MODULE SPECIFICATION

Part 1: Information			
Module Title	Computational Fluid Dynamics		
Module Code	UFMFWL-15-M	Level	Level 7
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	Mechanical Engineering [Sep][FT][Frenchay][1yr] MSc 2018-19 Mechanical Engineering [Sep][PT][Frenchay][2yrs] MSc 2018-19		
Module type:	Standard		
Pre-requisites	Computational Methods 2018-19		
Excluded Combinations	None		
Co- requisites	None		
Module Entry requirements	None		

Part 2: Description
Educational Aims: See Learning Outcomes **Outline Syllabus:** The syllabus includes: Introduction to Computational Fluid Dynamics and CFD Package Engineering flow problems and configurations Domain, boundary/initial conditions and mesh techniques

Governing equations and numerical methods

Turbulent flow and RANS turbulence modelling

Steady and transient flow solutions

Solution of engineering flow problems using a CFD package

Comparison of results with known experimental and numerical predictions

Introduction to Computational Fluid Dynamics: overview of CFD concepts and solution software, including flow problems, domain, boundary and initial conditions, mesh generation, conversation laws and NS equations, steady and unsteady RANS, turbulence modelling, and large-eddy simulation basics.

Practical RANS modelling techniques: e.g. problem definition, configuration, boundary conditions, 2D/3D mesh generations, solution methods, convergence and results analysis and comparisons.

Teaching and Learning Methods: This module is supported by computer practical sessions. Study time outside of contact hours will be spent on worked exercises and example problems.

Scheduled learning includes lectures, tutorials and computer practical sessions.

Independent learning includes hours engaged with essential reading, software, assignment preparation and completion etc. These sessions constitute an average time per level as indicated in the table below.

There are a total of 36 scheduled contact hours for lecturing and tutorials.

Lectures/tutorials: 36 hours
Self-directed learning : 60 hours
Coursework: 27 hours
Exam preparation : 27 hours
Total hours : 150

Part 3: Assessment

The module is assessed using two components of assessment where both theoretical concepts and practical implementation of computational fluid dynamics (CFD) theory are covered.

A two hour written end of module examination is used to assess concepts in CFD theory and methods under controlled conditions.

The coursework component is designed to assess modelling using software packages, and competence in critically evaluating and analysing results of computational fluid dynamics. The coursework assesses underlying CFD concepts in a practical context. The output of this coursework will be a report in the style of a 10 page conference paper. A template will be provided to help students structure the report appropriately.

The referred coursework will involve a reworking of the first sit submission taking into account feedback to improve the quality of the work. In the event of any non-submission of coursework a new but equivalent task will be published.

First Sit Components	**Final Assessment**	**Element weighting**	**Description**
Report - Component B		75 %	Individual report
Examination - Component A	✓	25 %	Examination (2 hours)

Resit Components	Final Assessment	Element weighting	Description
Report - Component B		75 %	Individual report
Examination - Component A	✓	25 %	Exam (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	Design and undertake substantial investigations to address significant areas of theory and practice in Computational Fluid Dynamics.
MO2	Select appropriate advanced methodological approaches and critically evaluate their effectiveness.
MO3	Apply appropriate theoretical and practical methods to the analysis and solution of engineering problems.
MO4	Demonstrate and critically evaluate current theoretical and methodological approaches through use of professional literature.
MO5	Act with initiative in decision-making within professional or given guidelines.
MO6	Communicate effectively using professional engineering terms.

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/ufmfwl-15-m.html