

Validation Report



BN306

**Bachelor of Engineering
In Mechatronics**

Introduction

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 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 it's staff in addition to the strategy of the department/school/Institute and government educational policy
- identifying through research the need for and the preferred structure and characteristics of the proposed programme

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

Programme overview

The Bachelor of Engineering in Mechatronics is a two year part-time conversion programme. This programme is targeted towards those working in related industry who have already achieved the award of Higher Certificate in Engineering (Electronics/Manufacturing) or a NFQ^I level 6 equivalent, who wish to upskill to an Ordinary Degree in Mechatronics, NFQ level 7.

Mechatronics is the synergistic combination of mechanical engineering, electronic engineering and software engineering. The purpose of this interdisciplinary engineering field is the study of automata from an engineering perspective and serves the purposes of controlling advanced hybrid systems. The word itself is a portmanteau of 'Mechanics' and 'Electronics'.

To provide a comprehensive coverage of the fundamental concepts, knowledge and supporting practical skills the academic content of this programme has been structured into the following six key areas:

- Electronic-specific Technologies
- Mechanics and Materials
- Information Technology
- Design and Development
- Mathematics
- Engineering Support of Mechatronics

The Engineering Support stream comprises of physics/engineering science, personal development, engineering drawing, ECAD^{II} and quality systems.

There is a strong emphasis within the syllabus on quality, testing and maintenance issues in a manufacturing environment in which automation plays a significant role.

The programme will be delivered online as a part-time programme with students expected to attend the IT Blanchardstown campus one Saturday morning in three, allowing them to complete a range of laboratory and tutorial sessions while also giving them time to interact with staff and meet their peers.

This programme is intended to consolidate and integrate both practical and analytical skills with knowledge previously gained to make a graduate of this programme of immediate value to industry.

^I National Framework of Qualifications

^{II} Electronic Computer Aided Design

Programme detail

Programme title	Bachelor of Engineering in Mechatronics
Award title	Bachelor of Engineering
Award type	Major – Add on
NFQ^I level	7
ECTS^{II} credits	60
Programme code	BN306
Banner code	BN_EMECC_D

Panel members

Chairperson	Dr. Annie Doona Dun Laoghaire Institute of Art, Design and Technology
Panel member 1	Dr. Pat Phelan University of Limerick
Panel member 2	Mr. Matt Cotterell Cork Institute of Technology
Panel member 3	Mr. Mark Pentony Hewlett-Packard
In attendance	Dr. Diarmuid O'Callaghan IT Blanchardstown Mr. Michael Keane IT Blanchardstown
Date of Panel Meeting	Friday 25 th April 2008

^I National Framework of Qualifications

^{II} European Credit Transfer and Accumulation System

Institute staff present

Session I Meeting with Director, Head of School & Head of Department

Dr. Mary Meaney	Director
Mr. Larry McNutt	Head of School of Informatics & Engineering
Mr. Richard Gallery	Head of Department of Engineering

Session II Head of School, Head of Department & Programme Leader(s)

Mr. Larry McNutt	Head of School of Informatics & Engineering
Mr. Richard Gallery	Head of Department of Engineering
Mr. Niall Campbell	Department of Engineering

Session III Meeting with programme design staff

Mr. Larry McNutt	Mr. Niall Campbell
Mr. Richard Gallery	Dr. Darren Lavelle
Mr. Cormac MacMahon	Mr. Daniel McSweeney
Mr. Raymond Manley	Mr. Derek Kerr
Mr. Fergus Maughan	Mr. John Massey
Mr. Niall Bell	

Panel findings

Section I

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 effort was undertaken to validate the need for, and the preferred structure and characteristics of the proposed programme.

Feedback from the following companies was presented to the panel:

- IBM
- Cully Automation
- Gerrard Laboratories

Rationale

IT Blanchardstown recognises that Mechatronics education in Ireland is a crucial contributor to the continued competitiveness of the high technology sector of the Irish economy and that the associated skills set is in demand by both national and international companies who require personnel with mechatronics expertise to help ensure that the products they manufacture are up-to-date and can be produced economically.

IT Blanchardstown also recognises that a large pool of students exist, working in local, related industry who have already achieved the award of Higher Certificate in Engineering (Electronics/Manufacturing) or a NFQ level 6 equivalent, who wish to upskill to an Ordinary Degree in Mechatronics, NFQ level 7.

