

# AVAT11005 *Flight Fundamentals*

## Term 1 - 2026

Profile information current as at 12/03/2026 12:05 pm

All details in this unit profile for AVAT11005 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.

### General Information

#### Overview

Aircraft require an array of mechanical, structural, and electrical components to ensure safe, comfortable, and efficient transport of passengers and goods across the world. In this unit, you will learn the fundamental physics concepts that govern aircraft design and performance. You will study the laws of motion and the concepts of momentum and energy conversion to develop your knowledge of the various power sources used by aircraft and how these power sources propel aircraft forward. You will learn about fluid dynamics and gravitational forces to help understand the lift and aerodynamics of aircraft. You will learn about electrical circuits and wave propagation, which are the basic concepts behind numerous aircraft systems from autopilot to navigation systems to communication systems to in-flight entertainment systems. Finally, you will combine your knowledge of these concepts to perform calculations relevant to flight planning, performance, and loading of aircraft.

#### Details

Career Level: *Undergraduate*

Unit Level: *Level 1*

Credit Points: 6

Student Contribution Band: 8

Fraction of Full-Time Student Load: 0.125

#### Pre-requisites or Co-requisites

There are no requisites for this unit.

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 - 2026

- 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. Online Quiz(zes)

Weighting: 20%

2. Written Assessment

Weighting: 30%

3. Online Test

Weighting: 50%

### 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 Unit Coordinator reflection

##### Feedback

This unit's teaching efforts have been thoroughly revised, which seems favourable for the student's learning outcomes.

##### Recommendation

Continuous improved teaching efforts should be there for this unit.

#### Feedback from Unit Coordinator reflection

##### Feedback

The overall student satisfaction score differed over the offerings.

##### Recommendation

Submission and marking guidelines for all assessment items should be developed and presented to the students on Moodle.

#### Feedback from Unit Coordinator reflection

##### Feedback

The overall student satisfaction score dropped in term three.

##### Recommendation

Assessment feedback sessions should be a good addition.

#### Feedback from Unit evaluation data

##### Feedback

Student overall satisfaction is relatively low due to lacking in useful feedback.

##### Recommendation

Incorporating sessions for feedback on assessments should be a beneficial enhancement.

## Unit Learning Outcomes

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

1. Perform calculations relevant to flight aerodynamics
  2. Use Newton's Laws to explain motion and conservation of energy and momentum in flight
  3. Explain DC and AC circuits in an aircraft systems context
  4. Describe the propagation of radio waves in an aircraft navigation context.
- In this unit, you will learn to use an E6B or CR3 calculator as necessary for flight-related calculations.















# Alignment of Learning Outcomes, Assessment and Graduate Attributes

— N/A Level  
  Introductory Level  
  Intermediate Level  
  Graduate Level  
  Professional Level  
  Advanced Level

## Alignment of Assessment Tasks to Learning Outcomes

### Assessment Tasks

### Learning Outcomes

	1	2	3	4
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 - First Nations Knowledges				
11 - Aboriginal and Torres Strait Islander Cultures				

## Textbooks and Resources

### Textbooks

AVAT11005

Prescribed

Conceptual Physics  
13th Global Edition (2022)

Authors: Paul G Hewitt  
Pearson Education Limited  
Harlow, Essex CM20 , England  
ISBN: 9781292437330

Binding: Paperback

AVAT11005

Supplementary

Flight Physics : Essentials of Aeronautical Disciplines and Technology, with Historical Notes  
(2009)

Authors: E. Torenbeek and H. Wittenberg

Springer Netherlands  
ISBN: 9781402086649

Binding: eBook

[View textbooks at the CQUniversity Bookshop](#)

### IT Resources

You will need access to the following IT resources:

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)
- Markdown Guide - <https://www.markdownguide.org/>
- Latex Guide - [https://www.overleaf.com/learn/latex/Learn\\_LaTeX\\_in\\_30\\_minutes](https://www.overleaf.com/learn/latex/Learn_LaTeX_in_30_minutes)

## Referencing Style

All submissions for this unit must use the referencing style: [American Psychological Association 7th Edition \(APA 7th edition\)](#)

For further information, see the Assessment Tasks.

