



UNIVERSITY of LIMERICK

OLLSCOIL LUIMNIGH

Quality Review of the **Department of Electronic and Computer Engineering**

The University of Limerick (UL), follows an established process for Quality Assurance (QA) and Quality Improvement (QI) in line with that developed jointly by IUA and IUQB. This involves a seven-year cycle during which all Departments work to improve the quality of their programmes and services, undergo a rigorous self-evaluation prior to a quality review by internationally recognised experts in the field.

The process itself evolved as a result of the Universities Act, 1997 in which the responsibility for QA/QI was placed directly with the individual universities. The UL Quality Support Unit (QSU) web site provides an elaboration of this process and the state of progress.

The broader picture is described in the publication *A Framework for Quality in Irish Universities* which can be downloaded from the IUQB web site: <http://www.iuqb.ie/>

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Department Web Site	http://www.ece.ul.ie/
QQI Web Site	www.qqi.ie
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1.0 Background

1.1 Legislative Framework

The University of Limerick, in common with all the universities in the Republic of Ireland, fell within the Universities Act, 1997 until recently. This Act specified the responsibilities of universities in Ireland for Quality Improvement and Quality Assurance. Section 12 stipulates that, 'The objects of a university shall include - ... to promote the highest standards in, and quality of, teaching and research'.

Section 35 (1) of the Act further required that each university Governing Authority 'shall...require the university to establish procedures for quality assurance aimed at improving the quality of education and related services provided by the university'. The Act provides a framework for the universities to develop their quality processes. Section 35 requires each university to review the quality of the work of all faculty, academic Departments and service (including administrative) Departments on a ten-year cycle. In particular 'The procedures shall include ... assessment by those, including students, availing of the teaching, research and other services provided by the university'.

Although each university is free to develop its own procedures in fulfilling its obligations under the Act, close co-operation has been achieved through the co-ordinating role of the Irish Universities Association Quality Committee, (IUAQC). Accordingly, the universities have developed a framework comprising a set of common principles and operating guidelines for quality improvement and quality assurance. These principles and guidelines have been integrated into each of the universities procedures, which ensure coherence through the university system, while maintaining the autonomy of each university and its individual institutional culture.

In late 2012 the Qualifications and Quality Assurance (Education and Training) Act 2012 superseded the Universities Act 1997 in respect of quality assurance matters in the universities and the IUQB was subsumed into the new Quality and Qualifications Ireland agency. There is a consultative process, started during 2013, and it will be some time before changes to QA and QI practice are reflected in the universities.

1.2 The IUQB / QQI

The Governing Authorities of the seven Irish universities established the Irish Universities Quality Board (IUQB) in February 2003. This board comprises representatives of the Conference of Heads of Irish Universities (CHIU) and a number of external members.

The aims of the IUQB were:

- To increase the level of inter-university cooperation in developing Quality Assurance processes
- To represent the Irish universities nationally and internationally on issues relating to quality assurance and quality improvement
- To articulate, on behalf of the Governing Authorities of the universities, the resource implications of recommendations for quality improvement.

The IUQB subsumed the roles and functions formerly carried out by the IUQSC (Irish Universities Quality Steering Committee) and has since been subsumed into Quality and Qualifications Ireland (QQI). More detail is available at www.qqi.ie

1.3 The Quality Review Process

The common framework adopted by the Irish universities for their Quality Assurance/Quality Improvement systems consistent with both the legislative requirement of the Universities Act 1997 and international good practice comprise the following stages:

1. Preparation of a self-assessment report by the unit taking into account feedback from students and customers.
2. Quality (Peer) Review involving external experts, both nationally and internationally, who have visited the Department, met the students and studied the Self-Assessment.
3. Quality Review Report, made publicly available by the Governing Authority of the university, incorporating the reactions and quality improvement plans of the Division and University.
4. Continuing improvement through implementation within the resources available to the university.

