Module Specification

Aerospace Control Engineering

Version: 2026-27, v1.0, Approved

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: Aerospace Control Engineering

Module code: UFMEBW-15-3

Level: Level 6

For implementation from: 2026-27

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: None

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: This module introduces the principles of control engineering applied to aerospace systems. Students learn to model dynamic systems, analyse stability and design feedback controllers using classical control techniques. Through aerospace-focused examples and simulations, the module develops practical skills in control solutions relevant to modern aircraft and UAV applications.

Features: Not applicable

Educational aims: To equip students with the fundamental knowledge and practical skills required to analyse, model, and design feedback control systems for aerospace applications and apply control techniques to real-world aerospace engineering problems.

Outline syllabus: Topics may include but are not limited to:
System modelling (Modelling simple dynamical and aerospace systems, Laplace operator, transfer functions etc)
Time response of first and second order systems
Block diagram representation
Frequency response of first and second order systems
The s-plane and root loci
Controllers (PID, IP-D) and application on aerospace systems
State Space modelling techniques
Approaches to dealing with non-linearity
System identification

Part 3: Teaching and learning methods

Teaching and learning methods: Students will learn through a combination of lectures and tutorial sessions. Lectures focus on key threshold concepts and their application through worked examples and real-world aerospace case studies. Tutorials provide hands-on practice in modelling aerospace systems and designing classical controllers, including the use of control design software tools.

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

MO1 Model and analyse dynamic aerospace systems using appropriate mathematical representations and assess their stability and performance.

MO2 Design and evaluate classical feedback controllers to meet specified performance and stability requirements for aerospace control applications.

MO3 Interpret and simulate closed-loop system behaviour using analytical methods and control software tools, and critically assess control system performance.

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 114 hours

Face-to-face learning = 36 hours

Reading list: The reading list for this module can be accessed at readinglists.uwe.ac.uk via the following link https://uwe.rl.talis.com/index.html

Part 4: Assessment

Assessment strategy: Assessed via end of semester Exam (100%).
Formative assessments (not contributing to module mark) is provided via support in tutorial sessions.
In-person individual exam, designed to engage students in the understanding of the fundamentals of system modelling, closed loop systems and responses, stability, and controller design (100%). The students will be asked to answer questions on the theory of controller design and to solve practical problems related to the dynamics, stability, and control of an aircraft.

Resit exam:
The resit assessment will follow the same format as the first sit: an in-person individual exam (100%), conducted under the same policies and question standards.

Assessment tasks:

Examination (First Sit)
Description: Examination: 3 hours
Weighting: 100 %
Final assessment: Yes
Group work: No

Learning outcomes tested: MO1, MO2, MO3

Examination (Resit)
Description: Examination (3 hours)
Weighting: 100 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2, MO3

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Aerospace Engineering [Frenchay] BEng (Hons) 2023-24

Aerospace Engineering [Frenchay] BEng (Hons) 2024-25

Aerospace Engineering with Pilot Studies [Frenchay] BEng (Hons) 2023-24

Aerospace Engineering with Pilot Studies [Frenchay] BEng (Hons) 2024-25

Aerospace Engineering with Pilot Studies [Frenchay] MEng 2023-24

Aerospace Engineering with Pilot Studies [Frenchay] MEng 2024-25

Aerospace Engineering with Pilot Studies {Foundation} [Frenchay] BEng (Hons) 2022-23

Aerospace Engineering with Pilot Studies {Foundation} [Frenchay] BEng (Hons) 2023-24

Aerospace Engineering [Frenchay] MEng 2023-24

Aerospace Engineering [Frenchay] MEng 2024-25

Aerospace Engineering {Foundation} [Frenchay] BEng (Hons) 2022-23

Aerospace Engineering {Foundation} [Frenchay] BEng (Hons) 2023-24