AT123 : Aircraft Structure And Aerodynamics

General Information

Author:	• Curtis G Potter
Course Code (CB01) :	AT123
Course Title (CB02) :	Aircraft Structure And Aerodynamics
Department:	AT
Proposal Start:	Fall 2024
TOP Code (CB03) :	(3020.20) Piloting
CIP Code:	(49.0102) Airline/Commercial/Professional Pilot and Flight Crew.
SAM Code (CB09) :	Clearly Occupational
Distance Education Approved:	No
Will this course be taught asynchronously?:	No
Course Control Number (CB00) :	CCC000284445
Curriculum Committee Approval Date:	05/22/2024
Board of Trustees Approval Date:	07/16/2024
Last Cyclical Review Date:	05/22/2024
Course Description and Course Note:	AT 123 provides the pilot with the necessary understanding of the aerodynamics of the aircraft and of the construction techniques and processes involved in the building of aircraft. This course meets the requirements for commercial pilots in the study of aircraft.
Justification:	Mandatory Revision
Academic Career:	• Credit
Mode of Delivery:	
Author:	Curtis G Potter
Course Family:	

Academic Senate Discipline

Primary Discipline:	• Aviation (Flight, navigation, ground school, air traffic control)
Alternate Discipline:	• Aeronautics
Alternate Discipline:	No value

Course Development

Basic Skill Status (CB08)

Course is not a basic skills course.

☐ Allow Students to Gain Credit by Exam/Challenge

Course Special Class Status (CB13)

Course is not a special class.

Pre-Collegiate Level (CB21)

Not applicable.

Grading Basis

- Grade with Pass / No-Pass Option

Course Support Course Status (CB26)

Course is not a support course

General Education and C-ID

General Education Status (CB25)

Not Applicable

Transferability

Transferable to CSU only

Transferability Status

Approved

Units and Hours

Summary

Minimum Credit Units (CB07)	3
Maximum Credit Units (CB06)	3
Total Course In-Class (Contact) Hours	54
Total Course Out-of-Class Hours	108
Total Student Learning Hours	162

Credit / Non-Credit Options

Course Type (CB04)

Credit - Degree Applicable

Noncredit Course Category (CB22)

Credit Course.

Noncredit Special Characteristics

No Value

Course Classification Code (CB11)

Credit Course.

☐ Variable Credit Course

Funding Agency Category (CB23)

Not Applicable.

☐ Cooperative Work Experience Education Status (CB10)

Weekly Student Hours

	In Class	Out of Class
Lecture Hours	3	6
Laboratory Hours	0	0
Studio Hours	0	0

Course Student Hours

Course Duration (Weeks)	18
Hours per unit divisor	0
Course In-Class (Contact) Hours	
Lecture	54
Laboratory	0
Studio	0

Total	54

Course Out-of-Class Hours

Lecture	108
Laboratory	0
Studio	0
Total	108

Time Commitment Notes for Students

No value

Units and Hours - Weekly Specialty Hours

Activity Name	Type	In Class	Out of Class
No Value	No Value	No Value	No Value

Pre-requisites, Co-requisites, Anti-requisites and Advisories

Advisory

AT120 - Private Pilot Ground School

Outcomes

- Demonstrate an understanding of aerodynamics and the science of flight.
- Demonstrate basic engine operating principles.

Entry Standards

Entry Standards

Course Limitations

Cross Listed or Equivalent Course

Specifications

Methods of Instruction

Methods of Instruction	Lecture
Methods of Instruction	Discussion
Methods of Instruction	Multimedia
Methods of Instruction	Collaborative Learning
Methods of Instruction	Demonstrations
Methods of Instruction	Guest Speakers

Out of Class Assignments

- Written examinations following each module
- Research project (e.g. aircraft design or propulsion)

Methods of Evaluation	Rationale
Exam/Quiz/Test	Midterm examinations
Project/Portfolio	Research projects
Presentation (group or individual)	Presentations
Writing Assignment	Written assignments
Exam/Quiz/Test	Final examination

Textbook Rationale

Aerodynamics for Aviators is the latest edition.

Textbooks

Author	Title	Publisher	Date	ISBN
Mark Dusenbury	Aerodynamics for Aviators	Aviation Supplies & Academics, Inc.	2016	978-1-61954-333-1
Dale Crane	A Pilot's Guide to Aircraft and Their Systems	Aviation Supplies & Academics, Inc.	2020	9781619547711

Other Instructional Materials (i.e. OER, handouts)

No Value

Materials Fee

No value

Learning Outcomes and Objectives

Course Objectives

Predict the efficiency and effect of airfoil components.

Restate the physical laws as they apply to flight.

Evaluate aircraft performance.

Summarize aircraft stability characteristics.

Solve practical problems involving weight and balance.

Compare and contrast a stall and a spin.

SLOs

Identify the laws of physics related to flight, and the structural engineering of an aircraft. Expected Outcome Performance: 70.0

ILOs Core ILOs	Demonstrate depth of knowledge in a course, discipline, or vocation by applying practical knowledge, skills, abilities, theories, or methodologies to solve unique problems.

Explain the effects of exceeding the structural or aerodynamic limitations of an airplane. Expected Outcome Performance: 70.0

ILOs Core ILOs	Demonstrate depth of knowledge in a course, discipline, or vocation by applying practical knowledge, skills, abilities, theories, or methodologies to solve unique problems.

Correlate aircraft performance and the factors that affect it. Expected Outcome Performance: 70.0

ILOs Core ILOs	Analyze and solve problems using critical, logical, and creative thinking; ask questions, pursue a line of inquiry, and derive conclusions; cultivate creativity that leads to innovative ideas.
	Demonstrate depth of knowledge in a course, discipline, or vocation by applying practical knowledge, skills, abilities, theories, or methodologies to solve unique problems.

Additional SLO Information

Does this proposal include revisions that might improve student attainment of course learning outcomes?

No

Is this proposal submitted in response to learning outcomes assessment data?

No

If yes was selected in either of the above questions for learning outcomes, explain and attach evidence of discussions about learning outcomes.

No Value

SLO Evidence

No Value

Course Content

Lecture Content

Aerodynamics (27 hours)

- The Four Forces
- Lift
- Bernoulli's Principle
- Newton's Third Law
- Downwash
- Factors Affecting Lift
    - Angle of Attack
    - Airfoil Shape and Area
    - Air Density
    - Airspeed
- Stalls
    - A Condition of the Airfoil
    - How the Stall Occurs
    - Airflow and Stall Progression
    - Recognition and Recovery
- Thrust
    - How Produced
    - Factors Affecting Thrust
- Weight/Gravity
- Constant
- Changes During Maneuvers
- Centrifugal Force
- Drag
    - Parasitic
    - Induced
- Aircraft Stability
    - Longitudinal
    - Lateral
    - Directional
- Operational Effects
- Ground Effect
- Density Altitude

        - Determination
        - Operations
- Region of Reversed Command
- Aerodynamics Effects on:
    - Climbs
    - Best Angle (VX)
    - Best Rate (VY)
    - Turns
    - Performance
- Forces
- Glides

Aircraft Structures (27 hours)

- Types of Structures
    - Monocoque
    - Semi-Monocoque
    - Composite
- Structural Integrity
    - In-flight stress/loads
    - Where Strength Comes From
    - In-flight loads
    - Maneuvers
    - Turbulent Air
- Aircraft Component Units
    - Landing Gear – Shock Struts
    - Wings
    - Fuselage
    - Empennage
    - Powerplant/Mounts
    - Aircraft Rigging
    - Engine Mounts
- Angle of Incidence
- Tail
- Offset Vertical Stabilizer
- Dihedral/Anti-Hedral
- Control Surfaces
    - Ailerons
        - Type and Balance
    - Rudders and Ruddervators
    - Elevators and Elevons
    - Stabilators
    - Airfoil Flaps
    - Trim Tabs

Total hours: 54

Additional Information

Is this course proposed for GCC Major or General Education Graduation requirement? If yes, indicate which requirement in the two areas provided below.

No

GCC Major Requirements

No Value

GCC General Education Graduation Requirements

No Value

Repeatability

Not Repeatable

Justification (if repeatable was chosen above)

No Value

Resources

Did you contact your departmental library liaison?

Yes

If yes, who is your departmental library liason?

Adina Lerner (Technology & Aviation, Visual & Performing Arts)

Did you contact the DEIA liaison?

Yes

Were there any DEIA changes made to this outline?

No

If yes, in what areas were these changes made:

No Value

Will any additional resources be needed for this course? (Click all that apply)

- No

If additional resources are needed, add a brief description and cost in the box provided.

No Value