



## **Module Specification**

### **Aerospace Thermofluids**

Version: 2025-26, v5.0, Approved

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## Part 1: Information

**Module title:** Aerospace Thermofluids

**Module code:** UFMFQU-15-1

**Level:** Level 4

**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:** None

**Excluded combinations:** None

**Co-requisites:** None

**Continuing professional development:** No

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

## Part 2: Description

**Overview:** Fluid dynamics and thermodynamics are fundamental to the understanding of aerospace vehicle design, structure and performance. Understanding aerodynamics, propulsion, structural integrity, hydraulics all require a sound understanding of the principles of thermofluids.

The module is designed to provide a solid foundation of knowledge, with practical exercises that reinforce theory and will enable the extension to specialist knowledge

in future years. Theory is underpinned by experiment and observation so that students can properly understand the mechanisms at work.

**Features:** Not applicable

**Educational aims:** The aim of this module is to introduce the fundamental concepts in fluid dynamics, thermodynamics and heat transfer for aerospace scientific methods and applications.

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

Conservation principles of mass, momentum and energy including continuity, fluid momentum, Bernoulli's principle, work, heat and energy

Key Concepts and laws of thermodynamics

Non-Flow Energy Equation (NFEE) and Steady Flow Energy Equation (SFEE)

Gas Processes and Gas Laws

Hydrostatics

Dimensional Analysis

Incompressible and viscous flow including laminar and turbulent flow

Flow measurements including measurement systems and uncertainty analysis

Heat Engines and Thermodynamic Cycles

Introduction to heat transfer including conduction, convection, radiation

### **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 and laboratory experiments.

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

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

**MO1** Explain fluid mechanics and thermodynamics principles in introductory aerospace design scenarios.

**MO2** Demonstrate fundamental knowledge on analysis of fluid mechanics and thermodynamics to assess simple flows.

**MO3** Apply practical and laboratory skills relevant to thermofluid processes.

**Hours to be allocated:** 150

**Contact hours:**

Independent study/self-guided study = 108 hours

Laboratory work = 4 hours

**Reading list:** The reading list for this module can be accessed at [readinglists.uwe.ac.uk](https://rl.talis.com/3/uwe/lists/D2EB47B3-F96E-281D-7BD8-AD80E1D78498.html?lang=en&login=1) via the following link <https://rl.talis.com/3/uwe/lists/D2EB47B3-F96E-281D-7BD8-AD80E1D78498.html?lang=en&login=1>

## **Part 4: Assessment**

**Assessment strategy:** The assessment strategy is designed to encourage regular engagement with the acquisition of skills and knowledge which is motivated through observation and experiment and assessed through a laboratory report.

The end of module examination assesses that students have a sound understanding of concepts and principles that are required for studies in aerodynamics, aerospace structures and propulsion systems encountered later in the programme. The examination will include analysis and reflection of experimental data from laboratory sessions.

The resit assessment will have the same format as the first sit assessment.

**Assessment tasks:**

**Laboratory Report (First Sit)**

Description: Laboratory report (2500 words)

Weighting: 25 %

Final assessment: No

Group work: No

Learning outcomes tested: MO2, MO3

**Examination (First Sit)**

Description: On-campus exam, invigilated

Weighting: 75 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2

**Laboratory Report (Resit)**

Description: Laboratory report (2500 words)

Weighting: 25 %

Final assessment: No

Group work: No

Learning outcomes tested: MO2, MO3

**Examination (Resit)**

Description: On-campus exam, invigilated

Weighting: 75 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2

**Part 5: Contributes towards**

This module contributes towards the following programmes of study: