

# Thermodynamics and Fluid Mechanics 1

## Module Information

2022.01, Approved

### Summary Information

Module Code	4104MECH
Formal Module Title	Thermodynamics and Fluid Mechanics 1
Owning School	Engineering
Career	Undergraduate
Credits	20
Academic level	FHEQ Level 4
Grading Schema	40

### Teaching Responsibility

LJMU Schools involved in Delivery
Engineering

### Learning Methods

Learning Method Type	Hours
Lecture	22
Online	22
Tutorial	22

### Module Offering(s)

Display Name	Location	Start Month	Duration Number Duration Unit
JAN-CTY	CTY	January	12 Weeks

### Aims and Outcomes

Aims	To introduce the essential principles of Thermodynamics and Fluid Mechanics
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**After completing the module the student should be able to:**

**Learning Outcomes**

Code	Number	Description
MLO1	1	Apply the laws of thermodynamics to open and closed systems
MLO2	2	Analyse heat and work transfers during Thermodynamic processes and cycles.
MLO3	3	Analyse hydrostatics and fluid flow.
MLO4	4	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	The aim of this module is to introduce you to the essential principles of Thermodynamics and Fluid Mechanics. This module introduces some of the most important fundamental ideas behind the development of core engineering disciplines of thermodynamics and fluid mechanics.
Additional Information	This module introduces some of the most important fundamental ideas behind the development of core engineering disciplines of thermodynamics and fluid mechanics. The content sets the framework for further study during levels 5, 6 & 7. The module is supported by tutorial work which will help develop the necessary understanding and skill required of an engineering student.

**Assessments**

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

**Module Contacts**

**Module Leader**

Contact Name	Applies to all offerings	Offerings
Jack Mullett	Yes	N/A

**Partner Module Team**

Contact Name	Applies to all offerings	Offerings
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