MODULE SPECIFICATION

Part 1: Information			
Module Title	Aerospace Thermofluids		
Module Code	UFMFQU-15-1	Level	Level 4
For implementation from	2020-21		
UWE Credit Rating	15	ECTS Credit Rating	7.5
Faculty	Faculty of Environment & Technology	Field	Engineering, Design and Mathematics
Department	FET Dept of Engin Design & Mathematics		
Module type:	Standard		
Pre-requisites	None		
Excluded Combinations	None		
Co- requisites	None		
Module Entry 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.

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: Conservation principles of mass, momentum and energy including continuity, fluid momentum, Bernoulli's principle, work, heat and energy
Key Concepts and laws of thermodynamics
Phase Change and Steam
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, two-phase heat transfer and heat exchangers

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.

Part 3: Assessment

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 (component B).

The end of module examination (component A) provides the control condition assessment and 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.

First Sit Components	**Final Assessment**	**Element weighting**	**Description**
Examination - Component A	✓	75 %	2 hour written examination
Laboratory Report - Component B		25 %	Laboratory report (2500 words)
Resit Components	**Final Assessment**	**Element weighting**	**Description**
Examination - Component A	✓	75 %	2 hour written examiation
Laboratory Report - Component B		25 %	Laboratory report (2500 words)

Part 4: Teaching and Learning Methods

Learning Outcomes

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

Module Learning Outcomes	**Reference**
Provide an accurate explanation of thermofluid properties and principles in fluid mechanics in introductory aerospace design scenarios (SM1b, SM2b)	MO1
Describe and perform a basic analysis of the thermodynamics cycle (SM2b)	MO2
Accurately assess simple flows and their behaviours (SM2b)	MO3
Apply practical and laboratory skills relevant to thermofluid processes (P3, P8).	MO4

Contact Hours	**Independent Study Hours:**	
	Independent study/self-guided study	108
	Total Independent Study Hours:	108
	Scheduled Learning and Teaching Hours:	
	Laboratory work Lectorials Tutorials	4 24 12
	Total Scheduled Learning and Teaching Hours:	40
	Hours to be allocated	150
	Allocated Hours	148
Reading List	*The reading list for this module can be accessed via the following link:* https://rl.talis.com/3/uwe/lists/7B96BB76-EEF8-B0EA-00B1-1EFCA6F7212F.html?lang=en-US&login=1	

Part 5: Contributes Towards
This module contributes towards the following programmes of study: