

Module Title Thermofluids 2	Reference EN2702 SCQF SCQF Level 8 SCQF Points 15 ECTS Points 7.5 Created May 2002 Approved March 2004 Amended August 2011 Version No. 4
Keywords Fluid properties, Systems, Energy Transfer, Heat and Work, 1st & 2nd Law of Thermodynamics, Gas and Vapour Cycles. Hydrodynamics, Incompressible flow, Boundary layer theory, Flow measurement.	

This Version is No Longer Current

The latest version of this module is available [here](#)

Prerequisites for Module

Thermofluids 1 (EN1702) or its equivalent.

Corequisite Modules

None.

Precluded Modules

None.

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.

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.

Indicative Student Workload

	Full Time	Part Time
<i>Contact Hours</i>		
Examination	3	3
Laboratory:	3	3
Lectures:	24	24
Tutorials:	24	24

Private Study

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

1. Apply Laws of Thermodynamics to analyses of steady state flow systems.
2. Apply the Laws of Thermodynamics to gas and vapour power processes and cycles.
3. Apply the continuity and steady flow energy equations to analyse the behaviour of incompressible fluids in flow systems.
4. Apply the momentum equation to determine the forces exerted by flowing fluids on vanes, pipe bends and other components of fluid handling equipment.

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. Reversed heat engine cycle, Vapour compression refrigeration cycle

Mode of Delivery

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

Assessment Plan

	Learning Outcomes Assessed
Component 1	2,3,4
Component 2	1,2,3,4

Component 2 is a closed book examination. (70% weighting)

Component 1 is a logbook and written laboratory report which incorporates two laboratory assignments; one covering LO2 and one covering either LO3 or LO4. (30 weighting)

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.