

Validation Report



BN528

**Master of Science in Computing in
Applied Cyber Security**

BN529

**Master of Science in Computing in
Applied Data Science & Analytics**

BN530

**Master of Science in Computing in
Multimodal Human Language Technology**

**Department of Informatics
School of Informatics & Engineering**

Institute of Technology Blanchardstown

April 2016

Introduction

In 2006 the Institute 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.

The existing Master of Science in Computing (BN518, NFQ^{II} Level 9, 90 ECTS^{III} credits), delivered since 2008, consists of 6 taught 10 ECTS credit modules and a 30 ECTS credit research project with an exit award of Postgraduate Diploma in Science in Computing. Within this programme learners elected to follow one of three streams namely:

- Information Security & Digital Forensics
- Business Intelligence & Data Mining
- Software Engineering

Given the success and ever increasing demand for this programme the Department of Informatics proposed to revalidate BN518 as three separate Master of Science in Computing programmes namely:

BN528 Master of Science in Computing in Applied Cyber Security

BN529 Master of Science in Computing in Applied Data Science & Analytics

BN530 Master of Science in Computing in Multimodal Human Language Technology

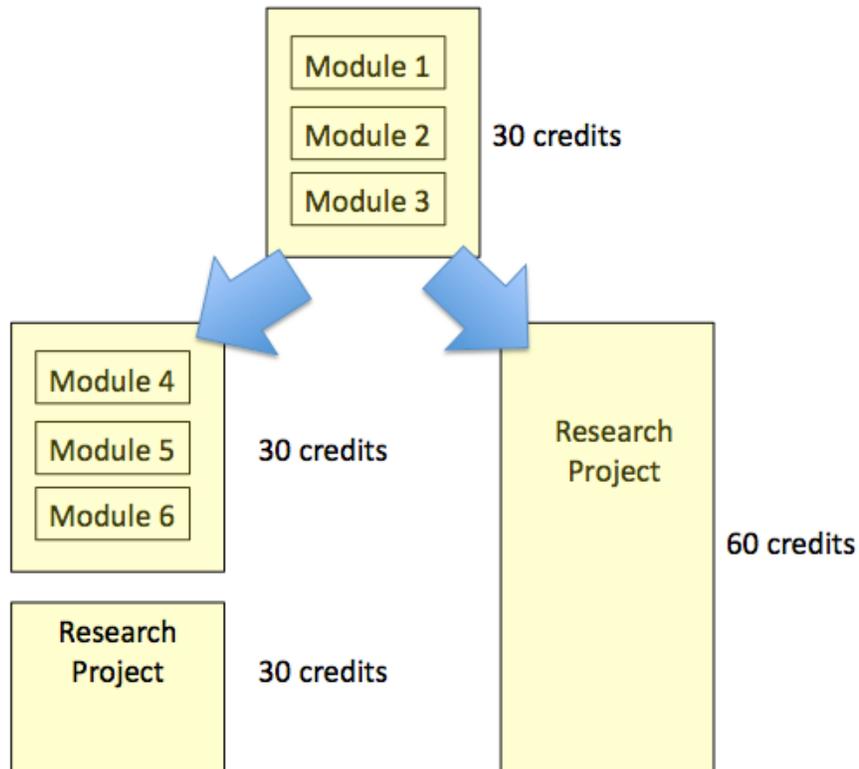
Each with exit awards of a Postgraduate Diploma in Science in Computing (60 ECTS credits) and a Level 9 Certificate in Science in Computing (30 ECTS credits)

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

^{II} National Framework of Qualifications

^{III} European Credit Transfer (and Accumulation) System

A further proposal offering learners on each of the new programmes (BN528, BN529 and BN530) the opportunity to take one of two pathways having successfully completed the first semester (30 ECTS credits) is illustrated in figure 1 below:



Pathway 1: 60 ECTS credits of taught modules with a 30 ECTS credit Research Project

Pathway 2: 30 ECTS credits of taught modules with a 60 ECTS credit Research Project

Programme overview

The emphasis of the three programmes is on a theoretical and practical approach in a modern working environment with the latest appropriate technology and techniques necessary for the cultivation of advanced analytics skills valuable to today's market place at the level appropriate for a Master of Science in Computing.

Master of Science in Computing in Applied Cyber Security

Today's society and business practices rely on digital information more now than at any time in the past for availability, integrity and confidentiality. Underlying these requirements are hardware, software and communication systems, the basic components of the digital information infrastructure, each with its own specific set of vulnerabilities that can affect the performance and integrity of the technological information systems.

This programme focuses on applied skills acquired through modules designed with the collaboration of industry and academia with the research component focusing on real-world business problems and is designed to produce highly knowledgeable and skilled graduates to counter the cyber security threat

Core modules include 'Network Security', 'Digital Forensics', 'Secure Communications & Cryptography' and 'Research Skills & Ethics'. Elective choice is provided to cater for professionals in the areas of networking, security and software engineering.

