

Validation Report



BN122

Bachelor of Science (Honours)

in

Energy Systems and Industrial Automation

Introduction

The mission of the Institute of Technology Blanchardstown 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 its existing taught higher education and training programmes up to and including level 9 of the National Framework of Qualifications.

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 staff in addition to the strategy of the department/school/Institute and government educational policy.
- Identified demand from existing third year learners and graduates of the current NFQ level 7 offering on sustainable electrical and control technology wishing to further upskill and progress to an honours degree.
- Dwindling CAO applications and feedback from stakeholders regarding confusion with the existing NFQ level 7 programme title.

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

Programme development

In 2009 a Bachelor of Science in Sustainable Electrical and Control Technology programme (BN039) was developed by staff in the trades department of ITB. The programme was designed to equip learners with the skills and knowledge to embark upon a rewarding career in sustainable electrical and control technology within the building services or manufacturing sectors. Having completed the first iteration of the programme in 2011 the design team carried out an extensive review of the programme the findings of which included the following proposals based on feedback from learners, industry consultation and intensive marketing research:

Design a new NFQ level 8 ab-initio programme incorporating:

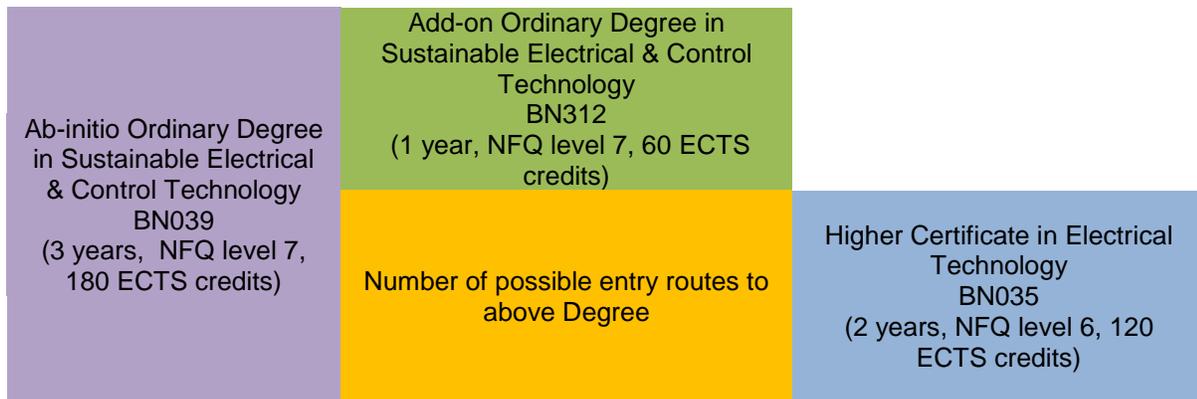
- A modified and re-titled BN039 (to more accurately reflect and inform prospective learners of the content, aims and objectives of the new NFQ level 8 award).
- A new NFQ level 8 add-on programme to provide a progression opportunity to existing BN039 graduates.

The proposed new programme, Bachelor of Science (Honours) in Energy Systems and Industrial Automation has been designed in response to this proposal.

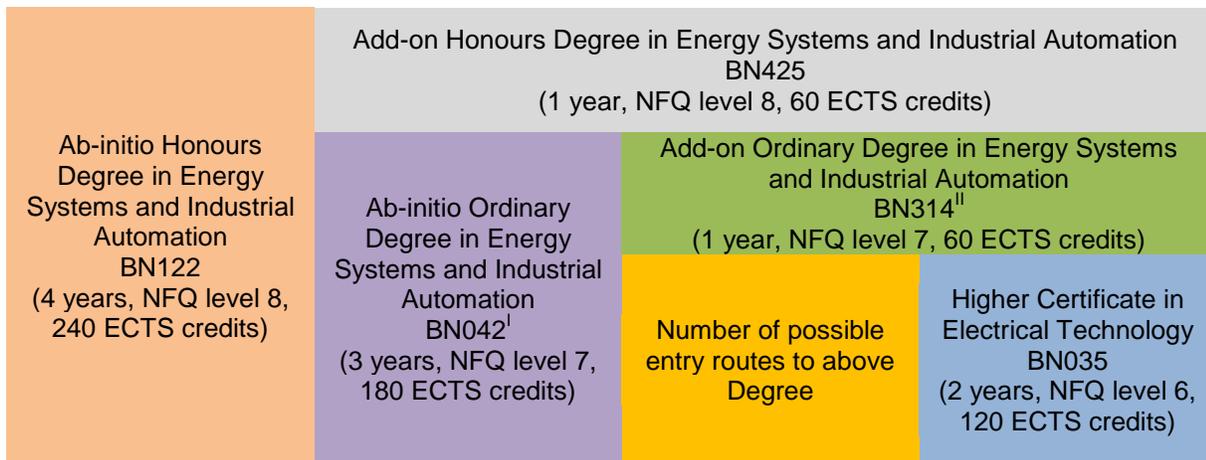
The first two tables on the following page outline the differences between the current programme structure BN039 and the new proposed programme BN122. The third table provides an overview of the proposed fourth year of the new programme with modules listed by stream.

