Panel Report   Phase 2, Programmatic Review of Schools of Engineering,
School   School of Mechanical, Electrical and Process Engineering
Department   Department of Electrical & Electronic Engineering
Date   29 – 30 April 2014

Programmes Submitted for Review
The following programmes, validated in the previous Engineering Programmatic Review of 2007-08, are presented for re-validation:

<u>Major Awards:</u>

Higher Certificate in Engineering in Electrical Engineering
Bachelor of Engineering in Electrical Engineering
Bachelor of Engineering (Honours) in Electrical Power Systems

Higher Certificate in Engineering in Electronic Engineering
Bachelor of Engineering in Electronic Engineering
Bachelor of Engineering (Honours) in Electronic Systems Engineering,

Postgraduate Diploma in Telecommunications Engineering
Master of Engineering in Telecommunications Engineering

Postgraduate Diploma in Embedded Systems Engineering
Master of Engineering in Embedded Systems Engineering

<u>Special Purpose / Minor Awards:</u>

NFQ 9   Certificate in Embedded Systems Engineering

Department of Electrical & Electronic Engineering Sub-Panel

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Mr Joe Buckley
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Sara McEvoy
David Griffin
Electronic:
Valerie Moloney
Cian Barry
Ronan Looney
John Loftus

Graduate Representatives
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Electronics:
Michael Coade
Ian Martin
Colin Leslie
Julien Pastel

Employer Representatives
Noel Meehan, Automated Systems & Controls (ASC) Ltd.
Brian Lee, Apple
Tony O'Connell, Analog
Michael Radley, CDGA Engineering Consultants
Eddie Leahy, PM Group
John Loughnane, Philips 666 (Whitegate Refinery)

Overall Recommendation on Revalidation

The Panel recommends continuing validation of the

> Higher Certificate in Engineering in Electrical Engineering
> Bachelor of Engineering in Electrical Engineering
> Bachelor of Engineering (Honours) in Electrical Engineering*
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> Higher Certificate in Engineering in Electronic Engineering
> Bachelor of Engineering in Electronic Engineering
> Bachelor of Engineering (Honours) in Electronic Engineering*
>
> Postgraduate Diploma in Telecommunications Engineering
> Master of Engineering in Telecommunications Engineering
>
> Postgraduate Diploma in Embedded Systems Engineering
> Master of Engineering in Embedded Systems Engineering
>
> NFQ 9   Certificate in Embedded Systems Engineering

*proposed programme title change

for a further period of five years, subject to the implementation of all requirements and ensuring the earliest possible implementation of the recommendations set out below.

Background

The Department of Electrical & Electronic Engineering comprises 27 whole-time academic staff, supplemented by staff from other departments as necessary. There are currently 256 full-time and part time students engaged in a range of programmes.

The Department focuses on undergraduate and postgraduate education in the areas of electrical and electronic engineering. Research activity within the Department is primarily based in the NIMBUS Centre for Embedded Systems Research which co-hosts the Technologies for Embedded Computing (TEC) gateway, www.nimbus.cit.ie. NIMBUS undertakes significant research and development activity within the discipline areas of electrical and electronic engineering. Nimbus personnel contribute significantly to the evolution of programmes within the Department of Electrical &Electronic Engineering. Research graduates number approximately 15 at masters level and 20 at PhD level since 2007.

Proposed Programme Changes

Higher Certificate in Engineering in Electrical Engineering
Bachelor of Engineering in Electrical Engineering

<u>Year 1:</u>	New modules:	Electrical Applications 1 (M), Electrical Applications (E)
	Modules Removed:	Computer Applications (ELEC6012) (M), Installation Practicals (ELEC6009) (E)
<u>Year 2:</u>	New modules:	Microcomputer Applications (M)
	Modules Removed:	Environment, Ethics & Elec. Eng (ELEC6020) (M),
	Module Swap:	MATH6041 (M) replaces MATH6042 (M)
<u>Year 3:</u>	New Modules:	Energy Systems and Sustainability (M), Power Modelling & Control (M), Plant Automation (M)
	Modules Removed:	Project modules, ELEC7004 and ELEC7005, Sustainable Electrical Systems (ELEC7016) (E), Energy Management (ELEC7008) (E)
	Module Status:	Advanced Computer Applications (ELEC7001) (E) becomes mandatory.

The Department undertook an analysis of progression rates of students based on their performance in Leaving Certificate mathematics. During the period 2007-2012, of the 36 students who were actively enrolled on the programme with a D grade in Ordinary Level Mathematics, 19 presented a full set of module marks at the end-of-year progression board with 11 progressing, with or without credit deficit, into the second stage within one year of enrolment.

