



**MERCER**  
COUNTY COMMUNITY COLLEGE

# COURSE OUTLINE

<b>Course Number</b> AVI 111	<b>Course Title</b> Flight Concepts	<b>Credits</b> 2
<b>Hours: 2</b> Lecture	<b>Co- or Pre-requisite:</b> None	<b>Implementation</b> Fall 2023

**Catalog description:**

Study of the principles of flight and air navigation, evolution of modern aviation (civil and military), and the basic physiological difficulties experienced in flight. [occasional offering]

**General Education Category:**  
**Not GenEd**

**Course coordinator:**  
Deanna Lawson  
(609) 570-3487  
lawsond@mccc.edu

**Required texts & Other materials:**

1. Airplane Flying Handbook by FAA (Free to download or ISBN 978-1644250686)
2. Pilot's Handbook of Aeronautical Knowledge by FAA (Free to download or ISBN 978-1560277507)

Downloads available at [https://www.faa.gov/regulations\\_policies/handbooks\\_manuals](https://www.faa.gov/regulations_policies/handbooks_manuals)

**Course Student Learning Outcomes (SLO):**

***Upon successful completion of this course the student will be able to:***

1. Explain the evolution of modern aviation. The student will become familiar with origins of General and Military Aviation as well as Commercial Aviation. (Supports ILG #1, ILG #7, PLO #2, PLO #3, PLO #4, and PLO #5)
2. Explain the basic elements of flight including the theory of flight, aircraft engines, aircraft instruments, basic flight techniques, and aircraft performance. (Supports ILG #3 and PLO #1)
3. Explain the flight environment which includes, airports, airspace, communications and flight publications. (Supports ILG #3, ILG #4, and PLO #1)
4. Explain the basic principles of navigation that include chart interpretation, pilotage and dead reckoning, as well as radio aids to navigation. (Supports ILG #3, ILG #4 and PLO #1)
5. Explain the principles of weight and balance as well as acquire the ability to determine whether aircraft are safely loaded for flight. (Supports ILG #2, ILG #3, and PLO #1)
6. Explain the physiological factors of flight as well as in-flight emergencies and how they are handled. (Supports ILG #11)

**Course-specific Institutional Learning Goals (ILG):**

**Institutional Learning Goal 1. Written and Oral Communication in English.** Students will communicate effectively in both speech and writing.

**Institutional Learning Goal 2. Mathematics.** Students will use appropriate mathematical and statistical concepts and operations to interpret data and to solve problems.

**Institutional Learning Goal 3. Science.** Students will use the scientific method of inquiry, through the acquisition of scientific knowledge.

**Institutional Learning Goal 4. Technology.** Students will use computer systems or other appropriate forms of technology to achieve educational and personal goals.

**Institutional Learning Goal 7. History.** Students will understand historical events and movements in World, Western, non-Western or American societies and assess their subsequent significance.

**Institutional Learning Goal 11. Critical Thinking:** Students will use critical thinking skills understand, analyze, or apply information or solve problems.

### **Program Learning Outcomes for Aviation Technology (PLO)**

- 1 - Demonstrate the knowledge and skills required to obtain the private and commercial certificates and instrument rating, including aeronautical technical skills and decision-making, while demonstrating safety as their primary focus.
- 2 - Analyze the effects of social, political, and economic world events on air transportation and how this may impact the aviation industry and careers in aviation.
- 3 - Describe the events in the development of aviation to the present day and evaluate the impact of these events on today's society.
- 4 - Demonstrate effective and correct written and verbal communication.
- 5 - Research and present information pertinent to their aviation discipline individually and in teams.

### **Units of study in detail – Unit Student Learning Outcomes:**

UNIT I: HISTORY OF HUMAN FLIGHT (Supports Course SLO #1)

#### UNIT I OBJECTIVES:

The student will be able to:

1. Explain the development of airships and balloons.
2. Explain the development of Commercial Aviation, and the origins of General Aviation, which include: For Commercial Aviation— selected Milestones, Growth Triggered by Jet Transportation, Airline Support Personnel, Airline Flight Crew, and future of Commercial Aviation. For General Aviation—Ballooning, Soaring, Parachuting, types of aircraft, and future of General Aviation.
3. Explain Military Aviation from World War I to the present.
4. Explain the development of Modern Aircraft and their Economical, Social, and Political contributions.

UNIT II: INTRODUCTION TO THE AIRPLANE (Supports Course SLO #2)

#### UNIT II OBJECTIVES:

The student will be able to:

1. Distinguish between different varieties of aircraft.
2. Define the major components of the airplane and engine.
3. Define the forces acting on the aircraft.
4. Explain the basic theory of lift.
5. Define terms related to basic aerodynamics.
6. Define direct factors of basic aerodynamics, such as: the three axes, aircraft stability, torque effect, how the aircraft turns, functions of the primary and secondary flight controls and the principles behind them, and the relationship between load factors and stall speeds.
7. Define different factors affecting aircraft performance, such as effects of temperature, density altitudes, gross weight, and humidity.

8. Describe aircraft flight instruments.

UNIT III: AIRPORTS AND AIRSPACE (Supports Course SLO #3)

UNIT III OBJECTIVES:

The student will be able to:

1. Recognize the various types of airports, runways, runway markings, and lighting systems.
2. Explain basic radio communication procedures.
3. Recognize controlled airspace and the restrictions to flight.

UNIT IV: NAVIGATION (Supports Course SLO #4)

UNIT IV OBJECTIVES:

The student will be able to:

1. Define different forms of air navigation including pilotage, dead reckoning, and radio navigation.
2. Interpret information on aeronautical charts.
3. Explain general forms of radio navigation such as VOR and ADF.

UNIT V: WEIGHT AND BALANCE (Supports Course SLO #5)

UNIT V OBJECTIVES:

The student will be able to:

1. Understand the principles of weight and balance and their importance to flight safety.
2. Explain terms of weight and balance including datum, fulcrum, arm, moment gross weight, center of gravity, and useful load.
3. Calculate basic weight and balance problems using the computation, chart, or graph method.

UNIT VI: MEDICAL ASPECTS AND EMERGENCIES (Supports Course SLO #6)

UNIT VI OBJECTIVES:

The student will be able to:

1. Recognize the interrelationships between oxygen, altitude, and the body.
2. Understand the effects of motion with regard to g-forces, spatial disorientation, vertigo, and motion sickness.
3. Understand various factors affecting vision and flight safety.
4. Explain the flight effects of drugs and alcohol.
5. Understand various airborne emergencies including fires, forced landings, hijackings, decompressions, etc. and how they can be handled.
6. Explain the psychological limitations which may affect one's ability to perform safely as a required crew member aboard an aircraft.

### **Evaluation of student learning:**

Evaluation and grading will be based on the student's growth and comprehension of the subject matter contained in the course work and lectures. Tests, papers, class attendance and class participation will be considered for the final grading.

	% of Final Grade
2 Tests	40%
1 Final Examination	20%
1 Paper	30%
Attendance & Participation	<u>10%</u>
Total	100%

The paper to be written will consist of a topic to be selected with approval of the instructor. It will consist of a review of the literature, 4-6 pages in length, and typed with an appropriate bibliography.

The paper will be submitted prior to the end of the course.

#### **NOTE:**

1. Students are required to take all tests on the date scheduled. No make up tests Will be permitted except for extremely serious circumstances.
2. All students are expected to comply with MCCC's policy on Academic Integrity As explained in the Statement on Students' Rights and Responsibilities in the college catalog.