It is envisaged that graduates of the proposed programme will have detailed knowledge and understanding of the fields of scientific knowledge underpinning energy systems and industrial automation and be able to apply this knowledge to achieve energy efficiencies within the process and manufacturing environments.

BN039 – existing programme structure



BN122 - proposed new programme structure



Modules and streams within BN425 (year 4 of BN122)

	Personal and Professional Development Stream	Energy System Stream	Facilities Management stream	Automation Stream
Year 4 Semester 7	Year 4 Project	Facilities Energy Management, Mechanical Services Design	Environmental Policy and Legislation	Programmable Logic Controllers 3, Environmental Monitoring Systems
Year 4 Semester 8	Engineering Management, Year 4 Project	Transmission and Distribution of Electrical Energy	Facilities Maintenance Management	Process Instrumentation and Control 2, SCADA

^I Replaces the existing BN039 programme

^{II} Replaces the existing BN312 programme

Programme detail

Programme title	Bachelor of Science (Honours) in Energy Systems and Industrial Automation
Award title	Bachelor of Science (Honours)
Award type	Major
Format	Ab initio
NFQ level	8
ECTS credits	240
Programme code	BN122
Banner code	BN_EESIA_8

Embedded awards

Institute code	Banner code	Title	NFQ level	ECTS credits	Format
BN042	BN_EESIA_7	Bachelor of Science in Energy Systems and Industrial Automation	7	180	Ab initio
BN314	BN_EESIA_D	Bachelor of Science in Energy Systems and Industrial Automation	7	60	Add on to BN035
BN425	BN_EESIA_B	Bachelor of Science (Honours) in Energy Systems and Industrial Automation	8	60	Add on to BN042
BN035 ¹	BN_ESELT_C	Higher Certificate in Science in Electrical Technology	6	120	Ab initio
BN742	BN_EESIA_XIA	Certificate in Industrial Automation	7	30	Minor award of BN122

¹ Pre-validated programme

Panel composition

Chair: Dr. Brendan McCormack
Institute of Technology Sligo

Members: Dr. Brian Foley
Trinity College Dublin

Mr. Joe Lawless
Athlone Institute of Technology

Ms. Carol Gartlan
Pfizer Biotech

Mr. David Berber
Automation & Control Engineering (Irl.) Ltd.

Mr. Eamonn Lane
Industrial Automation Expert

In attendance: Dr. Diarmuid O'Callaghan
Registrar
Institute of Technology Blanchardstown

Mr. Michael Keane
Quality Assurance & Compliance Officer
Institute of Technology Blanchardstown

Date of Panel Meeting Wednesday 18th April 2012

Institute staff consulted during panel visit

Session I

Dr. Mary Meaney	President
Dr. Larry McNutt	Head of School of Informatics & Engineering
Mr. Richard Gallery	Head of Department of Engineering
Mr. Liam Quirke	Head of Trades

Session II

Dr. Larry McNutt	Mr. Gerard Duke
Mr. Richard Gallery	Mr. David Peyton
Mr. Liam Quirke	Mr. Jerry Bradley
Mr. Damian Cox	Mr. John Kilcoyne
Mr. Owen Flood	

Panel findings

In evaluating the appropriateness, quality and proposed operation of this programme the following criteria has been considered and is 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. Through discussion with senior management the panel confirmed that necessary equipment to support learning up to NFQ level 8, currently not in place, would be procured and available in advance of the programme launch. See conditions of validation.

Evidence of consultation

Through discussion with Institute staff, the panel found that a comprehensive research/consultation effort was undertaken with stakeholders to validate the need for, and the preferred structure and characteristics of the proposed programme.

