

## MODULE DESCRIPTOR

### Module Title

Thermofluids 2

Reference	EN2702	Version	9
Created	March 2023	SCQF Level	SCQF 8
Approved	March 2004	SCQF Points	15
Amended	August 2023	ECTS Points	7.5

### Aims of Module

The aim of this module is to provide the student with the ability to integrate the principles of classical thermodynamics and fluid mechanics in order to provide a foundation for the subsequent analysis of industrial plant and process equipment.

### Learning Outcomes for Module

On completion of this module, students are expected to be able to:

- 1 Practice effective use of the Laws of Thermodynamics in steady-state energy systems.
- 2 Show an understanding of gas and vapour power processes and cycles.
- 3 Practice effective use of fluid dynamics equations in incompressible fluids in flow systems.
- 4 Show an understanding of frictional losses in fluid transmission systems.
- 5 Report key findings from experiments involving thermofluids laws.

### Indicative Module Content

Units and dimensions. 1st and 2nd Law of Thermodynamics, Reversible and Irreversible processes, Entropy. Heat Engine: Carnot cycle, Rankine cycle, Air Standard cycle, Otto cycle, Diesel cycle. Hydrodynamics, pressure distribution in fluids; Bernoulli's equation and flow through orifices, jets, Venturis, etc. Flow measurement. The momentum equation for flowing fluids; application to jet reaction, forces on bends, fixed and moving vanes; fluid machinery. Flow in pipe, Reynolds' experiments, laminar and turbulent flow, pipe wall friction, friction factor, pipe wall roughness, flow in pipe systems, pipe design. Boundary layer theory.

### Module Delivery

This module will be delivered by means of lectures and tutorials with integrated laboratory work.

**Indicative Student Workload**

	Full Time	Part Time
Contact Hours	50	50
Non-Contact Hours	100	100
Placement/Work-Based Learning Experience [Notional] Hours	N/A	N/A
TOTAL	150	150
Actual Placement hours for professional, statutory or regulatory body		

**ASSESSMENT PLAN**

If a major/minor model is used and box is ticked, % weightings below are indicative only.

**Component 1**

Type:	Coursework	Weighting:	30%	Outcomes Assessed:	5
Description:	Laboratory report.				

**Component 2**

Type:	Examination	Weighting:	70%	Outcomes Assessed:	1, 2, 3, 4
Description:	Closed book examination.				

**MODULE PERFORMANCE DESCRIPTOR****Explanatory Text**

The module has 2 components and to gain an overall pass a minimum D grade must be achieved in each component. The component weighting is as follows: C1 is worth 30% and C2 is worth 70%.

		Coursework:						NS
		A	B	C	D	E	F	
Examination:	A	A	A	B	B	E	E	
	B	B	B	B	C	E	E	
	C	B	C	C	C	E	E	
	D	C	C	D	D	E	E	
	E	E	E	E	E	E	F	
	F	F	F	F	F	F	F	
NS		Non-submission of work by published deadline or non-attendance for examination						

**Module Requirements**

Prerequisites for Module	Thermofluids 1 (EN1702) or its equivalent.
Corequisites for module	None.
Precluded Modules	None.

**INDICATIVE BIBLIOGRAPHY**

- 1 CLIFFORD, M., et al. 2009. An Introduction to Mechanical Engineering Part 1. London: Hodder Education.
- 2 EASTOP, T.D. and McCONKEY, A., 1993. Applied Thermodynamics for Engineering Technologists. 5th ed. Harlow: Longman.