Meeting of Energy professional Skills (MEnS)

ARCH1182
Professional Energy Skills in NZEB

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College of Engineering and the Built Environment

DUBLIN INSTITUTE OF TECHNOLOGY
Meeting of Energy Professional Skills (MEnS)

DIT MEnS module

Delivery

Admission: A/AT/E/BS

Selection:
50% Female / unemployed
50%

Ranking
Experience
Academic qualifications
Meeting of Energy Professional Skills (MEnS)

DIT MEnS summary to date

- 300 applicants
- 75/25 Men / women (225/75)
- 60/20/15/5 Architect / Technologist / Engineer / Surveyor
- Selection pro rata to discipline
- RIAI Education Manager MEnS student

DIT Edition 1

- Admission: 18 women / 2 unemployed males + 20 all the rest (male)
- Formal withdrawal: 2
- Current engagement / expected completion: c34
What is your professional discipline? (37 responses)

- Engineering: 62.2%
- Architecture: 16.2%
- Building Surveying: 13.5%
- Architectural Technology: Other:
What is your primary field of work? (37 responses)

- Building contracting: 67.6%
- Engineering: 16.2%
- Architecture: Other
- Public sector: Other
- Building surveying: Other
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What is your approximate age? (37 responses)

- 20-29: 43.2%
- 30-39: 16.2%
- 40-49: 29.7%
- 50-59: 8.1%
- 60-69: 70-79:
Meeting of Energy Professional Skills (MEnS)

Module Title: Professional Energy Skills in nZEB

School Responsible: DIT School of Architecture

Module Overview:

The Professional Energy Skills in nZEB module is designed to enable experienced building design professionals (including Architects, Engineers, Building Surveyors and Architectural Technicians) to develop an understanding of the EU energy performance in buildings directive (EPBD) and its impact on Energy Efficient Building (nZEB) performance standard, with particular reference to existing residential buildings. The module also contains a range of issues common to all EU jurisdictions, with advanced modeling tools and techniques applicable locally.

The module introduces the learner to the European and national policies in building energy efficiency and nZEB. It explores the use of materials and installations suitable for nZEB in the design of retrofit building solutions, and the incorporation of renewable energy sources in existing residential building stock. It investigates lifecycle cost analysis and explores the management and financial issues necessary for professionals to be able to influence the nZEB design and construction. It explores the calculation theories and methods used in energy compliance with the nZEB performance standard.

The module also develops skills in the application of advanced tools in modeling existing residential buildings, using national and international energy performance matrices, and thinking for the planning, fabrication, and services installations to achieve the nZEB design performance standard in residential buildings.

Learning Outcomes (LO):

On completion of this module, the learner will be able to:

1. Describe the EU policy and legislative frameworks appropriate to an nZEB retrofit of an existing residential building.
2. Appraise building fabric and building services installations, and consider the performance impact of retrofit materials and installations interventions in an existing residential building.
3. Apply calculation theories and methodologies used in energy modelling to achieve compliance with the nZEB performance standard in a residential retrofit project.
4. Assess and advise on the incorporation of renewable energy requirements to achieve the nZEB performance standard in an existing residential building.
5. Apply an industry standard or statutory Europe an energy assessment metric to a professional level to a residential retrofit project.
6. Prepare and model a range of energy retrofit interventions aimed at meeting the nZEB standard in a residential retrofit project.
7. Apply the principles of lifecycle cost analysis in assessing the relative merits of fabric interventions and services installations in an nZEB residential retrofit project.

Indicative Syllabus:

nZEB Description and Policies:
- EU and national policies regarding energy efficiency - nZEB: Energy Efficiency in Buildings Directive (EPBD) and Energy Performance Directive (EPBD);
- General nZEB application to both new build and retrofit buildings;
- Analysis of building stock in Ireland and main uses;
- Differences in application of nZEB to residential and non-residential buildings;
- Materials and installations suitable for nZEB design and retrofitting;
- Building fabric: existing performance assessment;
- Building fabric: interventions and interventions;
- Building services installations, including PV, solar thermal and geothermal;
- Energy calculation theories:
  - Thermo, including planar fabric heat loss (H), linear fabric heat loss (h), fabric R-values, moisture risks, vapour transmission, thermal condensation, surface condensation and mould risks;

Learning and Teaching Methods:
- Online lectures;
- Interactive online workshops and tutorials;
- Web-based group work;
- College based expert lectures;
- On-line community of learners and engagement with fellow learners;
- Site visits to exemplary domestic innovation projects;
- Self-directed learning, during and outside contact hours;
- Contact assessment of the students' participation with interactive feedback;
- Computer-based learning to the application of theoretical learning to real-world situations with self-directed learning from industry-relevant case studies.

Total Teaching Hours:
- Online webinars and tutorials: 6
- Online lectures: 10
- College contact: 10

Total Self-Directed Learning Hours: 155

Module Delivery Duration: The module is delivered within a 15 week Semester

Assessment

Assessment Type

- Computer examinations: 50%
- Project: 50%

LO Assessment:

- C2: 1,2,3,4,5,6

Module Specific Assessment Requirements:

- Minimum 40% required in each assessment.
- 80% pass mark in one of multiple choice examinations, maximum two re-takes.

Essential Reading:

Building Regulations Part L: Domestic
Learning outcomes

Unit 1: NZEB Description and Policies
Advise on the EU policy and legislative framework appropriate to an nZEB retrofit of an existing residential building.

Unit 2: Materials & Installations suitable for nZEB design and retrofitting
Appraise building fabric and building services installations, and consider the performance impact of retrofit materials and installations interventions in an existing residential building.

Unit 3: Incorporation of renewable energy sources in building stock
Assess and advise on the incorporation of renewable energy requirements to achieve nZEB performance in an existing residential building.
Meeting of Energy Professional Skills (MEnS)

Learning outcomes

Unit 4: Energy calculation theories
Apply calculation theories and methodologies used in energy modelling to achieve compliance with the nZEB performance standard in a residential retrofit project.

Unit 5: Energy modeling of buildings: tools and techniques
Apply an industry standard or statutory European energy assessment metric at a professional level to a residential retrofit project.

Propose and model a range of energy retrofit interventions aimed at meeting the nZEB standard in a residential retrofit project.

Unit 6: Management and finance
Apply the principles of life cycle cost analysis in assessing the relative merits of fabric interventions and services installations in an nZEB residential retrofit project.
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Lecturers

Unit 1: NZEB Description and Policies
• Simon McGuinness

Unit 2: Materials & Installations suitable for nZEB design and retrofitting
• Simon McGuinness

Unit 3: Incorporation of renewable energy sources in building stock
• Patrick Daly

Unit 4: Energy calculation theories
• Andy Lundberg

Unit 5: Energy modeling of buildings: tools and techniques
• Simon McGuinness (PHPP option)
• Patrick Daly (DEAP option)

Unit 6: Management and finance
• Daniel Coyle
# Meeting of Energy Professional Skills (MEnS)

## Professional Energy Skills in NZEB

Blended online distance learning mode of delivery

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**Week 1:**
- **Induction:** Introduction to DIT, MEnS, NZEB

**Week 2:**
- **Unit 1:** Learning outcome 1: NZEB Design and Planning

**Week 3:**
- **Unit 2:** Learning outcome 2: Materials & Installations suitable for NZEB design and retrofitting

**Week 4:**
- **Unit 3:** Learning outcome 3: Incorporation of renewable energy sources in building stock

**Week 5:**
- **Workshop 1:** Weeks 2-4: Feedback
- **Unit 4:** Learning outcome 4: Energy calculation/analysis

**Week 6:**
- **Unit 5:** Learning outcome 5: Energy Building Modelling and Techniques

**Week 7:**
- **Workshop 2:** Weeks 6-8: Preparation
- **Unit 6:** Learning outcome 6: Energy Building Modelling, Tools and Techniques

