# Airframe and Powerplant (AFPM)

**Community and Technical College**
Airframe and Powerplant Program (https://www.ctc.uaf.edu/programs/aviation-maintenance/)
907-455-2800

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
<th>Offered</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFPM F111</td>
<td>General Airframe and Powerplant</td>
<td>3</td>
<td>As Demand Warrants</td>
<td>Shop practices, basic math, applied physics, FAA regulations, basic electricity, aircraft weight and balance, ground operations and servicing, cleaning and corrosion control, and materials and process. Preparation for the FAA Mechanics Airframe Structures Written, Oral and Practical Exam.</td>
</tr>
<tr>
<td>AFPM F145</td>
<td>Basic Mathematics</td>
<td>1</td>
<td>Fall</td>
<td>Review of applied and technical mathematics related to the construction and engines of aircrafts. Common, decimal, fractions and mixed numbers; extracting square roots and raising numbers to a given power; solving ratios, proportions and percentage problems; fundamental algebraic operations.</td>
</tr>
<tr>
<td>AFPM F146</td>
<td>Basic Electricity</td>
<td>2</td>
<td>Fall</td>
<td>Electrical theory and concepts for the aviation mechanic. Ohm's law, electrical circuits, diagrams, batteries and a variety of electrical components.</td>
</tr>
<tr>
<td>AFPM F147</td>
<td>Physics for Mechanics</td>
<td>0.5</td>
<td>As Demand Warrants</td>
<td>Applications of mechanics; levers, sound, fluid and heat dynamics. Basic aircraft structures and aerodynamics. (Course does not fulfill natural science requirements for any degree.)</td>
</tr>
<tr>
<td>AFPM F148</td>
<td>Aircraft Drawing</td>
<td>1</td>
<td>Fall</td>
<td>Basic drafting. Drawings, symbols and schematic diagrams, sketches of repairs and alterations, blueprint information, graphs and charts.</td>
</tr>
<tr>
<td>AFPM F149</td>
<td>Fluid Lines and Fittings</td>
<td>0.5</td>
<td>Fall</td>
<td>Rigid and flexible fluid lines and fittings, fabrication and installation.</td>
</tr>
<tr>
<td>AFPM F205</td>
<td>Materials and Processes</td>
<td>2</td>
<td>Fall</td>
<td>Basic shop practices, including selection, identification and installation of aircraft hardware and materials, precision measuring tools and operations, basic heat treating processes, forms of nondestructive inspections.</td>
</tr>
<tr>
<td>AFPM F206</td>
<td>Airframe System and Components</td>
<td>2</td>
<td>As Demand Warrants</td>
<td>Aircraft electrical, hydraulic and pneumatic systems. Landing gear, instruments, fuel, communication and navigation, cabin atmosphere control, and fire protection systems. Inspection, checking, troubleshooting, repair and servicing. Preparation for the FAA Mechanics Airframe Structures written, oral and practical exam.</td>
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**AFPM F111**  General Airframe and Powerplant
3 Credits
Offered As Demand Warrants
Shop practices, basic math, applied physics, FAA regulations, basic electricity, aircraft weight and balance, ground operations and servicing, cleaning and corrosion control, and materials and process. Preparation for the FAA Mechanics Airframe Structures Written, Oral and Practical Exam.
Prerequisites: Experience requirements of FAR 65.77.
Lecture + Lab + Other: 3 + 0 + 0

**AFPM F145**  Basic Mathematics
1 Credit
Offered Fall
Review of applied and technical mathematics related to the construction and engines of aircrafts. Common, decimal, fractions and mixed numbers; extracting square roots and raising numbers to a given power; solving ratios, proportions and percentage problems; fundamental algebraic operations.
Prerequisites: Admission to A & P program.
Lecture + Lab + Other: 1 + 0 + 0

**AFPM F146**  Basic Electricity
2 Credits
Offered Fall
Electrical theory and concepts for the aviation mechanic. Ohm's law, electrical circuits, diagrams, batteries and a variety of electrical components.
Prerequisites: Admission to A & P Program.
Lecture + Lab + Other: 2 + 0 + 0

