ENGY H4007: Thermodynamics 2

Module Title:	Thermodynamics 2
Language of Instruction:	English

Credits:	5

NFQ Level:	8

Module Delivered In	1 programme(s)

Module Aim:	To provide students with specialised knowledge of the processes associated with the generation and consumption of energy in engineering systems

Learning Outcomes	
On successful completion of this module the learner should be able to:	
LO1	Analyse thermal models of representative systems in order to determine the steady state performance of such systems
LO2	Design, evaluate and predict the performance of heat exchangers.
LO3	Assess the obligations and implications for industrial organisations with respect to environmental legislation, the Emission Trading System, Carbon Trading, Green House Gas (GHG) permits and Integrated Pollution Prevention Control (IPPC) Licensing.
LO4	Quantify, by calculation and experimental measurement, the characteristics of thermal processes

Pre-requisite learning
Module Recommendations *This is prior learning (or a practical skill) that is recommended before enrolment in this module.*
No recommendations listed
Incompatible Modules *These are modules which have learning outcomes that are too similar to the learning outcomes of this module.*
No incompatible modules listed
Co-requisite Modules
No Co-requisite modules listed
Requirements *This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.*
No requirements listed

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Module Content & Assessment

Indicative Content
Heat Transfer Log Mean Temperature Difference, Heat exchanger design. Forced convection, Internal flow, External flow, Condensation.
Project Evaluation Micro CHP (combined heat and power) units into commercial applications. Biomass project for a commercial facility ESCO (Energy Service Company) and energy supply contracts. Calculations, Primary Energy Sayings (PES), Carbon footprint, CO2 savings. Energy Map: Sustainable Energy Authority of Ireland (S.E.A.I.) Grant applications and project viability
Environmental Impacts and Awareness Integrated Pollution Prevention Control (IPPC) Licensing GHG, Emission Trading Systems Legislative requirements for NOx, SOx, particulate emissions, Paris COP implications. Internalities associated with compliance with emission limit values using 'end-of-pipe Primary and secondary control measures.

Assessment Breakdown	%
Continuous Assessment	10.00%
Practical	30.00%
End of Module Formal Examination	60.00%

Continuous Assessment

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Examination	Class Test	1,2	10.00	Week 5

No Project

Practical

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Practical/Skills Evaluation	Heat Exchanger Design	1,2,4	10.00	Week 8
Practical/Skills Evaluation	Labs: Air in a condenser, Crossflow Heat Exchanger. Report & Assessment	1,2,4	20.00	Week 11

End of Module Formal Examination

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Formal Exam	n/a	1,2,3	60.00	End-of-Semester

SETU Carlow Campus reserves the right to alter the nature and timings of assessment

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Module Workload

Workload: Full Time		
Workload Type	*Frequency*	*Average Weekly Learner Workload*
Lecture	12 Weeks per Stage	4.00
Laboratory	12 Weeks per Stage	1.00
Independent Learning	15 Weeks per Stage	4.33
	Total Hours	125.00

Module Delivered In

Programme Code	Programme	Semester	Delivery
CW_EMMEC_B	Bachelor of Engineering (Honours) in Mechanical Engineering	7	Mandatory