# Module Specification

## Further Aerodynamics

Version: 2025-26, v5.0, Approved

**Contents**

## Part 1: Information

**Module title:** Further Aerodynamics

**Module code:** UFMFXU-15-3

**Level:** Level 6

**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:** Fundamental Aerodynamics 2024-25

**Excluded combinations:** None

**Co-requisites:** None

**Continuing professional development:** No

**Professional, statutory or regulatory body requirements:** None

## Part 2: Description

**Overview:** Advanced Aerodynamics aims to build on the fundamental aerodynamics and complete the undergraduate education in aerodynamics. Applications of the Navier-Stokes equations to boundary layers and compressible flow are investigated and low order numerical modelling of flows are considered.

**Features:** Not applicable

**Educational aims:** The module aims to provide a complete understanding of the principles of fundamental aerodynamics.

**Outline syllabus:** Topics covered are likely to include, but not limited to:

Fundamentals of viscous flows: conservation laws, laminar boundary layer and turbulent boundary layer.

Pressure gradient and boundary layer separation.

Flow transition: boundary layer transition process, prediction of the onset of transition.

Compressible flow: governing equations for normal and oblique shock waves, expansion waves, shock interactions, and application to diffusers, nozzles and engine intakes.

Use of the wind tunnel for internal and external aerodynamics.

## Part 3: Teaching and learning methods

**Teaching and learning methods:** The method of teaching and learning is designed so that students can quickly consolidate theoretical principles through exercises, laboratory experiments and application in coursework.

Lectures and lectorial sessions are used to convey concepts and principles which are then backed up by tutorials, self-paced sessions, hands-on laboratory experiments and coursewrok.

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

**MO1** Application of the theory for predicting boundary layer development, flow separation, transition and supersonic flow properties.

**MO2** Use of experimental facilities to acquire and process suitable data in comparison with flow simulations using analytical/numerical methods.

**MO3** Demonstrate key transferable skills in problem formulation and decision making, self-management and communication.

**Hours to be allocated:** 150

**Contact hours:**

Independent study/self-guided study = 114 hours

Lectures = 24 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/lists/08A7CA93-B6A4-AC26-C705-3B68E362FB4E.html?draft=true&lang=en&login=1&version=v1

## Part 4: Assessment

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

An examination that will test understanding of learning outcomes relating to theoretical knowledge and analytical and evaluation skills on aerodynamics.

A written assignment that ensures that students are able to demonstrate their understanding of underpinning principles within a practical or simulated practical environment where a portfolio of practical skills are assessed for example wind tunnels and numerical codes. A group report will be submitted with details defined in coursework briefing.

The resit assignment will be an individual report, again details to be defined in resit coursework briefing.

**Assessment tasks:**

**Examination** (First Sit)
Description: Written Examination (3 hours)

Weighting: 100 %
Final assessment: Yes
Group work: No
Learning outcomes tested:

**Written Assignment** (First Sit)
Description: Coursework (Max. 10 pages, approx. 2500 words)
Weighting: 0 %
Final assessment: No
Group work: Yes
Learning outcomes tested:

**Examination** (Resit)
Description: Written Examination (3 hours)
Weighting: 100 %
Final assessment: Yes
Group work: No
Learning outcomes tested:

**Written Assignment** (Resit)
Description: Coursework (Max 10 pages, approx. 2500 words)
Weighting: 0 %
Final assessment: No
Group work: No
Learning outcomes tested:

## Part 5: Contributes towards

This module contributes towards the following programmes of study:

Aerospace Engineering {Apprenticeship-UWE} [UCW] BEng (Hons) 2023-24

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

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

Aerospace Engineering {Foundation} [Sep][SW][Frenchay][5yrs] BEng (Hons) 2021-22

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

Aerospace Engineering [Frenchay] MEng 2023-24

Aerospace Engineering [Frenchay] MEng 2023-24

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

Aerospace Engineering {Apprenticeship-UWE} [UCW] BEng (Hons) 2023-24

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

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

Aerospace Engineering with Pilot Studies [Frenchay] MEng 2022-23

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

Aerospace Engineering [Frenchay] MEng 2022-23

Aerospace Engineering [Frenchay] MEng 2023-24

Aerospace Engineering with Pilot Studies [Frenchay] MEng 2022-23

Aerospace Engineering [Frenchay] MEng 2022-23

Aerospace Engineering with Pilot Studies {Foundation} [Sep][SW][Frenchay][5yrs] BEng (Hons) 2021-22

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

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

Aerospace Engineering [Frenchay] MEng 2022-23

Aerospace Engineering {Apprenticeship-UCW} [UCW] BEng (Hons) 2022-23

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

Aerospace Engineering with Pilot Studies [Frenchay] MEng 2022-23

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