



# **AVAT12006 Commercial Pilot Licence**

## **Aerodynamics & Aircraft General Knowledge**

### **Term 1 - 2024**

Profile information current as at 11/05/2024 09:29 pm

All details in this unit profile for AVAT12006 have been officially approved by CQUniversity and represent a learning partnership between the University and you (our student). The information will not be changed unless absolutely necessary and any change will be clearly indicated by an approved correction included in the profile.

## **Corrections**

### **Unit Profile Correction added on 27-02-24**

The Unit learning outcomes (amended to include AGK syllabus) 1. Explain the aerodynamic properties of an aerofoil and application of Coanda effect and Bernoulli's theorem. 2. Examine the forces, moments and the factors that affect the stability and control of an aircraft in flight. 3. Determine the performance aspects of power, weight, and speed in flight maneuvers including stalls and spin. 4. Explain the operation and construction of aircraft piston engine power plants. 5. Describe the operation and function of a typical small aircraft's mechanical systems, pressure/gyro flight instruments and aeronautical radio systems. 6. Convert between various airspeeds such as Indicated Airspeed, Rectified Airspeed, Calibrated Airspeed, Equivalent Airspeed, and True Airspeed

## General Information

### Overview

This unit will provide you with the knowledge of aerodynamics relevant for low altitude, sub-sonic flight in piston engine aircraft and the knowledge of small commercial aircraft power plants and systems. You will cover the aeronautical knowledge requirements of the Civil Aviation Safety Authority Commercial Pilot Licence aerodynamics as well as the General Aeronautical Knowledge syllabus. You will study the aerodynamic properties of an aerofoil and how it produces lift and drag. You will also study the forces and moments acting on an aeroplane in flight and how these affect an aeroplane's stability and controllability. Normal and abnormal flight characteristics and performance will also be studied. Topics you will study in depth include piston engine power plants and propellers. You will learn about aircraft electrical and hydraulic systems, fuel systems, and ice and rain protection systems. You will also become familiar with flight and navigation instruments.

### Details

Career Level: *Undergraduate*

Unit Level: *Level 2*

Credit Points: 6

Student Contribution Band: 8

Fraction of Full-Time Student Load: 0.125

### Pre-requisites or Co-requisites

Students must meet all requisites: 1. AVAT11002 Basic Aeronautical Knowledge OR (AVAT11012 Aviation Practice AND AVAT11013 Introduction to Aviation); AND 2. AVAT11005 Flight Fundamentals; AND 3. AVAT11010 Aviation Safety Fundamentals OR AVAT11007 Flight Planning, Performance, and Operation.

Important note: Students enrolled in a subsequent unit who failed their pre-requisite unit, should drop the subsequent unit before the census date or within 10 working days of Fail grade notification. Students who do not drop the unit in this timeframe cannot later drop the unit without academic and financial liability. See details in the [Assessment Policy and Procedure \(Higher Education Coursework\)](#).

### Offerings For Term 1 - 2024

- Cairns
- Online

### Attendance Requirements

All on-campus students are expected to attend scheduled classes – in some units, these classes are identified as a mandatory (pass/fail) component and attendance is compulsory. International students, on a student visa, must maintain a full time study load and meet both attendance and academic progress requirements in each study period (satisfactory attendance for International students is defined as maintaining at least an 80% attendance record).

### Website

[This unit has a website, within the Moodle system, which is available two weeks before the start of term. It is important that you visit your Moodle site throughout the term. Please visit Moodle for more information.](#)

## Class and Assessment Overview

### Recommended Student Time Commitment

Each 6-credit Undergraduate unit at CQUniversity requires an overall time commitment of an average of 12.5 hours of study per week, making a total of 150 hours for the unit.

### Class Timetable

#### [Regional Campuses](#)

Bundaberg, Cairns, Emerald, Gladstone, Mackay, Rockhampton, Townsville

#### [Metropolitan Campuses](#)

Adelaide, Brisbane, Melbourne, Perth, Sydney

### Assessment Overview

#### 1. **Written Assessment**

Weighting: 20%

#### 2. **Online Quiz(zes)**

Weighting: 20%

#### 3. **Examination**

Weighting: 60%

### Assessment Grading

This is a graded unit: your overall grade will be calculated from the marks or grades for each assessment task, based on the relative weightings shown in the table above. You must obtain an overall mark for the unit of at least 50%, or an overall grade of 'pass' in order to pass the unit. If any 'pass/fail' tasks are shown in the table above they must also be completed successfully ('pass' grade). You must also meet any minimum mark requirements specified for a particular assessment task, as detailed in the 'assessment task' section (note that in some instances, the minimum mark for a task may be greater than 50%). Consult the [University's Grades and Results Policy](#) for more details of interim results and final grades.

