

<b>Module Title:</b>	Sustainability & Energy Technology
<b>Language of Instruction:</b>	English

<b>Credits:</b>	10
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<b>NFQ Level:</b>	7
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<b>Module Delivered In</b>	<a href="#">3 programme(s)</a>
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<b>Teaching &amp; Learning Strategies:</b>	Lectures Projects Practicals Private study
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<b>Module Aim:</b>	The aim of the module is to develop competence in the evaluation of both traditional and renewable energy use in buildings and to foster an understanding of sustainability issues in the design, construction and operation of buildings.
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Learning Outcomes	
<i>On successful completion of this module the learner should be able to:</i>	
LO1	Complete a Building Energy Rating (BER) using DEAP and SBEM software
LO2	Demonstrate an understanding of building energy related legislation and regulations
LO3	Demonstrate a knowledge of and the ability to evaluate the use of alternative sustainable energy technologies for a building
LO4	Demonstrate a knowledge of energy efficient and sustainable building design
LO5	Demonstrate an understanding of sustainable building principles and issues to be considered by LEED, BREEAM and similar methodologies
LO6	Assess the economics of thermal insulation and fuel costs

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

**Module Content & Assessment**

**Indicative Content**

**Introduction**

(a) Overview of energy (b) Energy use in buildings (c) Energy management

**Energy Legislation, Policies and Standards**

(a) Part L, Building Regulations (b) Energy & emissions legislation, taxes and trading (c) National & international energy policies (d) ISO 50001; ISO 14001; EN 16001

**The Energy Efficient Building**

(a) Thermal comfort - building occupants and associated operations (b) Impact of building form, thermal mass & orientation on a building's thermal performance (c) Passive and active solar heating & cooling (d) Thermal insulation, thermal bridges & airtightness (e) The economics of optimal thermal performance (f) Passive House Standard (g) Nearly Zero Energy Buildings (NZEB) (h) Energy Retro Fitting techniques & details

**Energy Technology**

(a) Renewable energy sources (b) Integration of alternative technologies into building design & construction methods (c) Reduce CO2 emissions

**Energy Assessment Procedures (5 hours lectures, 40 hours Practical)**

(a) Energy Ratings of Buildings (b) BER (Building energy rating) (c) DEAP (Dwelling energy assessment procedure) (d) NEAP (Non-domestic Energy Assessment Procedure) & use of SBEM (e) EN 16001 Energy Management (f) European Energy Manager/ Certified Energy Manager principles

**Sustainable Buildings**

(a) Environmental impact of construction materials, management of the construction process & operation of the building (b) Green buildings, carbon reduction management & sustainable materials (c) Recycling water & waste; rainwater harvesting; green/blue roofs & walls (d) Sustainable communities & Code for Sustainable Homes (UK) (e) Building Research Establishment Environmental Assessment Method (BREEAM) (f) Leadership in Energy & Environmental Design (LEED)

**Energy Assessments**

(a) Heat loss calculations (b) Fuel consumption determination (c) Fuel source appraisals (d) Calorific fuel values (e) Energy audits

Assessment Breakdown	%
Project	50.00%
End of Module Formal Examination	50.00%

No Continuous Assessment

**Project**

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Project	No Description	1,2,3,4,5,6	50.00	n/a

No Practical

**End of Module Formal Examination**

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Formal Exam	No Description	2,3,4,5,6	50.00	End-of-Semester

ITCarlow reserves the right to alter the nature and timings of assessment

**Module Workload**

<b>Workload: Full Time</b>		
<i>Workload Type</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>
Lecture	30 Weeks per Stage	3.00
Laboratory	30 Weeks per Stage	1.00
Independent Learning	30 Weeks per Stage	4.00
Total Hours		240.00

**Module Delivered In**

<b>Programme Code</b>	<b>Programme</b>	<b>Semester</b>	<b>Delivery</b>
CW_CMFAC_B	<a href="#">Bachelor of Science (Honours) in Facilities and Building Services Management</a>	5	Mandatory
CW_CMQSU_B	<a href="#">Bachelor of Science (Honours) in Quantity Surveying</a>	5	Mandatory
CW_CMBSE_D	<a href="#">Bachelor of Science in Construction Management with Buildings Services</a>	5	Mandatory