Validation Report

BN117

Bachelor of Engineering (Honours)
in Computer Engineering
in Mobile Systems

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 2MP01[I].

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

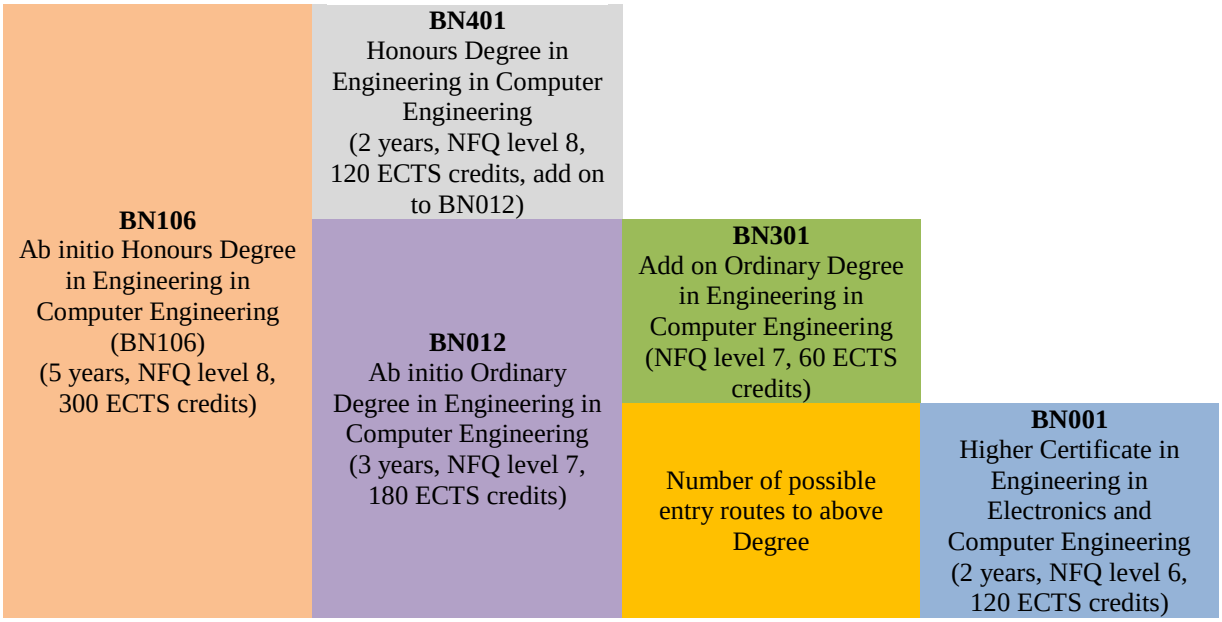
- Examining the competence, expertise and experience of staff in addition to the strategy of the department/school/Institute and government educational policy.
- Identified demand from existing third year learners and graduates of the current NFQ level 7 offering on computer engineering wishing to further upskill and progress to an honours degree.
- identifying through research and stakeholder consultation the need for and the preferred structure and characteristics of the proposed programme.

[I] 2MP01 Design, validation and accreditation of new academic programmes

Programme development

The School of Informatics and Engineering undertook a review of its programmes and activities during the academic year 2010/11 within which the computer engineering programmes currently available at NFQ levels 6 and 7 listed in 'Table1' below were assessed in areas such as student applications, throughput, assessment methodologies and progression opportunities. A thorough analysis of all modules, delivery methods and physical resources resulted in a number of change proposals being presented to an external peer-review expert panel. The overall recommendation of the panel was that all proposed changes to existing syllabi and recommendations made in the self-evaluation report produced in preparation for programmatic review are accepted and that all programmes be accredited for five years[I].

Table1: Existing structure of the suite of computer engineering programmes



Due to falling numbers of students enrolling on BN401 the Bachelor of Engineering (Honours) in Computer Engineering, NFQ level 8, two year add on to BN012 and issues that arose due to the changing nature of Engineers Ireland accreditation rules the Department of Engineering decided as part of programmatic review to discontinue this programme. In addition BN106 the Bachelor of Engineering (Honours) in Computer Engineering, NFQ level 8, five year ab initio programme comprising of BN012 (years 1-3) and BN401 (years 4-5) that was previously available has also been discontinued.

[I] Programmatic Review; School of Informatics & Engineering (Peer-review panel report), 9th December 2010.

'Table2' below illustrates the proposed new structure of the suite of computer engineering programmes. It is proposed to replace BN401, the two year NFQ level 8 add on, and BN106, the five year ab initio programmes with BN423 a new one year NFQ level 8 add on programme and associated four year NFQ level 8 ab initio programme (BN117).