## CQUniversity Policies

**All University policies are available on the [CQUniversity Policy site](#).**

You may wish to view these policies:

- Grades and Results Policy
- Assessment Policy and Procedure (Higher Education Coursework)
- Review of Grade Procedure
- Student Academic Integrity Policy and Procedure
- Monitoring Academic Progress (MAP) Policy and Procedure – Domestic Students
- Monitoring Academic Progress (MAP) Policy and Procedure – International Students
- Student Refund and Credit Balance Policy and Procedure
- Student Feedback – Compliments and Complaints Policy and Procedure
- Information and Communications Technology Acceptable Use Policy and Procedure

This list is not an exhaustive list of all University policies. The full list of University policies are available on the [CQUniversity Policy site](#).

## Previous Student Feedback

### Feedback, Recommendations and Responses

Every unit is reviewed for enhancement each year. At the most recent review, the following staff and student feedback items were identified and recommendations were made.

#### Feedback from Lecture and email

**Feedback**

Require more worked examples

**Recommendation**

Add more worked examples and discuss them in tutorials.

## Unit Learning Outcomes

**On successful completion of this unit, you will be able to:**
























1. Explain the aerodynamic properties of an aerofoil
2. Apply the Coanda effect and Bernoulli's theorem to demonstrate and calculate how an aerofoil produces lift and drag
3. Examine the forces and moments acting on an aircraft in all stages of flight
4. Discuss the factors that affect the stability and control of an aircraft in flight
5. Determine the performance aspects of power, weight, and speed in flight maneuvers
6. Explain the factors that affect the stall and spin characteristics of an aeroplane.

N/A. No external accreditation.

## Alignment of Learning Outcomes, Assessment and Graduate Attributes

 N/A Level	 Introductory Level	 Intermediate Level	 Graduate Level	 Professional Level	 Advanced Level
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### Alignment of Assessment Tasks to Learning Outcomes

Assessment Tasks	Learning Outcomes					
	1		2		3	4 5 6
1 - Communication						
2 - Problem Solving						
3 - Critical Thinking						
4 - Information Literacy						
5 - Team Work						
6 - Information Technology Competence						
7 - Cross Cultural Competence						
8 - Ethical practice						
9 - Social Innovation						
10 - Aboriginal and Torres Strait Islander Cultures						

## Textbooks and Resources

### Textbooks

AVAT12006

#### Prescribed

##### **Aerodynamics for Private and Commercial Pilots Licences**

Edition: 1st (2015)

Authors: David Robson

Aviation Theory Centre

Australia

ISBN: 978-1-8755-37-83-9

Binding: Paperback

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#### Supplementary

##### **Flight Physics**

(2002)

Authors: E Torenbeek and H. Wittenberg

Springer

London , United Kingdom

ISBN: 978-1-4020-8663-2 and e-978-1-4020-8664-9

Binding: Hardcover

[View textbooks at the CQUniversity Bookshop](#)

### IT Resources

**You will need access to the following IT resources:**

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)

## Referencing Style

**All submissions for this unit must use the referencing styles below:**

- [Harvard \(author-date\)](#)
- [American Psychological Association 7th Edition \(APA 7th edition\)](#)

For further information, see the Assessment Tasks.

## Teaching Contacts

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## Schedule

### Week 1 - 04 Mar 2024

Module/Topic	Chapter	Events and Submissions/Topic
Introduction Overview and Definitions Aerodynamic Principles.	Aerodynamics: Chapter 1	

**Week 2 - 11 Mar 2024**

Module/Topic	Chapter	Events and Submissions/Topic
Lift and Lift Augmentation Drag and L/D Ratio.	Aerodynamics: Chapter 1	

**Week 3 - 18 Mar 2024**

Module/Topic	Chapter	Events and Submissions/Topic
Stability and Control Balance and Trim.	Aerodynamics: Chapter 3 and 4	Quiz 1 opened.

