MODULE SPECIFICATION

Part 1: Information			
Module Title	Applied Aerodynamics		
Module Code	UFMFH7-15-3	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 aerodynamics and dynamic flight stability and flight test.

Educational Aims: See Learning Outcomes.

Outline Syllabus: This module will cover:
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 interaction, and application to diffusers, nozzles and engine intakes.
Hypersonic Flow: Qualitative Aspects.
Use of the supersonic wind tunnel for external aerodynamics.
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 analytical skills on aerodynamics and flight dynamics under controlled conditions. 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 on Aerodynamics (2 hrs)
Resit Components	**Final Assessment**	**Element weighting**	**Description**
Practical Skills Assessment - Component B		50 %	Assignment in flight testing
Examination - Component A	✓	50 %	Examination on aerodynamics (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**
Understand and predict conservation laws, boundary layer development, flow separation, transition and supersonic flow properties	MO1
Use numerical models to produce simulations of aircraft motion and aerodynamic flows	MO2
Operate a flight simulation package and use it to assess an aeroplane's stability	MO3
Learn to flight test an aircraft	MO4
Demonstrate key transferable skills in problem formulation and decision making, self-management and communication	MO5

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/ufmfh7-15-3.html	

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