Learner employment potential

It is envisaged that graduates of this NFQ level 8 programme will occupy an appropriate role as an energy systems and automation practitioner within the process or manufacturing sectors. Graduates will have a detailed knowledge of the causes and effects of climate change and a deep understanding of the role of industrial automation and energy management techniques in helping address the problem. They will have a detailed knowledge of current and emerging practices and technologies in the fields of industrial automation and energy utilisation. They will have specialised knowledge, creative and diagnostic skills and competences enabling them to design, implement and maintain procedures and systems in support of energy management and automation. Whilst researching this proposal the design team identified employment opportunities in the following sectors:

- Industries with automated manufacturing processes for product production and quality control.
- Services companies providing support to industrial and large commercial clients.

The panel concurred on the wide range of skills a graduate of this programme seeking employment would require and felt that these were well reflected in the programme. There was some discussion with regard to the appropriateness of the descriptor 'technician' in relation to a NFQ level 8 programme. The School explained that this was a commonly understood term used to describe the graduate engineer in the relevant industrial sector. The panel proposed the inclusion of the term 'subject matter expert' as

being more identifiable by industry. The panel also identified a skills shortfall within the energy stream of the programme, as proposed, relating to thermodynamics and heat transfer and asked that this be addressed. See conditions of validation. The panel was also of the opinion that calibration needed to be introduced to the curriculum of the NFQ level 6 exit award (Higher Certificate in Electrical Science) to improve the employment prospects of graduates. See panel recommendation III.

Protection of learners

Section 43 of the Act^I does not apply.

Quality assurance

The panel was informed of how the submission 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 programme is clear, accurate and fit for the purpose of informing prospective learners and other stakeholders and consistent with HETAC^{II} award titles. Arising from this discussion, the picture clearly emerged that the primary focus of this programme is on technology with engineering and science in support roles. Hence the panel, whilst mindful of existing HETAC named awards, was of the opinion that the award title "Bachelor of Technology", if available, would be more appropriate for this programme. See panel recommendation I.

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's 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.

^I Qualifications (Education and Training) Act, 1999

^{II} Higher Education and Training Awards Council

Teaching and learning

The panel discussed with staff of the Institute the various modes of interaction practised with learners. Course management arrangements were discussed and deemed adequate. Evidence of a clear dialogue was confirmed, enabling learners to develop and have available to them the support of academic staff. A tour of the facilities included laboratory/workshop facilities dedicated for teaching and the demonstration of electrical & mechanical energy systems and industrial automation while also providing the panel with the opportunity to meet current third year learners and discuss with them the various industrial automation projects currently being undertaken. To further enhance the learning experience the panel encouraged greater industry links either through learner work placement, or in the absence of same, project identification in consultation with industry. See panel recommendation V. The panel was of the opinion that this would afford learners the opportunity to gain hands on experience in providing solutions to actual business problems while also further developing closer links between IT Blanchardstown, local industry and employers.

Learner assessment

Through discussion with the design team, it was explained in detail to the panel the multiple modes of assessment, both formal and informal that will be employed throughout this programme. The panel heard how IT Blanchardstown's policy on continuous assessment is based on the objective of developing/enhancing the learners' application of knowledge, aptitude for critical analysis and problem solving within specific timeframes. The scale of learner assessment was deemed by the panel to be appropriate for the proposed programme however the panel recommended that assessment inputs and scoring between learners for group assignments/projects be clearly delineated and also that module learning outcomes be linked to individual assessment events. See panel recommendations IV and VI.

Standards of knowledge, skill and competence

Having reviewed the syllabi and assessment methods as proposed the panel was of the opinion that learners would be capable of attaining the standards of knowledge, skill or competence relevant for this award. However, in order to produce graduates of immediate benefit to industry the panel stressed the need for learners to have the ability to connect to different manufacturers controllers and gather data using remote modules and field buses. See panel recommendation IX.

Access, transfer and progression

The panel confirmed that the programme incorporates the established procedures for access, transfer and progression while accommodating a variety of access and entry requirements from applicants with expertise in related disciplines. However, the panel stressed the need to develop a transitional plan to accommodate the progression for

current BN039 graduates to the new one year NFQ level 8 add on programme namely BN425. See panel recommendation X.

Decision of the panel

The panel recommended the approval of the four year ab initio Bachelor of Science (Honours) in Energy Systems and Industrial Automation, the one year NFQ level 8 add-on Bachelor of Science (Honours) in Energy Systems and Industrial Automation and the updated NFQ level 7 offering to replace the existing Bachelor of Science in Sustainable Electrical and Control Technology.

