MODULE SPECIFICATION

Part 1: Information			
Module Title	Fluid Dynamics		
Module Code	UFMFVG-15-3	Level	Level 6
For implementation from	2020-21		
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	Mathematical Methods 2020-21		
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 uses an online 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.			
First Sit Components	**Final Assessment**	**Element weighting**	**Description**
Examination (Online) - Component A	✓	100 %	Online Examination
Resit Components	**Final Assessment**	**Element weighting**	**Description**
Examination (Online) - Component A	✓	100 %	Online Examination

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

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	

Part 5: Contributes Towards
This module contributes towards the following programmes of study: Mathematics and Statistics [Sep][FT][Frenchay][3yrs] BSc (Hons) 2018-19 Mathematics [Sep][FT][Frenchay][4yrs] MMath 2018-19 Statistics [Sep][FT][Frenchay][3yrs] BSc (Hons) 2018-19 Mathematics [Sep][FT][Frenchay][3yrs] BSc (Hons) 2018-19