**AFPM F147**  Physics for Mechanics
0.5 Credit
Offered Fall
Applications of mechanics; levers, sound, fluid and heat dynamics. Basic aircraft structures and aerodynamics. (Course does not fulfill natural science requirements for any degree.)
Prerequisites: Admission to A & P Program.
Lecture + Lab + Other: 0.5 + 0 + 0

**AFPM F148**  Aircraft Drawing
1 Credit
Offered Fall
Basic drafting. Drawings, symbols and schematic diagrams, sketches of repairs and alterations, blueprint information, graphs and charts.
Prerequisites: Admission to A & P Program.
Lecture + Lab + Other: 1 + 0 + 0

**AFPM F149**  Fluid Lines and Fittings
0.5 Credit
Offered Fall
Rigid and flexible fluid lines and fittings, fabrication and installation.
Prerequisites: Admission to A & P Program.
Lecture + Lab + Other: 0.5 + 0 + 0

**AFPM F205**  Materials and Processes
2 Credits
Offered Fall
Basic shop practices, including selection, identification and installation of aircraft hardware and materials, precision measuring tools and operations, basic heat treating processes, forms of nondestructive inspections.
Prerequisites: Admission to A & P Program.
Lecture + Lab + Other: 2 + 0 + 0

**AFPM F206**  Airframe System and Components
2 Credits
Offered As Demand Warrants
Aircraft electrical, hydraulic and pneumatic systems. Landing gear, instruments, fuel, communication and navigation, cabin atmosphere control, and fire protection systems. Inspection, checking, troubleshooting, repair and servicing. Preparation for the FAA Mechanics Airframe Structures written, oral and practical exam.
Prerequisites: Experience requirements of FAR 65.77.
Lecture + Lab + Other: 2 + 0 + 0
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<tr>
<td>AFPM F215</td>
<td>MOS Powerplant Theory/Maintenance</td>
<td>2</td>
<td></td>
<td>Jet engine fundamentals, analysis and testing. Inspecting turbo jets, turbo shaft and turbo fan engines. Overhaul, inspection and fundamentals of reciprocating engines. Preparation for the FAA Mechanics Airframe Structures written, oral and practical exam.</td>
<td>2 + 0 + 0</td>
</tr>
<tr>
<td>AFPM F216</td>
<td>MOS Powerplant System/Components</td>
<td>3</td>
<td></td>
<td>Fuel metering, induction systems, propellers, control systems and powerplant electricity. Repair, inspection, service and troubleshooting. Preparation for the FAA Mechanics Airframe Structures written, oral and practical exam.</td>
<td>3 + 0 + 0</td>
</tr>
<tr>
<td>AFPM F230</td>
<td>Aircraft Electrical Systems</td>
<td>2.5</td>
<td>Spring</td>
<td>Wiring, control, indication and protection devices for AC and DC systems. Inspection, troubleshooting service and repair of these systems.</td>
<td>2.5 + 0 + 0</td>
</tr>
<tr>
<td>AFPM F231</td>
<td>Powerplant Electrical Systems</td>
<td>1.5</td>
<td>Fall</td>
<td>Installation, inspection, testing, servicing engine electrical system wiring, controls, indicators and protective devices. Repair and service of electrical generating systems.</td>
<td>1.5 + 0 + 0</td>
</tr>
<tr>
<td>AFPM F235</td>
<td>Aircraft Reciprocating Engines</td>
<td>4.5</td>
<td>Spring</td>
<td>History and development of the aircraft reciprocating engine. Repair, overhaul and inspection of various types of engines. Operation and troubleshooting of engines.</td>
<td>4.5 + 0 + 0</td>
</tr>
<tr>
<td>AFPM F240</td>
<td>Turbine Engines</td>
<td>2</td>
<td>Summer</td>
<td>Development, theory and operation of turbine engines. Engine design, performance, accessories and subsystems. Engine maintenance and overhaul.</td>
<td>2 + 0 + 0</td>
</tr>
<tr>
<td>AFPM F244</td>
<td>Lubricating Systems</td>
<td>1.5</td>
<td>Spring</td>
<td>Identification and selection of lubricants for aircraft powerplants. Inspection, service, troubleshooting and repair of the lubrication systems and components.</td>
<td>1.5 + 0 + 0</td>
</tr>
<tr>
<td>AFPM F245</td>
<td>Ignition Systems</td>
<td>2</td>
<td></td>
<td>Overhaul, inspection and troubleshooting of reciprocating and gas turbine ignition systems. Repair and bench testing of components.</td>
<td>2 + 0 + 0</td>
</tr>
<tr>
<td>AFPM F246</td>
<td>Fuel Metering Systems</td>
<td>2</td>
<td>Spring</td>
<td>Fundamental operation of fuel metering systems in aircraft powerplants. Technical data to repair and overhaul carburetors and components. Inspecting, troubleshooting and adjusting turbine engine fuel metering systems and electronic fuel controls.</td>
<td>2 + 0 + 0</td>
</tr>
<tr>
<td>AFPM F248</td>
<td>Induction Systems</td>
<td>0.5</td>
<td>Spring</td>
<td>Operation and service of aircraft induction, preheat, anti-ice and supercharger systems.</td>
<td>0.5 + 0 + 0</td>
</tr>
<tr>
<td>AFPM F249</td>
<td>Powerplant Cooling Systems</td>
<td>0.5</td>
<td></td>
<td>Inspection, service and repair of engine cooling systems – both air and liquid cooled installations.</td>
<td>0.5 + 0 + 0</td>
</tr>
<tr>
<td>AFPM F250</td>
<td>Powerplant Exhaust Systems</td>
<td>0.5</td>
<td></td>
<td>Inspection, service and repair of engine exhaust systems. Includes operations of turbo compounded engines, thrust reversers and noise suppressors.</td>
<td>0.5 + 0 + 0</td>
</tr>
<tr>
<td>AFPM F251</td>
<td>Fuel Systems</td>
<td>1.5</td>
<td></td>
<td>Inspection, servicing, troubleshooting and repair of aircraft and engine fuel systems and components.</td>
<td>1.5 + 0 + 0</td>
</tr>
<tr>
<td>AFPM F252</td>
<td>Propellers</td>
<td>2</td>
<td>Spring</td>
<td>Identification and nomenclature of aircraft propellers. Operation, control and repair of both reciprocating and turbine engine installations.</td>
<td>2 + 0 + 0</td>
</tr>
<tr>
<td>AFPM F253</td>
<td>Transport Category Aircraft</td>
<td>1</td>
<td>Spring</td>
<td>Introduction to transport category aircraft systems and components.</td>
<td>1 + 0 + 0</td>
</tr>
</tbody>
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AFPM F254  Ice and Rain Control Systems
0.5 Credit
Offered Spring
Inspection, operation and troubleshooting of de-ice and anti-ice systems.
Prerequisites: Admission to A&P program.
Lecture + Lab + Other: 0.5 + 0 + 0

AFPM F255  Fire Protection Systems
0.5 Credit
Offered Fall
Inspection, servicing, troubleshooting and repair of aircraft and engine fire detection and extinguishing systems.
Prerequisites: Admission to A & P Program.
Lecture + Lab + Other: 0.5 + 0 + 0

AFPM F256  Communications and Navigation Systems
0.5 Credit
Offered Spring
Operation of aircraft avionics, autopilots and antennas, including inspection and installation.
Prerequisites: Admission to A&P program.
Lecture + Lab + Other: 0.5 + 0 + 0

AFPM F257  Instrument Systems
0.5 Credit
Offered Fall
Inspection, troubleshooting, removal and replacement of aircraft and engine instruments and indicating systems.
Prerequisites: Admission to A & P Program.
Lecture + Lab + Other: 0.5 + 0 + 0

AFPM F258  Cabin Atmosphere Control Systems
1 Credit
Offered Spring
Aircraft pressurization, air conditioning, heating and oxygen systems. Operation, inspection, troubleshooting, service and repair.
Prerequisites: Admission to A&P program.
Lecture + Lab + Other: 1 + 0 + 0

