



# AVAT11005 *Flight Fundamentals*

## Term 3 - 2023

Profile information current as at 29/04/2024 02:12 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 inflight 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 3 - 2023

- 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 Have your say comments

**Feedback**

This unit needs an overhaul in terms of relevance to the aviation industry practices.

**Recommendation**

Update the unit content to present relevant physics content in the context of how they apply to the operation of an aircraft.

#### Feedback from Have your say comments

**Feedback**

This unit needs revision in terms of applicable theories relevant to the aviation industry.

**Recommendation**

Assessments are not relevant to aviation - Update the unit assessment to include problem-solving in an aviation context.

## 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
<b>1 - Communication</b>	•	•	•	•
<b>2 - Problem Solving</b>	•	•	•	•
<b>3 - Critical Thinking</b>				
<b>4 - Information Literacy</b>	•	•	•	•
<b>5 - Team Work</b>	•	•		
<b>6 - Information Technology Competence</b>				
<b>7 - Cross Cultural Competence</b>				
<b>8 - Ethical practice</b>				
<b>9 - Social Innovation</b>				
<b>10 - Aboriginal and Torres Strait Islander Cultures</b>				

## Textbooks and Resources

### Textbooks

AVAT11005

#### Prescribed

##### Conceptual Physics

12th Global Edition (2015)

Authors: Paul G Hewitt

Pearson Education Limited

Harlow , Essex CM20 , England

ISBN: 9781292057132

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)

## Referencing Style

All submissions for this unit must use the referencing style: [Harvard \(author-date\)](#)

For further information, see the Assessment Tasks.

## Teaching Contacts

**Neamul Khandoker** Unit Coordinator

[n.khandoker@cqu.edu.au](mailto:n.khandoker@cqu.edu.au)

## Schedule

### Week 1 - 06 Nov 2023

Module/Topic	Chapter	Events and Submissions/Topic
Unit introduction. History of aviation. Motion and Newton's first law.	Flight Physics. Chapter: 1. Conceptual Physics. Chapters: 1, 2.	Tutorial 1: History of aviation. Motion and Newton's first law.

### Week 2 - 13 Nov 2023

Module/Topic	Chapter	Events and Submissions/Topic
Linear motion. Newton's second and third laws of motion. How Newton's second law is applied to an aeroplane.	Conceptual Physics. Chapters: 3, 4, 5.	Tutorial 2: Newton's second and third laws of motion.

### Week 3 - 20 Nov 2023

Module/Topic	Chapter	Events and Submissions/Topic
The principles of momentum, energy, and work. Energy in a flying aeroplane.	Conceptual Physics. Chapters: 6, 7.	Tutorial 3: The principles of momentum, energy, and work.
<b>Week 4 - 27 Nov 2023</b>		
Module/Topic	Chapter	Events and Submissions/Topic
How does an aeroplane fly? Pressure in a fluid. Archimedes Principle. Bernoulli's Principle.	Flight Physics. Chapter 2. Conceptual Physics. Chapters: 13, 14.	Pressure in a liquid. Archimedes Principle. Bernoulli's Principle.
<b>Vacation Week - 04 Dec 2023</b>		
Module/Topic	Chapter	Events and Submissions/Topic
Non teaching week. Opportunity for students to consolidate their reading.	It is your opportunity to practice the content of Week 1 to Week 5.	None.
<b>Week 5 - 11 Dec 2023</b>		
Module/Topic	Chapter	Events and Submissions/Topic
Forces act on an aeroplane. Lift, drag, weight, and thrust.	Flight Physics. Chapters: 2, 4.	Lift, drag, weight, and thrust.  <b>Assessment 1 (Quiz 1)</b> Due: Week 5 Thursday (6 April 2023) 4:00 pm AEST
<b>Week 6 - 18 Dec 2023</b>		
Module/Topic	Chapter	Events and Submissions/Topic
Waves and sound. Radio waves for flight communication.	Conceptual Physics. Chapters: 19, 20.	Tutorial 6: Waves and sound.
<b>Vacation Week - 25 Dec 2023</b>		
Module/Topic	Chapter	Events and Submissions/Topic
Non teaching week. Opportunity for students to consolidate their reading.	It is your opportunity to practice the content of Week 1 to Week 5.	None.
<b>Week 7 - 01 Jan 2024</b>		
Module/Topic	Chapter	Events and Submissions/Topic
Basic principles of electricity. What is the difference between AC and DC? Introduction to aircraft electrical system components.	Conceptual Physics. Chapters: 22, 23.	Tutorial 7: Basic principles of electricity.
<b>Week 8 - 08 Jan 2024</b>		
Module/Topic	Chapter	Events and Submissions/Topic
Aircraft engines and propulsion, Aero plane performance.	Flight Physics. Chapters: 5, 6.	Tutorial 8: Aircraft engines and propulsion, Aero plane performance.
<b>Week 9 - 15 Jan 2024</b>		
Module/Topic	Chapter	Events and Submissions/Topic
Use of flight manual computer to determine flight time, speed, distance and fuel consumption problems.	Materials will be available in Moodle.	Tutorial 9: Use of flight manual computer to determine flight time, speed, distance and fuel consumption problems.  <b>Assessment 2</b> Due: Week 9 Friday (19 Jan 2024) 11:45 pm AEST
<b>Week 10 - 22 Jan 2024</b>		
Module/Topic	Chapter	Events and Submissions/Topic
Principles of light, reflection and refraction.	Conceptual Physics. Chapters: 26, 27 and 28	Tutorial 10: Principles of light, reflection and refraction.

