

<b>Module Title:</b>	Building Services III
<b>Language of Instruction:</b>	English
<b>Credits:</b>	5
<b>NFQ Level:</b>	7
<b>Module Delivered In</b>	No Programmes
<b>Teaching &amp; Learning Strategies:</b>	<ul style="list-style-type: none"> <li>• Integrated projects in line with studio projects to develop student's ability to recognize and illustrate application of various energy efficient services at site and building level.</li> <li>• Group/team work utilized to carryout case studies as appropriate.</li> <li>• Internal tests to assess student's ability in understanding fundamental concepts and calculations through the module.</li> <li>• Lecture format utilized to provide theoretical instructions.</li> </ul>
<b>Module Aim:</b>	The aims of this module are : <ul style="list-style-type: none"> <li>• To give detailed understanding of energy efficient services that contribute to low energy developments.</li> <li>• To make students aware of the extensive range of energy efficient specialized services for modern buildings to improve building performance.</li> <li>• Introduce students to Fire management services.</li> <li>• To further students understanding and appreciation of M&amp;E building services for large scale developments and its implications on services coordination in the building</li> </ul>

Learning Outcomes	
<i>On successful completion of this module the learner should be able to:</i>	
LO1	Analyse a range of renewable technologies and their suitability for different building contexts.
LO2	Carry out basic calculations for renewable technologies to establish system sizes and space enclosure requirements
LO3	Understanding of a range of modern smart building technologies to achieve improved building performance
LO4	Have an understanding of Whole building Energy Demand Assessment
LO5	Have an understanding of security, fire detection & management services.
LO6	Have an understanding of Mechanical ventilation systems and basic sizing calculations to establish spaces enclosure requirements.
LO7	Have an understanding of Artificial lighting theory and design

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>		
6672	SERV H1501	Building Services I
6673	SERV H2503	Building Services II
6674	SERV H3501	Building Services III
<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

#### Renewable Technologies

Types of alternate energy sources- solar energy, wind energy, biomass, geothermal energy and heat pumps, CHP microgeneration, micro hydro power, ocean energy, tidal energy, wave energy, fuel cell technology. Study of each source of energy under • Principles of operation. • Types of sub systems and basic sizing calculations. • Areas of application • Methods of integrating with existing buildings.

#### Ventilation and air conditioning

• Fundamentals of HVAC • Types of Air conditioning systems and their applications in buildings • Spatial and physical requirements to accommodate a HVAC system in building

#### Artificial Lighting

• Fundamental of natural and artificial lighting • Lamps • Types of light fittings • Lighting levels • Artificial lighting design

#### Smart buildings/technologies

• Characteristic features of smart buildings and introduction to o Structured cabling systems. o Direct digital controls. o High band width communication infrastructure o Smart metering technologies o Advanced lighting and HVAC controls. • Areas of application for different control systems-time based controls, temperature based controls and lighting controls.

#### Security and fire protection

• Intruder alarm systems • Detection devices and sensors • Introduction to fire triangle and fire equipment. • Fire detection systems • Fire management services

#### Whole building Energy demand study

• Heating system running costs • Degree days calculations • Annual energy demand calculations

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

### Continuous Assessment

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Examination	No Description	1,2	10.00	n/a

### Project

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Project	No Description	1,2,3,4,7	30.00	n/a

No Practical

### End of Module Formal Examination

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Formal Exam	No Description	1,2,3,4,5,6,7	60.00	End-of-Semester

SETU Carlow Campus 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	2.00
Estimated Learner Hours	30 Weeks per Stage	3.00
Total Hours		150.00

