



North Texas Aviation Education Initiative

NORTH CENTRAL TEXAS COUNCIL OF GOVERNMENTS

Recommended Aviation Education Curricula for North Central Texas

October 2009



North Texas Aviation Education Initiative

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RECOMMENDED AVIATION EDUCATION CURRICULA FOR NORTH CENTRAL TEXAS

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A. GLOSSARY

This section defines acronyms and abbreviations used throughout the document.

Term	Description
A&P	Airframe & Powerplant
AABI	Aviation Accreditation Board International
B.S.	Bachelor of Science
CFI	Instructor Pilot Flight
CFII	Instrument Instructor Pilot Flight
CIP	Classification of Instructional Programs
MEI	Multi-Engine Instructor Pilot Flight
MRO	Maintenance, Repair, Overhaul
NCTCOG	North Central Texas Council of Governments
THECB	Texas Higher Education Coordinating Board
TTI	Texas Transportation Institute



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B. INTRODUCTION

The North Texas Aviation Education Initiative, sponsored by the North Central Texas Council of Governments (NCTCOG), consists of extensive research, analysis, recommendations and implementation steps. The findings and conclusions of a regional gap analysis, prepared prior to this report detailing recommended aviation curricula, provide significant rationale for the development of a comprehensive four-year degree program in aviation. Readily apparent in employment data and projections, and in the perspectives articulated by participants in three focus groups, this need is supported by both quantitative and qualitative evidence. Additionally, these conclusions reinforce the need that has long been recognized by many to exist in the state and the region.

The aviation industry is a diverse and growing field with needs ranging from technical and trade-level employees to executive-level managerial and professional-level knowledge workers. While certification programs are successfully training skilled workers, particularly on area community college campuses, North Central Texas continues to lose the ability to recruit and retain talented aviation professionals because there is no four-year baccalaureate program that offers multiple aviation degree plans while providing a flight training component.

A desirable outcome of this study is the development of an integrated aviation education program serving the region while building on the strengths of the existing resources. This includes not only incorporating the resources of existing two-year programs, but also attracting related industry in ongoing academic/industry partnerships. In this report, aviation higher education curricula are reserved and refined. Specifically, there are three aviation programs that have emerged as being recognized as regional needs. These are: 1) aviation management; 2) aviation flight; and, 3) aviation maintenance/technology management.

The report, *An Analysis of the Gap Existing between Aviation Workforce Needs and Supply for North Central Texas*, specifically noted the lack of options for students to pursue professional pilot training as part of their degree program. It also demonstrated limited opportunities for some skilled/technical workers to continue their education by taking management and other upper-division course offerings and pursuing degree programs in their field following completion of a two-year program.

An aviation management degree program is an integral curriculum from which all other programs are based. Many universities offer degrees in flight and maintenance options but, almost without exception, they also have a core aviation management program. This foundational approach allows institutions to offer an aviation degree program that provides four-year degree options for many individuals in a variety of aviation-related positions. It also provides a base from which more capital-intensive, aviation-academic programs can be built and evolve. These three programs should be balanced to prepare individuals for professional and management positions in a variety of aviation-industry jobs, including those related to flight and aircraft maintenance.

Many aviation programs that are similar in nature or purpose have different titles. The intent is to develop programs in aviation suited for these three distinct areas of study within aviation, regardless of the nomenclature. As will be illustrated later, schools with the same or similar programs may use slightly different terminology to describe their programs. The focus should be



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on the content of the program—not on the program’s name. The recommendation is to develop three programs focusing on 1) the management components of the aviation industry, 2) the flight-related employment opportunities within aviation, and 3) the maintenance and technology components of the industry including those managing a skilled/technical workforce. A recommended curriculum for each of these three program areas is presented herein.

The focus of the recommended curricula is upper division courses. Because general education requirements differ by institution, it is not necessary to outline lower division courses as part of the recommended aviation curricula. It should also be noted that some non-aviation core courses may differ due to where the degree program is in the education system; i.e. engineering, technology, business, public administration or education schools. Therefore, the recommended curricula centers on aviation courses for both the lower and upper division courses. Any institution developing an aviation program should pursue articulation agreements with community and technical colleges which have aviation programs. This helps facilitate entry into the program, making the program more attractive and accessible to students in general.

Articulation agreements are essentially partnerships between two- and four-year schools. They are official agreements that establish which courses from two-year schools will be accepted for credit towards a degree at a four-year school. Given the large number of two-year aviation programs in the state and region, articulation agreements can be useful in an aviation academic setting. They can allow a four-year institution to focus on upper division courses while accepting the lower division courses from the two-year schools without having to replicate or duplicate the effort. This frees up resources to build the program in other areas. Such agreements can also make an institution more attractive to students, knowing that their work will be accepted for a seamless transition into upper division coursework.

This report evaluates existing aviation curriculums and provides recommendations for appropriate curriculums for the three aviation programs. Organized in a way that lends itself to a review and refinement process, the following elements are included:

- Aviation Curriculum in Literature;
- Academic Program Accreditation – Aviation Accreditation Board International;
- Identification of Model Aviation Program Curriculums;
- Review of Existing Aviation Program Curriculums;
- Generic Curriculum from 2003 Texas Transportation Institute (TTI) Report (*Aviation in Higher Education: The Development of a Comprehensive Aviation Management and Commercial Pilot Program in Texas*);
- University of North Texas – Aviation Logistics Program; and
- Comparison/Analysis of Selected Curriculums and Recommended Aviation Program Curriculums.

This methodology approach allows for a meaningful evaluation of existing programs and the development of program curriculum to meet the needs of North Central Texas within existing resources and without duplicating the efforts of other institutions.



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C. AVIATION CURRICULA IN LITERATURE

Earlier work on this study focused on the identification of relevant literature pertaining to aviation education, particularly at the four-year college level. The body of published work on aviation curricula and program development topics is large and diverse. It is recommended that persons and/or institutions considering the establishment of aviation-related curricula should study the perspectives of various education experts. The literature review referenced here is available as a part of this study, and the annotated bibliography that is included in the review simplifies further research.

Issues which have been researched and documented by seasoned aviation academic professionals include specific course requirements, course development, program development, program assessment, aviation content delivery, stakeholder issues, program accreditation, industry needs and requirements, student performance and competency, as well as program quality characteristics, among others.

D. ACADEMIC PROGRAM ACCREDITATION – AVIATION ACCREDITATION BOARD INTERNATIONAL

Any aviation academic programs established in the region should be accredited by the Aviation Accreditation Board International (AABI). The AABI, formerly the Council on Aviation Accreditation, is an internationally-recognized organization that governs the accreditation process and fosters recognition of institutions and programs that achieve and maintain an appropriate level of performance and integrity. By doing so, they serve both the educational community and industry.

According to its website, AABI has three fundamental purposes. These are:

- To ensure the quality of the institution or program;
- To assist in the improvement of the institution or program; and
- To maintain relevance of education with the industry it serves.

AABI accredits both two- and four- year programs and offers many advantages to the programs that meet its criteria. According to its documents, advantages of accreditation include the following:

- Increased attractiveness of the program to prospective students and their parents by ensuring that the program meets accepted standards of quality;
- Employer assurance that graduates possess a broad background in the aviation industry as well as skills needed for aviation specializations;
- Confirmation to institutions that their aviation programs will periodically perform a comprehensive self-analysis to achieve their objectives; and
- Continued contact between aviation educators and other faculty, industry advisors, and practicing aviation professionals.



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AABI accredits aviation programs in six areas. These include aviation management, aviation maintenance, aviation electronics, aviation studies, flight education and safety studies. As noted earlier, many institutions have similar programs with varying names. While AABI uses this nomenclature, each institution can title its program as it wishes so long as it is consistent with the applicable AABI program name. Additionally, it must meet the specific program criteria for accreditation.

The accreditation process focuses on student achievement and, in doing so, has several objectives. Programs, in order to be accredited, must show that graduates of the programs have demonstrated the following:

- An ability to apply knowledge of mathematics, science, and applied sciences to aviation-related disciplines;
- An ability to analyze and interpret data;
- An ability to function on multi-disciplinary and diverse teams;
- An understanding of professional and ethical responsibility;
- An ability to communicate effectively, including both written and oral communication skills;
- A recognition of the need for, and the ability to engage in, life-long learning;
- A knowledge of contemporary issues;
- An ability to use the techniques, skills, and modern technology necessary for professional practice;
- An understanding of the national and international aviation environment; and
- An ability to apply pertinent knowledge in identifying and solving problems.

