MODULE SPECIFICATION

Part 1: Information			
Module Title	Fluid Dynamics		
Module Code	UFMFVG-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	Mathematical Methods 2018-19		
Excluded Combinations	None		
Co- requisites	None		
Module Entry requirements	None		

Part 2: Description
Overview: In this module you will study the linear algebra and multivariate calculus techniques that underpin the field of fluid dynamics. The techniques covered have applications in meteorology and in the design of aerodynamic structures such as aircraft wings and wind turbines. **Educational Aims:** In this module you will extend your knowledge of vector calculus and apply it to problems of three dimensional flow. **Outline Syllabus:** Particle paths, streamlines. Rate of change following the fluid. Mass conservation and incompressibility. Pressure forces. Euler equations and their derivation. Vorticity: rotational and irrotational flow. Bernoulli theorems. Simple potential flows. Simple viscous flows. No-slip boundary conditions. Derivation of the governing equation for viscous unsteady flow. The Navier-Stokes equations for incompressible flow. The Reynolds number and its interpretation. Exact solutions of the Navier-Stokes equations: Couette and

Poiseuille flow, unsteady flows.

Linear water wave theory.

Teaching and Learning Methods: Scheduled contact includes lectures and workshops. The latter serve partly to resolve issues brought up by the students on a week-by-week basis, and also to provide an arena for other learning activities appropriate to developing theory or to exploring applications.

Self-study includes: engaging with the resources provided; working on example sheets; locating and utilising other materials to support learning.

Contact: 36 hours
Assimilation and skill development: 54 hours
In-class tests preparation:15 hours
Exam preparation: 45 hours
Total: 150 hours

Part 3: Assessment

The assessment strategy is designed to provide students with feedback on a regular basis, of the ideas presented in the earlier part of the course. This will be achieved by setting three in-class tests with the best two from three tests used to calculate the Component B score.

Feedback from component B will assist students to prepare for the end-of-module examination that will test the ability to bring together concepts and techniques from the whole module and select appropriate solution techniques to the solution of mathematical problems that arise in fluid flow problems with interpretation of the results.

For the resit component B assessment students will be set an assignment consisting of a series of short questions designed to assist students assimilate basic concepts and techniques form the module.

First Sit Components	**Final Assessment**	**Element weighting**	**Description**
In-class test - Component B		25 %	In-class tests (best two from three)
Examination - Component A	✓	75 %	Examination (2 hours)
Resit Components	**Final Assessment**	**Element weighting**	**Description**
Written Assignment - Component B		25 %	Assignment
Examination - Component A	✓	75 %	Examination (2 hours)

Part 4: Teaching and Learning Methods

Learning Outcomes

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

	Module Learning Outcomes
MO1	To demonstrate an understanding of the mathematical aspects of fluid dynamics
MO2	Find solutions of the Navier-Stokes equations in simple geometries
MO3	Use mathematical techniques to model problems arising in fluid dynamics
MO4	Communicate mathematical concepts, analysis and results through a short written report

Contact Hours

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/ufmfvg-15-3.html