

MODULE DESCRIPTION FORM

DEPARTMENT OF MECHANICAL AND AEROSPACE ENGINEERING

ME221 FLIGHT MECHANICS AND FLIGHT TEST

Module Registrar: Dr E Minisci edmondo.minisci@strath.ac.uk	Taught To (Course): Cohorts for whom module is compulsory		
Other Lecturers Involved:	Credit Weighting: 10 (ECTS 5)	Semester: 2	
Assumed Prerequisites: no specific module – refer to below	Compulsory module	Academic Level: 2	Suitable for Exchange: N

Required prerequisites

Note: It is the responsibility of ALL students to ensure that they satisfy the prerequisite knowledge for this module BEFORE adding as part of curriculum selection. If unsure, please contact the Module Registrar or discuss with your Programme/Year Adviser of Studies.

- Introduction to air-vehicles, forces during flight, body and wind frames;
- Atmospheric models: standard model and NASA GRAM;
- Aerodynamic forces, moments, and nondimensional coefficients;
- Slender and bluff body aerodynamics, flow separation;
- Lift: aerofoil aerodynamics, stall, high-lift devices;
- Drag: skin friction, form, wave;
- Lift-induced Drag;
- Drag polar: definition and importance.

Module Format and Delivery (HOURS i.e. 1 credit = 10hrs of study):

Lecture	Tutorial	Laboratory	Groupwork	External	Online	Project	Assignments	Private Study	Total
24				10 (flight course and test)				66	100

Educational Aim

This module builds on the initial study carried out in Introduction to Aerospace. The taught part of the module is reinforced by flight experience training and flight test.

This module aims to provide an introduction to the mechanics of flight of fixed-wing aircraft. Using a combination of lectures, practical simulations, and assignments, students will develop a comprehensive understanding of flight mechanics principles and their application to real-world scenarios.

The flight experience is **mandatory**. To pass the module, a student must have satisfactorily completed the flight experience and submitted a satisfactory report.

Learning Outcomes

On completion of the module the student is expected to be able to:

- LO1 Demonstrate a thorough understanding of the aircraft motion.
- LO2 Demonstrate a thorough understanding of the most critical manoeuvres.
- LO3 Demonstrate a thorough understanding of the stability of conventional aircraft.
- LO4 Demonstrate a practical understanding of the most critical manoeuvres and aircraft stability.

Syllabus

The module will teach the following:

- The equations of motion.
- Avionics: flight instruments
- Aircraft performance: flight envelope; glide and climb; range and endurance; take-off and landing; turning.
- Longitudinal and lateral-directional static stability.
- Concepts of dynamic stability.

Assessment of Learning Outcomes

Criteria

For each of the Module Learning Outcomes the following criteria will be used to make judgements on student learning:

LO1

C1 Students should be able to understand and describe the equations of motion for a general fixed-wing aircraft.

LO2

C1 Students should be able to understand and describe the most critical manoeuvres.

C2 Students should be able to analyse the most critical manoeuvres.

LO3

C1 Students should be able to understand and explain the main concepts of static and dynamic stability.

C2 Students should be able to analyse the stability of a general aircraft using the appropriate tools.

LO4

C1 Students should be able to link the theory about aircraft manoeuvring and stability, and the real world experience.

The standards set for each criterion per Module Learning Outcome to achieve a pass grade are indicated on the assessment sheet for all assessment.

Principles of Assessment and Feedback

(within Assessment and Feedback Policy – search for ‘Academic policies & procedures’ at: <https://www.strath.ac.uk/>)

Assessment includes two online quizzes; students should expect to spend a considerable amount of effort to prepare for them as they form an important learning exercise as well as an assessment unit.

Informal feedback is provided directly within lectures, with self and peer-directed feedback encouraged during the course.

Standard Assessment Method(s) Including Percentage Breakdown and Duration of Exams (individual weightings)

Examination				Coursework		Practical		Project	
Number	Month	Duration	Weighting	Number	Weighting	Number	Weighting	Number	Weighting
1	Apr/ May	1.5hr	80%	2 online quizzes/tests	20% (10% each)	1	Pass		
* LO1, LO2, LO3				* LO1, LO2, LO3		*LO4			

* **L/Os:** Indicate which Learning Outcomes (LO1, LO2, etc) are to be assessed by exam/coursework/project/practical as required.

Coursework / Submissions deadlines (*academic weeks*):**Resit Assessment Procedures:**

For students who have not passed the module by the Exam Board: 1.5hr examination in July/August diet.

For students registered as Academic Assessment Only or carrying the module into year 3: Standard assessment will apply.

For students who are Reattending or Registered With Attendance: Standard assessment will apply.

For any student who passed the academic assessments at the previous attempt, but were awarded a "Fail Overall" for non-completion of the Flight Test element, completion of the Flight Test will be the only resit requirement. This must be completed at the next available opportunity.

^^Students must contact the Module Registrar for details as soon as results confirm that a resit is required.

PLEASE NOTE:

Students must complete the flight training course and achieve a 'PASS' for the flight test (including a report) and gain a summative mark of 40% to pass the module. Students who fail the module at the first attempt will be re-assessed during the July/August exam diet. This re-assessment will consist entirely of an exam. No marks from any previous attempts will be transferred to a new resit attempt.

Recommended Reading

*****Purchase recommended **Highly recommended reading *For reference**

- **Introduction to Aircraft Flight Mechanics: Performance, Static Stability, Dynamic Stability, and Classical Feedback Control by T.R. Yechout, with S.L. Morris, D.E. Bossert, W.F. Hallgren, AIAA, 2003
- *"Introduction to Flight" by Anderson, McGraw Hill, ISBN 0-07-109282-X

Additional Student Feedback

(Please specify details of when additional feedback will be provided)

Date	Time	Room No
		Check timetable webpages for details

Session: 2026/27

Approved:

Programme Lead/Director Signature: Dr Andrew McLaren

Date of Last Modifications: 29 August 2026

MODULE TIMETABLE

Module Code:

ME221

Module Title:

Flight Mechanics and Flight Test

Brief Description of Assessment:

- Two online, time constrained quizzes with 20% contribution towards the final module mark (10% for each quiz) – shown as ‘Online Test’ below
- One examination with 80% contribution towards the final module mark

Satisfactory completion (**PASS**) of the Flight Test **is essential to pass the module**. To pass the module, a student must have satisfactorily completed the flight experience AND submitted a satisfactory report.

Assessment Timing:-

Indicated on the table below are the start/submission dates for each assignment/project and the timing of each exam/assessment.

Please note: Timings could change during unforeseen periods of disruption; this should only be used as a guide.

Semester One	W&D Wk	WK1	WK2	WK3	WK4	WK5	WK6	WK7	WK8	WK9	WK10	WK11	Exam Period
	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item.

Semester Two	C&D Wk	WK1	WK2	WK3	WK4	WK5	WK6	WK7	WK8	WK9	WK10	WK11	Exam Period
	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Online Test	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Lab	Lab Report Submission	Online Test	Exam