by the Federal Aviation Administration.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- demonstrate the necessary knowledge to take the exams required by the Federal Aviation Administration (FAA) regulation requirements of Part 147 for the oral, practical, and written examinations.
- evaluate industry standards and aviation safety practices.
- analyze oxyacetylene, Metal Inert Gas (MIG), and Tungston Inert Gas (TIG) welds, to meet Federal Aviation Administration (FAA) standards.
- select and name appropriate hand tools and precision measuring equipment.
- match and select appropriate aircraft hardware for a specific purpose.
- apply appropriate non-destructive testing methods for various applications.
• analyze aircraft drawings.
• select appropriate fluid lines, hoses, and fittings.
• verify appropriate cleaning and corrosion control chemicals, media, and methods.
• compute and measure various structures utilizing specific formulas.
• define numerous principles of physics as related to aircraft structures.
• describe theory of flight for both fixed wing and rotary wing aircraft.

AERO 301 General Airframe and Powerplant Applications

Units: 3
Hours: 180 hours LAB
Prerequisite: AERO 309 with a grade of "C" or better; Concurrent enrollment in AERO 300 or completion of AERO 300 with a grade of "C" or better.
Transferable: CSU
Catalog Date: June 1, 2020

This course provides skills projects related to AERO 300 as required by the Federal Aviation Administration. Topics will include sheet metal repair, welding, and hardware identification. Minimum attendance is mandated by the Federal Aviation Administration.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

• demonstrate the knowledge necessary to take the required exams for the Federal Aviation Administration regulation requirements of Part 147 oral, practical, and written examinations.
• evaluate industry standards and aviation safety practices.
• analyze oxyacetylene, Metal Inert Gas "MIG", and Tungsten Inert Gas "TIG" welds, in order to meet industry FAA standards.
• select and name appropriate hand-tools and precision measuring equipment.
• match and select appropriate aircraft hardware for a specific purpose.
• apply appropriate non-destructive testing method for various applications.
• analyze aircraft drawings.
• select appropriate fluid lines, hoses, and fittings.
• verify appropriate cleaning and corrosion control chemicals, media, and methods.
• compute and measure various structures utilizing specific formulas.
• define numerous principles of physics as related to aircraft structures.
• describe theory of flight for both fixed wing and rotary wing aircraft.

AERO 302 Basic Electricity and Electrical Systems

Units: 5
Hours: 90 hours LEC
Prerequisite: AERO 309 with a grade of "C" or better
Advisory: Concurrent enrollment in AERO 303
Transferable: CSU
Catalog Date: June 1, 2020

This course provides electrical theory for airframe and powerplant electrical systems (circuits and schematics, ignition and electrical generating systems, instruments, batteries, and AC and DC circuit system components). Minimum attendance is mandated by the Federal Aviation Administration.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

• demonstrate the knowledge to take the exams for the Federal Aviation Administration regulation requirements of Part 147 for the oral, practical, and written examinations.
• analyze basic AC and DC electrical theory.
• measure capacitance and inductance in an electrical circuit.
• calculate and measure electrical power.
• measure and calculate voltage, resistance, continuity, and leakage in an electrical system.
• analyze, compare, and contrast various electrical systems used in aircraft.
• demonstrate the relationship of voltage, current, and resistance in series, parallel, and series-parallel electrical circuits utilized in aircraft.
• read, analyze, and interpret electrical circuit diagrams in complex and basic systems.
• define and label electrical circuit components.
• diagnose batteries for electrical malfunctions.
• design basic electrical circuitry for designated aircraft system.

AERO 303 Basic Electricity, Airframe and Powerplant Electrical Systems Applications

Units: 3
Hours: 180 hours LAB
Prerequisite: AERO 309 with a grade of "C" or better; Concurrent enrollment in AERO 302 or completion of AERO 302 with a grade of "C" or better.
Transferable: CSU
Catalog Date: June 1, 2020
This course provides development projects related to AERO 302 lectures as required by the Federal Aviation Administration to develop skills necessary for an Airframe and Powerplant Technician. Units of instruction include repair and maintenance techniques of airframe and powerplant electrical systems and cover ignition as well as electrical generating systems, instruments, batteries, and AC and DC circuits. Minimum attendance is mandated by the Federal Aviation Administration.

