MODULE SPECIFICATION

Part 1: Information			
Module Title	Spaceflight		
Module Code	UFMFCH-15-3	Level	Level 6
For implementation from	2019-20		
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	Aerodynamics and Flight 2019-20		
Excluded Combinations	None		
Co- requisites	None		
Module Entry requirements	None		

Part 2: Description

Overview: The module covers theoretical and practical aspects of spaceflight, and of dynamic flight stability and flight test.

Educational Aims: See Learning Outcomes.

Outline Syllabus: This module will cover:

Supersonic flow: finite strength wave formation; wave patterns; shock-expansion theory; supersonic coefficient definitions, linearised theory, normal and oblique shocks, ducts and in-takes.

Use of the supersonic windtunnel for external aerodynamics.

Hypersonic Flow: Qualitative Aspects, Newtonian Theory.

Space: Atmospheric Drag, Satellite Orbit Transfers, re-entry conditions, space environment.

Space: propulsion types, nozzle design, rocket staging.

Considerations for spacecraft design, launch, and operation.

Equations of motion of an aircraft: solutions in longitudinal and lateral degrees of freedom.

Longitudinal dynamic stability: phugoid and short period oscillation; mathematical description of each mode; magnitude and effects of damping; contribution(s) of aircraft layout.

Lateral dynamic stability: spiral dive, Dutch roll, Roll subsidence; mathematical description of each mode; magnitude and effects of damping; contribution(s) of aircraft layout.

Response Transfer Functions, Flight Control System.

Weight and balance; in-flight measurements; post-flight calculations; comparison with theory; trends from multiple flights and tests.

Teaching and Learning Methods: See Outline Syllabus and Assessment.

Part 3: Assessment

Component A is a two hour examination that will test understanding of learning outcomes relating to spaceflight for evaluating theory and spacecraft design principles.

Component B 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 flight stability and flight testing.

First Sit Components	**Final Assessment**	**Element weighting**	**Description**
Practical Skills Assessment - Component B		50 %	Assignment in flight testing
Examination - Component A	✓	50 %	Examination (2 hrs)
Resit Components	**Final Assessment**	**Element weighting**	**Description**
Practical Skills Assessment - Component B		50 %	Assignment in flight testing
Examination - Component A	✓	50 %	Examination (2 hrs)

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**
Use numerical models to produce simulations of both aircraft and spacecraft motion	MO1
Understand aircraft and spacecraft design principles and theory	MO2
Appreciate the issues in designing and assembling a spacecraft including issues on relevant systems, communications and navigation	MO3
Operate a flight simulation package and use it to assess an aeroplane's stability	MO4
Learn to flight test an aircraft	MO5
Demonstrate key transferable skills in problem formulation and decision making, self-management and communication	MO6

Contact Hours	**Independent Study Hours:**	
	Independent study/self-guided study	114
	Total Independent Study Hours:	114
	Scheduled Learning and Teaching Hours:	
	Face-to-face learning	36
	Total Scheduled Learning and Teaching Hours:	36
	Hours to be allocated	150
	Allocated Hours	150
Reading List	*The reading list for this module can be accessed via the following link:* https://uwe.rl.talis.com/modules/ufmfch-15-3.html	

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