

## AVIATION

### Aviation

College of Education

Department of Aviation

328 Armstrong Hall • 507-389-6116

Chair: Dr. Nihad Daidzic

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**Aviation Program Mission.** The mission of the Minnesota State Mankato Aviation program is to prepare principled professional aviation practitioners for responsible positions in the air transportation industry, including airline operations and management, corporate aviation, airport management, and government operations. The program aims to equip students to thrive in the rapidly changing and highly competitive fields of aviation and motivate them to engage in life long learning.

**Advising.** AVIA students will be assigned a AVIA faculty advisor following an initial or transfer orientation session. Faculty advising appointments may be scheduled through Karla Worden, Administrative Assistant in the Aviation Department Office. Mymique Baxter, College of Education Student Relations Coordinator, is also available for general education, cultural diversity, major admission and program completion (application for graduation) advisement. Students may make appointments through the College of Education Academic Advisement Office (Armstrong Hall 117). On-site airport advising is also available and hours will be posted.

**Admission to Major.** Coordinator for Admission to Major, Mymique Baxter, 117 Armstrong Hall.

All students must submit an unofficial transcript or DARS report (available at the Campus Hub).

Students must meet the following requirements:

- a minimum of 32 earned semester credit hours.
- a minimum cumulative GPA of 2.00.

Students may enroll in 100 and 200 aviation coursework prior to admission to major.

#### POLICIES/INFORMATION

**Flight Lab.** Flight lab completion requires evaluation by aviation faculty. Flight costs are determined on an hourly basis for aircraft and flight instruction. To obtain FAA certifications requires FAA exams which may require a fee.

**Transfer of college credit and credit for certificates and/or ratings.** The Minnesota State Mankato Department of Aviation bases its flight education philosophy in a four-year university degree. Consequently, students who have obtained flight certificates/ratings without earned college credit may not have satisfied the academic and flight requirements for the aviation major. Students must demonstrate that they have received the full breadth and depth of knowledge, skills, abilities, and attitudes consistent with an education received at Minnesota State Mankato. Once enrolled at Minnesota State Mankato, students are expected to complete all subsequent flight training within Minnesota State Mankato's aviation program.

**Transfer credits.** To satisfy aviation curriculum requirements, students with pilot certificates and ratings earned with college credit through a Council on Aviation Accreditation (CAA) accredited university may transfer those credits without demonstration of proficiency. College credits obtained through a non CAA accredited institution will be reviewed by the Department of Aviation to ensure the issuing institution follows policies and practices consistent with CAA accreditation standards. In the event credits do not transfer, students may be required to follow Credit for Experience procedures.

**Prior Experience.** Students entering Minnesota State Mankato with completed

FAA certificates must register for and complete the requirements for the applicable ground school and flight lab courses. Prior flight experience will be evaluated by the faculty and may result in advanced standing in flight labs. Students are responsible for aircraft rental required for the evaluation.

**GPA Policy.** Admission to College of Education, 2.0 cumulative GPA.

**P/N Grading Policy.** Only elective and general education courses may be taken P/N, unless offered P/N only.

#### AVIATION BS

##### Major Common Core

AVIA	100	World of Aviation (3)
AVIA	155	Basic Pilot Theory (4)
AVIA	205	Introduction to Air Transportation (3)

##### Major Emphasis: Professional Flight Concentration

AVIA	151	Private Pilot Flight Lab (3)
AVIA	201	Theory of Flight (3)
AVIA	202	Principles of Air Navigation (3)
AVIA	245	Instrument Pilot Theory (3)
AVIA	251	Commercial Pilot Flight Lab (3)
AVIA	255	Advanced Pilot Theory (3)
AVIA	261	Instrument Pilot Flight Lab (3)
AVIA	339	Aerospace Propulsion (3)
AVIA	371	Multi-Engine Flight Lab (1)
AVIA	436	Advanced Flight Operations (3)
AVIA	438	Flight Engineer (3)
AVIA	440	Regional Airline Operations (3)
AVIA	450	Airline Transport Pilot (3)
AVIA	451	Airline Transport Pilot Flight Lab (2)
GEOG	217	Weather (3)

##### CHOOSE 1 CLUSTER

###### Professional Flight options

Choose one option of 6 credits

(Choose 6 credits)

AVIA	380	Flight Instructor (3)
AVIA	381	Flight Instructor Flight Lab (1)
AVIA	382	Multi-Engine Instructor Flight Lab (1)
AVIA	391	Instrument Instructor Flight Lab (1)
(Choose 6 credits)		
AVIA	333	Airline Operations (3)
AVIA	442	Fundamentals of Air Traffic Control (3)

