APT A132: AVIATION NAVIGATION

Item	Value
Curriculum Committee Approval Date	12/09/2020
Top Code	302020 - Piloting
Units	3 Total Units
Hours	54 Total Hours (Lecture Hours 54)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	No
Grading Policy	Standard Letter (S)

Course Description

This course provides academic background for pilots preparing for the FAA Commercial Pilot license and FAA Instrument rating. The course will cover basic visual navigation, instrument navigation, use of Global Positioning Systems and an introduction to Flight Management Computers. Current Private Pilot Certificate will be verified by the Instructor at the first class meeting. Three hours. PREREQUISITE: APT A130; current Private Pilot Certificate (verified by the instructor at the first class meeting). Transfer Credit: CSU.

Course Level Student Learning Outcome(s)

1. A student who successfully completes this class will be able to explain the elements necessary to plan and execute a cross country flight under both visual or instrument flight rules.
2. The student who successfully completes this class will be able to, using an E-6B flight computer, perform calculations which solve time and distance problems, fuel consumption problems, wind drift correction problems and indicated to True Airspeed calculations.
3. The student who successfully completes this class will be able to explain the theory of Global Positioning System and its application to aircraft navigation.

Course Objectives

- 1. Solve problems by advanced methods of navigation: a. Course line computer b. Inverted navigation c. Radio navigation
- 2. Employ advanced methods to plot courses using pilotage, dead reckoning, and radio navigation.
- 3. Use flight conditions to solve in-flight calculations.
- 4. Analyze when point-to-point navigation is appropriate using GPS.
- 5. Diagnose when elements of the GPS system have failed and take appropriate actions.
- 6. Apply the principles of GPS navigation to both VFR and IFR flight planning.
- 7. Compare portable and panel mount GPS receivers and know when each would be appropriate.
- 8. Interpret the display indications of the GPS receiver to properly navigate along an airway and shoot an instrument approach.
- 9. Use flight planning skills to plan and prepare a cross-country flight log.
- 10. Explain advanced navigation systems including EFIS and FMS etc.

Lecture Content

Latitude and Longitude Chart projections for Air Navigation Charts and chart reading Dead reckoning Pilotage Special problems of dead reckoning E-6B air navigation computer Basic radio navigation Radio bearings The VHF Omni range Radio direction findings – ADF Theory of GPS Ranging-TOA GPS ranging Clock bias Position and time computations Signal acquisition and use Accuracy of GPS Differential GPS GPS Applications Aviation regulations and TSOs FRP-system integrity (Federal Radio navigation Plan) Timetable for implementation Flight Management Computer Systems

Method(s) of Instruction

- Lecture (02)
- DE Live Online Lecture (02S)
- DE Online Lecture (02X)

Instructional Techniques

Lecture and application of ideas, slide and multimedia presentations, equipment demonstrations

Reading Assignments

Reading assignments pertain to the textbook required for the course and any related material each student needs to review for each lecture session.

Writing Assignments

Short answer written homework assignments will be used to demonstrate writing proficiency. As a final project, the student will plan a complete instrument flight, including analyzing weather, route planning, navigation, communications, and aircraft performance. Critical thinking skills will be emphasized as the student deals with alternate airports, weather changes, and communications problems, applying principles learned in the course.

Out-of-class Assignments

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Demonstration of Critical Thinking

Written examinations Homework. Problem solving exercises

Required Writing, Problem Solving, Skills Demonstration

Short answer written homework assignments will be used to demonstrate writing proficiency. As a final project, the student will plan a complete instrument flight, including analyzing weather, route planning, navigation, communications, and aircraft performance. Critical thinking skills will be emphasized as the student deals with alternate airports, weather changes, and communications problems, applying principles learned in the course.

Textbooks Resources

1. Required Clausing, Donald. Aviators Guide to Navigation, ed. Columbus, Ohio: McGraw-Hill, 2007 2. Required FAA. Aeronautical Chart Users Guide, ed. Oklahoma City, OK: FAA, 2006 Rationale: -

Other Resources

1. L3/L4 Low Altitude Enroute Chart, NOAA 2. Los Angeles VFR Sectional Chart 3. E-6B Flight Computer 4. Course Plotter 5. Navigational dividers