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AVIATION

Seamount Building (Airpark) 269-471-3547 Fax: 269-471-6004 <u>airinfo@andrews.edu</u> www.andrews.edu/aviation/

Faculty

Dina M. Simmons, *Chair* James H. Doran Duane E. Habenicht C. Brooks Payne Randall Robertson Caleb Sigua

| Academic Programs | Credits |
|---|----------|
| BT: Aviation | 60-88 |
| Emphasis Areas | |
| Flight & Aviation Maintenance | |
| Flight & Business | |
| Flight | |
| Aviation Maintenance | |
| Aviation Maintenance & Business | |
| AT: Aviation | 40-52 |
| Emphasis Areas | |
| Flight | |
| Aviation Maintenance | |
| Minor in Aviation | 20 or 32 |
| Emphasis Areas | |
| Flight (20) | |
| Aviation Maintenance (32) | |
| Certificates | |
| Private Pilot | |
| Commercial Pilot | |
| Instrument Rating | |
| Flight Instructor | |
| Multi-Engine Rating | |
| FAA-approved Part 147, Aviation Maintenance | |
| Airframe | |
| Powerplant | |
| Airframe and Powerplant | |

Programs

For the aviation professional, the most competitive aviation program emphasizes both flight and maintenance. Therefore, the Department of Aviation strongly recommends completing a degree with both Flight and Aviation Maintenance emphases. Students who wish to enter a non-flying aviation career, may limit their specialization to Aviation Maintenance.

Two programs are available. A four-year Bachelor in Aviation, and a two-year Associate in Aviation.

Individualized majors are available as described in the previous section.

The airpark is located about 1.2 miles from the central campus. Students are expected to provide their own transportation to and from the airpark.

BT: Aviation

| Major* | 60-88 |
|--------------------------------|---------|
| General Education requirements | 41-44 |
| General electives | 23-0 |
| Total credits for degree | 124–132 |

General Education Requirements

See professional program requirements, p. 51, and note the following specific requirements:
Religion: professional degree requirements
Language/Communication: professional degree requirements
History: professional degree requirements
Fine Arts/Humanities: professional degree requirements
Life/Physical Sciences: professional degree requirements
Mathematics: professional degree requirements
Computer Literacy: INFS120 or DGME130 or pass a college-level competency exam of equivalent skills
Service: BHSC100 or BHSC300 "S" designated major course or service plan or 2 credits of fieldwork (0–2 cr)
Social Sciences: professional degree requirements
Fitness Education: professional degree requirements

*Emphasis Options

| Flight and Aviation Maintenance Flight—36 Aviation Maintenance—52 | (88) |
|--|------|
| Flight and Business | (75) |
| Flight—42 (See required courses.) | |
| Departmental electives-12 | |
| Business—21 min. | |
| Flight | (60) |
| Flight—42 (See required courses.) | |
| Departmental electives—18 | |
| Aviation Maintenance | (60) |
| Aviation Maintenance-52 | |
| Departmental electives-8 | |
| Aviation Maintenance and Business | (73) |
| Aviation Maintenance—52 | |
| Business—21 min. | |

Flight Area Courses

A Private Pilot Certificate, Instrument Rating, and a Commercial Certificate with Single and Multi-Engine Ratings are required for any BT or AT flight option. Flight lab fees, in addition to tuition, apply to all flight training courses (see Department of Aviation Charges, p. 72). Students are required to produce an FAA Student Pilot & Medical Certificate of Class 1 (recommended) or Class 2 (minimum), and proof of citizenship (passport or certified birth certificate) prior to entry into the Flight program. All other program requirements and procedures can be referenced in the department student handbook. Contact the Department of Aviation for more details.

Required Courses-42

AFLT115, 118, 120, 124, 126, 210, 215, 218, 225, 305, 316, 318, 326. Aviation electives are to be chosen in consultation with an advisor. These electives are added to the required core classes that make up the total hours required by the major.

Credit by exam will only be approved for new students transferring in with previous FAA certificates subject to departmental approval.

Aviation Maintenance Area Courses

An Aviation Maintenance Certificate with Airframe and Powerplant ratings is required for any BT or AT maintenance option. Lab fees apply to all maintenance courses. Students are required to have a Windows-compatible PC laptop for these courses. Due to the schedule and intensity of the Aviation Maintenance program, it is strongly recommended that students do not seek employment while taking the program full-time. All other program requirements and procedures can be referenced in the department student handbook.

Required Courses-52

AVMT108, 114, 116, 120, 204, 206, 210, 220, 226, 237, 304, 306, 308, 310, 314, and 316

Credit by exam will only be approved for new students transferring in with previous FAA certificates subject to departmental approval.

AT: Aviation

Students may earn an Associate of Technology degree by taking courses beyond those required for the certificate in either the flight or maintenance area. The additional courses give students a broader General Education base, prepare them better to perform the activities acquired by the certificate program, and facilitate study for an advanced degree.

| Major* | 40-52 |
|--------------------------------|-------|
| General Education requirements | 20-25 |
| General electives | 6-0 |
| Total credits for degree | 66-77 |
| - | |

*Emphasis Options

| Flight | (40) |
|--------------------------|------|
| Flight36 | |
| Departmental electives—4 | |
| Aviation Maintenance | (52) |

Aviation Maintenance—52

Minor in Aviation

Requirements: A minimum of 20 credits in flight or 32 in maintenance, respectively.

Students earn a minor in Aviation by completing one of the following:

Flight (20): AFLT115, 118, 215, 218. A Private Certificate with an instrument rating is required.

Aviation Maintenance (32): Complete either the Airframe or Powerplant License.

FAA Certification

FAA-Approved Instruction. The Department of Aviation operates a Flight School under Part 61, as well as an Airframe and Powerplant Maintenance Technician School approved by the FAA under Title 14 CFR, Part 147.

FAA Flight Certification Programs. Students may take flight instruction to qualify for several levels of certification. Students wishing only to take the content courses necessary for the specific flying expertise can take just the flight area courses as outlined under the respective certification requirements.

FAA Aviation Maintenance Certification Programs. Students

may earn the following FAA approved certificates from the department's Aviation Maintenance Technician School: Airframe

Powerplant Airframe and Powerplant

Courses

See inside front cover for symbol code.

Aviation Flight

AFLT104

Introduction to Aviation

Acquaints students with the history and opportunities in aviation, such as mission flying, flight instruction, aircraft maintenance, avionics, sales, safety, and aerodynamics of flight. *Fall, Spring*

AFLT110

Basic Aircraft Systems

The study of small aircraft systems, including: reciprocating engines, propellers and prop governors; fuel, electrical, hydraulic, pressurization, pneumatic and de-icing systems, flight controls, aircraft structures, weight and balance, and aircraft instrument systems. Also included will be pilot maintenance and a brief introduction of the FAA requirements for maintenance, inspections and recordkeeping. *Fall*

AFLT115

Private Pilot Ground School

Ground training to prepare students for the FAA private pilot airplane knowledge test. Topics include aerodynamics, weight and balance, Federal Aviation Regulations, navigation, meteorology, aircraft systems and performance. *Fall, Spring, Summer*

AFLT118 Flight Training 1

\$ (3)

(4)

Sixty-five (65) hours of aircraft and simulator time leading to the airplane Private Pilot Certificate including 10 hours of crosscountry flight. *Fall*, *Spring*, *Summer*

AFLT120 \$ (4) Applied Science for Aviation

Applies the sciences of mathematics and physics to the aerodynamics of flight, maintenance, weight and balance and various maintenance problems that the aircraft maintenance technician and pilot could encounter. Includes the study and use of aircraft drawings, schematics, and basic ground operations. (This course does not count toward FAA maintenance program credit.) *Fall*

(Credits)

(1 - 4)

(3)

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AFLT124

Aircraft Electricity

A study of the fundamental basics of electricity and electronics; including electrical diagrams, calculations, sources of electrical power, direct and alternating current, aircraft storage batteries, capacitance and inductance, binary code and the basics of solid state logic. (This course does not count toward FAA maintenance program credit.) *Fall*

AFLT126

Federal Aviation Regulations, Publications, Forms and Records Study of the federal regulations and manufacturer publications as they apply to aircraft design, maintenance, inspections, forms and records, and the certification and privileges/limitations of aviation maintenance technicians and pilots. (This course does not count toward FAA maintenance program credit.) *Fall*

AFLT210

Aircraft Systems

An in-depth study into the inspection, repair, checking, servicing and troubleshooting of the following aircraft systems; ice-andrain detection, cabin atmosphere (pressurization, heating, cooling, and oxygen), position warning systems, navigation and communication systems, and aircraft instruments and their use in trouble-shooting of aircraft systems. (This course does not count toward FAA maintenance program credit.) *Spring*

AFLT215

Instrument Pilot Ground School

Ground training to prepare the student for the FAA instrument rating airplane knowledge test. Topics include Federal Aviation Regulations, meteorology, instrument flight charts, flight planning, instrument approaches, use of navigation equipment, and FAA publications relating to instrument flight. *Spring*

AFLT218

Flight Training II

Sixty-five (65) hours of aircraft and simulator time leading to the airplane instrument pilot rating including 25 hours of cross-country flight needed to meet the 50-hour cross-country requirement. *Fall, Spring, Summer*

AFLT220

Meteorology

Meteorology provides students with a comprehensive study of the principles of meteorology while simultaneously providing classroom and laboratory applications focused on current weather situations. It provides real experiences demonstrating the value of computers and electronic access to time sensitive data and information. *Fall*

AFLT225

Aircraft Fuels and Fuel Systems

A study of the various types and handling of fuels used in aircraft. Includes a study of aircraft fuel systems, fuel metering methods and the inspection, checking, servicing, troubleshooting, repair and overhaul of fuel systems and their components, and fire detection and protection. (This course does not count toward FAA maintenance program credit.) *Spring*

AFLT230

Aerodynamics

The study of aerodynamic principles used in aircraft. Designed for a better understanding of basic design and devices used to improve aircraft performance. *Fall*

AFLT300

\$ (2)

\$ (2)

\$ Alt (4)

(4)

\$(3)

Alt (3)

\$ Alt (2)

Alt (3)

Aviation Safety Management

The study of physiological and psychological factors related to flight safety, emphasizing cause-and-effect of airplane accidents and their prevention. Includes a systems approach to safety program development and management. *Spring*

AFLT305

Commercial Pilot Ground School

Ground training to prepare the student for the FAA commercialpilot airplane knowledge test. Topics include advanced navigation, FAR Parts 61, 91, and 135 for air taxi, complex aircraft systems, weight and balance, and performance charts. *Fall*

AFLT310

Advanced Systems

The study of transport category aircraft systems, including: turbine engines, APUs, fuel, electrical, hydraulic, pneumatic, environmental control, emergency oxygen, pressurization, de-icing systems, and advanced avionics systems. Particular emphasis will be placed on preparing for airline systems ground school. Prerequisite: AFLT305. *Spring*

AFLT316

Turbine Engines

Principles and theory of jet-engine propulsion, design, types of, and associated systems. Maintenance, overhaul, installation-removal, repair, trimming, and troubleshooting of turbine engines. (This course does not count toward FAA maintenance program credit.) *Fall*

AFLT318

Flight Training III

Sixty-five (65) hours of single-engine flight, multi-engine flight and simulator time. The course includes preparation for the Private Pilot Multi-Engine Land rating. *Fall, Spring, Summer*

AFLT326

Flight Training IV

Sixty-five (65) hours of aircraft and simulator time leading to the airplane Multi-Engine and Single-Engine Commercial ratings. *Fall, Spring, Summer*

AFLT355

Flight Instructor Ground School

Ground training to prepare the student for the FAA flight instructor airplane knowledge test. Topics include techniques of teaching, analysis of maneuvers, and lesson planning. *Fall, Spring, Summer*

AFLT356

Flight Instructor Flight Training

Flight and ground training to prepare the student for the FAA flight instructor airplane practical test. Topics include the performance, teaching, and analysis of flight maneuvers required for the private and commercial airplane pilot (2 cr. for initial CFI; 1 cr. for CFI add-on). *Summer*

AFLT364

Basic and Advanced Ground Instructor

Prepares the student for the FAA basic and advanced ground instructor knowledge test. Topics include techniques of teaching aerodynamics, aircraft performance, aircraft systems, weight and balance, meteorology, navigation, and regulations. *Spring, Summer*

(4)

Alt (3)

\$ Alt (4)

\$ (3)

(2)

\$ (1-2)

(2)

\$(3)

AFLT365

Instrument Flight Instructor Ground School

Prepares the student for the FAA instrument flight instructor knowledge test. Topics include techniques of teaching instrument flight, analysis of instrument maneuvers, instrument approaches, enroute operations, regulations, and lesson planning. *Fall*

AFLT366

Instrument Flight Instructor Flight Training

Flight and ground training to prepare the student for the FAA instrument flight instructor airplane practical test. Topics include the performance, teaching, and analysis of attitude instruments, instrument approaches, and enroute operations. (2 cr. for initial; 1 cr. for add-on.) *Fall, Summer*

AFLT416

Turbine Transition

Ground and simulator training to prepare the student to work in a multiple crew aircraft operating under FAR Part 121 and 135. Topics include crew checklist usage and standard operating procedures (SOPs). *Fall, Spring, Summer*

AFLT430

Crew Resource Management

Study of the effective use of resources available to the crew to achieve safe and efficient flight operations. Areas include human factors, communication, conflict resolution, leadership, teamwork, and situational awareness as applied to flight operations. *Spring*

AFLT467

Multi-Engine Flight Instructor

Flight and ground training to prepare the student for the FAA multi- engine airplane flight instructor practical test. Topics include the performance, teaching, and analysis of maneuvers and procedures for the multi-engine airplane (2 cr. for initial CFI; 1 cr. for CFI add-on). *Summer*

AFLT469

Instrument Ground Instructor

Prepares the student for the FAA instrument ground instructor knowledge test. Topics include the techniques of teaching advanced weather theory, weather reports and forecasts, instrument procedures and regulations, approaches, and enroute operations. *Fall*

AFLT474

Techniques of Mission Flying

Develops special piloting skills required in remote undeveloped bush operations. Topics include pilotage, dead reckoning, GPS navigation, low-level operations, terrain flying, mountain passes and canyons, cargo drops, short fields, uphill and downhill operations on primitive airstrips, maximum performance techniques, and precision airplane control. *Fall, Spring, Summer*

AFLT485

Airline Transport Pilot Ground School

Prepares the student for the FAA airline transport pilot knowledge test. Topics include air-carrier or air-taxi regulations, high altitude weather, advanced weight and balance, and the performance and special problems in large airplane operations. *Fall, Spring, Summer*

AFLT486

Airline Transport Pilot Flight Training

Flight and ground training to prepare the student for the FAA airline transport pilot airplane practical test. Topics include

Aviation Maintenance

AVMT108

(2)

\$ (1-2)

\$ (2)

\$ Alt (2)

\$ (1-2)

(2)

\$ (3)

(3)

\$ (3)

Applied Science for Aerospace Technicians

Applies the sciences of mathematics and physics to the aerodynamics of flight, maintenance, weight and balance and various maintenance problems that the aircraft maintenance technician could encounter. Includes the study and use of drawings and basic ground operations. *Fall*

AVMT114

Aircraft Basic Electricity

A study of the fundamental basics of electricity and electronics; including electrical diagrams, calculations, sources of electrical power, direct and alternating current, aircraft storage batteries, capacitance and inductance, binary code and the basics of solid state logic. *Fall*

AVMT116

Federal Regulations, Publications, Forms and Records

Study of the federal regulations and manufacturer publications as they apply to aircraft design, maintenance, inspections, forms and records, and the certification and privileges/limitations of the aviation maintenance technicians. *Fall*

AVMT120

Materials and Processes for Aircraft Structures

Includes hand and power tool usage, aircraft hardware and materials, precision measurements, corrosion control, non-destructive testing, and fluid lines and fittings. *Fall*

AVMT204

Aircraft Electrical Systems

Practical study of aircraft electrical systems, including installation practices, repair, troubleshooting, service, and inspections. *Spring*

AVMT206

Powerplant Electrical Systems

A study of engine ignition and engine electrical systems (starter, generators, alternators, auxiliary electrical power units and their control circuits, engine instruments, and engine fire protection-suppression systems). *Spring*

AVMT210

Aircraft Systems

An in-depth study into the inspection, repair, checking, servicing and troubleshooting of the following aircraft systems; ice-andrain detection, cabin atmosphere (pressurization, heating, cooling, and oxygen), position warning systems, navigation and communication systems, and aircraft instruments and their use in trouble-shooting of aircraft systems. *Spring*

AVMT220

Aircraft Fuels and Fuel Systems

A study of the various types and handling of fuels used in aircraft. Includes a study of aircraft fuel systems, fuel metering methods and the inspection, checking, servicing, troubleshooting, repair and overhaul of fuel systems and their components, and fire detection and protection. *Spring*

\$ (4)

\$ (2)

\$ (2)

\$ Alt (2)

\$ Alt (4)

\$ Alt (4)

\$ Alt (2)

\$ (4)

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AVMT226

Engine Fuel Metering Systems

A study of the engine side of the fuel systems (firewall forward). Includes an in-depth study of fuel-metering devices used on aircraft engines (carburetors, pressure carburetors, direct and continuous fuel-injection systems). Service, maintenance, repair and trouble-shooting of each different system type is covered in detail. Spring