##### CHOOSE 1 CLUSTER

###### Professional Pilot electives

(Choose 16 credits)

GEOG	218	Weather Laboratory (1)
AVIA	333	Airline Operations (3)
AVIA	336	Basic Avionics and Mechanics (3)
AVIA	380	Flight Instructor (3)
AVIA	381	Flight Instructor Flight Lab (1)
AVIA	382	Multi-Engine Instructor Flight Lab (1)
AVIA	391	Instrument Instructor Flight Lab (1)
AVIA	437	Aviation Safety (4)
AVIA	442	Fundamentals of Air Traffic Control (3)
AVIA	443	Airline Dispatch (3)
AVIA	445	Aviation Resource Management (3)
AVIA	337	Avionics (3)
AVIA	455	Aircraft Performance (3)
AVIA	458	Aeromedical Factors (3)
AVIA	275	Helicopter Flight Theory (3)

##### Major Emphasis: Aviation Management Concentration

AVIA	334	Aviation Management (4)
AVIA	343	Airport Management (3)

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AVIA	432	Aviation Law (3)
AVIA	435	Aviation Insurance (3)
AVIA	437	Aviation Safety (4)
AVIA	442	Fundamentals of Air Traffic Control (3)
AVIA	443	Airline Dispatch (3)
AVIA	445	Aviation Resource Management (3)

### CHOOSE 2 CLUSTER

#### Business Foundation courses

Students either complete 28 credits of business foundation or approved minor. If the approved minor is less than 28 credits make up the difference to 28 credits from the Aviation Management electives.

ACCT	217	Survey of Financial and Managerial Accounting (4)
BLAW	200	Legal, Political, and Regulatory Environment of Business (3)
ECON	201	Principles of Macroeconomics (3)
ECON	202	Principles of Microeconomics (3)
MGMT	200	Introduction to MIS (3)
MGMT	330	Principles of Management (3)
MRKT	310	Principles of Marketing (3)
FINA	362	Business Finance (3)
IBUS	380	Principles of International Business (3)

#### Aviation Management electives

(Choose 12 credits)

GEOG	217	Weather (3)
GEOG	218	Weather Laboratory (1)
AVIA	333	Airline Operations (3)
AVIA	497	Aviation Internship (1-12)
AVIA	499	Individual Study in Aviation (1-6)
AVIA	336	Basic Avionics and Mechanics (3)
AVIA	201	Theory of Flight (3)
AVIA	202	Principles of Air Navigation (3)
AVIA	338	Aircraft Systems (3)
AVIA	339	Aerospace Propulsion (3)
AVIA	458	Aeromedical Factors (3)

**Required Minor: None.**

### PROFESSIONAL PILOT CERTIFICATE (CERT)

#### **Major Common Core**

AVIA	150	Private Pilot (4)
AVIA	201	Theory of Flight (3)
AVIA	202	Principles of Air Navigation (3)
AVIA	240	Instrument Pilot (3)
AVIA	250	Commercial Pilot (3)
GEOG	217	Weather (3)
GEOG	218	Weather Laboratory (1)

#### **Major Restricted Electives**

CHOOSE 2 CLUSTER:

#### Helicopter or Airplane

Select one group, either the helicopter option (12 credits) or the airplane option (10 credits).

(Choose 12 credits)

AVIA	152	Private Pilot Helicopter Flight Lab (3)
AVIA	242	Instrumental Pilot Helicopter Flight Lab (3)
AVIA	252	Commercial Pilot Helicopter Flight Lab (3)
AVIA	270	Helicopter Pilot (3)

(Choose 10 credits)

AVIA	151	Private Pilot Flight Lab (3)
AVIA	251	Commercial Pilot Flight Lab (3)
AVIA	261	Instrument Pilot Flight Lab (3)
AVIA	371	Multi-Engine Flight Lab (1)

#### Domestic or International Students

Pick one option. The first is intended for domestic students, the second offers courses in English for Aviation for non-native English speakers. Advisor approval is necessary for your selection.

(Choose 6 credits)

AVIA	100	World of Aviation (3)
AVIA	205	Introduction to Air Transportation (3)

(Choose 8 credits)

ENG	105	Advanced Academic English for Non-Native Speakers (4)
ENG	207	Special Topics in ESL (1-4)

### AERONAUTICS MINOR

Aeronautics is minor in Aviation obtained after completing 16 required aviation core courses and 10 aviation electives. The minor provides fundamentals of the Aeronautical and Aviation sciences that may result in the candidate obtaining pilot certificates provided the required flight training is completed and all practical tests passed.

