and maintenance of software application programs, and requires a supporting minor in an application area.

**BSE: Engineering**
The Bachelor of Science in Engineering degree has emphases in Electrical and Computer Engineering and in Mechanical Engineering. These two emphases build on a strong traditional mathematics, science, and engineering core. The Electrical and Computer Engineering emphasis focuses on the area of digital systems, communication systems, and computer-controlled instrumentation and computer simulation. The Mechanical Engineering emphasis focuses on the elements of mechanical design and the electromechanical elements of smart machines.

**General Courses**

See inside front cover for symbol code.

**GTEC110**

3-4 *(Freshman Seminar)*

College success and life enrichment skills. Included are an introduction to the resources of the university, principles of critical thinking, and Christian values clarification.

**GTEC115**

3-4 *(College Seminar)*

See description under GTEC110. Repeatable.

**GTEC298**

1-32 *(Prior Learning Assessment)*

Prior Learning Assessment (PLA) is a process which validates learning experiences occurring outside traditional college/university academic programs. A portfolio of evidence for demonstrating experience and competency justifies and determines the amount of credit granted. Repeatable with different topics.

**GTEC395**

1-4 *(Cooperative Work Experience)*

Supervised (by the dean or his appointee) on-the-job work experience with a cooperating industry. A minimum of 120 hours of work is required per credit. The student must submit a report of the cooperative work experience as specified by the instructor. Repeatable to 6 credits. Graded S/U. Prerequisites: an associate degree in technology or equivalent and permission of the dean. Students must apply and be accepted one semester in advance of their planned Cooperative Education experiences.

**GTEC498**

1-32 *(Prior Learning Assessment)*

See description under GTEC298. Total Prior Learning Assessment credits (GTEC298 and 498) may not exceed 32 credits.

**Individualized Programs of Study**

For students who have career goals or special interests in areas other than those provided in one of the established majors or minors, a special individualized program is available in the following degrees: Bachelor of Science, Bachelor of Technology, and Associate of Technology. An individualized concentration may be planned to meet the career goals of a student. Before the beginning of the junior year for baccalaureate-degree students or the beginning of the sophomore year for associate-degree students, the student, with the assistance of his or her advisor, prepares a proposed program of study. The program must be approved by a department faculty and the College of Technology Academic Policies and Curricula Committee.

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**AERONAUTICS**

Seamount Building (Airpark)
(269) 471-3547
Fax: (269) 471-6004
airinfo@andrews.edu
http://www.andrews.edu/COT/aviation
http://www.andrews.edu/COT/ap

**Faculty**

Allan R. Payne, Chair
James H. Doran
Duane E. Habenicht
Gary A. Marsh
Dina M. Simmons

<table>
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<tr>
<th>Academic Programs</th>
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<td>BT: Aviation Technology</td>
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<td>Flight</td>
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<td>AT: Aviation Technology</td>
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<td>Flight (36)</td>
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<td>Minor in Aviation Technology</td>
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<td>Flight (20)</td>
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<td>Maintenance (32)</td>
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<td>Powerplant</td>
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<td>Airframe and Powerplant</td>
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Students may choose program emphases (or a combination of them) in such areas as flight, maintenance and business.

**Programs**

If any of the degree programs do not meet the needs of the student, an individualized major is available as described on the previous page.

Two programs are available. A four-year Bachelor in Aviation Technology, and a two-year Associate in Aviation Technology. Both programs give the student beginning level skills in flight or maintenance. 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 Technology

Students taking the Bachelor of Technology degree may:
(1) combine areas to meet specific career goals (see options that follow) or
(2) limit their specialization to a single area—flight or maintenance.

| Major* | 40–52 |
| Degree core | 6 |
| General Education requirements | 16–22 |
| General electives | 6–0 |
| Total credits for degree | 62–74 |

*AT Options

Flight
- Flight—36 credits
- Departmental electives—4 credits
- Business—21 credits minimum

Maintenance
- Maintenance—52 credits

Minor in Aviation Technology

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

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


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

FAA Certification

FAA-Approved Instruction. The Department of Aeronautical Technology operates a Flight School as well as an Airframe and Powerplant Maintenance Technician School approved by the FAA under Title 14 CFR, Part 141* and Part 147, respectively.

* Private curriculum only

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 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.

Aeronautical Flight

AFLT104 (1–4)
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. Non-majors receive one free flight. Fall, Spring

AFLT115 (4)
Private Pilot Ground School

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

AFLT118  
*Flight Training I*  
Sixty-five (65) hours of aircraft and simulator time leading to the airplane Private Pilot Certificate including 10 hours of cross-country flight. Fall, Spring, Summer

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

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

AFLT305  
*Commercial Pilot Ground School*  
Ground training to prepare the student for the FAA commercial-pilot 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

AFLT315  
*Aircraft Systems for Pilots*  
The study of aircraft systems and engines, propellers and governors; the fuel, electrical, hydraulic, pneumatic, and de-icing systems, flight controls, weight and balance, and aircraft-instrument systems. 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

AFLT330  
*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

AFLT455  
*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

AFLT456  
*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 (4 cr. for initial CFI; 2 cr. for CFI add-on). Fall, Spring, Summer

AFLT464  
*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. Fall, Spring, Summer

AFLT465  
*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, Spring, Summer

AFLT466  
*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. Fall, Spring, Summer

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 (4 cr. for initial CFI; 2 cr. for CFI add-on). Fall, Spring, 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, Spring, Summer

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
A VMT116 (2)

Maintenance problems that the aircraft maintenance technician could encounter. Includes the study and use of drawings and basic ground operations. Fall, Spring, Summer

A VMT206 Alt (4)

Aircraft Systems

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

A VMT210 Alt (4)

Aircraft Systems

A VMT20 Alt (2)

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

A VMT30 Alt (3)

Aircraft Non-metal Structures

A study of wood and fabric as used in the construction of aircraft structures, and repair of such structures. Spring

A VMT31 Alt (3)

Aircraft Metal Structures

A study of the construction 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

A VMT310 Alt (4)

Gas 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. Fall

A VMT314 Alt (3)

Aircraft Propellers and Engine Inspections

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
A VMT316 Alt (7)
Reciprocating Engine Systems and Overhaul
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

TECH140 $ (2)
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

TECH250 $ (3–4)
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

TECH254 (3)
Technical Space Utilization
Acquaints students with the planning and organization of technical facilities. Consideration given to space requirements, building structure, material flow, equipment needs, site location, and environment control of such facilities. Spring

TECH285/485 (1–4)
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

TECH275/475 (1–4)
Topics in
Repeatable with different topics in aviation. Arranged

TECH294 (1–3)
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 department. Arranged

TECH295/495 (1–2)
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

TECH315 (3)
Succeeding in the Workplace
Focus on the development of attitudes, performance and communication that will assist in making the transition from the classroom to the workplace an enjoyable and profitable experience. Fall

TECH370 (3)
Technical World and Man
Gives students a general understanding of how modern technologies affect society. Topics include how humans respond to technological change, the social consequences of technology, and technological issues in national decisions. Spring

TECH390 (1–4)
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.

TECH395 (1–4)
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

TECH456 (3)
Safety and Loss Control
Safety and the fundamentals of accident prevention with emphasis on schools, school laboratories, and industrial applications. Introduction to the total program of loss control in industry, including the legal implications for both school and industry. Emphasis on the problem of accident prevention and control. Spring