Thermodynamics and Fluid Mechanics 1

Module Information

2022.01, Approved

Summary Information

Module Code	4509USST
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
LJMU Partner Taught

Partner Teaching Institution

Institution Name
University of Shanghai For Science and Technology

Learning Methods

Learning Method Type	Hours
Lecture	44
Tutorial	22

Module Offering(s)

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

Aims and Outcomes

Aims	To introduce the essential principles of Thermodynamics and Fluid Mechanics

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	
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
Exam	Examination	60	2	MLO1, MLO2, MLO3, MLO4
Test	In course tests	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