

Validation Report



BN039

**Bachelor of Science in Sustainable Electrical
and Control Technology**

(180 ECTS credits leading to NFQ Level 7 Award)

BN035

Higher Certificate in Science in Electrical Technology

(120 ECTS credits leading to NFQ Level 6 Award)

BN312

**Bachelor of Science in Sustainable Electrical and Control
Technology**

(Add on award to BN035 - 60 ECTS credits leading to NFQ Level 7 Award)

Introduction

The Institute of Technology Blanchardstown was established in 1999. The mission of the Institute is to serve its students and the community by meeting the skills needs in the economy and increasing the level of participation in third-level education and training, particularly in Dublin North-West and its environs.

The Institute in 2006 was awarded delegated authority enabling the development, validation, implementation and continuous improvement of taught higher education and training programmes up to and including level 9 of the National Framework of Qualifications.

In keeping with the Institute's mission statement, course and programme development is on-going. This programme supports the mission of the Institute and facilitates much wider access to the Institute by a cohort of potential students whose needs are currently not being met.

The purpose of this document is to report on the findings of the peer review panel established to validate this proposed programme against the criteria for the validation of programmes as stipulated in the Institute policy document 2MP01¹.

This submission by the School of Informatics and Engineering evolved through:

- examining the competence, expertise and experience of ITB staff in addition to the strategy of the department/school/Institute and Government educational policy
- research evidence indicating demand for technicians with relevant qualifications and experience in energy efficiency, sustainable energy technology and control and automation
- feedback from guidance counsellors in the immediate catchment area

¹ 2MP01 Design, validation and accreditation of new academic programmes

Programme overview

The proposed programme is a 3 year ordinary degree programme with an embedded award at Higher Certificate (level 6, on the NFQ¹). It is envisaged that graduates of this Bachelor of Science in Sustainable Electrical and Control Technology will be suitably qualified to gain employment as traditional electrical & control technicians within the areas of building services and automation. However, in IT Blanchardstown we feel that it is no longer appropriate to educate and train technicians in isolation from the sustainability agenda. Energy management and sustainability can no longer be just an 'add-on' or progression route for technicians. The concepts must be integrated into the education of technicians to ensure that all work undertaken whether new projects or updating of older installations will be carried out in the context of sustainability. This is vital to ensure that future technicians will play an important role in addressing the issues of climate change through their actions in implementing renewable technologies and energy efficient technologies. Thus the principles of sustainability and energy management underpin this entire programme.

The knowledge and skills a graduate of this programme will develop have been categorised within the following thematic areas of expertise:

- Mathematics
- Personal and professional development
- Practical skills
- Sustainability
- Electrical/services
- Electronics/automation

The sustainable thematic area will provide students with detailed knowledge and skills in relation to existing, emerging and future renewable technologies ensuring that they will be able to apply energy management techniques across a wide range of projects that they will encounter as employed graduates of this programme.

Sustainability is also at the heart of the automation, services and personal development thematic areas. The electrical services, electrical services design and mechanical building services modules teach the knowledge and skills required by students to design and implement the key electrical and mechanical services in buildings. In achieving these aims, students will be encouraged to identify and utilise the most energy efficient designs, components and systems currently available. The learning achieved in modules such as control and

¹ National Framework of Qualifications

instrumentation, automation and power and machines will enable the students to design and implement measurement and control strategies that lead to significant energy and cost savings in domestic, commercial and industrial applications.

Targeted catchment for this innovative offering is aimed at both the CAO¹ applicant and qualified electricians who may avail of advanced entry into year 2 subsequent to predefined entry requirements. The graduate emerging from this programme will not be a traditional electrical and control technician. Neither will they be an energy 'guru' far removed from the technical aspects of the electrical and control areas. The graduate will be a highly knowledgeable and 'hands-on' practitioner who throughout their career can approach all aspects of their work with a focus on sustainability.