Table2: Proposed structure for the new suite of computer engineering programmes

<table>
<tr><td rowspan="4">BN117

Ab initio Honours Degree in Engineering in Computer Engineering in Mobile Systems (BN117)
(4 years, NFQ level 8, 240 ECTS credits)</td><td colspan="3">BN423

Add on Honours Degree in Engineering in Computer Engineering in Mobile Systems
(1 year, NFQ level 8, 60 ECTS credits)</td></tr>
<tr><td rowspan="3">BN012

Ab initio Ordinary Degree in Engineering in Computer Engineering
(3 years, NFQ level 7, 180 ECTS credits)</td><td colspan="2">BN301

Add on Ordinary Degree in Engineering in Computer Engineering
(1 year, NFQ level 7, 60 ECTS credits)</td></tr>
<tr><td rowspan="2">Number of possible entry routes to above Degree</td><td rowspan="2">BN001

Higher Certificate in Engineering in Electronics and Computer Engineering
(2 years, NFQ level 6, 120 ECTS credits)</td></tr>
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Programme overview of BN423 (Year 4 of BN117)

Computer engineering has evolved as a discipline that involves the science and technology of design, construction, implementations, test and maintenance of software and hardware of modern computing systems, and computer controlled equipment. Computer engineering uses a basis in maths, computing, science and engineering to solve technical problems relating to computer hardware, software, networks and related systems. As computer based systems continue to become more pervasive and powerful (note the growth of smart phones for example), demand for computer engineering graduates will continue to grow. In tandem with this, there will be shifts in the body of knowledge and skills that such graduates should have, as new technologies become available and are developed for use in computing systems, with resultant novel applications.

On the basis of the research carried out with regard to the demand for computer engineering in Ireland, technology trends, and the structure and strengths of computer engineering education within ITB, the focus of the final year of this programme is on mobile systems. Technical course work will include computer architecture, algorithms, programming, software engineering, databases, networks, communications, web

technologies, circuit theory, digital logic, microelectronics, very large scale integration (VLSI), signal processing and embedded systems.

Modules and streams within BN423 (year 4 of BN117)

	Maths	Electronics	Software	Networks and Communications	Computer Architecture	Engineering Practice and Design	Support Stream
Year 4 Semester 7	Maths 7		Java and Algorithms	Mobile Internetworking Wireless Communication Systems	Embedded Operating Systems	4th Year Project	
Year 4 Semester 8		VLSI	Mobile Application Development		Applications of DSP	4th Year Project	Management Information Systems

Programme detail

Programme title	Bachelor of Engineering (Honours) in Computer Engineering in Mobile Systems
Award title	Bachelor of Engineering (Honours)
Award type	Major
Format	Ab initio
NFQ level	8
ECTS credits	240
Programme code	BN117
Banner code	BN_ECNG4_8

Embedded award

Institute code	Banner code	Title	NFQ level	ECTS credits	Format
BN423	BN_ ECNG4_B	Bachelor of Engineering (Honours) in Computer Engineering in Mobile Systems	8	60	Add on to BN012[l]

[l] Bachelor of Engineering in Computer Engineering, NFQ level 7, 3 years, 180 ECTS credits

Panel composition

Chair:	Dr. Barry O'Connor Cork Institute of Technology
Members:	Dr. Ronan Scaife Dublin City University
	Mr. James Wright ITT Dublin – Institute of Technology Tallaght
	Dr. Roisin Donnelly Dublin Institute of Technology
	Mr. Robert Colbert S3 Group
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 6th June 2012

Institute staff consulted during panel visit

Session I

Dr.	Larry McNutt	Head of School of Informatics & Engineering
Mr.	Richard Gallery	Head of Department of Engineering
Dr.	Catherine Deegan	Department of Engineering

Session II

Dr.	Larry McNutt	Dr.	Catherine Deegan
Mr.	Richard Gallery	Mr.	Benjamin Toland
Dr.	Barry Kirkpatrick	Mr.	Ivan Smyth
Mr.	Damian Cox	Mr.	Raymond Manley
Mr.	Paul Stacey	Dr.	Morris Rimbi
Dr.	Garret Brady	Dr.	Arnulf Horn
Mr.	Dave Carroll		

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.

Evidence of consultation

Through discussion with Institute staff, the panel explored the research/consultation effort undertaken with stakeholders to validate the need for, and the preferred structure and characteristics of the proposed programme. The panel, although satisfied with the overall consultation, was of the opinion that the industry consultation could have been more in-depth given the high level of industry within the Institute's immediate catchment area. The panel also encouraged the establishment of an industry advisory board to forge closer links with local industries and SMEs in the sector. See panel recommendation III.