**Student Learning Outcomes**

Upon completion of this course, the student will be able to:

- demonstrate the knowledge to take the exams for the Federal Aviation Administration regulation requirements of Part 147 for the oral, practical, and written examinations.
- measure capacitance, inductance, power, voltage, current, and resistance in aircraft electrical systems.
- calculate capacitance, inductance, power, voltage, current, and resistance in aircraft electrical systems.
- manage and service lead-acid and Ni-CAD batteries.
- analyze electromagnetic and mutual induction electrical systems.
- define magneto theory and fundamentals of operation as related to magneto service and overhaul.
- explain operation and theory of generators, DC motors, starters, and regulators.
- explain operation and theory of alternators, AC motors, magnetic brakes and clutches.
- analyze the theory and operation of inverters and converters as used in aircraft electrical systems.
- analyze basic and complex Airframe and Powerplant electrical systems for both multi-engine and single-engine aircraft.
- design a basic electrical system for a designated aircraft system.

**AERO 309 Introduction to Aircraft Mechanics**

<table>
<thead>
<tr>
<th>Units:</th>
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<tr>
<td>Hours:</td>
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<tr>
<td>Prerequisite:</td>
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<tr>
<td>Transferable:</td>
<td>CSU</td>
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<tr>
<td>Catalog Date:</td>
<td>June 1, 2020</td>
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This introductory course covers the fundamental theories and practices required of a Federal Aviation Administration certificated Airframe and Powerplant Mechanic.

**Student Learning Outcomes**

Upon completion of this course, the student will be able to:

- determine proper use and nomenclature of basic hand tools utilized in aircraft maintenance.
- calculate required data utilizing basic mechanical and electrical industry formulas.
- utilize appropriate Federal Aviation Administration approved data to determine proper methods of repair.
- manipulate industry approved precision measuring devices.

**AERO 310 Powerplant Theory and Maintenance**

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<thead>
<tr>
<th>Units:</th>
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<tbody>
<tr>
<td>Hours:</td>
<td>90 hours LEC</td>
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<tr>
<td>Prerequisite:</td>
<td>AERO 309 with a grade of &quot;C&quot; or better</td>
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<tr>
<td>Advisory:</td>
<td>Concurrent enrollment in AERO 311</td>
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<tr>
<td>Transferable:</td>
<td>CSU</td>
</tr>
<tr>
<td>Catalog Date:</td>
<td>June 1, 2020</td>
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This course provides instruction in reciprocating and gas turbine engine theory, overhaul, inspection, testing, and operation. Minimum attendance is mandated by the Federal Aviation Administration.

**Student Learning Outcomes**

Upon completion of this course, the student will be able to:

- demonstrate the knowledge to take the exams for the Federal Aviation Administration regulation requirements of Part 147 for the oral, practical, and written examinations.
- demonstrate understanding of turbine engine theory.
- identify proper nomenclature for the seven sections of the turbine engine.
- describe the various classifications of turbine engines along with their specialized usage.
- demonstrate understanding of the various accessories required to operate any turbine engine.
- distinguish between correct overhaul procedures for designated turbine engines.
- select appropriate inspection procedures for each section of the turbine engine.
- demonstrate understanding of reciprocating engine theory.
- identify proper nomenclature for each section of the reciprocating engine.
- describe the various classifications of reciprocating engines along with their specialized usage.
- demonstrate understanding of the various accessories required to operate any reciprocating engine.
- distinguish between correct overhaul procedures for designated reciprocating engines.
- select appropriate inspection procedures for each section of the reciprocating engine.
- select appropriate operation, overhaul, and repair data for reciprocating and turbine engines.