**Week 8:**
- **Workshop 3:** Weeks 10-12: Feedback
- **Unit 7:** Learning outcome 7: Management and Finance

**Week 9:**
- College

**Week 10:**
- College

**Week 11:**
- College

**Week 12:**
- College

**Week 13:**
- College
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Learning hours

European Credit Transfer System: ECTS

1 ECTS = 20 Learning hours

2 ECTS = 40 Learning hours
*Annual professional CPD = 20 structured + 20 unstructured = 40 hours

NZEB module = 10 ECTS / 200 Learning hours

10 week delivery / 200 Learning hours = 20 hours per week

• Pre-recorded lectures = 3 hours
• Webinar = 1 hour
• Self-directed study = 16 hours
• Preparation for formative assessment with colleagues
• Response to webinar feedback and summative assessment

In reality 20 hours minimum
MEETING OF ENERGY PROFESSIONAL SKILLS (MEnS)

The ‘Meeting of Energy Professional Skills’ (MEnS) project is funded by the Horizon 2020 EU Framework Programme for Research and Innovation, and addresses the EE4 Energy Efficiency action focused on upskilling construction professionals in ‘Nearly Zero Energy Building’ (NZEBS).

The MEnS project will provide and enhance the NZEB skills of building managers such as engineers and architects through a series of EU-wide inter-disciplinary accredited training activities developed by 9 universities and 3 market players. The project focuses on retrofitting of residential housing stock and emphasises gender equality, with the objective of achieving participation of at least 50% female or unemployed in the training programmes.

The MEnS project aims to:

Increase the knowledge and skills of at least 1800 engineers, architects and building managers in NZEB design and construction, out of which 50% will be women or unemployed.
**Level 9 postgraduate opportunities: Energy Retrofit Technology**

Operating and recruiting……..

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<thead>
<tr>
<th>Code</th>
<th>Programme</th>
<th>Credits</th>
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<tr>
<td>DT774</td>
<td>PGCert (Digital Analysis and Energy Retrofit)</td>
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<td>DT774a</td>
<td>PGDip (Digital Analysis and Energy Retrofit)</td>
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<td>DT774b</td>
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<td>DT775b</td>
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<td>DT775c</td>
<td>CPD Diploma (Hygrothermal Assessment)</td>
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<tr>
<td>DT775d</td>
<td>Postgraduate Certificate (Thermal Performance Modelling)</td>
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**H2020 ‘Meeting of Energy professional Skills’ (MEnS)**

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## MSc Programme Structure + MEnS

### Generic Level 9 MSc Programme Structure

(‘Nested programme’)

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<tr>
<td>Postgraduate Certificate 30 ECTS</td>
<td>Postgraduate Diploma 30 ECTS</td>
<td>MSc 30 ECTS</td>
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**MEns Professional Energy Skills in NZEB**

*within generic Level 9 MSc Programme Structure*
### MSc Programme Structure + MEnS

#### MSc Energy Retrofit Technology

**including**

*Postgraduate Certificate in*

*Digital Analysis & Energy Retrofit*

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<tr>
<td>BIM for Retrofit</td>
<td>Cost &amp; Value Management</td>
<td>Simulation for Retrofit</td>
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<tr>
<td>Energy Analysis for Retrofit</td>
<td>Retrofit Technology Project: Residential</td>
<td>Retrofit Technology Project: School</td>
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# MSc Programme Structure + MEnS

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<td>Postgraduate Diploma Building Performance (Energy Design: Non Domestic Retrofit)</td>
<td>MS: Building Performance (Energy Retrofit Technology)</td>
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**MSc Building Performance (Energy Retrofit Design)**

*Subject to validation September 2016*
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