



MODULE SPECIFICATION

Part 1: Information			
Module Title	Applied Aerodynamics		
Module Code	UFMFH7-15-3	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
<p>Overview: The module covers theoretical and practical aspects of aerodynamics and dynamic flight stability and flight test.</p> <p>Educational Aims: See Learning Outcomes.</p> <p>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.</p>

STUDENT AND ACADEMIC SERVICES

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)

STUDENT AND ACADEMIC SERVICES

Part 4: Teaching and Learning Methods																			
Learning Outcomes	<p>On successful completion of this module students will be able to:</p> <table border="1"> <thead> <tr> <th colspan="2" style="text-align: center;">Module Learning Outcomes</th> </tr> </thead> <tbody> <tr> <td>MO1</td> <td>Understand and predict conservation laws, boundary layer development, flow separation, transition and supersonic flow properties</td> </tr> <tr> <td>MO2</td> <td>Use numerical models to produce simulations of aircraft motion and aerodynamic flows</td> </tr> <tr> <td>MO3</td> <td>Operate a flight simulation package and use it to assess an aeroplane's stability</td> </tr> <tr> <td>MO4</td> <td>Learn to flight test an aircraft</td> </tr> <tr> <td>MO5</td> <td>Demonstrate key transferable skills in problem formulation and decision making, self-management and communication</td> </tr> </tbody> </table>	Module Learning Outcomes		MO1	Understand and predict conservation laws, boundary layer development, flow separation, transition and supersonic flow properties	MO2	Use numerical models to produce simulations of aircraft motion and aerodynamic flows	MO3	Operate a flight simulation package and use it to assess an aeroplane's stability	MO4	Learn to flight test an aircraft	MO5	Demonstrate key transferable skills in problem formulation and decision making, self-management and communication						
Module Learning Outcomes																			
MO1	Understand and predict conservation laws, boundary layer development, flow separation, transition and supersonic flow properties																		
MO2	Use numerical models to produce simulations of aircraft motion and aerodynamic flows																		
MO3	Operate a flight simulation package and use it to assess an aeroplane's stability																		
MO4	Learn to flight test an aircraft																		
MO5	Demonstrate key transferable skills in problem formulation and decision making, self-management and communication																		
Contact Hours	<table border="1"> <thead> <tr> <th colspan="2" style="text-align: center;">Contact Hours</th> </tr> </thead> <tbody> <tr> <td colspan="2" style="text-align: center;">Independent Study Hours:</td> </tr> <tr> <td style="text-align: center;">Independent study/self-guided study</td> <td style="text-align: center;">114</td> </tr> <tr> <td style="text-align: center;">Total Independent Study Hours:</td> <td style="text-align: center;">114</td> </tr> <tr> <td colspan="2" style="text-align: center;">Scheduled Learning and Teaching Hours:</td> </tr> <tr> <td style="text-align: center;">Face-to-face learning</td> <td style="text-align: center;">36</td> </tr> <tr> <td style="text-align: center;">Total Scheduled Learning and Teaching Hours:</td> <td style="text-align: center;">36</td> </tr> <tr> <td style="text-align: center;">Hours to be allocated</td> <td style="text-align: center;">150</td> </tr> <tr> <td style="text-align: center;">Allocated Hours</td> <td style="text-align: center;">150</td> </tr> </tbody> </table>	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
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	<p>The reading list for this module can be accessed via the following link:</p> <p>https://uwe.rl.talis.com/modules/ufmfh7-15-3.html</p>																		