The accreditation process goes beyond curriculum, encompassing every aspect of the academic program. As detailed in the *AABI Accreditation Criteria Manual*, it includes meeting criteria and adhering to standards in the following areas:

- Students;
- Program educational objectives;
- General outcomes;
- Curriculum;
- Faculty;
- Facilities, equipment, and services;
- Institutional support and financial resources;
- Complementary degree programs;
- Credit for non-collegiate achievement;
- Aviation safety culture and program;
- Program-level criteria; and
- Continuous assessment and improvement.



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The AABI *Accreditation Criteria Manual* provides specific guidelines on types of core courses. The development of any new aviation program should take into consideration the following conclusions:

- Outcomes in college level mathematics and basic sciences appropriate to the program;
- Outcomes in general education that complement the technical content of the curriculum and are consistent with the program and institution objectives;
- Outcomes appropriate to the following aviation core topics:
 - Attributes of an aviation professional, career planning, and certification;
 - Aircraft design, performance, operating characteristics, and maintenance;
 - Aviation safety and human factors;
 - National and international aviation law, regulations, and labor issues;
 - Airports, airspace, and air traffic control; and
 - Meteorology and environmental issues;
 - Outcomes appropriate to the program-level criteria.

While the first two points may vary from institution to institution, the outcomes specific to aviation core topics should be included in any curriculum. The manual addresses more specific elements for these outcomes and it should be consulted during program development for additional guidance, especially with respect to flight education programs. Additionally, the AABI requires that curriculums are developed with input from industry professionals and associations.

AABI has the support and backing of numerous corporate, trade and educational members in its pursuit of academic program excellence. These members are listed on its website (www.aabi.aero) and represent a wide spectrum across the aviation industry.

E. IDENTIFICATION OF MODEL AVIATION PROGRAM CURRICULUMS

To facilitate the selection of model programs and to ensure quality, only aviation programs that are AABI accredited were selected for study. Currently, there are 27 institutions that house accredited aviation programs in a variety of program areas. Larger, public universities, especially those with recognized reputations for quality programs, received the most thorough review. Additional consideration was given to programs located in proximity to the region. In the case of the maintenance-related programs, the selection was limited due to the small number of accredited programs in this specialty area. To better understand the breadth and depth of such programs, three programs within each category were selected for final analysis and comparisons, and included:

- Aviation Management
 - Arizona State University: Bachelor of Science (B.S.) Air Transportation Management
 - Purdue University: B.S. Aviation Administration
 - University of Louisiana, Monroe: B.S. Aviation



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- Aviation/Flight
 - Arizona State University: B.S. Professional Flight
 - University of Oklahoma: B.S. Professional Pilot
 - Louisiana Tech: B.S. Professional Aviation
- Aviation Maintenance/Technology
 - Purdue University: B.S. Aeronautical Engineering Technology
 - Middle Tennessee State University: B.S. Aerospace Maintenance Management
 - Western Michigan University: B.S. Aviation Maintenance and Technology

F. REVIEW OF EXISTING AVIATION PROGRAM CURRICULUMS

For each of the selected programs, the required courses/degree plans and the purpose of the program in terms of whom it serves were examined. Core courses required in each of the specialty areas were also required. Given the fact that individual academic institutions may differ on their general education and university core course and credit hour requirements, the focus of this review was on the aviation courses, particularly upper division courses. It is expected that a curriculum, once developed and finalized, can be integrated into a university’s overall curricula without materially altering the aviation program’s purpose or objectives. Additionally, it is expected that the institution will be able to develop articulation agreements with two-year schools which have aviation programs in order to facilitate a seamless transition into a four-year degree program.

Additional upper division aviation electives are required in some programs. Departmental location of the program within individual schools (within education, business and technology sectors) drives additional courses and electives. These electives are designed to allow students to broaden their exposure to specific facets of the aviation industry and to enhance their academic resumes.

Aviation Management Programs

The three aviation management programs selected for review are offered at Arizona State University, University of Louisiana, Monroe and Purdue University. The required aviation courses needed to complete the degree are shown in Exhibits 1 through 3 below.

