

Thermodynamics

Module Information

2022.01, Approved

Summary Information

Module Code	6109MECH
Formal Module Title	Thermodynamics
Owning School	Engineering
Career	Undergraduate
Credits	10
Academic level	FHEQ Level 6
Grading Schema	40

Teaching Responsibility

LJMU Schools involved in Delivery
Engineering

Learning Methods

Learning Method Type	Hours
Lecture	11
Online	11
Practical	6
Tutorial	11

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	Analyse the operating characteristics of advanced gas turbine power plants
MLO2	2	Analyse the operating characteristics of advanced vapour power cycles
MLO3	3	Predict the behaviour of psychrometric processes
MLO4	4	Analyse the compressible flow of gases and vapours

Module Content

Outline Syllabus	Complex gas turbine power plant, multi-stage compression and expansion, exhaust gas heat exchangers and the application of free power turbines with gas generators. Complex vapour power cycles, reheat, regenerative cycles with open and closed feed heaters. Combine heat and power vapour cycles with process steam bleed off. Use of Mollier chart for steam turbine expansion. Psychrometry, psychrometric processes and the psychrometric chart. Psychrometric plant such as air conditioning and climate control. 1D Isentropic flows of gases and vapours. Stagnation properties and the use of isentropic flow tables. Normal shock waves and normal shock relationships and tables. Application to nozzles, diffusers and turbines.
Module Overview	This module will introduce the essential principles of Thermodynamics and Fluid Mechanics and will take an in-depth look into the operation and thermodynamic cycle of engineering plant.
Additional Information	This module takes an in-depth look into the operation and thermodynamic cycle of engineering plant. The analysis of plant performance is delivered by lectures and tutorials which requires the student to have a fundamental understanding of the principles and how to apply them to practical situations.

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Centralised Exam	Examination	70	2	MLO1, MLO2, MLO3, MLO4
Portfolio	Portfolio	30	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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