**AERO 311 Powerplant Theory and Maintenance Applications**
This course covers projects related to the AERO 310 lectures as required by the Federal Aviation Administration. These include familiarization and operation of equipment required when overhauling and testing gas turbine and reciprocating powerplants, operation and familiarization of gas turbine powerplant accessories, fire detection/protection systems, and operation of gas turbine powerplants in the test cell environment. Minimum attendance is mandated by the Federal Aviation Administration.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- demonstrate the knowledge to take the exams for the Federal Aviation Administration regulation requirements of Part 147 for the oral, practical, and written examinations.
- assemble reciprocating engine for parts identification, cleaning, and inspection.
- assemble turbine engine for parts, identification, cleaning, and inspection.
- research turbine engine utilizing overhaul manual, airworthiness directives, and type certificates.
- research reciprocating engine utilizing overhaul manual, airworthiness directives, and type certificates.
- operate turbine engine in accordance with operators handbook.
- operate reciprocating engine in accordance with operators handbook.
- diagnose malfunctions in fire detection and protection systems.

AERO 312 Powerplant Systems and Components

This course provides instruction in the theory of reciprocating and gas turbine engines and related accessories including cooling, ignition, propellers, governors, and fuel metering. Minimum attendance is mandated by the Federal Aviation Administration.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- analyze ignition systems to include magneto, shower of sparks, boosted, vibrating, Full Authority Digital Engine Control (FADEC), and glow plug.
- analyze fuel metering systems to include float carburetors, pressure carburetors, fuel injection systems, and Full Authority Digital Engine Control (FADEC).
- analyze propeller systems to include governors, constant speed, controllable pitch, and fixed pitch as well as metal, wood, and composite construction.
- analyze induction systems to include naturally aspirated, turbo charged, and super charged.
- analyze engine starting systems to include electric and pneumatic.
- demonstrate an understanding of performance data due to variables of pressure, temperature, and humidity.

AERO 313 Powerplant Systems and Components Applications

This course provides skills development projects related to AERO 312 as required by the Federal Aviation Administration. Units of instruction include familiarization with and operation of test equipment required in overhauling reciprocating and turbine powerplant components and engine test cell operations. Minimum attendance is mandated by the Federal Aviation Administration.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- inspect and overhaul ignition system components to include magneto, shower of sparks, vibrator, glow plug, boosters, and FADEC systems.
- inspect and overhaul propeller systems to include governors, constant speed, controllable, and fixed pitch.
- inspect and overhaul induction systems to include naturally aspirated, turbo-charged, and supercharged.
- calculate engine performance data utilizing assigned charts and graphs.
- analyze and install engine starting systems to include electric and pneumatic.
- verify predicted engine performance in engine test cell.

AERO 320 Airframe Systems and Components

This course covers projects related to the AERO 310 lectures as required by the Federal Aviation Administration. These include familiarization and operation of equipment required when overhauling and testing gas turbine and reciprocating powerplants, operation and familiarization of gas turbine powerplant accessories, fire detection/protection systems, and operation of gas turbine powerplants in the test cell environment. Minimum attendance is mandated by the Federal Aviation Administration.
This course provides instruction in the following aircraft airframe systems: fuel, hydraulic, pneumatic, position and warning, air conditioning, heating, oxygen, pressurization, ice and rain control, and fire protection and detection. Minimum attendance is mandated by the Federal Aviation Administration.

### Student Learning Outcomes

Upon completion of this course, the student will be able to:

