



Module Specification

Principles of Flight

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Contents

Module Specification	1
Part 1: Information	2
Part 2: Description	2
Part 3: Teaching and learning methods	3
Part 4: Assessment.....	4
Part 5: Contributes towards	5

Part 1: Information

Module title: Principles of Flight

Module code: UFMEAP-15-2

Level: Level 5

For implementation from: 2025-26

UWE credit rating: 15

ECTS credit rating: 7.5

College: College of Arts, Technology and Environment

School: CATE School of Engineering

Partner institutions: None

Field: Engineering, Design and Mathematics

Module type: Module

Pre-requisites: Aeronautical Principles 2024-25, Principles of Aerodynamics 2025-26

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: This module provides an overview of flight mechanics, static and dynamic concepts using illustrated practical examples and computational exercises to help reinforce concepts of aircraft performance and stability.

Features: Not applicable

Educational aims: To introduce apprentices to the fundamentals of flight performance, static and dynamic stability. Apprentices will be exposed to in-service data and apply advanced analytical techniques to determine aircrafts performance and stability.

Outline syllabus: The module aims to introduce apprentices to the mechanics and stability of flight. The apprentices will be exposed to a number of aspects.

Elements of aircraft performance will be covered including trim, take-off and landing, climb, descent, and level flight.

Principles of aircraft longitudinal and lateral static stability will be covered including weight and balance, neutral point, static margin, effect of elevators including elevator angle to trim and stick force gradients, and stick-fixed versus stick-free static stability.

Principles of aircraft longitudinal and lateral dynamic stability covered including mathematical description, analytical solutions to, and numerical simulations of the primary dynamic modes of an aircraft.

Principles of flight test will be covered including in-flight measurements; post-flight calculations; comparison with theory and flight experience through flight simulation and in-flight data.

Part 3: Teaching and learning methods

Teaching and learning methods: The skills acquired by the apprentice are demonstrated within a design project based framework. A typical project may for instance be the conceptual design of an aircraft. The apprentice are led through the conceptual design by the teaching team upon which the apprentice can then apply the concepts and taught materials. They will then demonstrate their conformance to the learning outcomes in a portfolio of assessments.

The professional body requirement for exposure to flight test measurement methods are performed in this module as well by attendance of a laboratory session.

Module Learning outcomes: On successful completion of this module students will achieve the following learning outcomes.

MO1 Apply concepts and principles in flight theory to model performance, and to static and dynamic stability of aircraft

MO2 Apply fundamental flight test data processing principles to an aircraft.

MO3 Use analytical and numerical models to assess the aircraft dynamic flight modes.

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 114 hours

Face-to-face learning = 36 hours

Total = 0

Reading list: The reading list for this module can be accessed at readinglists.uwe.ac.uk via the following link

<https://rl.talis.com/3/uwe/lists/DCC3E5B3-4C0C-FB18-0A66-DF3C22CD6420.html?lang=en-GB&login=1>

Part 4: Assessment

Assessment strategy: The assessment for this module is as follows:

Control conditions assessments (group oral examinations up to 30min), designed to encourage timely engagement with the material and consolidate their understanding of theoretical principles, using aircraft as case-studies.

The resit assessment strategy is the same as the first sit.

Resit deliverable(s) will be scaled appropriately to group size and task complexity.

Assessment tasks:

Presentation (First Sit)

Description: An oral Group Examination including Q&A elements for each learner (30 mins)

Weighting: 100 %

Final assessment: Yes

Group work: Yes

Learning outcomes tested: MO1, MO2, MO3

Presentation (Resit)

Description: An oral Group Examination including Q&A elements for each learner (30 mins)

Weighting: 100 %

Final assessment: Yes

Group work: Yes

Learning outcomes tested: MO1, MO2, MO3

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Aeronautical Engineering {Apprenticeship-UCW}[UCW] BEng (Hons) 2024-25