Exhibit 1: Aviation Curriculum – Arizona State University: B.S. Aeronautical Management Technology (Air Transportation Management)

Lower Division	Upper Division
Introduction to Aeronautical Management Technology	Air Transportation
Private Pilot Ground School	Aircraft Design and Logistics Management
Aviation Meteorology	Aviation Law/Regulations
Aerospace Structures, Materials, Systems	Airport Management and Planning
Aircraft Powerplants	National Aviation Policy
	Airline Administration
	Aviation Management Capstone
	Internship

Source: Arizona State University



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Exhibit 2: Aviation Curriculum – University of Louisiana, Monroe: B.S. Aviation

Lower Division	Upper Division
Introduction to Aviation	Aviation Weather
Primary Ground Instruction Part 1	Commercial Ground Instruction
Primary Ground Instruction Part 2	Federal Aviation Regulations
Instrument Pilot Ground School	Aviation Safety
Aviation Professionalism	Aviation Law
	Air Traffic Administration
	Aircraft Engines and Systems
	Airport Administration

Source: University of Louisiana, Monroe

Exhibit 3: Aviation Curriculum – Purdue University: B.S. Aviation Management

Lower Division	Upper Division
Introduction to Aviation Technology	Global Aviation Systems
Basic Aircraft Science	Aviation Professional Issues
Fundamentals of Flight Lectures	Aviation Security
Aircraft Propulsion and Operating Systems	Aviation Finance
Ethics and Aviation	Aviation Safety Problems
Air Transportation	Aviation Law
ATC Procedures and Weather	Airport/Airline Management
	Aviation Capstone

Source: Purdue University

Aviation Maintenance Management Programs

The three aviation maintenance management programs selected for review are offered at Purdue University, Western Michigan University and Middle Tennessee State University. The required aviation courses needed to complete the degree are shown in Exhibits 4 through 6 below.

Exhibit 4: Aviation Curriculum – Purdue University: B.S. Aviation Technology (Aeronautical Option)

Lower Division	Upper Division
Introduction to Aviation Technology	Global Aviation Systems
Basic Aircraft Science	Advanced Aircraft Systems
Aircraft Materials	Aircraft Materials Processes
Basic Aircraft Electrical Theory	Fundamentals of Powerplant Systems
Aircraft Materials II	Advanced Aircraft Powerplants
Basic Aircraft Powerplant Technology	Aircraft Maintenance Practices
Introduction to Aircraft Systems	Aircraft Gas Turbine Engine Technology I
Fixed and Rotary Wing Assemblies	Aircraft Electronics
Powerplant Propulsion Systems	Aircraft Airworthiness Assurance
Introduction to Composite Technology	Airmen Certification Procedures
Nondestructive Testing For Aircraft	Aircraft Gas Turbine Engine Technology II
Avionics Systems for Aircraft	Aviation Professional Issues

Source: Purdue University



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Exhibit 5: Aviation Curriculum – Western Michigan University: B.S. Aviation Maintenance Technology

Lower Division	Upper Division
Introduction to Aviation	Reciprocating Engine Overhaul
Aerodynamics and Performance	Aircraft Structures II
Aviation Safety	Reciprocating Engine Systems
Maintenance Regulations	Aircraft Electrical II
Aircraft Structures I	Non-Destructive Testing
Basic Aircraft Engines	Avionics
Aircraft Electrical I	Airframe Systems
Aircraft Propellers	Testing, Evaluation, & Instrumentation
	Inspection & Service I
	Inspection & Service II
	Maintenance and Supportability
	AC Turbine Engine Systems
	Advanced Airframe Systems
	Senior Project I
	Senior Project II

Source: Western Michigan University

Exhibit 6: Aviation Curriculum – Middle Tennessee State University: B.S. Aerospace Maintenance Management

Lower Division	Upper Division
Introduction to Aerospace	Aerospace Materials
Theory of Flight	Propulsion Fundamentals
Introduction to Aerospace Maintenance	Sheet Metal Structures
Aerospace Maintenance Shop Practices	Aerospace Reciprocating Engine Overhaul
Airframe Inspection	Reciprocating Engine Maintenance Repair
Aircraft Welding	Advanced Aerospace Vehicle Structural Repair
Powerplant Inspection	Aerospace Accessory Systems Maintenance and Repair
Non-Metallic Structures: Dope, Fabric, and Finishing	Turbine Engine System
	Advanced Aerospace Engine System Maintenance and Repair
	Aircraft Finishing and Non-Destructive Inspection
	Aerospace Seminar
	Aerospace Vehicle Systems
	Reciprocating Engine Troubleshooting
	Turbine Engine Inspection and Troubleshooting
	Advanced Aerospace Vehicle Systems Overhaul
	Advanced Aerospace Accessory Systems Maintenance and Repair
	Aerospace Turbine Engine Maintenance and Overhaul

Source: Middle Tennessee State University



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Aviation/Flight Professional Pilot Programs

The three aviation/flight professional pilot programs selected for review are offered at Arizona State University, University of Oklahoma and Louisiana Tech University. The required aviation courses needed to complete the degree are shown in Exhibits 7 through 9 below.

