DSGN: Environmental Building Design

Module Title:	Environmental Building Design
Language of Instruction:	English

Credits:	5

NFQ Level:	8

Module Delivered In	1 programme(s)

Teaching & Learning Strategies:	Projects to develop student's ability to recognize and apply various environmental strategies at site and building level. • Group/teamwork utilized to carryout case studies as appropriate. • Internal tests to support student learning/revision of 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 students understanding of designing healthy, comfortable and secure environments in and around buildings that place a minimal strain on global resources • To develop students understanding of environmental principles and their application to build high performance, energy efficient built environments.

Learning Outcomes	
On successful completion of this module the learner should be able to:	
LO1	Discuss basic concepts in environmental physics that underpin human comfort in buildings;
LO2	Discuss the principles and theories of Passive design to achieve high performance, comfortable and energy efficient buildings,
LO3	Critically evaluate and choose appropriate building envelope and fenestration designs based on their performance and sustainability credentials
LO4	Critically evaluate and derive environmental design strategies in response to global and local climate analysis
LO5	Examine 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.*
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
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

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

No Continuous Assessment

Project

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Project	Project	1,2,3,4	60.00	n/a

No Practical

End of Module Formal Examination

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Formal Exam	End of semester exam	1,2,3,4,5	40.00	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	12 Weeks per Stage	4.00
Independent Learning Time	12 Weeks per Stage	3.33
Project	12 Weeks per Stage	3.33
	Total Hours	128.00

Module Delivered In

Programme Code	Programme	Semester	Delivery
CW_CMARC_B	Bachelor of Science (Honours) in Architectural Technology	7	Mandatory