Module Definition Form (MDF)

Module code: MOD009179	**Version:** 1 **Date Amended:** 09/Dec/2022

1. Module Title
Fluid Mechanics and Heat Transfer

2a. Module Leader
Mohamed Yehia

2b. School
School of Engineering and the Built Environment

2c. Faculty
Faculty of Science and Engineering

3a. Level
5

3b. Module Type
Standard (fine graded)

4a. Credits
15

4b. Study Hours
150

5. Restrictions

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

LEARNING, TEACHING AND ASSESSMENT INFORMATION

6a. Module Description

Gain the foundations in the theoretical and applied aspects of fluid mechanics and heat transfer, allowing you to be able to identify and analyse engineering problems that include air and water flow combined with heat transfer. The subject has a wide range of applications such as wind turbines, heating and air-conditioning, aerodynamics, heat exchanges and heat recovery systems.
The fluid mechanics will cover fluid static, conservation of mass and momentum leading to Bernoulli's equation, fluid flow classification and regimes, dimensional analysis, and fluid forces. The heat transfer will include combined conduction, convection, and radiation one-dimension with extendibility to more complex problems.
In this module, you will develop your learning, using applied and real-world problems complemented by laboratory activities to ensure consistent and deep learning.

6b. Outline Content

- Basic concepts in Fluid Mechanics such as viscosity, surface tension, compressibility, and ideal gas law
- Units and unit conversion in fluid mechanics and heat transfer
- Understanding and distinguishing the problems related to fluid mechanics, heat transfer and their interconnectivity
- Fluid Statics
- Fluid dynamics and Bernoulli's Equation
- Dimensional analysis
- Forces as a result of fluid flow
- Conduction/Convection/Radiation heat transfer
- Combined modes of heat transfer
- Applying all the concepts to a real-world problem

6c. Key Texts/Literature

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

6d. Specialist Learning Resources

Fluid Mechanics and Heat Transfer laboratory equipment

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	Distinguish elements of complex fluid mechanics and heat transfer problems and determine their interconnectivity
2	Knowledge and Understanding	Illustrates understanding of key principles related to complex fluid mechanics and heat transfer problems
3	Intellectual, practical, affective and transferrable skills	Apply knowledge of mathematics and engineering principles to solve complex fluid mechanics and heat transfer problems
4	Intellectual, practical, affective and transferrable skills	Conduct laboratory experiments, compare, and justify the results with respect to the theoretical methods, and write a laboratory report

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	30	1-3	Three hours per week for ten weeks
Other teacher managed learning	6	4	Three hours per week for two weeks, Laboratory Activity
Student managed learning	114	1-4	Self-managed study, engage with formative assessment, and preparing lab report
TOTAL:	150		

9. Assessment for the above Module Occurrence					
Assessment No.	**Assessment Method**	**Learning Outcomes**	**Weighting (%)**	**Fine Grade or Pass/Fail**	**Qualifying Mark (%)**
010	Examination Chelmsford	1-3	50 (%)	Fine Grade	30 (%)
Examination 1.5 hours (maps to Engineering Council Learning Outcome C2)					
Assessment No.	**Assessment Method**	**Learning Outcomes**	**Weighting (%)**	**Fine Grade or Pass/Fail**	**Qualifying Mark (%)**
011	Coursework	4	50 (%)	Fine Grade	30 (%)
Individual Report, maximum 1500 words (maps to Engineering Council Learning Outcome C12)					

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]