Exhibit 7: Aviation Curriculum – Arizona State University: B.S. Aeronautical Management Technology (Professional Flight)

Lower Division	Upper Division
Introduction to Aeronautical Management Technology	Commercial Instrument/Ground School II
Private Pilot Ground School	Flight Instructor Ground School
Aviation Meteorology	Flight Instructor Instrument Ground School
Flight Safety I (Private Pilot Certificate)*	Air Transportation
Flight Safety II (Commercial Pilot Certificate/Instrument Rating)	Flight Safety III (Flight Instructor)
Commercial Instrument/Ground School I	Multiengine Pilot Ground School
Aerospace Structures, Materials, Systems	Flight Safety IV (Multi-Engine)
Air Traffic Control	Aviation Law/Regulations
Aircraft Powerplants	Aircraft Design & Logistics Management
	Air Navigation
	Aviation Professional
	National Aviation Policy
	Aviation Safety and Human Factors
	Airline Instrument Procedures
	Regional Jet Aircraft Systems
	Regional Jet Aircraft Systems II
	Internship
	Airline Administration
	Regional Jet Operations Capstone

* Flight Safety I and II → Private and Commercial Certificates with Instrument Rating

Source: Arizona State University

Exhibit 8: Aviation Curriculum – University of Oklahoma: B.S. Aviation Professional Pilot

Lower Division	Upper Division
Introduction to Aviation	Career Development for Aviation Professionals
Primary Flying (Private Certificate)	Commercial Aviation (Commercial Certificate)
Advanced Flying (build time)	Fundamentals of Instrument Flight
Secondary Flying (build time)	Survey of Aviation Law
The History of Aviation	Airport Operations Management
Aviation Safety	Instrument Flying (Instrument Rating)
	Multi-Engine Flying (Multi-Engine)
	Turbine Transition
	Crew Resource Management
	Commercial Flying
	Aviation Field Project (Capstone)
	Airline Management

Source: University of Oklahoma



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Exhibit 9: Aviation Curriculum – Louisiana Tech University: B.S. Professional Aviation

Lower Division	Upper Division
Private Pilot Ground I	Aerodynamics
Private Pilot Ground II	Aviation Law
Private Pilot Flight I	Air Carrier Systems
Private Pilot Flight II	Commercial Pilot Ground I
Introduction to Computers	Commercial Pilot Ground II
Instrument Pilot Ground I	Commercial Pilot Flight I
Instrument Pilot Ground II	Commercial Pilot Flight II
Instrument Flight I	Commercial Pilot Flight III
Instrument Pilot Flight II	Airport Planning and Management
Aircraft Powerplant Systems	Corporate Aviation
Aviation Weather	Human Factors in Aviation
Fixed Base Operations	Multi-Engine Ground
	Instructor Pilot Flight
	Flight Instructor Ground
	Aviation Safety
	Aviation Professionalism
	Air Carrier Operations
	The National Airspace System
	Airline Economics and Management
	The Government Role in Aviation

Source: Louisiana Tech University

The courses listed above are those required for completion of the degree. Many programs have additional aviation electives that can be taken but are not degree requirements. These are advanced aviation classes, including advanced flight ratings. In addition, the flight certificates required for degree completion vary by university program as does the number of credit hours given for flight ratings.

G. GENERIC CURRICULUM FROM 2003 TTI REPORT

The frequently-cited TTI report, *Aviation in Higher Education: The Development of a Comprehensive Aviation Management and Commercial Pilot Program in Texas*, reviewed the curriculums of several aviation programs across the country in an effort to develop a generic curriculum that could be used as a foundation by a university or college wishing to establish an aviation program. It addressed both aviation management and flight programs. This review predominantly included large, public universities because the original focus was on developing an aviation program at a state-sponsored university in Texas.