## Teaching Contacts

Qilei Zhang Unit Coordinator  
[q.zhang@cqu.edu.au](mailto:q.zhang@cqu.edu.au)

## Schedule

Week 1 - 09 Mar 2026

Module/Topic	Chapter	Events and Submissions/Topic
Unit Introduction	Hewitt, P. G. (2015). Conceptual Physics (12th Global ed.). Pearson. Chapters: 1 & 2	
History of Aviation	Torenbeek, E., & Wittenberg, H. (2009). Flight Physics: Essentials of Aeronautical Disciplines and Technology, with Historical Notes (1st Ed.). Springer Netherlands. Chapter: 1	Tutorial: History of Aviation
Newton's First Law of Motion		Newton's First Law of Motion

Week 2 - 16 Mar 2026		
Module/Topic	Chapter	Events and Submissions/Topic
Linear Motion Newton's Second & Third Laws of Motion Aeroplane Applications	Hewitt, P. G. (2015). Conceptual Physics (12th Global ed.). Pearson. Chapters: 3, 4 & 5	Tutorial: Newton's Second & Third Laws of Motion
Week 3 - 23 Mar 2026		
Module/Topic	Chapter	Events and Submissions/Topic
Conservation Laws: Momentum & Energy Energy in a Flying Aeroplane	Hewitt, P. G. (2015). Conceptual Physics (12th Global ed.). Pearson. Chapters: 6 & 7	Tutorial: Conservation Laws: Momentum & Energy
Week 4 - 30 Mar 2026		
Module/Topic	Chapter	Events and Submissions/Topic
Pressure in a Fluid Archimedes' Principle Bernoulli's Principle	Hewitt, P. G. (2015). Conceptual Physics (12th Global ed.). Pearson. Chapters: 13 & 14 Torenbeek, E., & Wittenberg, H. (2009). Flight Physics: Essentials of Aeronautical Disciplines and Technology, with Historical Notes (1st Ed.). Springer Netherlands. Chapter: 2	Tutorial: Pressure in a Fluid Archimedes' Principle Bernoulli's Principle
Week 5 - 06 Apr 2026		
Module/Topic	Chapter	Events and Submissions/Topic
Aeroplane Forces Lift, Drag, Weight & Thrust	Torenbeek, E., & Wittenberg, H. (2009). Flight Physics: Essentials of Aeronautical Disciplines and Technology, with Historical Notes (1st Ed.). Springer Netherlands. Chapter: 2, 3 & 4	Tutorial: Lift, Drag, Weight & Thrust Assessment 1 (Quiz 1) Due Week 5 Friday (12 Dec 2025) 5:00 pm AEST
Week 6 - 13 Apr 2026		
Module/Topic	Chapter	Events and Submissions/Topic
Aircraft Engines & Propulsion Aeroplane Performance	Torenbeek, E., & Wittenberg, H. (2009). Flight Physics: Essentials of Aeronautical Disciplines and Technology, with Historical Notes (1st Ed.). Springer Netherlands. Chapter: 5 & 6	Tutorial: Aircraft Engines & Propulsion Aeroplane Performance
Vacation Week - 20 Apr 2026		
Module/Topic	Chapter	Events and Submissions/Topic
Non-teaching week. This week is an opportunity for students to consolidate their understanding of the covered material.	This week is your opportunity to practice the content of Week 1 through Week 6.	None
Week 7 - 27 Apr 2026		
Module/Topic	Chapter	Events and Submissions/Topic
Waves & Sound Radio Waves for Flight Communication	Hewitt, P. G. (2015). Conceptual Physics (12th Global ed.). Pearson. Chapters: 19 & 20	Tutorial: Waves & Sound
Week 8 - 04 May 2026		
Module/Topic	Chapter	Events and Submissions/Topic
Basic Principles of Electricity Difference between AC & DC Introduction to Aircraft Electrical System Components	Hewitt, P. G. (2015). Conceptual Physics (12th Global ed.). Pearson. Chapters: 22 & 23	Tutorial: Basic Principles of Electricity
Week 9 - 11 May 2026		
Module/Topic	Chapter	Events and Submissions/Topic

Using a Flight Manual Computer Determining Flight Time, Speed, Distance, Fuel Consumption Converting Units	Lecture notes Additional materials available in the Moodle page	Tutorial: Using a Flight Manual Computer Determining Flight Time, Speed, Distance, Fuel Consumption Converting Units Assessment 2 (Written Assignment) Due Week 9 Friday (23 Jan 2025) 5:00 pm AEST  Assessment 2 Due: Week 9 Monday (11 May 2026) 9:00 am AEST
Week 10 - 18 May 2026 Module/Topic	Chapter	Events and Submissions/Topic
Principles of Light	Hewitt, P. G. (2015). Conceptual Physics (12th Global ed.). Pearson. Chapters: 26, 27 & 28	Tutorial: Principles of Light
Week 11 - 25 May 2026 Module/Topic	Chapter	Events and Submissions/Topic
Practice on Varied Mathematical Examples	Content from Weeks 1 to 10.	Tutorial: Practice on Varied Mathematical Examples Assessment 1 (Quiz 2) Due Week 11 Friday (6 Feb 2026) 5:00 pm AEST
Week 12 - 01 Jun 2026 Module/Topic	Chapter	Events and Submissions/Topic
Assessment 3 (Online Test) Week 12 Tuesday (1st June 2026) 9:00 am AEST	N/A	Online Test Due: Week 12 Monday (1 June 2026) 11:59 am AEST
Exam Week - 08 Jun 2026 Module/Topic	Chapter	Events and Submissions/Topic
Vacation/Exam Week - 15 Jun 2026 Module/Topic	Chapter	Events and Submissions/Topic