Details of programmes validated include:

Institute code	Banner code	Title	NFQ level	ECTS credits	Format
BN122	BN_EESIA_8	Bachelor of Science (Honours) in Energy Systems and Industrial Automation	8	240	Ab initio

Embedded awards

Institute code	Banner code	Title	NFQ level	ECTS credits	Format
BN042	BN_EESIA_7	Bachelor of Science in Energy Systems and Industrial Automation	7	180	Ab initio
BN314	BN_EESIA_D	Bachelor of Science in Energy Systems and Industrial Automation	7	60	Add on to BN035
BN425	BN_EESIA_B	Bachelor of Science (Honours) in Energy Systems and Industrial Automation	8	60	Add on to BN042
BN742	BN_EESIA_XIA	Certificate in Industrial Automation	7	30	Minor award of BN122

Conditions of validation

This validation is subject to the following conditions:

- Introduce a module on thermodynamics to address the identified skills gap in the third year of the programme.
- Make available necessary equipment to supplement existing resources to support learning up to NFQ level 8 in advance of the commencement of this programme.

Panel recommendations

- I. Revisit the award title of the programme in the event that a more suitable award title, not currently available, is made available by HETAC in the future. The award title of “Bachelor of Technology” is proposed.
- II. Revisit the module ‘Engineering Science’ to provide a fundamental level of scientific understanding to underpin characteristics of the full range of transducers encompassed particularly in years III and IV of the programme.
- III. Consider introducing a topic on calibration in year two of the programme to provide better employment prospects for graduates of the NFQ level 6 exit award.
- IV. Map module learning outcomes to individual assessment events. The panel encouraged the use of ‘Coursebuilder’ to accommodate this mapping thus making the assessment and attainment of same more transparent to all stakeholders. The learning outcomes for the NFQ level 6 and 7 embedded programmes should also be included and the title and descriptors for the project included in these programmes should accurately reflect the level of learning required.
- V. Consider incorporating work placement within the programme. In the absence of same incorporate project identification in consultation with industry to maximise the work-based learning opportunity afforded to learners. Further define the technical areas of focus for the final year projects tailoring same such that their outputs are relevant and exploitable in Industrial settings. Explore the opportunity for learners to present their project findings to potential employers.
- VI. Clearly delineate between assessment inputs and scoring for each individual learner working on group projects/assignments.

- VII. Revisit the title of the module “Engineering Management” to more accurately reflect the module content as proposed.
- VIII. Consider introducing the option of electives within the fourth year of the programme to provide the opportunity for learners to gain experience in Engineering Six Sigma, Lean methods and also Quality. The Quality scope should include fundamentals of GMP (Good Manufacturing Practices) and GMP legislation.
- IX. Revisit the following modules placing a greater emphasis on control system integration, remote modules, field bus systems for distributed control and handling factory data for obtaining management information to allow for the implementation of efficient control strategies:
- | | |
|------------|---------------------------------------|
| ESIA H4019 | Process Instrumentation and Control 2 |
| ESIA H4020 | SCADA |
- X. Clarify transitional arrangements with regard to BN039 graduates progressing to the new NFQ level 8 add-on programme BN425 and the arrangements for the provision of supports for repeat students of the existing NFQ level 7 programme.
- XI. Include the phrase ‘subject matter expert’ in the graduate profile descriptor .
- XII. Make other technical and minor amendments as discussed at the panel meeting.

Minor award

As part of this validation process the panel also considered and approved the proposed changes to the minor award, BN742 Certificate in Industrial Automation.

Minor award detail as follows:

Institute code	Banner code	Title	NFQ level	ECTS credits
BN742	BN_EESIA_XIA	Certificate in Industrial Automation ¹	7	30

Module listing	Module codes
Programmable Logic Controllers 1	SECT H2022
Programmable Logic Controllers 2	SECT H3016
Programmable Logic Controllers 3	ESIA H4014
Fluid Power Systems	SECT H3020
Process Instrumentation and Control 1	SECT H3015
Process Instrumentation and Control 2	ESIA H4019

Panel signatures

Chair

Dr. Brendan McCormack _____ Date _____

Secretary

Dr. Diarmuid O'Callaghan _____ Date _____

¹ Minor award of the Bachelor of Science (Honours) in Energy Systems and Industrial Automation (BN122).