- demonstrate the knowledge to take the exams for the Federal Aviation Administration regulation requirements of Part 147 for the oral, practical, and written examinations.
- demonstrate understanding of theory, nomenclature, and operation of fuel systems to include gravity flow, pressurized, multi-tank, and large aircraft systems.
- demonstrate understanding of hydraulics; to include emergency, retractable landing gear, actuator driven, closed, open, flight controls, and large aircraft systems.
- demonstrate understanding of pneumatics; to include emergency, landing gear, actuator driven, and large aircraft systems.
- demonstrate understanding of oxygen to include emergency, portable, chemical, and permanently installed systems.
- demonstrate understanding of fire protection and detection warning and extinguishing systems to include portable, Fenwall, Kidde, continuous loop, photo electric, carbon monoxide, Halon, carbon tetrachloride, and HRD systems.
- demonstrate understanding of heating to include combustion heater, electrical, and bleed air systems.
- demonstrate understanding of ice and rain control to include mechanical, chemical, electrical, and bleed air systems.
- demonstrate understanding of air conditioning; to include freon, vapor cycle, and air cycle bleed air systems.
- demonstrate understanding of position and warning indicators to include landing gear, trim, spoilers, doors, and high lift devices.
- demonstrate understanding of pressurization to include cabin atmosphere control systems, out flow valves, negative pressure relief valves, controllers, and turbo charger systems.

### AERO 321 Airframe Structures

| Units: | 5 |
| Hours: | 90 hours LEC |
| Prerequisite: | AERO 309 with a grade of "C" or better |
| Corequisite: | Concurrent enrollment in AERO 323 |
| Transferable: | CSU |
| Catalog Date: | June 1, 2020 |

This course provides instruction in aircraft sheet metal, fabric, dope, and paint processes, plastic, wood, fiberglass, honeycomb, composites, and laminated structures, assembly and rigging, and landing gear systems. Minimum attendance is mandated by the Federal Aviation Administration.

### Student Learning Outcomes

Upon completion of this course, the student will be able to:

- demonstrate the knowledge to take the exams for the Federal Aviation Administration regulation requirements of Part 147 for the oral, practical, and written examinations.
- demonstrate understanding of aircraft sheet metal; to include metal shearing, rolling and bending, rivet sizing, and layout.
- demonstrate understanding of dope and fabric; to include basic covering techniques and minor repair.
- demonstrate understanding of paint processes; to include primers, top coats, striping and numbering, and minor repair.
- demonstrate understanding of landing gear systems; to include fundamental structure, alignment, and tracking.
- demonstrate understanding of assembly and rigging; to include both aircraft and helicopters.
- demonstrate understanding of non-metallic structures; to include plastic, wood, fiberglass, honeycomb, composites, and laminated structures.

### AERO 322 Airframe Systems and Components Applications

| Units: | 3 |
| Hours: | 180 hours LAB |
| Prerequisite: | AERO 309 with a grade of "C" or better |
| Corequisite: | Concurrent enrollment in AERO 320 |
| Transferable: | CSU |
| Catalog Date: | June 1, 2020 |

This course provides skill development projects as required by the Federal Aviation Administration. The projects are related to the subject areas covered in AERO 320 and include familiarization, operation, overhaul, testing, and diagnosis of the components and systems. Minimum attendance is mandated by the Federal Aviation Administration.

### Student Learning Outcomes

Upon completion of this course, the student will be able to:

- demonstrate the knowledge to take the exams for the Federal Aviation Administration regulation requirements of Part 147 for the oral, practical, and written examinations.
- demonstrate fuel system overhaul procedures on assigned components; to include gravity flow, pressurized, multi-tank, and large aircraft assigned system.
- demonstrate hydraulic system overhaul procedures on basic hydraulic systems, retraction systems, and actuators.
- demonstrate pneumatic system overhaul procedures on basic pneumatic systems, retraction systems, and actuators.
- demonstrate oxygen system overhaul procedures on portable and permanently installed systems; to include regulators, storage bottles, valves, and supply lines.
- demonstrate fire protection and detection system overhaul procedures; to include Finnwall, Kidde, and Halon systems.
- demonstrate heating system overhaul procedures; to include combustion heater, electrical, and bleed air systems.
- demonstrate ice and rain overhaul procedures; to include mechanical, electrical, and bleed air systems.
- demonstrate air conditioning overhaul procedures; to include vapor cycle, and air cycle bleed air systems.
- demonstrate position and warning indicator overhaul procedures; to include landing gear, trim, spoilers, doors, and high lift devices.
- demonstrate pressurization systems overhaul procedures; to include cabin atmosphere control systems, out flow valves, negative pressure relief valves, controllers, and turbo charger systems.
AERO 323 Airframe Structures and Systems Applications