#### **Minor Core**

Aviation minor consists of 16 core credits. Choose 12 credits from the aviation minor electives.

AVIA	100	World of Aviation (3)
AVIA	155	Basic Pilot Theory (4)
AVIA	201	Theory of Flight (3)
AVIA	202	Principles of Air Navigation (3)
AVIA	205	Introduction to Air Transportation (3)

#### **Minor Elective**

(Choose 12 credits)

AVIA	151	Private Pilot Flight Lab (3)
AVIA	245	Instrument Flight Theory (3)
AVIA	251	Commercial Pilot Flight Lab (3)
AVIA	255	Advanced Pilot Theory (3)
AVIA	261	Instrument Pilot Flight Lab (3)
AVIA	333	Airline Operations (3)
AVIA	334	Aviation Management (4)
AVIA	339	Aerospace Propulsion (3)
AVIA	343	Airport Management (3)
AVIA	371	Multi-Engine Flight Lab (1)
AVIA	432	Aviation Law (3)
AVIA	436	Advanced Flight Operations (3)
AVIA	437	Aviation Safety (4)
AVIA	438	Flight Engineer (3)
AVIA	440	Regional Airline Operations (3)
AVIA	442	Fundamentals of Air Traffic Control (3)
AVIA	443	Airline Dispatch (3)
AVIA	445	Aviation Resource Management (3)
AVIA	458	Aeromedical Factors (3)

### COURSE DESCRIPTIONS

#### **AVIA 101 (3) Introduction into Aeronautics**

A study of how aviation fits into our modern world, relation to business, and contribution to the economy. Study of aviation as a visible alternative in transportation.

Fall, Spring

#### **AVIA 150 (4) Private Pilot**

A study of basic aeronautical knowledge including principals of flight, aerodynamics, aviation regulations, weather, visual and instrument navigation, and emergencies. The course meets, but is not limited to, FAR part 61.105 (a, 1-6). Satisfactory completion of this course may result in an endorsement for the FAA Private Pilot written exam.

Fall, Spring

#### **AVIA 151 (3) Private Pilot Flight Lab**

Provides beginning flight student with the in-flight requirements needed to obtain the FAA Private Pilot's Certificate.

Fall, Spring

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### **AVIA 152 (3) Private Pilot Helicopter Flight Lab**

Provides initial flight student with the in-flight training requirements needed to obtain the FAA private Pilot Helicopter Certificate.

On-Demand

### **AVIA 155 (4) Basic Pilot Theory**

This course covers all the knowledge material required for the FAA private pilot certification at a deeper and more academic level.

Fall, Spring

### **AVIA 171 (1) Multi-Engine Flight Lab**

Prepares advanced flight student with the in-flight requirements needed to obtain the FAA Multi-Engine Pilot rating.

Pre: AVIA 151, or equivalent

Fall, Spring

### **AVIA 201 (3) Theory of Flight**

A study of physics and aerodynamic principals of flight and propulsion systems. The nature of aerodynamic forces are explained. Flight principals of lighter-than-Air, airplane, glider, rotocraft and powered lift are covered in detail.

Prereq: AVIA 101, AVIA 150

Fall, Spring

### **AVIA 202 (3) Principles of Air Navigation**

A study of fundamental air navigation principles and how it is applied to flight. Pilotage and dead reckoning. Great circle navigation. Charts and conformal projects. Celestial navigation systems and their operations and use.

Pre: AVIA 150

Spring

### **AVIA 205 (3) Introduction to Air Transportation**

Discusses various segments of the aviation industry, their associations, their regulators, and their impact on the economy. The course uses an historical perspective as well as current industry events to enlighten students to the many career opportunities in aviation today.

Fall, Spring

### **AVIA 240 (3) Instrument Pilot**

A study of the aeronautical knowledge including aviation regulations, weather, instrument navigation, and instrument emergencies. The course meets, but is not limited to, FAR part 61.65 (b, 1-4). Satisfactory completion of this course may result in an endorsement for the FAA Instrument Pilot written exam.

Pre: AVIA 150, or equivalent

Fall, Spring

### **AVIA 241 (3) Instrument Pilot Flight Lab**

Prepares advanced flight students with the in-flight requirements needed to obtain the FAA Instrument Pilot rating.

Pre: AVIA 151, or equivalent

Fall, Spring

### **AVIA 242 (3) Instrument Pilot Helicopter Flight Lab**

Prepares advanced flight students with the in-flight requirements needed to obtain the FAA Instrument Pilot Helicopter rating.

Pre: AVIA 152

On-Demand

### **AVIA 245 (3) Instrument Flight Theory**

This course covers all the knowledge material required for the FAA instrument pilot rating at a deeper and more academic level.

