STUDENT AND ACADEMIC SERVICES

MODULE SPECIFICATION

Part 1: Information			
Module Title	Further Aerodynamics		
Module Code	UFMFXU-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	
Department	FET Dept of Engineering Design & Mathematics		
Module Type:	Standard		
Pre-requisites	Fundamental Aerodynamics 2021-22		
Excluded Combinations	None		
Co-requisites	None		
Module Entry Requirements	None		
PSRB Requirements	None		

Part 2: Description

Overview: Advanced Aerodynamics aims to build on the fundamental aerodynamics and complete the undergraduate education in aerodynamics. Applications of the Navier-Stokes equations to boundary layers and compressible flow are investigated and low order numerical modelling of flows are considered.

Educational Aims: The module aims to provide a complete understanding of the principles of fundamental aerodynamics

Outline Syllabus: Fundamentals of viscous flows: conservation laws, laminar boundary layer and turbulent boundary layer.

Pressure gradient and boundary layer separation.

Flow transition: boundary layer transition process, prediction of the onset of transition.

Compressible flow: governing equations for normal and oblique shock waves, expansion waves, shock interactions, and application to diffusers, nozzles and engine intakes.

Horseshoe vortex systems and panel codes.

Use of the wind tunnel for internal and external aerodynamics

Teaching and Learning Methods: The method of teaching and learning is designed so that students can quickly consolidate theoretical principles through exercises, laboratory experiments and application in coursework.

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

Part 3: Assessment

Component A is a two hour examination that will test understanding of learning outcomes relating to analytical skills on aerodynamics

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 example wind tunnels and numerical codes. An individual report of 3000 words will be submitted.

First Sit Components	**Final Assessment**	**Element weighting**	**Description**
Examination - Component A	✓	50 %	Written Examination
Written Assignment - Component B		50 %	Coursework
Resit Components	**Final Assessment**	**Element weighting**	**Description**
Examination - Component A	✓	50 %	Written Exam
Written Assignment - Component B		50 %	Coursework

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**
Application of the theory for predicting boundary layer development, flow separation, transition and supersonic flow properties. (SM1b, SM2b)	MO1
Application of analytical/numerical models/methods to produce simulations of aerodynamic flows (SM1b, SM2b, EA3b)	MO2
Application of ground based experimental facilities to acquire and process suitable data, and analyse flow simulations (SM1b, SM2b, P3, P8)	MO3
Demonstrate key transferable skills in problem formulation and decision making, self-management and communication (P4)	MO4

Contact Hours

Independent Study Hours:	
Independent study/self-guided study	114
Total Independent Study Hours:	114
Scheduled Learning and Teaching Hours:	

	Lectures	24
	Tutorials	12
	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/lists/08A7CA93-B6A4-AC26-C705-3B68E362FB4E.html?draft=true&lang=en&login=1&version=v1	

Part 5: Contributes Towards
This module contributes towards the following programmes of study: Aerospace Engineering [Sep][FT][Frenchay][3yrs] BEng (Hons) 2020-21 Aerospace Engineering [Sep][FT][Frenchay][4yrs] MEng 2020-21 Aerospace Engineering with Pilot Studies [Sep][FT][Frenchay][3yrs] BEng (Hons) 2020-21 Aerospace Engineering with Pilot Studies [Sep][FT][Frenchay][4yrs] MEng 2020-21