MODULE SPECIFICATION

Part 1: Information			
Module Title	Spaceflight		
Module Code	UFMFCH-15-3	Level	Level 6
For implementation from	2018-19		
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		
Contributes towards			
Module type:	Standard		
Pre-requisites	Aerodynamics and Flight 2018-19		
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 be able to:

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

Contact Hours

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