Master of Science in Computing in Applied Data Science & Analytics

Data analytics, the analysis of both large and small data sets, has become a fundamental source of valuable information derived from ever increasing volumes of structured and unstructured data. Data analytics applications cover a variety of organizations and industries, and remains mission critical for businesses as it turns information into an asset for deriving insight and making decisions.

Learners will acquire expert knowledge and understanding of advanced theoretical and practical knowledge and skills relevant to data science including recent developments; best practices in research and its applications in data analytics and data science; and the key stages of relevant research and development methodologies. Learners will evaluate and critically appraise data

science techniques with respect to business objectives, datasets and research questions applying a range of advanced data science techniques.

Core modules include 'Business Intelligence', 'Data Pre-Processing & Exploration', 'Data Mining Algorithms' and 'Data Science Applications' and 'Research Skills & Ethics'. Elective choice is provided in 'Text & Web Content Mining', Geospatial Data Mining & Knowledge Discovery', 'Programming for Big Data' and 'Statistics'.

Lectures are delivered using Adobe Connect online classroom environment which facilitates live delivery of lectures, VoIP for lectures and students, screen sharing, web cam, file sharing, breakout rooms for group discussions, whiteboard, question and answer session and other facilities. This, coupled with lecture recordings and other learning resources being made available through Moodle (our virtual learning environment) provides a truly flexible learning environment for all participants.

Master of Science in Computing in Multimodal Human Language Technology

The term Natural Language Processing (NLP) is as an engineering subdomain of computer science concerned with the building of products and solutions that treat human language through information technology. Recently the term NLP is giving way to the term Human Language Technology (HLT) as one that is more meaningful and useful to express the nature of this endeavour and the enterprise of providing solutions to do with the use, deployment and understanding of human languages in its widest sense through contemporary technology.

HLT has become an increasingly central component of computer science, as it has become increasingly prevalent in our lives through ubiquitous applications such as Internet search and information retrieval, speech technology, business intelligence and data mining. It requires knowledge of both computer science and linguistics, and often other related disciplines, but in particular, it requires an understanding of linguistics.

The emphasis of this programme is on current and leading paradigms in Multimodal Human Language Technology focussing on areas of software and language engineering that allow computer systems to understand human language and speech. Language engineering is the application of knowledge of written and spoken language to the development of software based information, information-retrieval, transaction, web services, agents, tools including machine translation technologies, web friendly mark-up languages including XML, and

communication systems so that they can recognise, understand, interpret, manipulate and generate human language.

Core modules include 'Natural Language Processing', 'Linguistics for Human Language Technology', 'Programming for Natural Language Processing' and 'Research Skills & Ethics'. Elective choice is provided for the following specific areas of expertise for professionals in:

- Avatars and intelligent agents
- Speech processing
- Machine translation
- Human language systems

Panel composition

Chair	Mr. David Denieffe Vice-President for Academic Affairs Institute of Technology Carlow
Academic experts	Mr. Tim Horgan Head of Department of Computing Cork Institute of Technology Dr. Ken Oakley Department of Information Technology Limerick Institute of Technology Dr. Joan Condell Computer Science Research Institute University of Ulster
Industry experts	Mr. Stephen Howell Microsoft Ms. Maria Hyland IBM Mr. Sheamus Causer Deutsche Bank
In attendance	Dr. Philip Owende Head of Department of Engineering IT Blanchardstown Mr. Michael Keane Quality Assurance Officer IT Blanchardstown
Date of Panel Meeting	Thursday 14 th April 2016

Consultation

Management consulted during the panel meeting:

Dr. Brian Nolan	Head of School of Informatics and Engineering
Dr. Anthony Keane	Head of Department of Informatics

Academic staff consulted during the panel meeting:

Dr. Geraldine Gray	Ms. Irene Murtagh
Dr. Markus Hofmann	Dr. Barry Kirkpatrick
Mr. Damian Cox	Dr. Christina Thorpe
Dr. Simon McLoughlin	Mr. Arnold Hensman
Mr. Mark Cummins	Mr. Robert Smith

Findings of the panel

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 found that a comprehensive research/consultation effort was undertaken with stakeholders to validate the need for, and the preferred structures, pathways and characteristics of the proposed programmes.

Learner employment potential

The panel was of the opinion that graduates would be of immediate value to industry and can look forward to an exciting range of career opportunities.

Protection of learners

Section 43 of the Act¹ 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 programmes.

