

<b>Module Code</b>	MEU55B03
<b>Module Name</b>	Advanced Thermal Fluids Design
<b>ECTS Weighting</b>	10 ECTS
<b>Semester taught</b>	Semester 2
<b>Module Coordinator/s</b>	Associate Professor Anthony Robinson
<b><a href="#">Module Learning Outcomes</a> with reference to the <a href="#">Graduate Attributes</a> and how they are developed in discipline</b>	<p>On successful completion of this module, students should be able to:</p> <p>LO1. Solve problems for practical and industrially relevant thermal fluids applications.</p> <p>LO2. Analyse and generate closed mathematical models and/or simulations of heat transfer, fluid dynamic and thermodynamic systems.</p> <p>LO3. Apply design principles with bespoke engineering solutions to multidisciplinary problems with specified design goal performance targets and within design constraints.</p> <p>LO4. Understand the dynamics of teamwork in the context of solving multifaceted problems with rigid timelines.</p> <p>LO5. Communicate in the form of technical reports and formal presentations.</p> <p><b>Graduate Attributes: levels of attainment</b></p> <p>To act responsibly - Enhanced</p> <p>To think independently - Enhanced</p> <p>To develop continuously - Enhanced</p> <p>To communicate effectively - Enhanced</p>
<b>Module Content</b>	<p>This module is developed to deepen the student's understanding of heat and mass transfer as well as their capacity to solve complex engineering problems associated with real life thermal fluid systems. The module structure is primarily continuous assessment centred on problem-based learning. The group assignments and laboratory will pull together knowledge and understanding of thermodynamics, fluid mechanics and heat transfer together with other core areas of mechanical and manufacturing engineering, by posing open-ended and real-life thermal fluid system design problems that require bespoke engineering solutions. The problems will coordinate technical performance requirements with plausible real-life constraints such as size/weight, material compatibility, manufacturability, cost etc. The group assignments will encourage the use of internet resources and archived journal publications to find new and/or unconventional techniques for their design with the aim of fostering innovative and critical thinking while bringing the</p>

students up to speed with regard to the state of the art of both commercially available high technologies as well as emerging high technology.

**Teaching and Learning Methods**

This module uses problem-based learning via self-directed group assignments, group presentations, a laboratory and final examination to help students achieve the required learning outcomes.

**Assessment Details**

Please include the following:

- **Assessment Component**
- **Assessment description**
- **Learning Outcome(s) addressed**
- **% of total**
- **Assessment due date**

Assessment Component	Assessment Description	LO Addressed	% of total	Week due (provisional)
Written examination	End of semester examination	1-3	15	Exam period
Laboratory	Group design and build laboratory	3-5	10	Week 12
Assignments	Three group assignments (each 3 weeks in duration)	1-5	75	Staggered in Weeks 1-10

**Reassessment Requirements**

Written Examination

**Contact Hours and Indicative Student Workload**

<b>Contact hours: 55 (45 for Lecture, 10 for Laboratory)</b>
<b>Independent Study (preparation for course and review of materials): 30</b>
<b>Independent Study (preparation for assessment, incl. completion of assessment): 80</b>

**Recommended Reading List**

- Cengel and Turner, Fundamentals of Thermal Fluid Sciences (McGraw-Hill) Dynamics , JL Meriam (Wiley)
- Cengel and Bowles, Thermodynamics: an Engineering Approach (McGraw- Hill)

- Incropera & DeWitt, Introduction to heat Transfer (Wiley)
- White, Fluid Mechanics (McGraw-Hill)

**Module Pre-requisite**

4B4 Heat Transfer, 4B13 Fluid Mechanics

**Module Co-requisite**

NA

**Module Website**

**Are other Schools/Departments involved in the delivery of this module? If yes, please provide details.**

No

**Module Approval Date**

August 2024

**Approved by**

Anthony Robinson

**Academic Start Year**

2024

**Academic Year of Date**

2024/25