## Term Specific Information

### Communication

Please use AVAT11005 as the first word in the subject line for emails. Typically, I will be able to answer emails within 2 business days, unless I am away for an extended period of time. In your emails, always end the email with your name and CQU email address.

## Assessment Tasks

### 1 Assessment 1

Assessment Type  
Online Quiz(zes)

#### Task Description

The online quizzes (individual assessments) consist of two parts.

Part 1 (the first quiz) will be conducted in Week 5, and Part 2 (the second quiz) will be conducted in Week 11. Only one attempt is allowed for each quiz.

The first quiz, which will be conducted in Week 5, covers the lectures and tutorials from Weeks 1 to 4, while the second quiz, which will be conducted in Week 11, covers the content from Weeks 5 to 9. The first quiz will be available on Moodle from 5:00 pm AEST on Friday of Week 4 until 5:00 pm AEST on Friday of Week 5.

The second quiz will be available on Moodle from 5:00 pm AEST on Friday of Week 10 until 5:00 pm AEST on Friday of Week 11.

Both quizzes must be completed within the given timeframe. Each quiz will consist of 20 questions, including a combination of multiple-choice, true/false, fill-up the blanks, calculations, among others. Students will be given 35 minutes for each quiz to answer the questions. The quizzes will automatically be submitted after 35 minutes. Each question carries equal marks. Questions will be drawn from a pool of question banks. Twenty questions will be randomly selected from a question bank for each quiz attempt. Your responsibility is to ensure that you use a reliable and uninterrupted internet connection for these quizzes. You can attempt the quizzes at any location, provided you have uninterrupted access to the Moodle website. Attempt all questions, as there are no negative marks for incorrect answers.

#### AI ASSESSMENT SCALE: NO AI

You must not use AI at any point during the assessment. You must demonstrate your core skills and knowledge. This assessment is exempted from the 72-hour submission grace period and must be completed by the stated submission date/time.

Number of Quizzes

2

Frequency of Quizzes

Other

Assessment Due Date

Please refer to task description

Return Date to Students

Students will be able to see the marks upon completion of their quiz attempt

Weighting

20%

Minimum mark or grade

20%

Assessment Criteria

The quiz questions are equal weighting and there are no negative marks associated with incorrect answers. Therefore, students are encouraged to attempt all questions within the quiz.

Referencing Style

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

Submission

Online

Submission Instructions

These are online quizzes, therefore, students will need a steady and uninterrupted internet connection to complete them. Students are urged to complete the quizzes during working hours at TaSAC (the ICT help desk). If you experience any technical difficulties, contact TaSAC and alert your Unit Coordinator right away. Students are urged to read the CQU Assessment policy.

Learning Outcomes Assessed

- Perform calculations relevant to flight aerodynamics
- Use Newton's Laws to explain motion and conservation of energy and momentum in flight
- Explain DC and AC circuits in an aircraft systems context
- Describe the propagation of radio waves in an aircraft navigation context.

## 2 Assessment 2

Assessment Type

Written Assessment

Task Description

This is an individual assessment accessible via the unit Moodle site. It consists of several questions designed to test students' basic understanding of physics, including flight physics concepts. It comprises questions covering topics from Week 1 to Week 8. Students are required to demonstrate their theoretical knowledge, critical thinking, analytical, and problem-solving skills.

The questions will be available on Moodle on Friday of Week 6. A marking rubric will be provided for each question in Moodle. This assessment is an important activity to evaluate and enhance students' comprehension. Students should upload their answers to Moodle as a single PDF file within the allocated time period. Further specific details related to this assessment will be published on the unit Moodle.

Students should study the questions carefully, consult the provided lecture, tutorial, and Moodle materials, and conduct research using textbooks, journal articles, and online resources. Students should use appropriate tools for drawings and

equations. There is no specific word count for answering each question. Students are strongly advised to thoroughly review the related materials before attempting the assessment. A submission link will be available on Moodle, where students can submit the assessment on or before the deadline. Email submissions will not be accepted. The minimum mark to pass this assessment is 50%. Also, the overall minimum mark to pass this unit (AVAT11005) is 50%. Late submissions and unacceptable similarity scores will be handled according to CQUniversity policy. Students are advised to refer to the policy for details.