The proposed level 6 award is embedded in the structure of this degree programme, consisting of the first two years and will thus equip students with a combination of technological know-how, skills and competence to be able to operate as effective electrical/control technicians by applying many different tools and technologies and will be in a position to learn new engineering techniques as they arise, as directed in the workplace with an understanding of the importance and various methods used in electrical energy management.

¹ Central Applications Office

Programme detail

Programme title	Bachelor of Science in Sustainable Electrical and Control Technology
Award title	Bachelor of Science
NFQ level	7
ECTS^I credits	180
Programme code	BN039
Banner code	BN_ESECT_7

Embedded award

ITB code	Banner code	Title	Award title	ECTS credits	Format
BN035	BN_ESELT_C	Higher Certificate in Science in Sustainable ^{II} Electrical Technology	Higher Certificate in Science	Level 6 120 credits	Ab initio

Add on award

BN312	BN_ESECT_D	Bachelor of Science in Sustainable Electrical and Control Technology	Bachelor of Science	Level 7 60 credits	Add on to BN035
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^I European Credit Transfer and Accumulation System

^{II} Proposed title – see conditions of validation

Panel members

Chairperson	Dr. Brendan McCormack Institute of Technology Sligo
Panel member 1	Mr. Austin Hanley Athlone Institute of Technology
Panel member 2	Dr. Lisa Looney Dublin City University
Panel member 3	Dr. Brian Foley Trinity College Dublin
Panel member 4	Mr. Cormac Madden ESB Networks
In attendance	Dr. Diarmuid O'Callaghan IT Blanchardstown Mr. Michael Keane IT Blanchardstown
Date of Panel Meeting	Thursday 28 th May 2009

Institute staff present

Session I Meeting with President, Head of School, Head of Department(s) & Programme Leader(s)

Mr. Larry McNutt, Head of School of Informatics and Engineering

Mr. Richard Gallery, Head of Department of Engineering

Mr. Liam Quirke, Head of Trades

Mr. Gerard Duke, Department of Engineering

Mr. David Peyton, Department of Engineering

Session II Meeting with lecturing staff

Mr. Larry McNutt

Mr. Liam Quirke

Mr. Richard Gallery

Mr. Gerard Duke

Mr. David Peyton

Dr. Catherine Deegan

Mr. Cormac McMahon

Mr. John Kilcoyne

Ms. Michelle Looby

Mr. Daniel McSweeney

Dr. James Duffy

Mr. Noel Carey

Mr. Gareth Curran

Mr. Niall Bell

Dr. Kevin Mellon

Panel findings

In evaluating the appropriateness, quality and proposed operation of this programme the following criteria have been considered and are hereby reported upon:

Strategic planning

The panel was satisfied that the programme is in keeping with the Institute's mission, that it does not constitute redundant provision and that it makes efficient use of resources.

Evidence of consultation

From the submission document and through discussion with the programme design team the panel heard how a thorough examination of policy and publications was undertaken by the programme development team to assist in setting the context and determining the need for the proposed programme. The causes and effects of greenhouse gas emissions were explored, particularly in the context of energy production and use. European Commission and Irish Government reports in the areas of energy efficiency and sustainability were examined to ensure that the proposed programme is in line with policy in these areas. A number of reports by the 'Expert Group for Future Skills Needs' were consulted. This allowed an overview of current and future skills needs in the sustainability sector to be developed. The examination of the report from a SIF¹ funded project produced by Cork Institute of Technology provided an insight into a possible progression framework for craftspeople into the proposed programme. Finally, an examination of the needs of school leavers and how they relate to the proposed programme was supported by reference to recent apprentice recruitment figures.

A list of the most relevant publications accessed is shown below.

- Fourth Assessment Report of the Intergovernmental Panel on Climate Change, IPCC, 2007.
- Action Plan for Energy Efficiency: Realising the Potential, The European Commission, 2006.
- Ireland National Climate Change Strategy 2007-2012, Department of the Environment, Heritage and Local Government, 2007.
- Government White Paper: Delivering a Sustainable Energy Future for Ireland, Department of Communications, Marine and Natural Resources, 2007.