This course provides projects related to the AERO 321 lectures as required by the Federal Aviation Administration to develop skills in inspecting, checking, diagnosing, servicing, and repairing the components and systems. Minimum attendance is mandated by the Federal Aviation Administration.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- demonstrate the knowledge to take the exams for the Federal Aviation Administration regulation requirements of Part 147 for the oral, practical, and written examinations.
- calculate and build sheet metal projects to include shearing, rolling, bending, and riveting.
- formulate and cover basic dope and fabric project to include making minor repairs.
- assess correct painting process and paint surface utilizing primer, top coat, and striping.
- assemble and rig landing gear assemblies to include alignment and tracking.
- demonstrate proper assembly and rigging procedures for aircraft and helicopters.
- demonstrate proper repair technique for non-metallic structures to include plastic, wood, fiberglass, honeycomb, composites, and laminated structures.

AERO 330 Advanced Airframe and Powerplant Inspection

This course provides the theory of the following: Advanced Airframe and Powerplant mechanic privileges and limitations, aircraft and engine electrical systems, communication systems, engine electrical systems, navigation and autopilot systems, fluid lines, fittings, maintenance forms and records, maintenance publications, as well as weight and balance calculations. Minimum attendance is mandated by the Federal Aviation Administration.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- demonstrate the knowledge to take the exams for the Federal Aviation Administration regulation requirements of Part 147 for the oral, practical, and written examinations.
- manufacture and inspect aircraft fuel, pneumatic, and hydraulic hose assemblies.
- diagnose and inspect advanced powerplant electrical and instrument systems to include basic engine cores, as well as fuel, lubrication, cooling, pneumatic, hydraulic, indicator, ignition, electrical, and exhaust.
- calculate required data for both airplane and helicopter weight and balance.
- prepare FAA required maintenance forms and records.
- specify and utilize appropriate maintenance publications.
- demonstrate an understanding of required mechanic privileges and limitations under Part 1, 43, 65, 91, 121, 135, and 145 of the Federal Aviation Regulations.

AERO 331 Advanced Structures and Systems Inspection

This course provides the theory of the following: Airframe system inspection, Powerplant system inspection, assembly and rigging processes, ground operation and servicing, cleaning and corrosion control, and aircraft instrument systems. Minimum attendance is mandated by the Federal Aviation Administration.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- demonstrate the knowledge to take the exams for the Federal Aviation Administration regulation requirements of Part 147 for the oral, practical, and written examinations.
- start, ground operate, move, service, secure aircraft, and identify typical ground operation hazards.
- determine adjustments and limits for adjustable and rigged flight control system assemblies.
- identify and select cleaning materials, chemical cleaners, and the effect of caustic cleaning products on aluminum structures.
- demonstrate understanding of airframe system conformity and airworthiness inspections. Know the primary purpose of aircraft system inspections. Determine requirements of airframe, airframe system and components inspections. Determine that an aircraft is in conformity with FAA specifications.
- demonstrate understanding of engine system conformity and airworthiness inspections. Know the primary purpose of aircraft system inspections. Determine requirements of engine, engine system and components inspections. Determine that an engine is in conformity with FAA specifications.
AERO 332 Advanced Airframe and Powerplant Inspection Applications

Units: 3
Hours: 180 hours LAB
Prerequisite: AERO 300, 301, 302, 303, 320, 321, 322, and 323 with grades of "C" or better.
Corequisite: Concurrent enrollment in AERO 330
Transferable: CSU
Catalog Date: June 1, 2020