¹ Qualifications (Education and Training) Act, 1999

Programme title and award title

Following discussion, the panel was satisfied that the titles of the proposed programmes are clear, accurate and fit for the purpose of informing prospective learners and other stakeholders and consistent with QQI award titles.

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 QQI 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 each of the individual programmes 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.

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 the programmes. The panel was informed of how the Institute'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 each of the proposed programmes.

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 the award of Master of Science.

Access, transfer and progression

The panel confirmed that the programme incorporates the established procedures for access, transfer and progression. The panel encouraged further development within each of the programmes to utilise the wealth of innovative modules to design and deliver minor awards and company specific training courses within the various speciality streams, see panel recommendations.

New pathway

The panel was very supportive of the proposed model (30 credits taught with a 60 credit research project) and commended the programme design team on what they found to be a responsive initiative to address identified industry needs and this model's alignment with the HEA strategy on structured postgraduate study. In relation to the assessment of the 60 credit research project module the panel was of the opinion that the assessment process as applied to the traditional research masters be replicated, see panel recommendations. Also the panel noted the opportunity this research project could provide in relation to the volume of published peer reviewed articles.

Decision of the panel

The panel recommended the validation of the proposed programmes and associated exit awards namely:

Programme title	Master of Science in Computing in Applied Cyber Security
Programme code	BN528
Award title	Master of Science
NFQ level	9 (90 ECTS credits)
Exit awards	Postgraduate Diploma in Science in Computing in Applied Cyber Security (BN532) Minor award: Level 9 Certificate in Science in Computing in Applied Cyber Security (BN534)

Programme title	Master of Science in Computing in Applied Data Science & Analytics
Programme code	BN529
Award title	Master of Science
NFQ level	9 (90 ECTS credits)
Exit awards	Postgraduate Diploma in Science in Computing in Applied Data Science & Analytics (BN531) Minor award: Level 9 Certificate in Science in Computing in Applied Data Science & Analytics (BN535)

Programme title	Master of Science in Computing in Multimodal Human Language Technology
Programme code	BN530
Award title	Master of Science
NFQ level	9 (90 ECTS credits)
Exit awards	Postgraduate Diploma in Science in Computing in Multimodal Human Language Technology (BN533) Minor award: Level 9 Certificate in Science in Computing in Multimodal Human Language Technology (BN536)

Conditions of validation

This validation is subject to the following conditions:

1. Entry requirements.

Revise and clearly articulate the entry requirements for each individual programme.

2. Module learning outcomes.

Revise the module learning outcomes within each of the programmes to providing a consistency in relation to volume with terminology appropriate for a NFQ level 9 programme, and clearly outline the assessment events and linkages to the attainment of the learning outcomes and reassessment opportunities as appropriate.

Panel recommendations

In the light of continuous improvement the panel offered the following recommendations:

➤ 60 credit research project

Encourage publication based on research completed as part of the 60 credit research project.

Replicate the quality assurance and assessment process as exists and is applied to traditional research masters.

➤ Module descriptors and learning outcomes

Make research skills, ethical considerations and transferrable skills more explicit within the module descriptors across the three programmes.

Remove any technology specific references within module learning outcomes.

➤ Opportunities for further programme development

Encourage further development within each of the programmes to utilise the wealth of innovative modules to design and deliver minor awards and company specific training courses within the various speciality streams.

➤ Applied Data Science & Analytics programme

Explicitly illustrate how visualisation and the mathematical and statistical elements are entrenched across the mandatory modules. Also, consider changing the status of the elective statistics module to mandatory and introducing a dedicated module on visualisation.

Reconsider module titles containing the word 'mining' as the panel was of the opinion that there was an over reliance on same.

➤ Applied Cyber Security programme

Reconsider the title and inclusion of cloud security within the 'Business Continuity' module.

- Multimodal Human Language Technology programme
Revise the module descriptor and assessment events of the 'Avatar Technology' module.
- Make other technical and minor amendments as discussed at the panel meeting.

Additional proposal considered by the panel

The programme BN031 'Higher Certificate in Science in Computing – Associate Professional in Networking Technologies' (NFQ level 6 – 120 ECTS credits) was validated in June 2014. In the intervening period since the validation of this programme the term 'Associate Professional' has become established in the Further Education sector at levels 5 & 6 with courses delivered by the ETBI (Education and Training Boards Ireland) and Solas. Staff within the Department of Informatics are of the opinion that the 'Associate Professional' term could lead to confusion and be misleading to prospective students thus have proposed that the words 'Associate Professional' be removed from the programme title. The new programme title as proposed to the panel is 'Higher Certificate in Science in Computing in Networking Technologies'. The panel having considered this proposal recommend to the Academic Council of the Institute that this proposal be accepted.

Panel signatures

Chair

Mr. David Denieffe _____ Date _____

Secretary

Dr. Philip Owende _____ Date _____