Module Definition Form (MDF)

Module code: MOD011140	**Version:** 1 **Date Amended:** 07/Jul/2025

1. Module Title
Computational Fluid Dynamics and System Engineering Project

2a. Module Leader
Ahad Ramezanpour

2b. School
School of Engineering and the Built Environment

2c. Faculty
Faculty of Science and Engineering

3a. Level
6

3b. Module Type
Standard (fine graded)

4a. Credits
30

4b. Study Hours
300

5. Restrictions

Type	Module Code	Module Name	Condition
Pre-requisites:	None		
Co-requisites:	None		
Exclusions:	None		
Courses to which this module is restricted:	None		

LEARNING, TEACHING AND ASSESSMENT INFORMATION

6a. Module Description

This project-based module will help you prepare for full-scale industrial projects involving engineering simulation activities with a wide range of versatility. You'll work in groups of 3-5, to carry out a teamwork feasibility study, create/obtain the necessary CAD files, carry out CFD analysis of a product operating under specified and realistic specifications, and finally use MATLAB & Simulink to create an up-to-date digital twin of the engineering system.

6b. Outline Content

- Understanding the importance of the teamwork and collaboration Definition of individual projects (for each team)
- Feasibility study and evaluation of individual projects Geometry creation amendment (if external source is used)

Application of CFD on the model

- Final amendments to the CFD model and extraction of the loads
- Creation of a simulation with MATLAB & Simulink for system analysis
- Exchange of DATA between CFD and MATLAB & Simulink model
- Critical analysis of results and preparing the final report

6c. Key Texts/Literature

The reading list to support this module is available at: https://readinglists.aru.ac.uk/

6d. Specialist Learning Resources

None

7. Learning Outcomes (threshold standards)

No.	Type	On successful completion of this module the student will be expected to be able to:
1	Knowledge and Understanding	Demonstrate the capacity to select and apply appropriate computational and analytical techniques to analyse and model a complex engineering problem, recognizing its scope, constraints, and limitations.
2	Knowledge and Understanding	Apply an integrated or systems approach to the solution of a complex problem.
3	Intellectual, practical, affective and transferrable skills	Demonstrate independent engineering simulation skills in fluid dynamics and systems simulation, supporting critical analysis of input data and results of an engineering simulation and understanding of scopes and limitations
4	Intellectual, practical, affective and transferrable skills	Effectively function as an individual and as a member of a team; establish the proficiency to communicate effectively on complex engineering subjects orally and in writing, with technical and non-technical audiences.

8a. Module Occurrence to which this MDF Refers				
Year	**Occurrence**	**Period**	**Location**	**Mode of Delivery**
2025/6	ZZF	Template For Face To Face Learning Delivery		Face to Face

8b. Learning Activities for the above Module Occurrence			
Learning Activities	**Hours**	**Learning Outcomes**	**Details of Duration, frequency and other comments**
Lectures	0	None	None
Other teacher managed learning	72	1-4	6 hours per week, workshop and supervised activity in a computer room
Student managed learning	228	1-4	Self Directed Activity and Learning
TOTAL:	300		

9. Assessment for the above Module Occurrence					
Assessment No.	**Assessment Method**	**Learning Outcomes**	**Weighting (%)**	**Fine Grade or Pass/Fail**	**Qualifying Mark (%)**
010	Coursework	1-3	80 (%)	Fine Grade	30 (%)
One report on CFD and MATLAB and Simulink, Max 4500 words associated with the requirements of Engineering Council learning outcomes C3, C6					
Assessment No.	**Assessment Method**	**Learning Outcomes**	**Weighting (%)**	**Fine Grade or Pass/Fail**	**Qualifying Mark (%)**
011	Practical	4	20 (%)	Fine Grade	30 (%)
Group oral presentation, 5 minutes per individual student in group plus 5 minutes Q&A, equivalent of maximum 1000 words per individual, associated with the requirements of Engineering Council learning outcomes C16					

In order to pass this module, students are required to achieve an overall mark of 40% (for modules at levels 3, 4, 5 and 6) or 50% (for modules at level 7*).

In addition, students are required to:
(a) achieve the qualifying mark for each element of fine graded assessment as specified above
(b) pass any pass/fail elements

[* the pass mark of 50% applies for all module occurrences from the academic year 2024/25 – see Section 3a of this MDF to check the level of the module and Section 8a of this MDF to check the academic year]