

Summary Information

Module Code	4610IYO
Formal Module Title	Thermodynamics and Fluid Mechanics 1
Owning School	Engineering
Career	Undergraduate
Credits	20
Academic level	FHEQ Level 4
Grading Schema	40

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Lonnie Readioff	Yes	N/A

Module Team Member

Contact Name	Applies to all offerings	Offerings
Mohamed Kara-Mohamed	Yes	N/A

Partner Module Team

Contact Name	Applies to all offerings	Offerings
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Teaching Responsibility

LJMU Schools involved in Delivery
LJMU Partner Taught

Partner Teaching Institution

Institution Name
Study Group

Learning Methods

Learning Method Type	Hours
Lecture	24
Seminar	36

Module Offering(s)

Offering Code	Location	Start Month	Duration
APR-PAR	PAR	April	12 Weeks
JAN-PAR	PAR	January	12 Weeks

Aims and Outcomes

Aims	The module aims to introduce the essential principles of thermodynamics and fluid mechanics.
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Learning Outcomes

After completing the module the student should be able to:

Code	Description
MLO1	Apply the laws of thermodynamics to open and closed systems
MLO2	Analyse heat and work transfers during Thermodynamic processes and cycles.
MLO3	Analyse hydrostatics and fluid flow.
MLO4	Apply the governing equations of fluid dynamics for simplified flow.

Module Content

Outline Syllabus

Thermodynamic definitions:- states, processes, paths, cycles, open and closed systems, pressure, temperature, energy-heat and work transfers.

Concepts of work, energy and power.

Zeroth and First Laws of Thermodynamics, application of the First Law - Non Flow and Steady Flow Energy Equations (NFEE & SFEE), internal energy, enthalpy.

Equations of state of perfect gases and real gases.

Analysis of Thermodynamic processes.

Properties of mixtures, Gibbs-Dalton laws.

Properties of vapours, steam calculations using tabulated data and charts.

Brief introduction to the Second Law of Thermodynamics and entropy.

Fluid Mechanics definitions:- pressure, density, dynamic/kinematic viscosity, static and dynamic fluid flow.

Hydrostatics:- manometry, forces of submerged surfaces, buoyancy.

Introduction to fluid dynamics and dimensional analysis.

Visualisation methods of fluid flow, stream lines and stream tubes.

Bernoulli's equation and continuity of flow for incompressible fluids.

Laws of conservation applied to Fluid Flow.

Applications of conservation of energy, conservation of mass and conservation of momentum equations.

Brief introduction to losses in pipe fluid flow.

Module Overview

Additional Information

This module introduces some of the most important fundamental ideas behind the development of core engineering disciplines of thermodynamics and fluid mechanics.

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Learning Outcome Mapping
Exam	Examination	60	2	MLO1, MLO3, MLO2, MLO4
Test	V.L.E. test	40	0	MLO1, MLO3, MLO2, MLO4