Pre: AVIA 155

Fall, Spring

### **AVIA 250 (3) Commercial Pilot**

A study of advanced aeronautical knowledge, including aerodynamics, aviation regulations, weather, visual and instrument navigation, and emergencies. The course meets, but is not limited to, FAR part 61.125 (a, 1-4). Satisfactory completion of this course may result in an endorsement for the FAA Commercial Pilot written exam.

Pre: AVIA 150, or equivalent

Fall, Spring

### **AVIA 251 (3) Commercial Pilot Flight Lab**

Prepares advanced flight students with the in-flight requirements needed to obtain the FAA Commercial Pilot's Certificate.

Pre: AVIA 151, or equivalent

Fall, Spring

### **AVIA 252 (3) Commercial Pilot Helicopter Flight Lab**

Prepares advanced flight students with the in-flight requirements needed to obtain the FAA Commercial Pilot Helicopter Certificate.

Pre: AVIA 152, AVIA 242

On-Demand

### **AVIA 255 (3) Advanced Pilot Theory**

This course covers all the knowledge material required for the FAA commercial pilot certification at a deeper and more academic level.

Pre: AVIA 155

Fall, Spring

### **AVIA 270 (3) Helicopter Pilot**

Study of Helicopter theory to meet FAA part 141 certification requirements for helicopter.

Pre: AVIA 150, AVIA 250, AVIA 260

On-Demand

### **AVIA 275 (3) Helicopter Flight Theory**

This course covers all the knowledge areas required for the FAA helicopter private, instrument and commercial pilot certification at a deeper and more academic level.

Pre: AVIA 155

Variable

### **AVIA 333 (3) Airline Operations**

Designed to cover the complex area of operation techniques and problems confronting the airlines today. Entails a study of marketing research, passenger trends, feasibility route studies, etc.

Fall, Spring

### **AVIA 334 (4) Airline Management**

Provides an understanding of management and financial techniques related to aviation businesses. Generally accepted and proven business techniques and proven business techniques are applied to the aviation setting.

Fall, Spring

### **AVIA 336 (3) Aircraft Structures and Design**

Introduces the fundamentals of design criteria for an aircraft. Design, strength and the structural stability of an airframe. Materials used for aircraft design. Loads on the airplane structure. Different structures using aluminum alloys and composite materials.

Fall

### **AVIA 337 (3) Avionics**

Principles of Avionics are an expanded course on the theory and Applications of Aviation Electronics for future pilots and students of aviation and aeronautics. The course highlights modern synthetic displays, navigation, automatic flight control, FMS, and other essential aircraft equipment.

Variable

**AVIA 338 (3) Aircraft Systems**

Hydraulic, pneumatic, electrical, pressurization, environmental, and other systems for large-transport category aircraft are covered. Also turbine engines, primary and secondary flight controls, and miscellaneous important systems are examined. Examples of systems in large transport-category jets will be discussed from the pilot operational perspective.

**AVIA 339 (3) Aerospace Propulsion**

The course provides basic principles of operation and components description of the traditional and modern propulsion systems used in atmospheric and space transportation vehicles. Reciprocating engines with propellers, turbine jet engines, and chemical rockets are covered.

Spring

**AVIA 340 (3) Flight Operations**

Introduces students to the operating procedures, systems applications, and techniques used in high performance and turbine aircraft for corporate and regional airline operations. Emphasis is on regulations, SOP's, aircraft systems, flight techniques, and operations of turboprop and regional jets.

Fall, Spring

**AVIA 343 (3) Airport Management**

Provides an understanding of management and operations techniques related to airports. Aspects of design, finance, planning and public relations are emphasized.

Spring

**AVIA 380 (3) Theory of Flight Instruction**

A study of the fundamentals of instruction including the learning process, effective teaching evaluation, course development, lesson planning, and instructing techniques. The course meets, but is not limited to, FAR part 61.187 (a, 1-6). Satisfactory completion of this course may result in an endorsement for the FOI and CFI-A written exam.

Pre: AVIA 150, AVIA 250, AVIA 260

Fall, Spring

**AVIA 381 (1) Flight Instructor Flight Lab**

Prepares advanced flight students with the in-flight requirements needed to obtain the FAA Certified Flight Instructor's Certificate.

Pre: AVIA 251 and AVIA 241, or equivalent

Fall, Spring

**AVIA 382 (1) Multi-Engine Instructor Flight Lab**

Prepares advanced flight students for the in-flight requirements needed to obtain the FAA Multi-Engine Flight Instructor's Certificate.