Summary comments include the following:

- The programs reviewed ranged in total credit hour requirements from 120 to 128;
- The number of aviation course credit hours in aviation management programs varies from 29 to 43 while the professional pilot programs varies from 27 to 78 hours;



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- Because the professional pilot programs have more aviation classes, they include flight and ground school courses as part of the curriculum. The additional units in the aviation management curriculum are made up by required courses from supporting departments which often include accounting, marketing, general business, political science, statistics, computer science, and speech/communications among others in colleges or schools of business, engineering, or education;
- A common core of classes emerged that was pertinent to both aviation management and flight programs. This included the following courses which are typically three credit hour, upper division courses:
 - Aviation History;
 - Air Transportation;
 - Airport Planning and Management;
 - Aviation Law;
 - Airline Administration/Operations;
 - Air Traffic Control;
 - Aviation Safety; and
 - Aviation Weather/Meteorology.

The core courses listed here are quite similar to those outlined by AABI in their curriculum criteria.

The 2003 TTI report also documented additional courses required in flight programs which include the following:

- Private Pilot Ground;
- Private Flight;
- Instrument Pilot Ground;
- Instrument Pilot Flight;
- Commercial Pilot Ground;
- Commercial Pilot Flight;
- Multi-Engine Pilot Ground;
- Multi-Engine Pilot Flight;
- Flight Instructor Ground; and
- Instructor Pilot Flight (CFI).

The optional courses that are dependent on the depth of the available flight training include those for instrument instructor and multi-engine instructor as follows:

- Instrument Flight Instructor Ground;
- Instrument Instructor Pilot Flight (CFII);
- Multi-Engine Instructor Pilot Ground; and
- Multi-Engine Instructor Pilot Flight (MEI).



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The naming and sequencing of flight courses vary between programs and, in some cases, certificate ratings may receive credit.

The TTI report also addresses the fact that many universities offer a variety of additional classes that are significant to some aspect of aviation. The report notes that many of these can enhance or supplement the core classes for both aviation management and professional pilot programs. These courses are also typically upper-division and three credit hours. They include:

- Air Cargo Management;
- General Aviation Management;
- Contemporary Issues in Aviation;
- Aviation Marketing;
- Aviation Finance;
- National Airspace System;
- Corporate Aviation;
- Fixed Base Operations;
- Aviation Professionalism;
- Aviation Capstone (Senior Project);
- Government Role in Aviation;
- Air Navigation;
- National Aviation Policy;
- Aviation Logistical Management;
- Human Factors;
- Flight Physiology;
- Introduction/Orientation to Aviation;
- Aviation Infrastructure;
- Air Transport Labor Management;
- Crew Resource Management; and
- Theory of Flight or Aerodynamics or equivalent.

The report concludes that existing aviation curriculum will be developed and expanded around existing resources in the academic department in which it resides. Its strengths and focus will, to a large extent, be related to where the program is located administratively within the university. Finally, in its review of existing aviation programs, the TTI report notes the importance of internship programs for both professional pilot and aviation management options. It also underlined the importance of student organizations that can prove helpful in the educational process and career networking.

H. UNIVERSITY OF NORTH TEXAS – AVIATION LOGISTICS PROGRAM

The University of North Texas, Denton is currently seeking final approval from the Texas Higher Education Coordinating Board (THECB) for a new aviation degree program. This B.S. in Aviation Logistics takes advantage of existing resources in the university's Department of Marketing and Logistics in the College of Business Administration. The program is coded in the Classification of Instructional Programs (CIP) as *Aeronautics/Aviation/Aerospace Science and Technology, General* (49.0101). According to program documentation, its graduates are



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expected to be prepared for employment in a variety of positions and industries including “entry and mid-level management positions related to flight crews, operations scheduling, air traffic control, airport management, air passenger, air freight, aviation safety, aviation maintenance, and public policy development.”

The new program calls for the development of 11 new aviation courses to support the existing academic curriculum. The degree program requires a total of 120 credit hours including a 27-unit, aviation logistics concentration. The program does not include any flight or operations focus at this time, but partnerships to do so with community colleges in the area are expected to be forthcoming. The aviation courses are:

- LGAV 2100, Introduction to Aviation Industry;
- LGAV 3110, Aviation Maintenance Programs;
- LGAV 3120, Aviation Safety;
- LGAV 3130, Air Cargo Planning and Control;
- LGAV 3140, Air Passenger Planning and Control;
- LGAV 3150, Aviation Law, Public Policy and Regulatory Environment;
- LGAV 3510, Private Pilot and General Aviation Concepts;
- LGAV 3520, Instrument Flying Concepts;
- LGAV 3530, Commercial Pilot Concepts;
- LGAV 4100, Airport & Infrastructure Planning and Control; and
- LGAV 4500, Human Factors and Cockpit Resource Leadership.