AFPM F259  Hydraulic and Pneumatic Systems
1.5 Credits
Offered Spring
Operation of hydraulic and pneumatic systems and uses in aircraft. Identification of hydraulic fluids, seals, hydraulic and pneumatic control devices, inspection and servicing and troubleshooting.
Prerequisites: Admission to A&P program.
Lecture + Lab + Other: 1.5 + 0 + 0

AFPM F260  Aircraft Landing Gear Systems
1.5 Credits
Offered Spring
Simple and complex landing gear systems. Operation, service and repair of mechanical and hydraulic retraction mechanisms. Wheel, tire and brake service. Aircraft speed and configuration warning systems, electric brake controls, anti-skid systems, landing gear position and warning systems.
Prerequisites: Admission to A & P Program.
Lecture + Lab + Other: 1.5 + 0 + 0

AFPM F261  Nonmetallic Structures
1 Credit
Offered Summer
Inspection, service and repair of wood structures. Preliminary and secondary repair of interior and service of plastic, honeycomb, bonded, and composite and laminated structures.
Prerequisites: Admission to A & P Program.
Lecture + Lab + Other: 1 + 0 + 0

AFPM F262  Aircraft Coverings
1 Credit
Offered Summer
Selection, application, inspection and testing of fabric and fiberglass coverings and methods of repair.
Prerequisites: Admissions to A & P Program.
Lecture + Lab + Other: 1 + 0 + 0

AFPM F263  Aircraft Finishes
0.5 Credit
Offered Summer
Identification and selection of aircraft finishing materials. Application of paints, dopes, primers and trim.
Prerequisites: Admission to A & P Program.
Lecture + Lab + Other: 0.5 + 0 + 0

AFPM F264  Sheet Metal Structures
3 Credits
Offered Spring
Aircraft sheet metal fabrication, inspection and repair, including rivets and fasteners.
Prerequisites: Admission to A & P Program.
Lecture + Lab + Other: 3 + 0 + 0

AFPM F265  Aircraft Welding
1.5 Credits
Offered Summer
Contemporary welding methods on aircraft structures. Oxyacetylene, arc, inert gas and brazing techniques. Inspection of welded structure and safety procedures.
Lecture + Lab + Other: 1.5 + 0 + 0

AFPM F266  Assembly and Rigging
1.5 Credits
Offered Fall
Aerodynamic theory and function of aircraft control surfaces. Fabrication and installation of control devices for fixed and rotary wing aircraft; jacking and control surface balance.
Prerequisites: Admission to A & P Program.
Lecture + Lab + Other: 1.5 + 0 + 0

AFPM F267  Airframe Inspections
0.5 Credit
Offered Summer
Inspection and return of aircraft to service. Procedural and legal aspects of 100 hour, annual and periodic inspections.
Prerequisites: Admission to A & P Program.
Lecture + Lab + Other: 0.5 + 0 + 0

AFPM F270  Airframe Testing
0.5 Credit
Offered Summer
Preparation for the Federal Aviation Administration written, oral and practical exams for the powerplant mechanics' license.
Prerequisites: Admission to A & P Program.
Lecture + Lab + Other: 0.5 + 0 + 0
AFPM F271  Powerplant Inspections
0.5 Credit
Offered Summer
Methodology and record keeping for inspection of aircraft reciprocating and gas turbine engines.
Prerequisites: Admission to A & P Program.
Lecture + Lab + Other: 0.5 + 0 + 0

AFPM F272  Powerplant Testing
0.5 Credit
Offered Summer
Preparation for the Federal Aviation Administration written, oral and practical exams for the powerplant mechanics' license.
Prerequisites: Admission to A & P Program.
Lecture + Lab + Other: 0.5 + 0 + 0

AFPM F325  Inspection Authorization Preparation
2 Credits
Offered As Demand Warrants
Prepares FAA certificated Airframe and Powerplant mechanics eligible for an inspection authorization under FAR 65.91 for the FAA tests to obtain their inspection authorization. Course also includes practical aspects of the privileges and limitations of the holder of an IA.
Prerequisites: FAA A & P Certificate, meet additional requirements of FAR 65.91.
Lecture + Lab + Other: 1 + 2 + 0