MODULE SPECIFICATION

Part 1: Information			
Module Title	Thermoflduid Systems and Computational Flow Dynamics		
Module Code	UFMFAQ-30-3	Level	Level 6
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	None		
Excluded Combinations	None		
Co- requisites	None		
Module Entry requirements	None		

Part 2: Description

Overview: The Thermofluid Systems and Computational Flow Dynamics module focusses on thermofluid systems, the types and designs of typical plant found in nuclear industries, such as fans, compressors and HVAC systems. Key areas for study are understanding fluid flow theory and applying CFD modelling.

Educational Aims: Learners will develop the theoretical understanding of fluid flow principles, by investigating hot and cold fluids in fluid flow machines. Learners will study Computational Flow Dynamics (CFD) theory and carry out CFD modelling, which would be used in industry.

Outline Syllabus: The topics covered in this unit are:

Thermofluids:
Compressible flow machines design (fans, compressors)
Compressible flow machines (pumps)
Refrigeration and heat pumps
Air conditioning, mixing of air-streams and psychrometry
HVAC systems, combined heat and power (CHP), energy recovery.

CFD:
CFD theory and applications
CFD modelling software
Laminar and turbulent flow conditions
Modelling with Hex geometries
Mesh and mesh characteristics
Boundary flow conditions
Navier-Stokes flow transport equations

Teaching and Learning Methods: See Outline Syllabus and Assessment.

Part 3: Assessment			
Component A – Data Interpretation: Analysing a Case Study – The learner will be given a set of fluids data as a case study and will be asked to perform flow analysis calculations, for example viscosity and flow velocity vectors in a constricted pipe. Component B – CFD Model – The learners will create a CFD model of fluid flow in a section of nuclear plant and present their results, along with explanations of operating principles, energy use and design of fluid machinery in presentation slides. The resit assessment tasks for this module will involve a rework and reflective evaluation of the work carried out in the original task.			
First Sit Components	**Final Assessment**	**Element weighting**	**Description**
Set Exercise - Component B		45 %	Presentation slides
Practical Skills Assessment - Component B		30 %	CFD model
Case Study - Component A	✓	25 %	Data interpretation - analysing a case study
Resit Components	**Final Assessment**	**Element weighting**	**Description**
Set Exercise - Component B		45 %	Presentation slides
Practical Skills Assessment - Component B		30 %	CFD model
Case Study - Component A	✓	25 %	Data interpretation - analysing a case study

Part 4: Teaching and Learning Methods

Learning Outcomes

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

	Module Learning Outcomes
MO1	Conduct thermofluid and flow analysis calculations
MO2	Explain and analyse the operating principles of HVAC and fluid machinery
MO3	Explain and evaluate energy use, design and cost drivers of fluid machinery
MO4	Design and create computational fluid dynamics (CFD) models

Contact Hours

Contact Hours	
Independent Study Hours:	
Independent study/self-guided study	228
Total Independent Study Hours:	228
Scheduled Learning and Teaching Hours:	
Face-to-face learning	72
Total Scheduled Learning and Teaching Hours:	72
Hours to be allocated	300
Allocated Hours	300

Reading List

The reading list for this module can be accessed via the following link:

https://uwe.rl.talis.com/index.html