Higher Certificate in Engineering in Electronic Engineering
Bachelor of Engineering in Electronic Engineering

<u>Year 1</u>	Module Swap:	MATH6045 replaces MATH6046
<u>Year 2:</u>	New Module:	Electronic Syst. Programming 'C' (M)
	Module Removed:	Project Engineering (ELTR6018) is removed and an extra hour given to Electronic Project (ELTR6015).
	Module Moved:	Firmware Development (INTR7003)
	Module Renamed:	Digital Principles (ELTR6014) to Digital Electronics
<u>Year 3:</u>	New Module:	Maths for Digital Systems (MATH7011)
	Module Removed:	Electronic Project (ELTR7013)

The Department undertook an analysis of progression rates of students based on their performance in Leaving Certificate mathematics. It was noteworthy that during the period 2007-2012 of the 33 students who were actively enrolled on the programme with a D grade in Ordinary Level Mathematics, 8 presented a full set of module marks at the end-of-year progression board and only 4 progressed, with or without credit deficit, into the second stage within one year of enrolment.

Bachelor of Engineering (Honours) in Electrical Power Systems

The Department proposes to
1) Change the title of the programme to:
   Bachelor of Engineering (Honours) in Electrical Engineering.
2) Move the free choice elective slot from semester 7 to semester 8.
3) Reduce the number of differentiated modules from 6 to 3.
4) Introduce the following module and programme changes:

Year 1   As for Bachelor of Engineering in Electrical Engineering

Year 2:   As for Bachelor of Engineering in Electrical Engineering
          Differentiation removed: ELEC6015 replaces ELEC6029

Year 3:   As for Bachelor of Engineering in Electrical Engineering
          Differentiation removed: ELEC7006 replaces ELEC7017

Year 4:   Module Status: SCADA & Industrial Networks (ELEC8014) becomes mandatory
                            Electrical Switchgear (ELEC8007) becomes mandatory.
                            Managing Electrical Projects (ELEC8010) becomes mandatory.
                            Power Systems and Machines (ELEC8011) becomes mandatory.

Bachelor of Engineering (Honours) in Electronic Systems Engineering

The Department proposes to

1) Change the title of the programme to:
   Bachelor of Engineering (Honours) in Electronic Engineering
2) Move the free choice elective slot moves from semester 7 to semester 8.
3) Reduce the number of differentiated modules from 6 to 3.
4) Introduce the following module and programme changes:

Year 1:   As for Bachelor of Engineering in Electronic Engineering

Year 2:   As for Bachelor of Engineering in Electronic Engineering
          Differentiation removed: ELTR6015 replaces ELTR6020

Year 3:   As for Bachelor of Engineering in Electronic Engineering
          Differentiation removed: ELTR7019 replaces ELTR7029

Year 4:   New modules: Project Development, Project Realisation
          Module Status: Object Oriented Design for Electronics (ELTR8018) becomes elective
          Module Removed: Discrete Time Maths TM425 (MATH8002)

Postgraduate Diploma in Embedded Systems Engineering
Master of Engineering in Embedded Systems Engineering

No programme-level changes proposed. Module descriptors updated.

Postgraduate Diploma in Telecommunications Engineering
Master of Engineering in Telecommunications Engineering

Legacy programmes with no enrolments for some time. One remaining student enrolled who is expected to graduate shortly. No programme or module updates proposed.

NFQ 9   Special Purpose Award   Certificate in Embedded Systems Engineering

This programme has not been offered as of yet. No programme-level changes proposed. Module descriptors updated.

Commendations

The panel commends the Department for the quality of the documentation provided in advance of the review and their engagement with the panel over the course of the visit. In our interactions with students, graduates and employers, the programmes and staff of the Department were universally praised. In particular, students welcomed the use of Blackboard by lecturing staff.

Requirements

1) The panel feels that a capstone project is an essential element for an undergraduate engineering degree. It therefore asks that the Department introduces a capstone project into the award year of the Bachelor of Engineering in Electrical Engineering.
2) The panel requests that the Department should look at enhancing ties with industry through projects/placement/site visits and inclusion of guest speakers.
3) The panel requests that the Department complete the internal quality assurance in regard to module descriptors and programme schedules.

Recommendations

The panel recommends to the Department the following:

1) The Department should look to develop a common first year on the Bachelor of Engineering in Electrical Engineering and Bachelor of Engineering in Electronic Engineering. The experience in other Higher Education Institutions is that this has been of benefit both in terms of student recruitment and programme efficiency.
2) The Department would actively pursue accreditation for its Honours degree programmes.
3) The Department would introduce Arduino or a similar programming platform into the first year of its programmes to enhance the programming stream of modules.
4) Arising from analysis undertaken by the Department in relation to the progression of students with low Leaving Certificate mathematics grades, the Department should review the entry requirements of its programmes.
5) The Department may wish to consider the introduction on a Project Management module into its programmes.