MODULE SPECIFICATION

Part 1: Information			
Module Title	Pilot Studies and Aerodynamics		
Module Code	UFMF9C-30-2	Level	Level 5
For implementation from	2018-19		
UWE Credit Rating	30	ECTS Credit Rating	15
Faculty	Faculty of Environment & Technology	Field	Engineering, Design and Mathematics
Department	FET Dept of Engin Design & Mathematics		
Contributes towards			
Module type:	Standard		
Pre-requisites	Engineering Mathematics 2018-19, Introduction to Aeronautics 2018-19		
Excluded Combinations	None		
Co- requisites	None		
Module Entry requirements	None		

Part 2: Description

Educational Aims: The course aims to provide a basic education in aerodynamics and flight mechanics with illustrated practical and computational exercises so that students can gain a true feel for aircraft performance and stability.

Outline Syllabus: Aspects of Ground school training for a typical Private Pilots licence including (for pilots) meteorology, interpreting weather data, aircraft systems, communications, flight information, flight computers, weight and balance, performance, navigation and cross country flight planning.

Principles of Stability and Control: Static Stability, Dynamic Stability.

Static Stability: Longitudinal Stability, Neutral Point, Static Margin, Calculation of Elevator Angle to Trim, Stick-fixed versus Stick-free Static stability, Elevator Hinge Moment, Lateral Stability.

Subsonic Flow over Aerofoils and wings: flow field characteristics; influential flow field and shape parameters; stall and separation; boundary layer flows.

Potential theory, 2D aerofoil and 3D wing theory including vortex systems.

Transonic and Supersonic Flows over aerofoils: compressible flows, shock waves.

High lift profiles and devices, effects of leading and trailing edges.

Introduction to computational fluid dynamics (CFD): relevant equations, principles of discretisation, turbulence models, mesh generation, boundary conditions, accuracy and convergence, post-processing, validation and assessment of results.

Teaching and Learning Methods: See Assessment

Part 3: Assessment

This module covers theoretical and practical aspects of aerodynamics, performance, static stability and orbital mechanics.

Component A is a two hour exam on Aerodynamics

Component B is an assessment portfolio demonstrating key skills. It reinforces theory by giving students practical experience in applying the theoretical principles in a real context. It includes:
Aerodynamics assignment including computational fluid dynamics (CFD), and physical testing of flows.
Performance, stability assignment.
Basic spacecraft trajectories and manoeuvres.

First Sit Components	**Final Assessment**	**Element weighting**	**Description**
Portfolio - Component B		75 %	Portfolio
Examination - Component A	✓	25 %	Examination (2 hrs)
Resit Components	**Final Assessment**	**Element weighting**	**Description**
Portfolio - Component B		75 %	Portfolio
Examination - Component A	✓	25 %	Examination (2 hrs)

Part 4: Teaching and Learning Methods

Learning Outcomes

On successful completion of this module students will be able to:

	Module Learning Outcomes
MO1	Use aerodynamic theory for describing subsonic, transonic and supersonic flows
MO2	Acquire basic knowledge in flight theory for performance, stability and design of aircraft and spacecraft
MO3	Use of numerical models to produce simulations of aerodynamic flows for basic geometries in different flow regimes
MO4	Acquire piloting skills through ground school training
MO5	Demonstrate key transferable skills in problem formulation and decision making, self-management and communication
MO6	Demonstrate an awareness of, and access to professional literature

<table>
<tr><td></td><td></td></tr>
<tr><td>Contact Hours</td><td>
<table>
<tr><th colspan="2">Contact Hours</th></tr>
<tr><td colspan="2"></td></tr>
<tr><td colspan="2">Independent Study Hours:</td></tr>
<tr><td>Independent study/self-guided study</td><td>228</td></tr>
<tr><td>Total Independent Study Hours:</td><td>228</td></tr>
<tr><td colspan="2">Scheduled Learning and Teaching Hours:</td></tr>
<tr><td>Face-to-face learning</td><td>72</td></tr>
<tr><td>Total Scheduled Learning and Teaching Hours:</td><td>72</td></tr>
<tr><td>Hours to be allocated</td><td>300</td></tr>
<tr><td>Allocated Hours</td><td>300</td></tr>
</table>
</td></tr>
<tr><td>Reading List</td><td>The reading list for this module can be accessed via the following link:

https://uwe.rl.talis.com/modules/ufmf9c-30-2.html</td></tr>
</table>