This course provides development projects as required by the Federal Aviation Administration. The projects are in the same areas as the subject areas covered in the AERO 330 lectures and include familiarization with and operation of test equipment required for checking and testing the airframe and powerplant systems of airworthy aircraft. Minimum attendance is mandated by the Federal Aviation Administration.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- demonstrate the knowledge to take the exams for the Federal Aviation Administration regulation requirements of Part 147 for the oral, practical, and written examinations.
- manufacture and inspect aircraft fuel, pneumatic, and hydraulic hose assemblies.
- diagnose and inspect advanced powerplant electrical and instrument systems to include basic engine cores, as well as fuel, lubrication, cooling, pneumatic, hydraulic, indicator, ignition, electrical, and exhaust systems utilizing appropriate test equipment.
- calculate, after weighing aircraft, information required to obtain weight and balance data.
- prepare, in both hard copy and electronic versions, required aircraft maintenance forms and records, to include FAA form 337.
- utilize appropriate maintenance publications to include overhaul manuals, maintenance manuals, operation handbooks, and illustrated parts catalogs.
- demonstrate understanding of FAA Part 91, 121, 135, and 145 as applicable to assigned projects.

AERO 333 Advanced Structures and Systems Inspection Applications

Units: 3
Hours: 180 hours LAB
Prerequisite: AERO 300, 301, 302, 303, 310, 311, 312, and 313 with grades of "C" or better.
Corequisite: Concurrent enrollment in AERO 331
Transferable: CSU
Catalog Date: June 1, 2020

This course provides development projects as required by the Federal Aviation Administration. The projects are in the same areas as the subject areas covered in the AERO 331 lectures and include familiarization with and operation of test equipment required for checking and testing the airframe structures and powerplant systems of airworthy aircraft. Minimum attendance is mandated by the Federal Aviation Administration.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- demonstrate the knowledge necessary to take the Federal Aviation Administration regulation requirements of Part 147 for the oral, written, and practical examinations.
- start, ground operate, move, service, secure aircraft, and identify typical ground operation hazards.
- correctly perform adjustments and set limits for adjustable and rigged flight control system assemblies.
- identify, select, and use aircraft cleaning materials.
- correctly perform airframe system conformity and airworthiness inspections.
- correctly perform engine system conformity and airworthiness inspections. Determine requirements of engine, engine system and components inspections.
- correctly perform inspections, check, service, and troubleshoot aircraft instrument systems.
- know the primary purpose of aircraft system inspections.
- determine requirements of engine, engine system, and component inspections.
- determine requirements of airframe, airframe system, and component inspections.

AERO 494 Topics in Aeronautics, Aviation Maintenance

Units: 0.5 - 4
Hours: 9 - 72 hours LEC
Prerequisite: None.
Transferable: CSU
Catalog Date: June 1, 2020

This is a specialized course developed in conjunction with industry partners to address emerging industry training needs.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- examine current topics in aeronautics and aviation maintenance.
- develop skills and knowledge in the area of the title of the segment being offered.

AERO 495 Independent Studies in Aeronautics
This is an independent studies course in Aeronautics. Related projects will be assigned under the supervision of an Aeronautics faculty member and a selected industry partner from the local community.

**Student Learning Outcomes**

Upon completion of this course, the student will be able to:

- design and discuss a proposal of study with a supervising aeronautics instructor.
- demonstrate the ability to independently pursue a course of study or project in aeronautics.
- prepare a final report or project incorporating results of study or activities.

**AERO 499 Experimental Offering in Aeronautics**

This is a specialized course developed in cooperation with industry to address emerging training needs in flight technology. This course may be taken no more than three times for credit provided there is no duplication of topics.

**Nondestructive Testing (NDT) Courses**

**NDT 299 Experimental Offering in Nondestructive Testing**

This is a specialized course developed in cooperation with industry to address emerging training needs in flight technology. This course may be taken no more than three times for credit provided there is no duplication of topics.

**NDT 381 Magnetic Particle Inspection Level 1 and 2**

This Level I & II classroom training covers the basic principles of the magnetic particle nondestructive testing method that will allow students to identify defects in aerospace components using this application. This course covers the theoretical and practical aspects of this method and is designed to meet the training requirements of National Aerospace Standard (NAS) 410. This course provides both the initial training and the required recurrent training for NDT technicians.

