ENGR H3602: Energy Systems 3

Module Title:	Energy Systems 3
Language of Instruction:	English

Credits:	10

NFQ Level:	7

Module Delivered In	No Programmes

Teaching & Learning Strategies:	The module will be delivered using lectures and tutorials with a mixture of presentations, example exercises, question and answer sessions, group discussions and online resources. Laboratory classes will be delivered to students working in groups to obtain experimental data with subsequent individual reporting/assessment.

Module Aim:	To provide students with an understanding of the processes associated with the generation and consumption of fluids and energy in engineering systems

Learning Outcomes	
On successful completion of this module the learner should be able to:	
LO1	Analyse the types and characteristics of flow within a pipe
LO2	Analyse the performance of pumps and fans in terms of the systems in which they are operating
LO3	Analyse simplified fluid dynamic models of representative systems in order to determine the steady state performance of such systems
LO4	Analyse simplified thermodynamic models of representative systems in order to determine the steady state performance of such systems
LO5	Quantify by calculation and experimental measurement the characteristics of fluid dynamic and thermodynamic 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
• Analysis of pipe and conduit systems o Pressure drops/Head Losses, o Primary losses, o Secondary losses, o Equivalent lengths, o System characteristics.
• Centrifugal pumps & fans o Pump/Fan Characteristics & performance, o Pump/Fan selection, o Series & Parallel Pumping.
• Heat Engines & Power Generation o Steam Reheat & Regeneration cycles, o Gas Turbine systems, o Combined Heat and Power.
• Refrigeration & Heat Pumps o Simple and practical cycles, o Refrigeration components.
• Heat Transfer o Log Mean Temperature Difference, o Heat exchanger design, o Central Heating systems, o Steam distribution and use.
• Air Conditioning o Properties of humid air, o Air conditioning processes, o Air conditioning systems.

Assessment Breakdown	%
Continuous Assessment	15.00%
Practical	15.00%
End of Module Formal Examination	70.00%

Continuous Assessment

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Examination	Class Tests: Fluid Mechanics	1,2,3	5.00	Week 8
Examination	Class Test: Thermodynamics	4	5.00	Week 22
Project	Central Heating system design	1,2,3,4	5.00	n/a

No Project

Practical

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Practical/Skills Evaluation	Fluid Mechanics Labs: Head Losses in Nozzles and Diffusers, Head Losses in Flowmeters, Fluid Momentum, Series & Parallel Pumping, Friction Factor in Turbulent Flow, Thermodynamics Labs: Efficiency of Steam Turbine, Air in a Condenser, Refrigeration Unit, Cross Flow Heat Exchanger, Properties of Humid Air Central Heating project & written Laboratory assessment	5	15.00	n/a

End of Module Formal Examination

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Formal Exam	A final written examination will assess the extent to which the student has achieved the module learning outcomes	1,2,3,4,5	70.00	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	Every Week	2.00
Laboratory	Every Week	1.00
Tutorial	Every Week	1.00
Estimated Learner Hours	Every Week	3.00
	Total Hours	7.00