MECH H1608: Energy Technology

Module Title:	Energy Technology
Language of Instruction:	English

Credits:	5

NFQ Level:	6

Module Delivered In	No Programmes

Teaching & Learning Strategies:	This module will be delivered using lectures and tutorials incorporating 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:	The aim of this module is: 1. To give students a broad understanding of the advantages and challenges of sustainable energy systems; 2. To introduce the fundamental concepts of fluid systems and the behaviour of the working fluids involved.

Learning Outcomes	
On successful completion of this module the learner should be able to:	
LO1	Offer an informed opinion on the different methods of achieving sustainability of future energy needs and the challenges inherent in such a policy.
LO2	Solve basic problems relating to fluid statics;
LO3	Solve basic problems relating to fluid dynamics;
LO4	Solve basic problems relating to the gas laws

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
Units o Fundamental units. o Derived units
Fluid Statics o Definition of a fluid. o Density, relative density. o Force, definition of pressure. Hydraulic jack. o Measurement of pressure – upright, inverted and inclined U-tube manometers, Bourdon pressure gauge. o Archimedes' principle. Measurement of density. o Measurement of temperature – liquid in glass thermometers, bimetallic strips, thermocouples
Fluid Dynamics o Continuity Equation. o Bernoulli's equation. o Measurement of volume flow rate – venturi meter, orifice plate, turbine meter, rotameter.
Thermodynamics o Work, heat, energy. o Thermodynamic properties, state of a gas, o The gas laws
Sustainable Energy o Energy Sources, Use and Policy o Wind Energy o Wood Pellet and Chip o Solar Thermal o Biofuels and transport Fuels o Geothermal and Heat pumps o Solar PV and Fuel Cells o Hydroelectricity o Domestic Energy Ratings BER/DEAP/EPBD

Assessment Breakdown	%
Continuous Assessment	20.00%
Practical	10.00%
End of Module Formal Examination	70.00%

Continuous Assessment

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Other	This will be assessed through class tests, essays and oral presentations	1,2,3,4	20.00	n/a

No Project

Practical

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Practical/Skills Evaluation	Students will carry out a number of laboratory experiments throughout the academic year and will produce written reports. Students will be assigned to groups for the execution of the laboratory practical work but reports must be submitted on an individual basis. The following laboratory practical work will be completed: • Density of solids • Archimedes principle • Pressure bench • Flowmeters • Centrifugal Pump • Boyle's Law	2,3,4	10.00	Sem 2 End

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	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	1.00
Laboratory	Every Week	0.50
Estimated Learner Hours	Every Week	1.50
	Total Hours	3.00