More detail is available at www.ul.ie/quality

1.4 Management of Quality in the University

The Vice President Academic and Registrar has overall responsibility for implementation of Quality Assurance/Quality Improvement policy and implementation at the University of Limerick. Implementation is carried out by the Director of Quality. The planned schedule of Quality Review of both academic and support departments was commenced in the year 2000, with the first full cycle of units within the University being reviewed within a seven-year cycle.

Academic departments are reviewed against international standards as described in the document “A Guide to the Quality Review Process for Academic Departments”, which is available on the UL website at www.ul.ie/quality.

In 2006, the university decided to implement a bespoke quality management system (QMS) and developed a suitable template with the assistance of external quality experts. This system is described in the document “Quality Management Systems – Standard Framework for Support Departments”.

More detail is available at www.ul.ie/quality

2.0 The Department of Electronic and Computer Engineering

The Department of Electronic and Computer Engineering has a mission to advance knowledge and practice in disciplines related to electronic and computer engineering through high-quality teaching, research and service to the university and the wider community.

The Department of Electronic and Computer Engineering has 21 full-time academic staff, 17 research staff, nine technical staff and 1.5 administrative staff. The department has 58 full-time research students, 51 of whom are PhD students and seven of whom are research master's students.

The undergraduate programmes for which the department is responsible are: BE in Electronic and Computer Engineering, BSc in Electronics and BSc in Mobile Communications and Security. The following postgraduate taught programmes are offered by the department: MEng in Computer and Communications Systems (full time/part time), MEng in Information and Network Security, MEng in VLSI Systems (full time/part time), Grad Dip/MEng in Computer Engineering, HDip in Mobile and Secure Cloud Computing and HDip in Software Development for Middleware Integration.

The Department of Electronic and Computer Engineering has created extensive linkages with Irish and multinational companies, international academic institutions and research funding agencies. These linkages have helped to create a stimulating learning environment for the department's undergraduate and postgraduate students. The department's diverse and multidisciplinary research activities cover many aspects of ICT, engineering and science, that extends well beyond the traditional boundaries of electronic and computer engineering.

3.0 The Follow-up Process

The Quality Review process occurs on an approximately seven-year cycle at the University of Limerick. An average of five academic Departments are reviewed annually. Once the Peer Review Group report is finalised, the Department concerned immediately sets about planning its response to the issues raised therein.

The self-evaluation process is intended to be a reflective exercise in which a Department/Division should identify many of its strengths and weaknesses and develop plans to strengthen and grow as appropriate. Quite often, the Peer Review Group (PRG) will reinforce these issues and may identify areas of concern that were overlooked. In many cases, the PRG will also highlight the strengths of the Department and encourage faculty and staff to take advantage of these.

After the department and the university have been given time to respond to the issues raised; the Peer Review Group's report will be made available to the wider community through the University's web site. Normally, the report is available within the University less than four weeks after the PRG visit. Responses and plans for action are incorporated into the report and are subject to the approval of the University's Governing Authority Strategic Planning and Quality Assurance Committee. Presentation to the committee usually follows within six months of the PRG visit. The Governing Authority will publish the Peer Review report, including reactions and plans, following approval.

It is expected that a review of progress in implementing recommendations and investigating issues raised would occur quarterly for the two years following the Peer Review Visit. Progress Reports will be published as deemed appropriate.

Date	Action
immediately	Department is issued with Peer Review Group report and required to prepare reactions and plans for Quality Improvement as appropriate. The report is circulated to all members of Management Committee for comment.
Within 3 weeks	PRG Report, incorporating reactions, is presented to UL Executive Committee for discussion, as appropriate.
+ 2 months	Reactions and plans incorporated into the Quality Improvement Action Plan and circulated to GA Strategic Planning and Quality Assurance committee. PRG Report with Responses and Quality Improvement Action Plan are tabled at GA-SPQAC meeting for discussion.
+ 1 year	Head of Department, Dean, Vice-President Academic & Registrar and Director of Quality discuss progress with resolution of recommendations and outstanding items are referred to Executive Committee, Academic Council and/or Governing Authority as appropriate.

