MODULE SPECIFICATION

Part 1: Information			
Module Title	Spaceflight		
Module Code	UFMFCH-15-3	Level	Level 6
For implementation from	2022-23		
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: The module covers theoretical and practical aspects of spaceflight propulsion, vehicle design and operation. Students will study the different types of propulsion to and in-space including aerodynamic, structural and thermal aspects.

Educational Aims: The aim of this module is to provide knowledge and understanding on the propulsive design and subsequent performance of transatmospheric and space vehicles. The module brings together, scientific, engineering design and mathematical concepts covered at an earlier stage in the programme but now applied to the space and near-space environment.

Outline Syllabus: This module will cover:
- Propulsion technology for transatmopspheric travel and in space.
- Rocket design (staging, nozzles),
- Planetary flightpaths: launch, re-entry and landing;
- theoretical and numerical modelling techniques for hypersonic aerothermodynamics,
- space structures
- atmospheric drag effects on vehicles and orbits
- Supersonic flow theory including use of the supersonic windtunnel for external aerodynamics.

Teaching and Learning Methods: The module delivery is designed to support students decide on suitable propulsion technologies to take a vehicle into space, and then
produce useful predictions on the vehicle behaviour in-flight whilst undertaking its mission.

To achieve this objective the methods presented in lectures will inform and make clear the connection between theory and practice. The material will be discussed and practised in tutorial sessions and simulation labs.

Part 3: Assessment

Component A is two hour exam viva where students are questioned on their technical knowledge of space propulsion and on solving theoretical problems for design space propulsion vehicles and space structures.

Component B is a group report on space vehicle design. This report allows the students to demonstrate their successful application of the principles and methods provided in the module, and it enables them to present their worked solution to the given problem. Group work marks will be moderated using the peer assessment strategy set out in the EDM Group Work Policy

The resit assessment will follow the same format as the first sit apart from the group project being replaced with an individual contribution only.

First Sit Components	**Final Assessment**	**Element weighting**	**Description**
Group work - Component B		50 %	Assignment in spaceflight design and systems. The size of the group report is up to 6000 words with an additional 500 words from each student on their reflection and individual understanding of the process.
Examination - Component A	✓	50 %	A closed book exam on the methods and calculation procedures taught in the course. (2 hours)
Resit Components	**Final Assessment**	**Element weighting**	**Description**
Examination - Component A	✓	50 %	A closed book exam on the methods and calculation procedures taught in the course. (2 hours)
Project - Component B		50 %	Individual assignment in spaceflight propulsion and design. The size of the report is up to 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**
Describe and explain in detail, design principles and theory for spacecraft and launch vehicles (SM1b, EA1b, EL1)	MO1
Compare and evaluate different propulsion systems, selecting appropriate systems for different scenarios (SM1b, D3b, EA1b, EA2, P8)	MO2
Apply a range of appropriate simulation tools for mission and vehicle design from concept to operation (SM2b, EA3, P8)	MO3
Validate and analyse designs created in the operating space environment and in planetary atmospheres. (EA2, D3b, EL4)	MO4

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: Aerospace Engineering with Pilot Studies (Design) {Foundation} [Sep][SW][Frenchay][5yrs] BEng (Hons) 2018-19 Aerospace Engineering with Pilot Studies (Systems) {Foundation} [Sep][SW][Frenchay][5yrs] BEng (Hons) 2018-19 Aerospace Engineering (Design) {Foundation} [Sep][SW][Frenchay][5yrs] BEng (Hons) 2018-19