¹ Strategic Innovation Fund

- A Review of the Employment and Skills Needs of the Construction Industry in Ireland, Expert Group for Future Skills Needs, 2008.
- National Skills Bulletin, Expert Group for Future Skills Needs, 2008.
- Tomorrow's Skills: Towards a National Skills Strategy, Expert Group for Future Skills Needs, 2007.
- Education in Employment, Cork Institute of Technology, 2008.
- Apprentice Recruitment Patterns: Report to Department of Education & Science and the HEA, Skills Initiative Unit, 2008.

The panel also heard how interviews were carried out with key personnel in a number of industries in the Dublin area including; Wyeth, Leo laboratories, Bristol-Myers Squibb and the Hanley Control Group to name but a few. The panel were informed of the key findings, a summary of these are included below:

- The general consensus found that existing graduates from third level programmes tend to have a deficit in the practical areas while trades people often lack some skills in technical report writing and information technology.
- Investment in renewable technologies was not highlighted as a major priority. However, energy management within existing processes is seen as vital to achieve cost reductions.
- In terms of proposed programme content, 'Process Control and Instrumentation' was highlighted by all as a highly desirable module. Practical skills in PLC¹ configuration, programming and fault-finding were identified as required content. The same practical approach to installation, configuration and fault-finding of electrical machines and their control systems was viewed as vital content. Strong computer, technical writing and project management skills were also seen as very important.
- Participants in this consultation commented on the relevance and responsive nature of the proposed programme and expressed their support in that that they would encourage and support some of their existing craftspeople to enrol on the programme if it were offered in a flexible manner.

The panel was satisfied with this consultation.

¹ Programmable logic controllers

Relevance

The need for engineers and technicians with relevant qualifications and experience in energy efficiency, sustainable energy technology and control and automation has been clearly identified. Successful practice in these areas requires a combination of technological know-how, design skills, and a critical understanding of the industry context. This programme aims to provide this combination of skills and knowledge, and in doing so to put its graduates in an ideal position to operate at the heart of organisations engaged in sustainable engineering/construction projects.

The European Commission and Irish Government have clearly prioritised energy efficiency and sustainability in their policies to address climate change. Many Government-backed and other initiatives are in place to provide stimulus in the area of energy reduction. These initiatives should lead to job creation and growth in the sustainability sector. The proposed programme is designed to be in line with these policies and initiatives.

The need to provide re-skilling opportunities for electrical craftspeople displaced by the decline in residential building has been identified. The proposed programme will provide such re-skilling opportunities. The application of an appropriate progression framework will allow the current skills and prior learning of electricians, wishing to access the programme, to be recognised on entry.

The programme will also cater for school leavers that may be interested in a career in the sustainable electrical and control fields. In addition, it will provide an alternative route into the electrical/control industries for many who may have wished to pursue an apprenticeship but may not now have that option due to the reduction in the numbers being recruited to the trade.

Protection of learners

Section 43 of the Act¹ does not apply.

¹ Qualifications (Education and Training) Act, 1999

Learner employment potential

It is envisaged that graduates of the Level 7 Bachelor of Science programme will be suitably qualified to occupy an appropriate senior technician/junior engineer role within the sustainable construction or manufacturing industries. Graduates will have an awareness of the causes and effects of climate change and a deep understanding of the role of sustainable energy systems and energy management techniques in helping address the problem. They will have a familiarity with new and emerging technologies in the area of energy management. They will have specialised knowledge, creative and diagnostic skills and competences. These will enable them to design, implement and maintain renewable energy technologies and sustainable electrical and control systems in support of energy reduction and will be equipped to take supervisory responsibility within project teams. An example of an identified skills deficit in the current market that a graduate of this programme may address has been identified, that of supporting architects and planning and design personnel in the sustainability context of their projects.