4.0 Preliminary Comments of the Peer Review Group (PRG)

The Peer Review Group (PRG) appreciates the welcome extended to it by Professor Paul McCutcheon, his introduction to the University of Limerick (UL), and his identification of the institutional context and purpose of the PRG's review of the Department of Electronic and Computer Engineering (ECE).

The members of the PRG also wish to thank the ECE staff for their hospitable reception and willing cooperation throughout the review process.

ECE is commended for its thorough self-assessment report (SAR) prepared by the ECE Quality Team led by Dr Donal Heffernan, with input from members of the department including student input.

The PRG appreciated the prompt provision of the supplementary information it requested, and the frank and informative participation of members of the department in their several meetings with the PRG.

The PRG recognises ECE's vibrant multidisciplinary research culture, its publication record, connections with industry, patent activity, continued development of research, outreach activities and forward-looking initiatives.

Despite the considerable pressures imposed by financial stringency, staffing restrictions, severe staffing attrition at senior level and the perceived lack of recognition of ECE's current role and potential contributions, the PRG notes the department's continued commitment to a vibrant teaching culture, research agenda and student experience.

5.0 The Report of the Peer Review Group

5.1 Mission

Commendations

The PRG commends the following:

- 5.1.1 The clear, focused and simple ECE mission which is aligned to and supports the UL mission, clearly stating the field of knowledge of the department and its commitment to teaching, research and service to the university and the wider community.

- 5.1.2 The ambition of ECE to be relevant at an international level in ICT-related disciplines in both teaching and learning.

- 5.1.3 The SWOT analysis and strategic planning sessions which began in June 2013 with the participation of members of the department, resulting in the formulation of a three-year quality improvement plan (2015/16-2017/18).

- 5.1.4 The significant increase in numbers of overseas students at the postgraduate level.

- 5.1.5 The growing relationship between ECE and the ICT industry, especially in the local region.

Recommendations

The PRG recommends the following:

- 5.1.6 Adopt the current ECE mission (2011-2015) and deploy it through defined goals, objectives and actions.

- 5.1.7 Implement the mission through a defined time plan and milestones.

- 5.1.8 Ensure annual monitoring and review by the HoD and faculty dean of the planned implementation and take the necessary measures to address any shortfall.

- 5.1.9 The resources assigned to the department must be adequate to enable the ECE vision and strategy.

- 5.1.10 Design a plan to increase the number of engineering students coming into the university, while maintaining excellence in quality.

- 5.1.11 Pay particular attention to addressing the current gender imbalance in the ECE student cohort.

- 5.1.12 At university level, take a more aggressive approach to actively marketing ECE programmes both nationally and internationally.

- 5.1.13 At university level, work with secondary schools to change the current perception of engineering by illustrating the growing value of the ICT engineering discipline to society.

5.2 Design and Content of Curriculum

Commendations

The PRG commends the following:

- 5.2.1 The rationalisation of course offerings and related course modules to enable delivery of a tighter, more effective curriculum.

- 5.2.2 The adaptation of the BE offering to integrate it effectively with the BE Engineering Choice programme.

- 5.2.3 The use of Engineers' Ireland learning outcomes in analysing all modules offered.

- 5.2.4 The ongoing integration of emerging ICT topics into the ECE programmes.

Recommendations

The PRG recommends the following:

- 5.2.5 Influence the relevant entry requirements to ICT programmes across the university to assist in aligning student ability with programme requirements.

- 5.2.6 Brand the BSc offerings as BSc ICT to more accurately reflect their content and purpose.

- 5.2.7 Ensure consistency in the way all ECE module-related materials are stored and made accessible to the student body.

- 5.2.8 Develop a competency map for ECE which is aligned to the departmental strategic plan and supported by the ECE development and recruitment programme.

- 5.2.9 Develop a fully implementable approach to a Year 5 addition and actively evaluate the potential of an additional co-op period as part of this.

- 5.2.10 Develop a support programme to assist students in addressing an identified shortcoming in thesis preparation.

- 5.2.11 Develop a programme on the important subject of the Internet of Things (IoT) in collaboration with other relevant departments such as the Department of Computer Science and Information Systems (CSIS).

