

Module Information

2022.01, Approved

Summary Information

Module Code	4508NCCG
Formal Module Title	Thermodynamics, Heat Pumps and Engines
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
Nelson and Colne College Group

Learning Methods

Learning Method Type	Hours
Lecture	48
Practical	12

Module Offering(s)

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

SEP-PAR	PAR	September	12 Weeks
SEP_NS-PAR	PAR	September (Non-standard start date)	12 Weeks

Aims and Outcomes

Aims	This module introduces students to the principles and concepts of thermodynamics and its application in modern engineering. On successful completion of this module students will be able to investigate fundamental thermodynamic systems and their properties, apply the steady flow energy equation to plant equipment, examine the principles of heat transfer to industrial applications, and determine the performance of internal combustion engines.
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After completing the module the student should be able to:

Learning Outcomes

Code	Number	Description
MLO1	1	Investigate fundamental thermodynamic systems and their properties.
MLO2	2	Apply the Steady Flow Energy Equation to plant equipment.
MLO3	3	Examine the principles of heat transfer to industrial applications.
MLO4	4	Determine the performance of internal combustion engines.

Module Content

Outline Syllabus	Revision: of energy, laws of thermodynamics, gas laws Introduction to concept of entropy Polytropic processes: constant pressure, constant volume, adiabatic and isothermal systems Diagrammatic methods: PV and TS Steady Flow Energy analysis Heat transfer: modes, use of U and k values, heat exchangers, regenerators, heat losses from pipes, optimal lagging Internal combustion engines: Otto, Diesel and Carnot cycles, applications of theory to practical applications, efficiency Other devices: heat pumps, Stirling cycle
Module Overview	
Additional Information	

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Report	Assignment	100	0	MLO2, MLO3, MLO4
Competency	NCC Group Pass/Fail			MLO1

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
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Christian Matthews	Yes	N/A
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Partner Module Team

Contact Name	Applies to all offerings	Offerings
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