Learner employment potential

It is envisaged that graduates of this NFQ level 8 programme will be able to work on the research, design, development, testing, implementation and maintenance of computer engineering systems, with an emphasis on mobile systems. Specific knowledge and skills areas include:

- Programming, including C, C++ (OO programming) Java, and assembly
- Real-time and embedded systems
- Mobile application development
- Communications and networks, with an emphasis on wireless and mobile systems
- DSP, VLSI, ECAD, digital and analogue electronics

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. The panel however, identified a skills shortfall within the networks and communication stream of the programme, as proposed, relating to network security and encryption and asked that this be addressed.The panel was also of the opinion that power management and consumption needed to be introduced to the curriculum of the electronics stream. See panel recommendation V.

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. However, the panel expressed concern at what initially appeared to be an element of confusion regarding the programme title as presented in the submission documents.

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.

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. The panel while supporting the use of problem based learning (PBL) as proposed felt that PBL activities and assessments needed to be formalised to ensure greater transparency and consistency across the programme as a whole. The panel also recommended that a uniform

[I] Qualifications (Education and Training) Act, 1999
[II] Higher Education and Training Awards Council

allocation of student workload be consistently applied to each 5 credit module. See panel recommendation II.

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 ITB'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. The panel while commending the inclusion of support workshops was of the opinion that the learning outcomes of same needed to be assessed for credit to ensure maximum learner participation. The panel was also of the opinion that the soft skills to which these workshops contribute should be assessed via specific learning outcomes in the project. See panel recommendation 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.

Access, transfer and progression

The panel following discussion 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 noted the absence of the programme entry requirements within the submission document. The panel asked that these be specified for both the ab initio and add on awards and that relevant recognition of prior learning (RPL) policies/provisions be specified also. See panel recommendation IV.

Documentation

The panel was of the opinion that the documentation as presented lacked detail in terms of staff curriculum vitaes and information on relevant research which it felt was important in assessing the academic and intellectual resources available to develop a level 8 programme. See panel recommendation IV

Decision of the panel

The panel recommended the approval of the four year ab initio Bachelor of Engineering (Honours) in Computer Engineering in Mobile Systems and the one year NFQ level 8 add on Bachelor of Engineering (Honours) in Computer Engineering in Mobile Systems.

Details of programmes validated include:

Institute code	Banner code	Title	NFQ level	ECTS credits	Format
BN117	BN_ ECNG4_8	Bachelor of Engineering (Honours) in Computer Engineering in Mobile Systems	8	240	Ab initio

Embedded awards

Institute code	Banner code	Title	NFQ level	ECTS credits	Format
BN423	BN_ ECNG4_B	Bachelor of Engineering (Honours) in Computer Engineering in Mobile Systems	8	60	Add on

Commendations

The panel commended the programme design team on their obvious enthusiasm, commitment and technical knowledge in an ever evolving area and their use of Coursebuilder in providing a detailed description of the module syllabi. The panel also commended the delivery of one online module per year of the programme as a positive initiative to further foster independent learning.

Panel recommendations

I. Revisit the terminology of both the programme and module learning outcomes as proposed within the submission document to ensure that they more accurately reflect the aims and objectives of this programme as a level 8 programme on the National Framework of Qualifications.

II. Consider formalising the problem based learning activities, the monitoring of same and related assessment events to ensure greater transparency and consistency across the programme as a whole. It is important that there be a uniform student workload per each 5 ECTS credit module.

III. Consider establishing an industry advisory board to support the final year projects, thus ensuring continued relevance of the programme content and to forge closer links with relevant industries, particularly SME's. Stakeholder engagement should be more structured and on-going.

IV. Revisit and update the submission document to include the following:

a) Curriculum vitae of staff

a) Active departmental related research

b) Programme entry requirements, including RPL, for both the ab initio and add on awards

c) Student support services available to learners

d) Detailed student effort providing clarity between required contact hours and independent learning

V. Review the curriculum to include the following:

a. Network security (including cryptology/cryptosecurity) within the 'Networks and Communications' stream

b. Power management and consumption within the 'Electronics' stream in Digital Design/VLSI.

VI. Assess the learning outcomes of the support workshops against identified project deliverables.

VII. Consider publishing additional information on departmental staff, resources and active departmental research on the ITB website.

VIII. Consider using an electronic submission pack for future panels and make other technical and minor amendments to the submission document as discussed at the panel meeting.

Panel signatures

Chair

Dr. Barry O'Connor _____ Date _____

Secretary

Dr. Diarmuid O'Callaghan _____ Date _____