#### AI ASSESSMENT SCALE: NO AI

You must not use AI at any point during the assessment. You must demonstrate your core skills and knowledge. This assessment is exempted from the 72-hour submission grace period and must be completed by the stated submission date/time.

#### Assessment Due Date

Week 9 Monday (11 May 2026) 9:00 am AEST

#### Individual submission

#### Return Date to Students

Marks and comments will be uploaded in Moodle

#### Weighting

30%

#### Minimum mark or grade

50%

#### Assessment Criteria

Each question in the assessment will be assessed separately against a series of criteria (which will be available through Moodle on Monday of Week 4).

Some of the key criteria include:

- Proper formatting and structuring;
- Have neat, legible, and tidy work and presentation;
- Evidence of understanding, correct workings, answers, and solutions to questions;
- Accuracy and correct results, correct use of terminology (scientific language), and conventions;
- Correct referencing style used where necessary;
- On-time submission;
- Respectful and appropriate acknowledgment of others' contributions through proper referencing and citation;
- Use of appropriate tools to produce clear, high-quality diagrams and/or equations when required.

#### Referencing Style

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

#### Submission

Online

#### Submission Instructions

A dedicated submission link is available in Moodle

#### Learning Outcomes Assessed

- Use Newton's Laws to explain motion and conservation of energy and momentum in flight
- Explain DC and AC circuits in an aircraft systems context
- Describe the propagation of radio waves in an aircraft navigation context.

## 3 Online Test

#### Assessment Type

Online Test

#### Task Description

The online test will be held on the same date and at the same time. You can sit for this test at a location with an uninterrupted Internet connection, a video camera, a scanner, and a flight computer (E6B). The minimum mark to pass this assessment is 50%. Also, the overall minimum mark to pass this unit (AVAT11005) is 50%. The guidelines for the online test will be available in Moodle. The online test assesses all of this unit's learning outcomes. The test covers topics from Weeks 1 to 10 and consists of a mix of questions requiring short and descriptive answers and calculations. The online test is scheduled for Week 12 and will be conducted during the regular class period. The test has a duration of 2 hours and 30 minutes.

Students will have an additional 45 minutes to scan and upload their answers to the Moodle submission link. The submission link will close after the total allotted time (3 hours and 15 minutes from the start of the test), after which

submissions will no longer be accepted. Unfortunately, there is no opportunity to submit the answers after the allotted time, and submission via email is not acceptable. Please note that this is a closed-book test. Students are not allowed to use textbooks, hand notes, and online resources, but can use a flight computer (physical, not online) and a calculator. However, mathematical equations will be provided along with the questions.

All handwritten answers must be uploaded to the relevant submission portal in Moodle in PDF or JPEG format. You may use a scanner or take clear photos with your phone to upload your answers, provided the quality of the images is acceptable. Below is a list of recommended camera scanning apps suitable for this purpose. Be sure to download your chosen app before the exam to ensure a smooth scanning process.

Adobe Scan (DC): <https://adobescan.app.link/d/1n1NntFHTkb>

Microsoft Lens: <https://apps.apple.com/au/app/microsoft-lens-pdf-scanner/id975925059>

SwiftScan: <https://swiftscan.app/en/index.html>

CamScanner: <https://www.camscanner.com/>

ClearScan: <https://clearscanapp.com/>

#### AI ASSESSMENT SCALE: NO AI

You must not use AI at any point during the assessment. You must demonstrate your core skills and knowledge. This assessment is exempted from the 72-hour submission grace period and must be completed by the stated submission date/time.

#### Assessment Due Date

Week 12 Monday (1 June 2026) 11:59 am AEST

#### Return Date to Students

Marks will be disclosed on the certification of grade day.

#### Weighting

50%

#### Minimum mark or grade

50%

#### Assessment Criteria

This is an online test. All instructions and assessment criteria will be provided within the test questions. The test will include a mix of short-answer, broad, and calculation-based questions. You are required to complete all questions within 2 hours and 30 minutes. You will need to scan and upload your answers to the Moodle submission link. For this, you will be given an extra 45 minutes. Also, please take a look at the task description.

#### Referencing Style

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

#### Submission

Online

#### Learning Outcomes Assessed

- Perform calculations relevant to flight aerodynamics
- Use Newton's Laws to explain motion and conservation of energy and momentum in flight
- Explain DC and AC circuits in an aircraft systems context
- Describe the propagation of radio waves in an aircraft navigation context.

# 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