The first six courses listed are part of the aviation core. The others, part of two different areas of concentration, are taken as focus electives. Those choosing the *Analysis* focus area can take LGAV 4100 in addition to other management and decision science courses. Those choosing the *Control* focus area can take LGAV 3510, 3520, 3530, and 4500.

This program is a stand-alone, four-year degree program but also serves as a finishing school for those earning two-year degrees from aviation programs in the state. Transition into the four-year program could be facilitated, or streamlined, by a series of articulation agreements with the two-year aviation programs. The program is expected to start in Fall 2010.

I. COMPARISON/ANALYSIS OF SELECTED CURRICULUMS AND RECOMMENDED AVIATION PROGRAM CURRICULUMS

Existing curriculums have been refined and fully-developed to provide for a recommended program of study for each of the three specialty areas, based on review of: curriculums from selected schools; a generic curriculum proposed in the TTI report; the AABI accreditations standards and criteria; and, the existing literature related to aviation program curricula. The following aviation program curriculums are recommended for further study and implementation in North Central Texas.



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Aviation Management Curriculum

The recommended curriculum for aviation management is shown in Exhibit 10. The courses represent key topics that should be included in an aviation management program in order to provide students with the breadth and depth of exposure to aviation suitable for employment in a variety of aviation management functions. It should be noted that additional classes should accompany these aviation courses on a degree plan. Specifically, an aviation management program should include additional courses in management, marketing, and business, among others, relevant to the individual institution’s offerings and resources.

Exhibit 10: Recommended Curriculum – Aviation Management

Lower Division	Upper Division
Introduction to Aviation	Aviation Law and Ethics
Aviation History	Aviation Safety (Safety Management Systems)
Private Pilot Ground School	Airport Planning and Development
National Airspace System	Airport and Airline Operations
	Intermodal Transportation and Logistics
	Aviation Security
	International Aviation
	Air Transport Labor Management
	Aviation Capstone Course

Source: Av-Ed Team

Aviation Maintenance Management Curriculum

The development of a four-year aviation maintenance management curriculum is somewhat complicated due to the focus of lower-division courses centering on the Airframe & Powerplant (A&P) certification process. For this reason, it is recommended that the lower division coursework of such a curriculum achieve this outcome. Many two-year institutions that offer aviation maintenance curriculums are already focused on this objective. Specific program resources and facilities dictate the titles and sequence of the courses leading up to the certification. This coursework would be in conjunction with lower division, general education requirements of the institution. Following completion of the first two years and the A&P certification, students should have a choice as to pursue a track that focuses only on management or one that includes more advanced technical coursework in conjunction with some management courses. This differentiation is shown in Exhibit 11.

Students focusing on the management option would likely have some lower division deficiencies to make up as well as a maintenance management core to complete. Those wanting more advanced technical coursework would focus their upper-division efforts on additional courses in advanced electronics/electronic control systems, flight management systems, advanced materials/composites, and advanced propulsion systems, among others. Additional upper division electives, for either track, could take the form of other aviation courses or other upper division courses relevant to the program area and offered by the university, college or school.



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Two additional university programs/curriculums that should be consulted by those looking to establish an aviation maintenance management program include Embry-Riddle Aeronautical University and Southern Illinois University, Carbondale. Their aviation maintenance/technology management course offerings are substantial, and emulation would result in a high quality curriculum and program.

The small number of aviation maintenance/technology management programs in existence in the state could make such a program in North Central Texas attractive to students well beyond the region. Offering two tracks allows students to continue their education, in two needed areas, and create educated and skilled employees with advanced technical and managerial skills to serve the regional aviation and aerospace industry in both maintenance and manufacturing sectors.