Learner employment potential

Mechatronics is a field with a future, exciting career opportunities and a huge range of applications. Mechatronic systems are at the forefront of technological developments. Transport, healthcare, service, automotive and entertainment and just a few of the sectors that are benefiting from developments in Mechatronics. These sectors are looking for graduates that have a broader engineering background including Electronic and Mechanical and IT skills.

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 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.

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.

¹ Qualifications (Education and Training) Act, 1999

^{II} Higher Education and Training Awards Council

Section II

In evaluating this programme the following specific aspects have been considered and are hereby reported upon:

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. Evidence of a clear dialogue was confirmed, enabling learners to develop and have available to them the support of academic staff.

In a presentation given by the e-learning co-ordinator the panel learned that IT Blanchardstown possesses a broad range of knowledge and expertise in the area of learner support and course delivery technologies. A demonstration was also given of ITB's online classroom tool facilitating the delivery of online lectures and meetings. The panel also heard how this will be the Institute's first programme aiming to deliver live lecture content to distance students using the internet. The panel commended the interdepartmental co-operation, effort and professionalism of the design team on this new initiative.

A tour of the facilities included a fully operational Manufacturing Technology Workshop used for teaching and the demonstration of engineering production techniques in addition to nine laboratory facilities dedicated to engineering science and electronic and computer engineering elements of mechatronic programmes.

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 was satisfied with the proposed resource plan for the necessary staffing levels and were suitably impressed with the qualifications, experience, competence and commended the obvious enthusiasm of the staff concerned.

Minimum entry requirements

It was noted by the panel that this programme is primarily targeted towards students with a Higher Certificate in a discipline other than mechatronics. The panel felt that entry requirements for the various potential cohorts of applicants for admission to the programme required further clarification.

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. The panel heard how IT Blanchardstown's policy on continuous assessment is based on the objective of developing/enhancing the students' application of knowledge, aptitude for critical analysis and problem solving within specific timeframes. Assessment procedures include a combination of tests, assignments, reports, projects, presentations and seminars. The panel also heard how online assessment would also be used. The scale of learner assessment was deemed by the panel to be appropriate for the proposed programme.

Standards of knowledge, skill and competence

The panel felt having reviewed the syllabi and assessment methods 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 while accommodating a variety of access and entry requirements from applicants with expertise in related disciplines.

Decision of the panel

The panel recommended the validation of the proposed programme namely:

Programme title	Bachelor of Engineering in Mechatronics
Award title	Bachelor of Engineering
Award type	Major – Add on
NFQ level	7
ECTS credits	60
Programme code	BN306
Banner code	BN_EMECC_D

Panel conditions

This validation is subject to the following condition:

To allay any confusion that may arise during admission to the programme the panel has requested that the minimum entry requirements be clearly articulated for each of the different potential cohorts of students specifying any necessary bridging modules as appropriate. This is to include:

- Type and level of award of previous appropriate qualifications
- Essential skill sets required clearly defined as a pre-requisite
- Protocol for determining chosen elective in Semester 1

Panel recommendations

The following specific recommendations were made:

- 1) Review the content and terminology of the learning outcomes to ensure consistency and equity throughout the submission document. The panel also felt that the following needed to be made more explicit in the learning outcomes:
 - Communication skills
 - Ethical and professional practices
- 2) Consider the inclusion of energy and environmental control in the programme content.
- 3) Stipulate access to laboratory resources and required software for the on-line learner.
- 4) Consider removing the “Fluid Power System” module, defining same as a pre-entry bridging module and re-assigning the 5 credits possibly to the project or include an “Industrial Engineering” module in its place.
- 5) Consider the equity of credits between this programme and other programmes with regard to the work load involved in the completion of the project and the learning outcomes to be gained.
- 6) Update and standardise bibliographies with additional inclusion of online resources.
- 7) Review the module syllabi to ensure that no pre-requisites exist between sequential odd and even semesters.
- 8) Make other technical and minor amendments as discussed at the panel meeting.

Panel observations

The panel commended and congratulated the design team on this initiative to identify, address and respond to industry needs both locally and nationally. They 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 also commended the willingness of Institute staff present to engage in open and frank dialog through which their obvious enthusiasm for the new programme became evident.

Panel signatures

Chairperson

Dr. Annie Doona _____ Date _____

Secretary

Dr. Diarmuid O'Callaghan _____ Date _____