DSGN H4503: Environmental Building Design

Module Title:	Environmental Building Design
Language of Instruction:	English

Credits:	5

NFQ Level:	8

Module Delivered In	No Programmes

Teaching & Learning Strategies:	• 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. • Group/team work utilized to carryout case studies as appropriate. • Internal tests to assess student's ability in understanding fundamental concepts and calculations through the module. • Lecture format utilized to provide theoretical instructions.

Module Aim:	The aim of this module is to: • To develop in students an understanding of designing healthy, comfortable and secure environments in and around buildings that place a minimal strain on global resources • To develop in students an understanding of both the principles and application of the subject, to save energy and build high performance, energy efficient built environments.

Learning Outcomes	
On successful completion of this module the learner should be able to:	
LO1	Demonstrate an understanding of basic concepts in environmental physics that influence human comfort in buildings;
LO2	Knowledge in the principles and theories of Passive design , to achieve high performance,comfortable and energy efficient buildings,and be aware how these matters affect technical design and detailing.
LO3	Understand the performance/behaviour of building fabrics in response to ambient environments
LO4	Understand and evaluate the scenarios of Condensation risks in buildings
LO5	Understand the factors influencing global and local climate and be able to interpret environmental strategies in response to site microclimate
LO6	Ability to solve basic problems in environmental physics using numerical and graphical procedures;
LO7	Understand and interpret the readings and graphical data generated from climate analysis software.

Pre-requisite learning		
Module Recommendations *This is prior learning (or a practical skill) that is recommended before enrolment in this module.*		
6672	SERV H1501	Building Services I
6673	SERV H2503	Building Services II
6674	SERV H3501	Building Services III
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
Outdoor environments • Elements of climate and their impacts on built environment • Site microclimate study • Environmental Site analysis techniques • Sun and wind study and its applications.
Building envelope and indoor environments • Factors influencing envelope design • General concepts, Theory & principles influencing façade design, • Intelligent building skins and their characteristics • Theory and principles of High performance facades-Twin shell facades etc. • Day lighting theory and principles o Climate and light o The daylight factor concept o Daylight factor calculations o Day lighting strategies for buildings in relation to building orientation, building form and site context o Daylight directing systems-including side lighting and top lighting options. • Behaviour of building envelopes to thermal and moisture gradients. • Types of condensation and condensation risk evaluation • Psychrometric chart and its applications in the context of passive building design
Building Ventilation • Principles of ventilation and air movement • Means of natural ventilation: wind driven and buoyancy driven or combined. • Design considerations; position of openings, external features, size of openings, control of openings. • Measurement and sizing of ventilation opening for buildings. • Ventilation strategies for buildings: natural and mixed mode, single sided, cross ventilation, stack ventilation etc.
Thermal design of buildings • Heat exchange processes in buildings • High performance glazing and windows • Passive heating concepts and principles • Passive Solar gain strategies for buildings • Solar shading devices
Acoustic design • Fundamentals of Acoustics • Human perception and reaction to sound • Environmental Noise • Sound and solid surfaces • Sound in enclosed spaces • Sound transmission in buildings
Sustainable services Integrating renewables.

Assessment Breakdown	%
Project	40.00%
End of Module Formal Examination	60.00%

No Continuous Assessment

Project

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Project	Project 1	2,3,5,7	20.00	Sem 1 End
Project	Project 2	2,3,5,6,7	20.00	End-of-Semester

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

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Module Workload

Workload: Full Time		
Workload Type	*Frequency*	*Average Weekly Learner Workload*
Lecture	30 Weeks per Stage	2.00
Estimated Learner Hours	30 Weeks per Stage	3.00
	Total Hours	150.00