

Module Code	Pre-requisite Module codes	Co-Requisite Modules code(s)	ISCED Code	Subject Code	ECTS Credits	NFQ Level
ENEN9108	ENEN9106				5	9
Module Title	Thermal Bridge Assessment: 3D and Project					

This Header should be repeated on each page of the Module

School Responsible:	Dublin School of Architecture
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Module Overview:

The Thermal Bridge Assessment 3D & Project module is the third of three modules which comprise the NSAI-recognised DT775B CPD Diploma in Thermal Bridge Assessment programme. The ENEN9108 Thermal Bridge Assessment 3D & Project module follows ENEN9107 Thermal Bridge Assessment Fundamentals and ENEN9106 Thermal Bridge Calculation for Building Performance modules.

The focus of the Thermal Bridge Assessment 3D & Project module is on the application of theoretical knowledge and mathematical calculation tools to the use of a 3D thermal modelling application and the development of a Thermal Bridge Assessment design project for the purposes of registration as a Thermal Modeller.

The Thermal Bridge Assessment 3D & Project module enables the learner to engage in a critical analysis of the relevant standards through the use of validated 3D thermal modelling software. This requires the application of applied building physics and conventions of thermal bridge calculation in the creation of high quality building details which comply with 3D thermal modelling conventions and standards and the TGD Part L of the Building Regulations as a specialist in the field.

Learning Outcomes (LO):

On Completion of this module, the learner will be able to

1	Apply an understanding of the mathematical calculations underpinning and used by thermal bridge analytical software applications to critique related computer output data.
2	Apply the requirements of the codes and standards relating to linear and point thermal bridging, temperature factor determination, and calculation of the Y-factor for a whole building.
3	Use a 2D and 3D thermal bridge analytical software application and validate its suitability to thermal bridging analysis in accordance with the examples from ISO 10211 Appendix A.
4	Apply analytical & numerical software applications to the assessment and resolution of thermal bridging problems.
5	Carry out a comprehensive analysis of thermal bridge performance in an existing domestic building.
6	Determine areas of weak performance and develop design solutions to minimise heat flow and optimise surface temperatures at junctions.
7	Prepare a technical performance report for the purpose of demonstrating compliance with Building Regulations.

Indicative Syllabus:

Theory and principles:

- Maths for thermal bridge assessment, Psi Values, Chi values, Y Factor and Frsi values.
- Building physics for thermal bridge assessment: Principles of thermal performance, fabric heat loss, moisture risk, vapour transmission, interstitial condensation and surface risk in domestic buildings in Ireland

Codes and standards:

- Legislative context
- Thermal bridge assessment codes, standards, conventions

Computer applications

- Computer applications for thermal bridge assessment

Analysis, diagnosis and thermal bridge problem solving

- Construction detailing for thermal bridge assessment: thermal weaknesses in traditional and contemporary construction assemblies, failures in contemporary construction assemblies,
- Case study failures
- Case study solutions

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- Standard solutions in building detailing: guidance

Learning and Teaching Methods:

- Online lectures
- Interactive online webinars
- Web-based group work
- College-based workshops and expert lectures
- On-line supportive community of learners and engagement with fellow learners
- Self-directed learning during and outside contact hours
- Scenario-based formative exercises
- Summative on-line assessments

Total Teaching Contact Hours

Online webinar workshops / Online lectures / College contact

H
30

Total Self-Directed Learning Hours

Self-directed learning

H
70

Module Delivery Duration:

The module is delivered over 8 weeks within a 30 week academic year.

Assessment

Assessment Type	Weighting (%)	LO Assessment (No.)
One day open book lab based examination	20%	1
Computer application project work	50%	3,4
Thermal bridge assessment group project work	20%	2, 5, 6
Regulation Compliance Report	10%	7
Module Specific Assessment Arrangements (if applicable)		
(a) Derogations from General Assessment Regulations	70% pass mark for LO1 lab-based computer assessment. 50% pass mark for LO2-7 project assessments.	
(b) Module Assessment Thresholds	40% threshold in project assessments.	
(c) Special Repeat Assessment Arrangements		

Essential Reading:

Linear Thermal Bridging conventions and standards

Ward T, Building Research Establishment Ltd (BRE), 2006, IP 1/06: 2006 *Assessing the effects of thermal bridging at junctions and around openings*, Watford: BRE Press

Ward, T and Sanders, C, 2007. *Conventions for calculating linear thermal transmittance and temperature factors*, BR497. Watford: IHS BRE Press.

ISO 10211: 2007, *Thermal bridges in building construction – Heat flows and surface temperatures – Detailed calculations*.

ISO 13370: 2007, *Thermal performance of buildings – Heat transfer via the ground- Calculation methods*.

U Value calc conventions and standards

Anderson B, Building Research Establishment Ltd (BRE), 2006, BR 443: 2006 *Conventions for U-Value Calculations* 2006 Edition, Watford: BRE Press

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Supplemental Reading: (author, date, title, publisher)

DEAP workbook and associated manuals and guides

Anon, Sustainability Energy Authority of Ireland, September 2008. *Dwelling Energy Assessment Procedure (DEAP)* 2008 Edition, Version 3.1 Irish official method for calculating and rating the energy performance of dwellings. Wilton Place: SEAI

Anon, Sustainability Energy Authority of Ireland, January 2011. *Dwelling Energy Assessment Procedure (DEAP) Survey Guide*. Version 2.0. Wilton Place: SEAI

Dew Point conventions and standards

BS EN ISO 13788:2002, *Hygrothermal performance of building components and building elements. Internal surface temperature to avoid critical surface humidity and interstitial condensation. Calculation methods*

BS EN 15026:2007, *Hygrothermal performance of building components and building elements. Assessment of moisture transfer by numerical simulation*

BS5250:2002, *Code of practice for control of condensation in buildings*

Building Regulations Part L: domestic

Anon, Department of the Environment, Heritage and Local Government, 2008. *Building Regulations 2007, Technical Guidance Document L, Conservation of fuel and energy - Dwellings*. Dublin: The Stationary Office.

Anon, Department of the Environment, Heritage and Local Government, 2008. *Building Regulations 2008, Technical Guidance Documents* The Stationary Office.

Version No:	1	Amended By	Cormac Allen Andy Lundberg
Commencement Date	September 2017	Associated Programme Codes	DT9769

Modules that are to be offered as Stand-Alone CPD Programmes must have an NFQ level assigned

*Details of the assessment schedule should be contained in the student handbook for the programme stage.

Date of Academic Council approval