AVMT228

Maintenance: General, Airframe, or Power Plant Review

A review of all subjects from a selected curriculum. A minimum of five examinations per curriculum area is required. Prerequisites: All applicable curriculum subjects must have been completed. Fall, Spring

AVMT237

Aircraft Hydraulic, Pneumatic, and Landing Gear Systems Operation and maintenance of aircraft hydraulic systems, pneumatic systems, landing-gear systems, and the inspection, checking, servicing, trouble-shooting, and repair of these systems and system components. Spring

AVMT304

Aircraft Metal Structures

A study and application of the processes used in the fabrication and repair of aircraft metal structures. Welding theory and practice with emphasis on weld-quality identification. Riveted, aircraft, aluminum, sheet-metal structures including the fabrication and repair of such structures. Fall

AVMT306

\$ Alt (2)

\$ Alt (2)

\$ Alt (4)

\$ Alt (3)

Aircraft Non-metal Structures

A study of wood and fabric as used in the construction of aircraft and a study of the methods, tooling, inspection, processes, and repair of composite aircraft structures. Includes the application, identification, and functions of aircraft protective finishes. Spring

AVMT308

Aircraft Assembly, Rigging and Inspections

Study of the nomenclature and design features of both fixedwing and rotor-wing aircraft and the assembly, alignment of aircraft structures, and rigging and balancing of control system. A detailed inspection of the entire aircraft or rotorcraft is covered as it applies to the airframe 100-hour and other required inspection. Spring

AVMT310

Gas Turbine Engines

Principles and theory of jet-engine propulsion, design, types of, and associated systems. Maintenance, overhaul, installationremoval, repair, trimming, and troubleshooting of turbine engines. Fall

AVMT314

Aircraft Propellers and Engine Inspections

Reciprocating Engine Systems and Overhaul

Theory and limited work on propellers, both wood and metal. Encompasses fixed, adjustable, controllable, feathering, reversible, and the control of the latter by mechanical, hydromatic, or electrical control systems. The inspection practice of performing the 100-hour inspection on aircraft engines and propellers. Spring

AVMT316

\$ Alt (7)

A study of reciprocating engine theory, overhaul methods, and

practices and the installation of reciprocating engines. Also includes a study of the following engine systems: exhaust, cooling, induction, and lubrication. Spring

Technology

AVIA140

\$ Alt (2)

\$ (1-3)

\$ Alt (4)

\$ Alt (4)

Welding Technology

Oxyacetylene and electric welding processes including oxyacetylene welding, cutting, and brazing; basic shielded metal arc welding and basic gas metal arc welding. A limited amount of out-of-position welding will be stressed. Fall

AVIA250 Machine Shop

Basic set-up and operation of lathes, milling machines, grinders, drilling machines, and shapers; safety, machine maintenance, off-hand grinding, drill sharpening, layout, and inspection emphasized. Spring

AVIA285/470

Project Course

Development of a skill in a given area of technology under the supervision of the instructor. Repeatable to 12 project credits. Prerequisite: Permission of instructor. Fall, Spring

AVIA275/476 Topics in

Repeatable with different topics in aviation. Arranged

AVIA294

Cooperative Work Experience

Work experience with an aviation organization or airline. A minimum of 120 hours of work required per credit. Graded S/U. Prerequisite: Permission of the department. Arranged

AVIA296/495

Independent Study

Enables students to pursue topics in aviation not offered in other scheduled courses. Prerequisite: Permission of the department. Repeatable to 4 credits. Arranged

AVIA390

Internship

On-the-job internship experience for those students seeking industrial experience which cannot be simulated in a classroom setting. A range of 120-150 clock hours of work are required for each credit. Selected in consultation with the student's advisor. May be repeated.

AVIA395

Practicum

Lab or on-the-job experience to build skills in a specific area of technology. Prerequisite: Permission of department. Repeatable to 6 credits. Arranged

AVIA460

Program Continuation

The Aeronautics student may register for this title while clearing deferred grade (DG) and/or incomplete (I) classes, or working to complete practical tests in the flight and/or maintenance programs. Registration for this title indicates full-time status. Prerequisites: permission of advisor and department chair.

\$ (2)

\$ (3, 4)

(1 - 4)

(1-3)

(1-3)

(1-4)

(1-4)

(1 - 4)

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