Exhibit 11: Recommended Curriculum – Aviation Maintenance/Technology Management

Management	Advanced Technical
Lower Division	Lower Division
Accounting	As set forth in university's general education requirements
Computer Systems/Management Information Systems	
Business Law	
Marketing	Upper Division
Upper Division	Advanced Courses in:
Aviation Labor Relations	Aircraft Electronics
Aviation Maintenance Management	Electronic Control Systems
Production/Operations Management	Flight Management Systems
Project Management in Aviation Operations	Advanced Materials/Composites
Life Cycle Analysis of Aviation/Aerospace Systems	Advanced Propulsion Systems
Quality Control Systems Management (ISO 9000)	Advanced Communications Systems
Unmanned Aerospace Vehicle Systems	Advanced Navigation Systems
Maintenance, Repair, Overhaul (MRO) Program Management	Aviation Maintenance Management

Source: Av-Ed Team

Aviation/Flight Professional Pilot Curriculum

The recommended curriculum for an aviation/flight professional pilot program is shown in Exhibit 12. The curriculum is similar to the aviation management curriculum. Where management and business courses are included in the management curriculum, flight courses and ground schools are included in the flight curriculum. It is expected that students entering upper division courses would have a commercial pilot certificate and instrument rating. This means they have successfully completed private pilot, commercial pilot, and instrument pilot ground schools and related flight courses. They would either be awarded credit for such completion or would need to take additional lower division courses to meet the credit hour requirements if they were attempting to transfer the credit for flight ratings. Additional electives and course offerings are dependent on the resources and facilities of the given institution but could include additional flight ratings such as multi-engine flight instructor. Additionally, courses focusing on crew resource management, regional jet systems, and human factors are pertinent to flight programs and could be easily incorporated into a program.



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Exhibit 12: Recommended Curriculum – Aviation/Flight Professional Pilot

Lower Division	Upper Division
Introduction to Aviation	Aviation Law and Ethics
Aviation History	Aviation Safety (Safety Management Systems)
National Airspace System	Airport and Airline Operations
	Intermodal Transportation and Logistics
	Aviation Security
	International Aviation
	Air Transport Labor Management
	Multi-Engine Ground/Flight
	Flight Instructor Ground/Flight
	Instrument Flight Instructor Ground/Flight
	Aviation Capstone Course

Source: Av Ed Team

The development of any core curriculum is going to be dependent on the specific university's general education requirements and the offerings available in the aviation department and the school or college in which it resides. The available electives will also be determined by these factors, among others. The core curriculums, however, should largely resemble the courses recommended above. For additional information on aviation curriculums, core courses, and elective courses, those developing curriculums should consult the curriculums of AABI accredited programs.

Connections at the University, Community College, Trade School, and High School Levels

The existence of a seamless aviation education experience across all levels of learning is a worthy and achievable goal that will pay returns to students, employers, and the aviation community at large. The above curricula provide a roadmap for institutions wanting to establish programs at the university level. They allow for accommodations for students entering from two-year schools where they have earned an associate degree in business, A&P certificates or pilot certificates/ratings.

Establishing such relationships between two- and four-year schools can be accomplished easily, and in some cases in the state, they already have been established. These are largely done through articulation agreements between institutions where it is agreed upon, in advance, what classes will be accepted for credit in a particular program. This is beneficial for both schools as it conveys to students that their work will be accepted by four-year schools while allowing four-year schools to focus on upper-division curriculum, knowing the incoming students will be prepared because they have taken the prerequisites to many of the upper-level classes.



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Establishing connections from trade schools or high schools can be more difficult. Accepting credit from trade schools could present issues with accrediting agencies depending on the nature and the quality of the school. Programs looking to reach out to trade schools for a student pipeline or to accommodate students in their degree plans by recognizing work completed at trade schools should be aware of any implications that accepting credit may have on their own program's accreditation and academic reputation. If such arrangements are pursued, the program's faculty should be active in reviewing, revising, and establishing curriculum and other pertinent matters for the benefit of the student and the respective programs.

High schools often are engaged in dual-credit programs in conjunction with colleges and universities. Such programs allow high school students to take college classes or receive college credit for courses taken while still in high school. In some cases, students can graduate from high school and a community college at approximately the same time. While the technical nature of the courses involved in aviation programs may make this prohibitive, establishing and offering dual credit courses may help capture the interests of some students and put them on a path to an aviation career. It would also provide a pipeline of students from the high school environment. As with trade school agreements, the faculties of the institutions involved should work together to ensure program quality and the ease of transferring credit to facilitate the progress and development of the matriculating student.

The type collaborations and partnerships that exist between educational institutions should also exist between the business community and education institutions as part of the culture of these organizations. This strengthens the aviation industry by enhancing the value of its partnerships and relationships with educational organizations and recognizing academia's importance and role in the industry's overall success. These connections will be explored in detail in other reports that address program coordination, a strategic business plan for implementation, and additional outreach recruitment efforts.