UNIVERSITY of BRADFORD

Module Descriptor

Module Details	
Module Title	Thermofluids 1
Module Code	ENG4008-B
Academic Year	2022/3
Credit Rating	20
School	Department of Mechanical and Energy Systems Engineering
Subject Area	Engineering
FHEQ Level	FHEQ Level 4
Pre-requisites	
Co-requisites	

Contact Hours	
Type	**Hours**
Tutorials	12
Lectures	48
Directed Study	140

Availability	
Occurrence	**Location / Period**

BDA	University of Bradford / Semester 2

Module Aims

To provide students with a fundamental understanding of the composite subject Thermofluids, which comprises two branches of engineering science - Thermodynamics and Fluid Mechanics.

Thermodynamics is the study of energy and energy transformation and is widely applicable to all branches of engineering involving work being done or heat being transferred. Fluid mechanics is the study of fluid behaviour at rest and in motion, and has a wide range of applications in mechanical, chemical, civil and biomedical systems.

Outline Syllabus

1) Properties of fluids
2) Hydrostatics and buoyancy forces
3) Fluids in motion - laminar and turbulent flows
4) Introduction to energy thermodynamics
5) Systems, energy, work, heat, properties.
6) First Law of Thermodynamics.
7) Mass continuity
8) Energy conservation - Bernoulli's equation
9) Conservation of momentum
10) Ideal gases; thermodynamic tables, compressibility
11) Analysis of closed systems
12) Analysis of open systems

Learning Outcomes

01	Demonstrate knowledge of fluid flow and energy balances in engineering components such as pipes, weirs, nozzles, turbine and engines.
02	Explain the principles of thermodynamics and fluid mechanics and demonstrate the ability to apply these principles to the analysis of simple processes
03	Measure and critically evaluate energy balances and fluid flows; predict the behaviour of fluids in simple engineering applications
	Demonstrate analytical skills, problems solving skills and design

04	skills related to heat transfer, fluid and particle flow equipment.

Learning, Teaching and Assessment Strategy
Theory, implementation, application, and critical analysis is gained through interactive lectures, tutorials, case studies and directed study. All lectures will be delivered online. Face to face tutorials with individual groups will be held to provide further support and guidance, as appropriate. These will be supplemented by online tutorials. Engineering application and evaluation is gained from laboratory practical experiments which will be video recorded and samples sets of data provided to students for analysis . Formative feedback will be provided to students during online discussions of the experiments and during tutorials. Directed study provides students with the opportunity to undertake guided reading and to develop their own portfolio of learning to enhance transferable skills and knowledge relating to evaluation of own role and subject provision. Assessment of understanding, application and critical analysis is by open book examination (LOs 1-4); assessment of engineering application is assessed by laboratory experiments and written coursework (LO5). Formative assessment will be provided as part of tutorial sessions with the aid of worked examples. This module satisfies the below Learning Outcomes as specified by the Accreditation of Higher Education Programmes: Fourth Edition (AHEP4) as published by the Engineering Council in-line with the UK Standard for Professional Engineering Competence (UK-SPEC). These outcomes specify five key areas of learning which partially (C) or fully (M) meet the academic requirement for CEng registration: Science and Mathematics (1), Engineering Analysis (2-4), Design and Innovation (5-6), The Engineer and Society (7-11), and Engineering Practice (12-18). Further details of these learning outcomes can be found at https://www.engc.org.uk/ahep/ M1, C1, C2, M7, C7, M12, C12, C16,

Mode of Assessment

Type	Method	Description	Weighting	
Summative	Laboratory Report	Individual lab report based on ideal gas expansion or heat transfer.		20%

Summative	Laboratory Report	Individual lab report based on measurement of fluid flow		20%
Summative	Examination - Closed Book	Answer 4 questions from 6 (3 Fluids, 3 Thermodynamics)	2 hour	60%

Reading List
To access the reading list for this module, please visit https://bradford.rl.talis.com/index.html

Please note:

This module descriptor has been published in advance of the academic year to which it applies. Every effort has been made to ensure that the information is accurate at the time of publication, but minor changes may occur given the interval between publishing and commencement of teaching. Upon commencement of the module, students will receive a handbook with further detail about the module and any changes will be discussed and/or communicated at this point.