Module Code | Pre-requisite Module codes | Co-Requisite Modules code(s) | ISCED Code | Subject Code | ECTS Credits | NFQ Level
---|---|---|---|---|---|---
ENEN 9202 | Building Performance NZEB Design Project: Multi-Unit Residential | | | | 10 | 9

**Module Title:** Building Performance NZEB Design Project: Multi-Unit Residential

**School Responsible:** Dublin School of Architecture

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**Module Overview:**

The focus of the Building Performance NZEB Design Project: Multi-Unit Residential module is on domestic multi-unit residential housing characterised by receiving contexts with steady state performance design parameters, and with an emphasis on the Irish technical design and legislative context.

The module provides for the further development and application of Postgraduate Certificate in Energy Efficiency in Design learning to the development of energy performance strategies at macro and micro levels for an NZEB residential design project and for a consideration of life cycle and cost optimality.

The module aims to challenge learners to apply a critical awareness of construction detailing in devising construction solutions to new and renovation NZEB design problems, and develop an ability to generate a comprehensive technical information package using a variety of energy-related digital applications.

The module comprises three parts. The first explores the receiving context with a technology lecture series centred on industry case studies exploring challenges, responses, success and failures.

The second is centred on the main NZEB design project, and involves the energy analysis of new and existing building conditions with a thermal, energy and retrofit performance brief, the development of macro and micro environmental design proposals or interventions based on thermal and energy performance data, and the generation of a comprehensive technical information package describing NZEB design and construction solutions using a variety of energy-related digital applications.

The third part is concerned with cost and value management and aims to develop the learner’s knowledge of life cycle and cost benefit analysis with regard to new and/or renovation projects.

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**Learning Outcomes (LO):**

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

1. **Determine energy performance characteristics of a new or existing residential building scheme of moderate complexity, centred on Part L and NZEB design compliance.**

2. **Develop energy performance strategies for the building at macro and micro levels to achieve energy performance objectives.**

3. **Develop NZEB design solutions which address underlying scientific principles, energy performance criteria and buildability with cognisance for cost implications, and which address energy-related legislative requirements.**

4. **Generate a comprehensive technical information package using-energy performance and related digital applications describing an NZEB solution to a design problem.**

5. **Develop appropriate strategies to carry out option analysis and appraisal using life cycle costing and cost benefit analysis to critically evaluate investment decisions on a low energy NZEB design project.**

6. **Record and present performance data using industry report writing conventions.**

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**Indicative Syllabus:**

**NZEB technology context:**

- Environmental design principles and impacts: Overview of environmental considerations, embodied energy and carbon, environmental specification and environmental assessment methods
- Retrofit Technology: Theory, application and industry case Studies
- Existing buildings: 18th and 19th century techniques centred on solid brick construction and related technologies
- Existing buildings: 20th century techniques centred on concrete block cavity wall construction and related technologies
Module Title: Building Performance NZEB Design Project: Multi-Unit Residential

- Building failures: traditional techniques including concrete block cavity wall construction
- Building failures: engineered techniques including framed and clad constructions
- Building failures: product-led performance design, systems and inter-system interfaces
- Building failures: Interventions to protected structures

NZEB design:
- Overview of key low energy design strategies for domestic and multi-unit residential projects
- Passive Measures: Heating and ventilation
- Active Measures: Energy efficiency in building services
- Renewable Energy System: Micro / Building integrated

NZEB Design Project:
- NZEB design proposals for residential buildings of moderate complexity exploring performance centred on Part L compliance.
- Development of energy performance strategies at macro and micro levels for NZEB Design Project: Multi-Unit Residential.
- Research methods and academic report writing.

Management and finance
- Cost / benefit balance;
- Simple Payback Calculation;
- Life Cycle Cost Analysis Calculation (LCCA);
- Investment return;
- Cost optimality;

Learning and Teaching Methods:
- College based workshops and critiques
- Online lectures
- Interactive online workshops and tutorials
- Web-based group work
- On-line supportive community of learners and engagement with fellow learners
- Guest lecturers
- Site visits
- Individual and group tutorials
- Workshops related to projects
- Execution of project
- Critiques and reviews
- Self-directed learning during and outside contact hours

Total Teaching Contact Hours 60
Total Self-Directed Learning Hours 140

Module Delivery Duration:
The module is delivered over one 15 week Semester.

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<th>Assessment Type</th>
<th>Weighting (%)</th>
<th>LO Assessment (No.)</th>
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<tr>
<td>NZEB design proposal for residential building with steady state thermal performance assessment characteristics to A-rated BER performance target supported by related technical research and with sustainability and cost appraisal. Project in sub sets developing each learning outcome, with weighting and thresholds confirmed in project schedule in Student Handbook.</td>
<td>100%</td>
<td>1-6</td>
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**Module Title**: Building Performance NZEB Design Project: Multi-Unit Residential

**Module Specific Assessment Arrangements (if applicable)**

- (a) Derogations from General Assessment Regulations: 50% pass
- (b) Module Assessment Thresholds
- (c) Special Repeat Assessment Arrangements

**Essential Reading:**

- DEAP workbook and associated manuals and guides, 2011 & 2012 editions
- Building Regulations: domestic

**Passive House detailing**

- Institut fur Internationale Architektur-Dokumentation, (2003), *Detail,* Munich.

**Dew Point conventions and standards**

- *Linear Thermal Bridging conventions and standards*

**Life Cycle Cost Analysis**


**EU Cost Optimal Calculation Methodology**


**Supplemental Reading:**

- *U Value calculation conventions and standards*

**Linear Thermal Bridging conventions and standards**


**Dew Point conventions and standards**

- *IS EN 15026:2007,* Hygrothermal performance of building components and building elements. Assessment of moisture transfer by numerical simulation
- *BS 5250:2002,* Code of practice for control of condensation in buildings

**General**

- Institut fur Internationale Architektur-Dokumentation, (2003), *Detail,* Munich
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**Module Title**: Building Performance NZEB Design Project: Multi-Unit Residential

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**Version No:** 1  
**Amended By**: Cormac Allen  
**Simon McGuinness**

**Commencement Date**: September 2017  
**Associated Programme Codes**: DT9772  
**DT9773**

# 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**: .................................