It is envisaged that graduates of the Level 6 Higher Certificate in Science award will be suitably qualified to occupy an appropriate technician role within the sustainable construction or manufacturing industries. They will have the knowledge, skills and competences that will enable them to implement and maintain renewable energy technologies and sustainable electrical and control systems in support of energy reduction. They will be equipped with the skills required to work on their own initiative or as part of a project team and to take responsibility for the work of others within more complex groups.

Quality assurance

The panel was informed of how the proposed programme had been developed and approved internally whilst complying with the Institute's quality assurance policies and procedures. The panel concurred that said policies and procedures had been applied to the development of the proposed programme.

Programme titles and award titles

Following discussion, the panel was satisfied that the title of the proposed level 7 programme is clear, accurate and fit for the purpose of informing prospective learners and other stakeholders of the focus of the programme. However, the panel were of the opinion that the word "Sustainable" was not fit for the purpose of informing prospective learners and other stakeholders of the focus of the level 6 embedded award. See conditions of validation.

Ethics

The panel was satisfied that the Institute has internal policies and procedures in place to ensure that all teaching, learning or research activity across the spectrum of NFQ levels is conducted / delivered in a manner that is both morally and professionally ethical.

Unity

The panel found that the programme design is consistent with HETAC's¹ policy on accumulation of credits and certification of subjects, that it has an underlying unifying theme with modules bonded by linkages being either implicit or explicit. It was also clear to the panel how the standards of knowledge, skill and competence evolve throughout the programme as a whole.

¹ Higher Education and Training Awards Council

Teaching and learning

The panel discussed with staff of the Institute the various modes of interaction with learners. Evidence of a clear dialogue was confirmed, enabling learners to develop and have available to them the support of academic staff.

Course management arrangements were discussed and deemed adequate, these included:

- survey of students by lecturer
- summary of survey of students by lecturer
- survey of students by department
- course boards

The panel were informed of how the aims of the programme will be achieved through the application of a range of teaching and learning methods including:

- Lectures
- Workshop exercises
- Laboratory exercises
- Tutorials
- Project work
- Problem based learning
- Educational visits to industry

Wherever it is practical and appropriate, the panel were informed of how the students will acquire hands on experience within a workshop/lab environment at the earliest opportunity. To support this approach, a dedicated practical stream runs through years 1 and 2. In addition, many of the other modules have a heavy weighting towards laboratory time. The students will be required to show that they are reflecting on their work, and are learning from their practical experience through the use of assessments, presentations, project work and problem based learning.

Through discussion it became apparent how project work will be utilised throughout the programme. The project module in second year, and the major project module in the final year of the programme, will call upon the students to draw together the knowledge they have gained at earlier stages of the programme. Project work will also be employed within a number of other modules where the content lends itself to this approach. Examples of modules where project work may be appropriate include: Electrical Services 1 & 2, Automation 1 & 2 and Electrical Services Design. In addition to supporting the technical content of the programme, project work will enable students to enhance

their skills in the areas of team working, project management and communications.

The practical 'learn by doing' approach adopted in the programme makes it ideal for the utilisation of 'Problem Based Learning' (PBL). This is an approach to teaching whereby the learners are presented with a sequence of problems and/or projects to complete. The learning is driven by a process of enquiry, usually takes places in groups, and is facilitated by the tutor. The method aims to encourage key skills such as team working, problem solving and independent learning. Subject areas where PBL may be appropriate include: electronics, electrical services, automation and sustainable technology. Educational visits to industry and trade shows will form an integral part of the programme, and will be seen to particular effect in the technology, automation, sustainable and specialisation thematic areas. Visits will be used to re-enforce learning in particular modules and to supply support material for project and problem based learning activities.

The panel heard how the programme has been designed to attract qualified electricians who may avail of advanced entry into year 2 subject to certain criteria which the panel felt needed to be more clearly articulated. See panel recommendations. Many applicants from this category may be electricians that are currently in employment. In order to meet their needs in addition to the needs of school leavers and unemployed craftspeople the programme can be offered through different modes of delivery which may include:

- Full time
- Part time
- Blended learning

The panel was satisfied that the necessary staffing levels exist to deliver the programme and were suitably impressed with the qualifications, experience, and competence of the Institute's staff, as well as the effectiveness of their collaboration across disciplines in planning the detail of this programme. The panel commented on the obvious enthusiasm of staff involved in the development of the programme and the valuable expertise of ITB staff in on-line lecture delivery as demonstrated to the panel .

Learner assessment

Through discussion with the design team, and from the submission document itself it was explained in detail to the panel the multiple modes of assessment, both formal and informal that will be employed on the programme. These included a combination of in-class tests, formal examinations, assignments, reports, projects, presentations and seminars. The panel also heard how coursework assessments where appropriate, will include individual and teamwork

assignments, projects, class and laboratory exercises, workshop practice, and assignments.

Standards of knowledge, skill and competence

The panel felt having reviewed the syllabi and assessment methods for the programme that learners would be capable of attaining the standards of knowledge, skill or competence relevant for this award.

Access, transfer and progression

The programme incorporates the established procedures for access, transfer and progression allowing students to choose from various entry and exit points that support clear transfer and progression routes within the National Framework of Qualifications (NFQ).

Panel observations

The panel congratulated the programme design team on what they found to be a very impressive, highly innovative initiative responding to the dramatic decline in the construction and manufacturing sectors whilst incorporating the current market shift towards energy management and cost reductions. This innovation extended to the re-examination of standard engineering subjects to deliver learning outcomes in sustainability. The panel also commended this initiative to instil the concept of energy management and sustainability in technician training from the very outset.

Decision of the panel

The panel recommends the validation of the proposed programme, its embedded award and add on award namely:

Banner code	ITB code	Programme title	Award title	ECTS credits	Format
BN_ESECT_7	BN039	Bachelor of Science in Sustainable Electrical and Control Technology	Bachelor of Science	Level 7 180 credits	Ab initio
BN_ESELT_C	BN035	Higher Certificate in Science in Electrical Technology	Higher Certificate in Science	Level 6 120 credits	Ab initio
BN_ESECT_D	BN312	Bachelor of Science in Sustainable Electrical and Control Technology	Bachelor of Science	Level 7 60 credits	Add on to BN035

Panel conditions

This validation is subject to the following conditions:

1. The panel were of the opinion that the word “Sustainable” was not fit for the purpose of informing prospective learners and other stakeholders of the focus of the level 6 embedded award and recommended that the word be removed from the programme title.
2. The panel requested that the learning outcomes for each of the modules of the level 7 award be rewritten to more clearly demonstrate their achievement with regard to aspects of sustainability.

Panel recommendations

1. Review and further clarify the entry requirements with regard to the following:
 - Mathematics
 - Advanced entrants to year 2 including necessary bridging modules for entry from specific apprentice trades
 - BN312 - Level 7 add on programme
2. Review the module syllabi to ensure that no unnecessary pre-requisites exist between sequential odd and even semesters.
3. Consider including more mechanical content within the practical stream as outlined in the submission document.
4. Review the profile of the level 6 graduate to more accurately reflect the programme learning outcomes.
5. Consider reinforcing the visibility of the different teaching and delivery modes to more accurately reflect actual delivery and options available to the different student cohorts.
6. Reconsider the content of the 'Mathematics 3' and 'Digital Electronics' modules to eliminate any unnecessary overlap.
7. Revisit the content of the module 'Engineering Science' so as to more comprehensively underpin the modules on 'Sustainable Technology'.
8. Reconsider the content of the module 'Instrumentation and Control' in order to further emphasise the learning aspects of the control element.
9. Review class contact hours and independent learning to balance against ECTS norms.
10. Make other technical and minor amendments as discussed at the panel meeting.

Panel signatures

Chairperson

Dr. Brendan McCormack _____ Date _____

Secretary

Dr. Diarmuid O'Callaghan _____ Date _____