

Thermodynamics

Module Information

2022.01, Approved

Summary Information

Module Code	6309MECH
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
Practical	3
Tutorial	11

Module Offering(s)

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

Aims and Outcomes

Aims	The module aims to provide a comprehensive insight into power generation at an advanced level by studying the performance and behaviour of thermodynamic systems for evaluation of industrial plant applications.
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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 plants 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	
Additional Information	This module provides students with knowledge regarding the thermal efficiency of common heat cycles and examines how waste heat may be recovered to improve cycle efficiency and reduce greenhouse emissions. This module includes content which relates to the following UN Sustainable Development Goals: SDG7 – Affordable and Clean Energy SD13 – Climate Action

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Centralised Exam	Examination	100	2	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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