**Student Learning Outcomes**

Upon completion of this course, the student will be able to:

- qualify for the classroom portion of required NAS/ASNT hours for Level I and II of the magnetic particle inspection certification as prescribed by NAS 410 and SNT-TC-1A.
- identify NDT methods and select the most appropriate method for a given material.
- describe the certification and qualification process of NDT technicians.
- explain magnetic particle principles and methods.
- explain magnetism and magnetic properties in ferrous materials.
- locate and identify discontinuities in ferrous materials using magnetic particle inspection techniques with both portable and fixed equipment.
- demonstrate proper cleaning procedures prior to NDT inspections.
- describe manufacturing techniques and probable discontinuities from various methods.

**NDT 382 Liquid Penetrant Inspection Level 1 and 2**

This Level I & II classroom training covers the basic principles of the liquid penetrant nondestructive testing method that will allow students to identify defects in aerospace components using this application. This course covers the theoretical and practical aspects of this method and is designed to meet the training requirements of National Aerospace Standard (NAS) 410.

**Student Learning Outcomes**

Upon completion of this course, the student will be able to:

- qualify for the classroom portion of required NAS/ASNT hours for Level I and II of the liquid penetrant inspection certification as prescribed by NAS 410 and SNT-TC-1A.
- identify NDT methods and select the most appropriate method for a given material.
describe the certification and qualification process of NDT technicians.

explain liquid penetrant inspection principles and methods.

explain liquid penetrant properties.

locate and identify discontinuities in materials using liquid penetrant inspection techniques with both portable and fixed equipment.

demonstrate proper cleaning procedures prior to NDT inspections.

describe manufacturing techniques and probable discontinuities from various methods.

NDT 383 Ultrasonic Inspection Level 1 and 2

This Level I and II classroom training covers the basic principles of the ultrasonic nondestructive testing method that will allow students to identify defects in aerospace components using this application. This course covers the theoretical and practical aspects of this method and is designed to meet the training requirements of National Aerospace Standard (NAS) 410. Students who have successfully completed this course more than 36 months ago may repeat it for recertification.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- qualify for the classroom portion of required NAS/ASNT hours for Level I of the Ultrasonic Inspection certification as prescribed by NAS 410 and SNT-TC-1A.
- identify NDT methods and select the most appropriate method for a given material.
- explain the certification and qualification process of NDT technicians.
- describe ultrasonic testing inspection principles and methods.
- describe ultrasonic properties in various metals.
- locate and identify discontinuities in materials using ultrasonic inspection techniques.
- demonstrate proper cleaning procedures prior to NDT inspections.
- explain manufacturing techniques and probable discontinuities from various methods.

NDT 384 Electromagnetic Inspection Level 1 and 2

This Level I and II classroom training covers the basic principles of the electromagnetic nondestructive testing method that will allow students to identify defects in aerospace components using this application. This course covers the theoretical and practical aspects of this method and is designed to meet the training requirements of National Aerospace Standard (NAS) 410. This course provides both the initial training and the required recurrent training for NDT technicians.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- qualify for the classroom portion of required NAS/ASNT hours for Level I and II of the electromagnetic inspection certification as prescribed by NAS 410 and SNT-TC-1A.
- identify NDT methods and select the most appropriate method for a given material.
- explain the certification and qualification process of NDT technicians.
- describe electromagnet testing inspection principles and methods.
- describe electromagnetic properties in materials.
- locate and identify discontinuities in materials using electromagnetic inspection techniques.
- demonstrate proper cleaning procedures prior to NDT inspections.
- explain manufacturing techniques and probable discontinuities from various methods.

NDT 499 Experimental Offering in Nondestructive Testing

Phillip B. Cypret

Kevin Goehring

Lawrence Johnson
Business and Industry

This program is part of the Business and Industry meta major.