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MODULE DESCRIPTOR

Module Title

Thermofluids 2

Reference	EN2702	Version	6
Created	July 2017	SCQF Level	SCQF 8
Approved	March 2004	SCQF Points	15
Amended	September 2017	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	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 continunity 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.
5	Perform experiments involving thermofluids laws and provide analysis of key findings.

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.

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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:	Report which incorporates two laboratory assignments.				

Component 2

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

MODULE PERFORMANCE DESCRIPTOR

Explanatory Text

In order to pass the module students must achieve at least a grade D overall AND a minimum of 35% in the examination and coursework.

Module Grade	Minimum Requirements to achieve Module Grade:
A	70% and above
B	60-69%
C	50-59%
D	40-49%
E	35-39%
F	34% and below
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.