

COURSE OUTLINE

Aviation and Transportation 121 Navigation

Catalog Statement

AT 121 introduces the students to the aspect of dead reckoning and pilotage navigation using the aeronautical chart. Composite navigation and vector analysis using the flight computer familiarize the student with the practical features of navigation. Current and future methods of radio navigation are explained.

Total Lecture Units: 3.0

Total Laboratory Units: 0.0

Total Course Units: 3.0

Total Lecture Hours: 48.0

Total Laboratory Hours: 0.0

Total Laboratory Hours To Be Arranged: 0.0

Total Faculty Contact Hours: 48.0

Prerequisite: None.

Recommended Preparation: completion of AT 120 or possession of a private pilot's certificate.

Course Entry Expectations

Prior to enrolling in the course, the student should be able to:

- interpret aeronautical charts symbols;
- distinguish differences between courses and headings;
- solve problems on the slide rule face of the flight computer;
- solve problems on the wind face of the flight computer;
- demonstrate basic understanding of FAA flight rules related to airspace and navigation;
- evaluate situations that may be encountered in flight.

These objectives will meet the requirements established by the Federal Aviation Administration for the commercial pilot's knowledge of the navigation and the examination criteria in this outline.

Course Exit Standards

Upon successful completion of the required coursework, the student will be able to:

- plan flights, both locally and to distant locations;
- calculate aircraft weight and balance before flight, assess whether it is within limits, and correct an overweight or out of balance condition;
- review and interpret FAA flight briefings as they relate to the flight in question;
- obtain, collect and calculate the information required in FAA regulation §91.103.

Total Faculty Contact Hours = 48.0

Course Content

Review of navigation methods (1 hour)

- Dead reckoning and pilotage
- Radio navigation
- VFR charts

Regulatory requirements of flight planning (1 hour)

- Pre-flight actions
- The navigation log

Performance & wind calculations (8 hours)

- Atmospheric affects on aircraft performance
- Performance charts and graphs
- Interpolation
- Winds and temperatures aloft charts
- Wind correction angle

Flight briefings (3 hours)

- Telephone vs. online
- Types of briefings
- Requirements for obtaining weather briefings
- NOTAMS
- TFRs
- Traffic delays
- Navigation websites and apps

Weight & balance (4 hours)

- General techniques
- Type-specific techniques
- Weight and CG limits
- Effects of loading on aircraft handling

Use of the E6B flight computer (5 hours)

- Mechanical vs. electronic
- Functions
- Accuracy

Airspace (3 hours)

- Classes of airspace
- Special Use Airspace
- Special VFR operations
- Communication requirements
- Weather minimums

LAX Transition Routes (1 hour)

Flight in the San Diego area (1 hour)

Night Flight (1 hour)

Introduction to IFR (Instrument Flight Rules) flight planning (2 hours)

- IFR charts
- The National Airway System
- Flight plan requirements and filing

Aviation Security (2 hours)

- Airport security awareness

- Aircraft theft prevention
- Density altitude **(1 hour)**
 - The Gas Law
 - Calculating density altitude
 - Affects on performance
- Over water operations (flights to Catalina) **(1 hour)**
- Flights to destinations further than the fuel tanks will allow **(2 hours)**
- Selection and use of visual checkpoints **(3 hours)**
 - FAA requirements
 - Spacing
 - Designated VFR reporting points
 - Inappropriate visual checkpoints
 - Checkpoints at night and VFR over-the-top
- Use of radio navigation methods **(4 hours)**
 - VOR and VORTAC
 - GPS
 - Lost procedures
 - Future radio navigation
- Personal minimums **(2 hours)**
- Risk management **(3 hours)**
 - The go/no-go decision
 - Diversion
 - In-flight emergencies

Methods of Instruction

The following methods of instruction may be used in this course:

- lectures;
- reading assignments;
- guided discussion;
- in-class preparation of a flight plan;
- Internet and DVD videos;
- demonstrations.

Out of Class Assignments

The following out of class assignments may be used in this course:

- students complete 11 flight plans as homework assignments with varying difficulty, complexity and scenarios that address some of the most important considerations in local and long distance flights.

Methods of Evaluation

The following methods of evaluation may be used in this course:

- mid-term exam;
- final exam;

- homework;
- class participation.

Textbooks

Hayes, Michael. *Private Pilot Oral Exam Guide*. 10th ed.
Newcastle, WA: Aviation Supplies and Academics 2012. Print.
10th Grade Reading Level ISBN: 978-56027-949-5

Any current Private Pilot textbook is required. This may be from the FAA, Jeppesen, Machado, Kershner or other recognized author/publisher.

Student Learning Outcomes

Upon successful completion of the required coursework, the student will be able to:

- review, interpret and assess FAA weather briefings and determine their impact on the planned flight;
- read and interpret FAA charts and publications necessary for flight planning;
- plan flight route and with appropriate altitude for the flight;
- prepare general aviation navigation logs appropriate for flight;
- calculate aircraft weight and balance, assess whether it is within limits for the aircraft and provide what must be done to correct it if it is not.