

<b>Module Title:</b>	Services Technology
<b>Language of Instruction:</b>	English
<b>Credits:</b>	10
<b>NFQ Level:</b>	7
<b>Module Delivered In</b>	<a href="#">3 programme(s)</a>
<b>Teaching &amp; Learning Strategies:</b>	Lectures Projects Practicals Private study
<b>Module Aim:</b>	The aims of the subject are: (1) to enable students to understand the contribution of a building's services to the overall performance of the building; (2) to enable students to understand the impact of a building's fabric on its services; (3) to identify the different technologies associated with each type of service; (4) to give students a basic understanding of the design and installation of all the major services; (5) to provide an understanding of sustainable design; (6) to teach students how to use environmental monitoring and testing equipment to analyse the internal environment of a building for standard and regulation compliance.
<b>Learning Outcomes</b>	
On successful completion of this module the learner should be able to:	
LO1	to evaluate the performance of the individual building services in terms of current standards, regulations and practices;
LO2	to apply applicable design calculations to aid in the evaluation of the building's performance;
LO3	to apply various laboratory and site tests to aid in the evaluation of the building's services performance.
<b>Pre-requisite learning</b>	
<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**

**(1) Heating (10 hours lectures, 10 hours tutorials)**

(a) Heating systems equipment and technology (b) Pipe, pump, emitter and boiler sizing (c) Heating controls (d) Fuel types

**(2) Electricity (15 hours lectures, 15 hours tutorials)**

(a) ETCI Regulations (b) Single and three phase installations (c) Single and three phase cable sizing (d) Circuit protection, protective devices, bonding and electrical safety (e) Protective gear basic calculations (f) Site electricity (g) Building Services Controls (h) Smart Technologies

**(3) Ventilation (10 hours lectures, 10 hours tutorials)**

(a) Mechanical ventilation equipment and technology (b) Ductwork and fan sizing

**(4) Air Conditioning (10 hours lectures, 10 hours tutorials)**

(a) Heat gains and associated control (b) Psychometrics (c) Air handling unit (AHU) sizing and detailing (d) Energy saving alternatives to air conditioning e.g. free cooling

**(5) Building Services Laboratory (60 hours practicals)**

(a) Air leakage testing (b) Thermal imaging (c) U-value analysis (d) Air movement and quality assessment (e) Daylight and artificial lighting analysis (f) Acoustic and noise transfer analysis (g) Electricity testing (h) Fire alarms (i) Water quality assessment (j) Condition monitoring (k) Maintenance management systems (l) Building management systems

<b>Assessment Breakdown</b>	<b>%</b>
Practical	40.00%
End of Module Formal Examination	60.00%

No Continuous Assessment

No Project

**Practical**

<i>Assessment Type</i>	<i>Assessment Description</i>	<i>Outcome addressed</i>	<i>% of total</i>	<i>Assessment Date</i>
Practical/Skills Evaluation	Practicals	1,2,3	40.00	n/a

**End of Module Formal Examination**

<i>Assessment Type</i>	<i>Assessment Description</i>	<i>Outcome addressed</i>	<i>% of total</i>	<i>Assessment Date</i>
Formal Exam	No Description	1,2	60.00	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	1.50
Laboratory	30 Weeks per Stage	2.00
Tutorial	30 Weeks per Stage	1.50
Estimated Learner Hours	30 Weeks per Stage	2.67
	Total Hours	230.00

**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