**Week 4 - 25 Mar 2024**

Module/Topic	Chapter	Events and Submissions/Topic
Straight Flight Turning Flight.	Aerodynamics: Chapter 5 and 6	None

**Week 5 - 01 Apr 2024**

Module/Topic	Chapter	Events and Submissions/Topic
Stalling Spinning and Spiral Dives Effects of Atmospheric Disturbances.	Aerodynamics: Chapter 7 and 8	Quiz 1 closes Quiz 2 opened.

**Vacation Week - 08 Apr 2024**

Module/Topic	Chapter	Events and Submissions/Topic
No lectures	Review material from the first 5 weeks.	None

**Week 6 - 15 Apr 2024**

Module/Topic	Chapter	Events and Submissions/Topic
Powerplant and Systems	Aircraft General Knowledge: Chapters 2, 3 and 4	Quiz 2 closes Quiz 3 opened

**Week 7 - 22 Apr 2024**

Module/Topic	Chapter	Events and Submissions/Topic
Propellers, Lubrication and Cooling Systems.	Aircraft General Knowledge: Chapter 5, 7 and 6.	None <b>Written Assignment</b> Due: Week 7 Monday (22 Apr 2024) 11:59 pm AEST

**Week 8 - 29 Apr 2024**

Module/Topic	Chapter	Events and Submissions/Topic
Electrical, Environmental, and Fire Protection Systems.	Aircraft General Knowledge: Chapter 9, 11 and 12	Quiz 3 closes Quiz 4 opens

**Week 9 - 06 May 2024**

Module/Topic	Chapter	Events and Submissions/Topic
Fuel Systems Hydraulic Systems and Undercarriage.	Aircraft General Knowledge: Chapter 8 and 10.	None

**Week 10 - 13 May 2024**

Module/Topic	Chapter	Events and Submissions/Topic
Flight Instruments.	Aircraft General Knowledge: Chapters 13, 14 and 15.	Quiz 4 closes Quiz 5 opens

**Week 11 - 20 May 2024**

Module/Topic	Chapter	Events and Submissions/Topic
Automatic Flight Radio Waves and Aeronautical Radio Telephony.	Aircraft General Knowledge: Chapter 16 and 17.	None

### Week 12 - 27 May 2024

Module/Topic	Chapter	Events and Submissions/Topic
Revision - Aerodynamics and AGK topics from Week 1-11 Final exam preparation		Quiz 5 closes

### Review/Exam Week - 03 Jun 2024

Module/Topic	Chapter	Events and Submissions/Topic
	Past exam papers.	None

### Exam Week - 10 Jun 2024

Module/Topic	Chapter	Events and Submissions/Topic
Final Exam	All chapters covered in the Aerodynamics and AGK text plus tutorials and assignment review.	Exam

## Term Specific Information

Additional Textbook (recommended).  
Aircraft General Knowledge, 2nd edition (2018)  
Authors: Robson, D  
Aviation Theory Centre  
Brisbane, Queensland, Australia  
ISBN: 978-1-875537-14-3  
Binding: Paperback

## Assessment Tasks

### 1 Written Assignment

#### Assessment Type

Written Assessment

#### Task Description

Select an aircraft accident pertaining to any aircraft. This may be anything from a light aircraft to a commercial airliner.

Ensure that the accident involves an element relating to aerodynamics or an aircraft systems issue. For example, loss of control due to stall or spin.

Critically analyse the accident. Include in your paper:

- Accident description (what, when, why, etc);
- The aerodynamics and aircraft systems factors contributing to this accident;
- The actions or lack of actions by the pilot.
- The safety analysis and recommendations.

If there is limited information available about the accident, you may express your own opinion but ensure you justify your reasoning.

#### Assessment Due Date

Week 7 Monday (22 Apr 2024) 11:59 pm AEST

22/04/2024 11:59 PM AEST

#### Return Date to Students

Week 9 Monday (6 May 2024)

via Moodle

#### Weighting

20%

#### Assessment Criteria

The paper should be written in a report format with a title page, executive summary,



introduction, main body, conclusion / recommendations.

Referencing required is Harvard style or APA style 7th edition.

Number the pages and include a table of contents.

You may add section and sub section numbers and headings.

Use maps and diagrams if appropriate.

Use Arial or Calibri (Body) 11 or 12 font. Remember that presentation is very important

Assessment will be based on evidence of a thorough search of the available literature, the general presentation of the report, clarity of English, spelling, punctuation and correct arrangement of sentences and paragraphs (i.e. well written English). The development of the narration, explanation and the resulting conclusions.