5.3 Teaching, Learning and Assessment

Commendations

The PRG commends the following:

- 5.3.1 The design of ECE programme modules all of which combine theoretical study with supporting laboratory work.

- 5.3.2 The useful practice of student evaluation of teaching (SET) and the encouraging average SET results for the department.

- 5.3.3 The good employment rates of ECE graduates.

- 5.3.4 The involvement of practitioners from industry in delivering lectures.

- 5.3.5 The excellent idea of the learning centres and the very valuable support they offer to students.

Recommendations

The PRG recommends the following:

- 5.3.6 Make the SET or equivalent assessment programme compulsory and available to the head of department and use this information in annual appraisals.

- 5.3.7 Provide timely feedback to students on all assignments and well before exams.

- 5.3.8 Establish a teaching and research advisory board that includes both academics and representatives of industry.

- 5.3.9 Establish an ICT common entry qualification system across the university.

- 5.3.10 Develop a plan for offering MOOCs (massive open online courses).

5.4 Facilities and Learning Resources

Commendations

The PRG commends the following:

- 5.4.1 The ECE five-year plan for updating teaching and laboratory facilities to ensure continued graduate competitiveness in a market that increasingly values hands-on practical experience over pure theoretical education.
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- 5.4.2 The good balance between theoretical knowledge and laboratory experience.
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Recommendations

The PRG recommends the following:

- 5.4.3 As a matter of urgency, prioritise the replacement of older equipment which does not currently support the policy of providing quality, industry-leader graduates. The UL executive should seriously consider a one-off funding of equipment to position ECE at the forefront of the national ICT strategy.
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- 5.4.4 Establish adequately funded ongoing maintenance and equipment replacement.
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- 5.4.5 Explore with the relevant authorities the possibility of housing the ECE department in one building to encourage collegiality and a greater sense of department identity.
-
- 5.4.6 At university level, ensure that sufficient resources are available to underpin appropriate teaching and learning support within student PC cluster facilities.
-

5.5 Staff

Commendations

The PRG commends the following:

- 5.5.1 The high level of qualification of ECE staff in all categories, including the outstanding qualifications (at doctoral level) of some technical staff.

- 5.5.2 The strong commitment of academic staff members in assuming responsibilities other than those associated with teaching and research.

Recommendations

The PRG recommends the following:

- 5.5.3 Use the UL workload allocation model as an instrument of work recognition for the department as well as individual ECE staff. This information should be used for annual appraisals.

- 5.5.4 Target the appointment of full professorships on the basis of a well-planned, agreed and cohesive consolidation of the current research groups.

- 5.5.5 At university level, ensure the provision of sustainable funding for the establishment of an ECE chair.

- 5.5.6 Align appointment, recruitment and promotion with the strategic needs of the department as specified in the mission statement.

5.6 Student Guidance & Support

Commendations

The PRG commends the following:

- 5.6.1 The provision of ECE-driven peer-led review sessions which demonstrates the department's focus on the development of high-quality, engaged students with technical knowledge and transferrable skills relevant to industry.

- 5.6.2 The provision of ECE-driven peer-supported learning groups which demonstrates the department's commitment to identifying students in difficulty and providing early intervention to reduce student attrition.

- 5.6.3 The clear evidence that ECE factors first year transition issues into curriculum planning with a view to minimising student attrition.

- 5.6.4 The accessibility of teaching staff to the student body.

Recommendations

The PRG recommends the following:

- 5.6.5 At university level, as a matter of urgency, ensure the adequate resourcing and timely delivery of mental health support services.

- 5.6.6 Continue to engage with SAA on the revision of the student advisor programme to ensure a more effective system.

- 5.6.7 At university level, provide faith-based student support consistent with the broadening demographics of the institution.

5.7 Research Activity

Commendations

The PRG commends the following:

- 5.7.1 The department's plausible targets for growth in terms of PhD students, high-quality publications, patents and research income.

- 5.7.2 The alignment of ECE research activities with industrial and societal needs and in line with national and EU strategies.

- 5.7.3 The increase in secured research income over the last three years.

- 5.7.4 The emergence of three spin-out companies from ECE research activities.

- 5.7.5 The submitted bids by ECE staff for more than €24 million in research funding over the past three years.

Recommendations

The PRG recommends the following:

- 5.7.6 Develop the ECE research strategy in close cooperation with CSIS and the Department of Mathematics and Statistics.

- 5.7.7 Consolidate ECE research units into research groups of critical mass and in line with the above well-defined research strategy. There should be at least three academics per group headed by a senior academic with an established track record in research.

- 5.7.8 Aim for PhD completion within 4.5 years.

- 5.7.9 Identify and list relevant IEEE top-quartile journals and communicate these to all ECE academics and PhD students.

- 5.7.10 Target top-quartile IEEE journals and aim for one publication per year per academic member in such journals, with such publications to be integrated into the promotions evaluation.

- 5.7.11 Set a challenging three-year rolling average target of research income per year for research-active academics.

5.8 Department Organisation and Management

Commendations

The PRG commends the following:

- 5.8.1 The active engagement of the student body via the peer-learning programme as a critical component of the ECE departmental organisation.
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- 5.8.2 The discretionary contribution of many members of the department in handling the administrative burden of the department.
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Recommendations

The PRG recommends the following:

- 5.8.3 Define an additional role within ECE, reporting to the HoD, to provide oversight and coordination across the diverse research activities.
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- 5.8.4 Implement an effective performance management system that is timely, relevant and impactful to motivate and guide all staff within the department.
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- 5.8.5 Work with the relevant authorities to establish a realistic career path both within and across the three core elements of the department – academic, research and technical.
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- 5.8.6 At faculty level, ensure provision of comprehensive, meaningful and actionable financial data to help departments plan for and manage their activities.
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- 5.8.7 Develop and resource a succession planning process for critical positions within ECE to ensure departmental continuity.
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- 5.8.8 At university level, address concerns about the fitness for purpose of key support tools, in particular the Student Records System.
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5.9 Quality Improvement Plan

Commendations

The PRG commends the following:

- 5.9.1 The development, through a defined process, of the initial quality improvement (QI) proposal.

- 5.9.2 The broad participation of members of ECE staff in the review process.

- 5.9.3 The proactive commitment to quality improvement across the majority of the department.

Recommendations

The PRG recommends the following:

- 5.9.4 Develop QI plans in response to this report, addressing each recommendation individually and applying specific targets, deliverables and deadlines.

- 5.9.5 Engage with the faculty and university management in the case of recommendations which are beyond the means and/or control of the department to ensure full awareness and ownership of these recommendations across the faculty and university.

- 5.9.6 Allocate specific resources, manpower and priority to each theme arising from the recommendations to enable these to be properly addressed and implemented.

- 5.9.7 When it is fully developed, subject the QI plan to a risk assessment to ensure practicality of implementation.

Appendices

A Membership of the Peer Review Group:

Ms. Adele Harrington	Consultant Engineer, Dublin.
Prof. Brian Osborne	Quality Assurance Consultant, Canada (Chairperson)
Ms. Ailish O'Farrell	Technical Writer, Limerick (Recording Secretary)
Mr Eamon Ryan	Management Consultant, Limerick.
Dr Maria-Ribera Sancho	Universitat Politecnica de Catalunya (UPC) – BarcelonaTech, Spain.
Prof Rahim Tafazolli	University of Surrey, UK

B Membership of the Department Quality Team:

Donal Heffernan	Senior Lecturer (Quality Team Leader)
John Nelson	Department Head
Emily Spencer	Department Administrator
John Bird	Chief Technical Officer
Martin Hayes	Course Director, BE Electronic & Computer Engineering
Elfed Lewis	Associate Professor

C Contact

The Peer Review Group were given the opportunity over three days to talk to the department's Quality Team both formally and informally. Meetings with staff, employers, graduates, postgraduate and undergraduate students and others were scheduled as group sessions. The Review Group was given the opportunity to meet all staff during a visit to the facilities of the department and this was most helpful.

All the meetings provided extremely useful additional information to support the SAR.