## Week 11 - 29 Jan 2024

Module/Topic	Chapter	Events and Submissions/Topic
Review of class	None specific.	Tutorial: Discussion based on Online Test.  <b>Assessment 1 (Quiz 2)</b> Due: Week 11 Friday (26 May 2023) 4:00 pm AEST

## Week 12 - 05 Feb 2024

Module/Topic	Chapter	Events and Submissions/Topic
No class. Preparation for <b>Online Test.</b>	None	

## Online Test Week - 12 Feb 2024

Module/Topic	Chapter	Events and Submissions/Topic
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## Assessment Tasks

### 1 Assessment 1

#### Assessment Type

Online Quiz(zes)

#### Task Description

The online quizzes (individual assessments) contain two parts. Part 1 (first quiz) will be conducted in Week 5, and part 2 (second quiz) will be conducted in Week 11. *For each quiz, one attempt is allowed.*

*The first quiz in week 5 covers the lectures and tutorials' content of weeks 1, 2, 3, and 4, while the second quiz in week 11 covers the lectures and tutorials' content of weeks 5, 6, 7, 8 and 9. In Moodle, the first quiz questions will be available on Week 5, Monday, at 12:00 pm AEST and will remain open on Week 5, Thursday, until 4:00 pm AEST. The second quiz questions will be available in Moodle on Week 11, Tuesday, at 12:00 pm AEST and will remain open on Week 11, Friday, until 4:00 pm AEST.*

Both quizzes must be completed within the given timeframe. There will be 20 questions for each quiz (a combination of multiple-choice, true/false, fill-up the blanks, calculations etc.). Students will be given 35 minutes for each quiz to answer the questions. The quizzes will automatically be submitted after 35 minutes. Each question will carry equal marks.

Questions will be drawn from a pool of question banks. Twenty (20) questions will be randomly selected and displayed for each quiz when you attempt the quizzes. Your responsibility is to ensure that you use a reliable and uninterrupted internet connection for this test. 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.

#### 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%

#### 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

- [Harvard \(author-date\)](#)

## 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. This assessment will consist of several questions to test the student's basic understanding of physics, including flight physics concepts, which will involve answering some questions. It comprises a set of questions on the topics covered from Week 1 to 8 Week, and students are required to demonstrate their theoretical knowledge, critical thinking, analytical and problem-solving skills. The questions will be available in Moodle in Week 3. For each question, there will be marking rubrics in Moodle. This assessment is an important activity to check and enhance students' comprehension. The 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 site in Week 3. Students need to study the questions carefully, consult with the provided lecture/tutorial/Moodle materials and conduct research using textbooks, journal articles, and website materials. Students should use appropriate tools for drawings and equations for drawings and equations. There is no specific word count in answering each question. Students are strongly advised to cover the related materials sufficiently before answering the assessment. There will be a submission link in Moodle, where students submit the assessment on or before the deadline. *Email submission is not acceptable.*

A late submission penalty will be applied as per CQUniversity policy. Unacceptable similarity scores will also be treated according to CQU policy. *For late submission and unacceptable similarity scores, students are advised to refer to CQUniversity policy.*

### Assessment Due Date

Week 9 Friday (19 Jan 2024) 11:45 pm AEST  
Individual submission

### Return Date to Students

Week 11 Friday (2 Feb 2024)  
Marks and comments will be uploaded in Moodle

### Weighting

30%

### Assessment Criteria

Each question in the assessment will be assessed separately against some criteria (the detailed criteria will be available in Moodle in Week 3). Some of the key criteria are as follows:

- 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.
- The correct referencing style where necessary.
- On-time submission.
- Prepare answers while respecting the contributions of others by providing appropriate referencing and citations.
- If answering questions requires drawing diagrams and/or writing equations, students should use appropriate tools to have quality diagrams and or equations.

### Referencing Style

- [Harvard \(author-date\)](#)



**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**

There is a mandatory online test in this unit. The online test will be held at the same date and at the same time. You can sit for this test at a location with an uninterrupted Internet connection and where you have access to a scanner. Also, your computer must have a video camera to monitor the test. The minimum mark to pass this assessment (online test) 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 assessed all four learning outcomes. The test covers topics from weeks 1 to 10 and consists of a mix of short and descriptive answer questions and calculations. This online test will be held during the university exam period. The exact date and time will be available in Weeks 9-10. The test has a duration of 3 hours. Students will be provided with an additional 60 minutes to scan and upload the answers to Moodle submission link. The submission link will become inactive after the allotted time (after 4 hours from the starting time), and you will be unable to upload/submit your answers via the submission link. Unfortunately, there is no opportunity to submit the answers after the allotted time and submission via Email is not acceptable. Please note this is a closed-book test. Students are not allowed to use textbooks, hand notes, and online resources, but can use flight computer (physical, not online) and calculator. Equations will be provided at the end of the questions. You should use A-4 size papers to write answers. To upload/submit your answers, you are required to make your all answers in a single pdf file (the file size must not exceed 100 MB).

If you are unable to find a scanner, you can use your mobile phone to scan and upload the answer scripts. *Please find a list of Camera Scan apps below that is suitable for this.*

- 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/>

**Assessment Due Date****Return Date to Students****Weighting**

50%

**Minimum mark or grade**

50%

**Assessment Criteria**

No Assessment Criteria

**Referencing Style**

- [Harvard \(author-date\)](#)

**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