### **Referencing Style**

- [Harvard \(author-date\)](#)
- [American Psychological Association 7th Edition \(APA 7th edition\)](#)

### **Submission**

Online

### **Submission Instructions**

Submit through Moodle

### **Learning Outcomes Assessed**

- Explain the aerodynamic properties of an aerofoil
- Apply the Coanda effect and Bernoulli's theorem to demonstrate and calculate how an aerofoil produces lift and drag
- Examine the forces and moments acting on an aircraft in all stages of flight
- Discuss the factors that affect the stability and control of an aircraft in flight
- Determine the performance aspects of power, weight, and speed in flight maneuvers
- Explain the factors that affect the stall and spin characteristics of an aeroplane.

2 There will be 5 online quizzes throughout the term contributing 20% to final assessment. They will be tackled online and be due at approximately 2 week intervals as given in the Moodle site

### **Assessment Type**

Online Quiz(zes)

### **Task Description**

Each quiz consists of 10 questions with 4 possible answers. You must select what you think is the correct solution. These are short questions and answers, for example, Qn . What gives an aircraft the basic Lift it needs to fly?

Four Possible Answers are: (1) the shape of the tailplane; (2) the imbalance of pressure on the upper and lower surfaces of the wings; (3) the inclination of the chord line to the horizontal; (4) the upward angle of the aircraft nose to the vertical.

### **Number of Quizzes**

5

### **Frequency of Quizzes**

Fortnightly

### **Assessment Due Date**

Due dates for each quiz are detailed on Moodle and will be reaffirmed in the Lectures

### **Return Date to Students**

As specified after the closing date for each quiz.

### **Weighting**

20%

### **Assessment Criteria**

This a simple correct or incorrect answer.

**Referencing Style**

- [Harvard \(author-date\)](#)
- [American Psychological Association 7th Edition \(APA 7th edition\)](#)

**Submission**

Online

**Learning Outcomes Assessed**

- Apply the Coanda effect and Bernoulli's theorem to demonstrate and calculate how an aerofoil produces lift and drag
- Explain the factors that affect the stall and spin characteristics of an aeroplane.

**Examination****Outline**

Complete an invigilated examination.

**Date**

During the examination period at a CQUniversity examination centre.

**Weighting**

60%

**Length**

120 minutes

**Minimum mark or grade**

50

**Exam Conditions**

Restricted.

**Materials**

Dictionary - non-electronic, concise, direct translation only (dictionary must not contain any notes or comments).

## Academic Integrity Statement

As a CQUniversity student you are expected to act honestly in all aspects of your academic work.

Any assessable work undertaken or submitted for review or assessment must be your own work. Assessable work is any type of work you do to meet the assessment requirements in the unit, including draft work submitted for review and feedback and final work to be assessed.

When you use the ideas, words or data of others in your assessment, you must thoroughly and clearly acknowledge the source of this information by using the correct referencing style for your unit. Using others' work without proper acknowledgement may be considered a form of intellectual dishonesty.

Participating honestly, respectfully, responsibly, and fairly in your university study ensures the CQUniversity qualification you earn will be valued as a true indication of your individual academic achievement and will continue to receive the respect and recognition it deserves.

As a student, you are responsible for reading and following CQUniversity's policies, including the [Student Academic Integrity Policy and Procedure](#). This policy sets out CQUniversity's expectations of you to act with integrity, examples of academic integrity breaches to avoid, the processes used to address alleged breaches of academic integrity, and potential penalties.

### What is a breach of academic integrity?

A breach of academic integrity includes but is not limited to plagiarism, self-plagiarism, collusion, cheating, contract cheating, and academic misconduct. The Student Academic Integrity Policy and Procedure defines what these terms mean and gives examples.

### Why is academic integrity important?

A breach of academic integrity may result in one or more penalties, including suspension or even expulsion from the University. It can also have negative implications for student visas and future enrolment at CQUniversity or elsewhere. Students who engage in contract cheating also risk being blackmailed by contract cheating services.

### Where can I get assistance?

For academic advice and guidance, the [Academic Learning Centre \(ALC\)](#) can support you in becoming confident in completing assessments with integrity and of high standard.

### What can you do to act with integrity?



#### Be Honest

If your assessment task is done by someone else, it would be dishonest of you to claim it as your own



#### Seek Help

If you are not sure about how to cite or reference in essays, reports etc, then seek help from your lecturer, the library or the Academic Learning Centre (ALC)



#### Produce Original Work

Originality comes from your ability to read widely, think critically, and apply your gained knowledge to address a question or problem