MODULE SPECIFICATION

Part 1: Information			
Module Title	Aerodynamics C		
Module Code	UFMEWA-15-M	Level	Level 7
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	None		
Excluded Combinations	None		
Co- requisites	None		
Module Entry requirements	None		

Part 2: Description

Overview: Module Entry requirements, the module is intended for science and engineering graduates, or equivalent, with strong mathematical skills.

Educational Aims: See learning outcomes.

Outline Syllabus: Unsteady Aerodynamics:

Review of the basic laws, Theodorsen equation, panel methods

Oscillating airfoils in incompressible, subsonic, and supersonic flows

Arbitrary airfoil motion, oscillating finite wings

Unsteady motion of finite wings

Unsteady motion of non-lifting bodies

Unsteady boundary layer flow in two-dimensional and asymmetric flows

Periodic boundary layer flows

Unsteady separation

Oscillating flow in a pipe

Unsteady compressible boundary layers

Aero-elastic buffet

Stall flutter

Teaching and Learning Methods: Students will learn through a combination of formal lectures and tutorial sessions.

Part 3: Assessment			
The module is examined via an open book exam.			
First Sit Components	**Final Assessment**	**Element weighting**	**Description**
Examination - Component A	✓	100 %	Open book exam (180 minutes)
Resit Components	**Final Assessment**	**Element weighting**	**Description**
Examination - Component A	✓	100 %	Open book exam (180 minutes)

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**
The key principles of unsteady aerodynamics	MO1
The differences between buffet and stall flutter	MO2
The numerical methods used for unsteady aerodynamics	MO3
Unsteady motion on wings and no-lifting bodies	MO4
The physics of unsteady aerodynamics (subsonic/transonic and supersonic flows) and numerical methods, such as panel methods and Theodorsen equation	MO5
Applications of theoretical predictions to wings	MO6
The numerical/experimental data from a wing	MO7
The unsteady phenomena caused by the interaction between the shock on the upper surface and the separation characterized by a main frequency corresponding to the shock movement and the pulsation of the separation	MO8
Panel methods for analysis of lift generation and oscillating airfoils	MO9
The boundary-layer viscous – inviscid interaction	MO10
The Theordorsen function, which is essentially a Fourier Transform of the Wagner Function, and understand its limitations	MO11
Relevant professional literature	MO12
Problem formulation and decision making	MO13

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/ufmewa-15-m.html	

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