Pre: AVIA 251 and AVIA 241, or equivalent

Fall, Spring

**AVIA 383 (1) Flight Instructor Helicopter Flight Lab**

Prepares advanced flight students with the in-flight requirements needed to obtain the FAA Certified Flight Instructor Helicopter Certificate.

Pre: AVIA 252

On-Demand

**AVIA 391 (1) Instrument Instructor Flight Lab**

Prepares advanced flight students with the in-flight requirements needed to obtain the FAA Instrument Flight Instructor's Certificate.

Pre: AVIA 251 and AVIA 241, or equivalent

Fall, Spring

**AVIA 392 (1) Instrument Instructor Helicopter Flight Lab**

Prepares advanced flight students with the in-flight requirements needed to obtain the FAA Instrument Helicopter Flight Instructor Certificate.

Pre: AVIA 242, AVIA 252

On-Demand

**AVIA 432 (3) Aviation Law I**

To instruct the student relative to legal implications of aircraft ownership, leases, rentals, and overall aircraft operation. Emphasis is placed on the understanding of liability and negligence from the operator and pilot standpoints.

Spring

**AVIA 435 (3) Aviation Law II**

This course will take an in-depth look at several legal topics that touch the aviation industry. The course will use the case study method to look at several aviation-related cases, including commercial airline accidents, pilot certificate actions, airline security violation cases, international aviation law, and several other current legal matters that involve the airline industry.

Pre: AVIA 432

Spring

**AVIA 436 (3) Advanced Flight Operations**

Introduces advanced professional flight students to the standardized utilization and troubleshooting of systems and techniques used in high performance turbine aircraft. Emphasis is on SOP's, aircraft systems, flight techniques, and operations of narrow- and wide-body large transport category jets.

Pre: AVIA 340

**AVIA 437 (4) Aviation Safety**

The understanding and implementation of safe operating procedures. Assists the student in arriving at proper decisions related to periods of stress when operating as pilot in command. Various FAA regulations and standard and safe operating procedures are also discussed.

Fall

**AVIA 442 (3) Fundamentals of Air Traffic Control**

To provide the student with the basic knowledge of ATC as a career and the fundamentals necessary for FAA certification.

Fall

**AVIA 443 (3) Airline Dispatch**

Introduces the workings of the complex system of air control in the US and abroad. Covers such subjects as radio communications, airspace classification, radar control, and operation as well as aircraft separation. Looks at present and future air traffic control systems.

Spring

**AVIA 445 (3) Aviation Human Factors**

A study of various techniques designed to enhance management and leadership methods. Emphasizes decision-making and judgment skills as well as methods to improve effective communication and skills to develop a productive work environment for flight crew and other airline personnel.

Fall

**AVIA 450 (3) Professional Pilot Theory**

Introduces the technical training required for the operation of large transport-category aircraft in airline service. Aircraft performance, advanced aerodynamics, W&B, High-Altitude weather, regulations, SOP's, and advanced instrument flying techniques and procedures are covered. This course exceeds knowledge necessary to pass the FAA written test for the Airline Transport Pilot (ATP) Certificate.

Pre: AVIA 250, AVIA 260

Fall

**AVIA 451 (4) Professional Pilot Flight Lab**

Prepares students who desire careers as professional pilots. Emphasizes complete ground tutoring and flight instruction relating to instrument maneuvers, SOP's, regulation interpretation, pilot discipline, and professional procedures. Crew resource management, LOFT, and turbine-transition flights in an advanced jet flight simulator are used.

Pre: AVIA 241, AVIA 251

Fall, Spring

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### **AVIA 455 (3) Aircraft Performance**

The fundamental principles and calculation of the performance in various phases of flight: takeoff and land, climb and descent performance, maximum-range and maximum-endurance cruise, single-engine performance in multi-engine aircraft, standard atmosphere and basic subsonic and supersonic aerodynamics is covered.

Pre: AVIA 201

Variable

### **AVIA 458 (3) Aeromedical Factors**

Covers aeromedical factors that are essential for high-altitude flying aircraft. Hypoxia, hyperventilation, dysbarism, basic gas laws. Armstrong line, vision in flight, day and night. Pressurization systems, pressurized suits, danger of loss of cabin pressure, future HSCT and LEO commercial flights.

Variable

### **AVIA 490 (1-10) Aviation Workshop**

Variable

### **AVIA 497 (1-12) Aviation Internship**

Supervised experience in business, industry, state or federal institutions.

Fall, Spring

### **AVIA 499 (1-6) Individual Study in Aviation**

Allows the student an individual course of study on an aviation topic to be arranged with the department. This course will be writing intense.

Fall, Spring