



UNIVERSITY of LIMERICK

OLLSCOIL LUIMNIGH

Quality Review of the **Department of Physics and Energy**

The University of Limerick (UL), through its membership of the Irish Universities Quality Board (IUQB), follows an established process for Quality Assurance (QA) and Quality Improvement (QI). 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 has 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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1.0 Background

1.1 Legislative Framework

The University of Limerick, in common with all the universities in the Republic of Ireland, falls within the Universities Act, 1997. This Act specifies 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 requires 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.

More detail is available at www.quality.ul.ie/The_Act.htm and www.iuqb.ie

1.2 The Irish Universities Quality Board

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 are:

- 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). More detail is available at www.iuqb.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 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.quality.ul.ie

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.quality.ul.ie .

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.quality.ul.ie

2.0 *The Department of Physics and Energy*

The Department was established in 1994 as the Department of Physics and assumed its present name in January 2011 to better reflect its mission and programmes. It now delivers more than 1200 student-modules on physics and energy and this number is growing. The modules provide the core material for six physics-based degree programmes and service teaching to other programmes within the Faculty of Science & Engineering; they include both undergraduate and graduate levels.

From 2002 to 2009, the number of undergraduate students on physics-based programmes increased three-fold. The Department currently supervises 38 PhD research students, a four-fold increase since 2002, and mentors 11 postdoctoral researchers, increased from 2 in 2001. It secured €1.4 M per annum in research funding, on average, in the period 2002–2009. Over the same period the Department's peer-reviewed publications averaged approximately 50 per year and citations of its research work grew eight-fold to more than 400 per year in 2009.

The Department's mission is:

To inspire enquiry, excellence and innovation in physics and energy.

The mission embodies the goals of:

- Enthusing and motivating students to think critically
- Equipping students with the analytical skills to question accepted wisdom
- Exploiting physics for the betterment of society
- Engaging in innovative research that focuses on nanophysics, energy and medical physics
- Exploring and integrating effective strategies in physics education

The role of the Department is to educate; to conduct applied and fundamental research in the area of physics and energy, and in so doing, promote these subjects in society; to promote within its members and its students the courage to question accepted wisdom; and to graduate students who are critical thinkers, who are knowledgeable and who are self-motivated to learn, solve problems and improve themselves.

The Department currently comprises 21 members: eight full-time permanent academic staff; six full-time contract academic staff; three permanent and two contract technical staff; and two contract support staff (administrators), one full-time and one part-time. The fourteen academics include one professor, five senior lecturers, four lecturers (above the bar), three junior lecturers (below the bar) and one senior research fellow. Four technical officers are led by a chief technical officer.

The Department offers five undergraduate programmes (in collaboration with other Science & Engineering Departments) and one postgraduate programme. These are respectively the BSc Applied Physics, the BSc Mathematics & Physics, the BSc Energy, the BSc (Ed) Physical Science, the BSc (Ed) Biology with Physics or Chemistry and the MSc Applied Physics. See also www.physics.ul.ie

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 Governing Authority Strategic Planning and Quality Assurance Committee

Presentation to the University's Governing Authority usually follows within six months of the PRG visit. The Governing Authority will publish the Peer Review report, including reactions and plans, immediately 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 are published as deemed appropriate.

Date	Action
April 2011	Physics and Energy 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.
July 2011	Reactions and plans, from all levels, incorporated into the document. Quality Improvement Action Plan developed and circulated to GA committee Strategic Planning and Quality Assurance. PRG Report with Responses and Quality Improvement Action Plan are tabled at Executive Committee meeting for discussion.
November 2011	PRG Report, incorporating reactions, is presented to UL Governing Authority for approval for publication.

4.0 Preliminary Comments of the Peer Review Group (PRG)

The PRG found the Self-Assessment Report (SAR) of the Department of Physics and Energy to be a very clear account of the Department's activities and a thoughtful and insightful analysis of the Department's strengths and weaknesses. The report also included a constructive set of proposals for future actions. The SAR therefore formed a good foundation for framing our discussions over the course of the review visit.

In our discussions with members of the Department, we found staff to be unfailingly helpful, open and reflective. They engaged actively with all the issues we raised, answered our questions clearly and patiently, and provided us promptly and efficiently with all the additional information we requested.

The Department demonstrated a very strong team spirit, and a clear and consistent commitment to teaching and research. They showed admirable commitment to the wellbeing and development of their students and graduates, and this was confirmed by our meetings with a range of students, graduates and employers. As members of the PRG, we wish to express our gratitude for the hospitality and cooperation we received, and our admiration for the dedication and professionalism demonstrated by the staff we met.

The Department, along with the University of Limerick (UL) as a whole, is now in a difficult period where resources are constrained by public expenditure restrictions, and this has understandably placed some additional burdens on staff. We will refer to some specific implications of these resource limitations in the detailed comments which follow. However, as part of this introductory overview, we would like to make two general observations which underlie many of the specifics. The first observation is that UL should not underestimate the opportunity cost of 'fire fighting' a continuing series of resource challenges. This approach to resource management carries a risk that it can consume a disproportionate share of the management and leadership capacity within the Department and limit the opportunities for more strategic development. The second observation is to recognise the very positive strengths of the Department, including the high reputation and positive impact of physics provision among local and national employers, and the potential industrial relevance of emerging research and teaching provision in Energy.

Arising from these observations, we believe that senior management at UL now needs to take a more strategic view of the contribution which the Department can make to the university's broader objectives, and put in place more stable, transparent and evidence-led processes for making key decisions about future resource allocation in this area.

5.0 The Report of the Peer Review Group

5.1 Mission

Commendations

The PRG commends the following:

5.1.1 The Department mission statement which is short, crisp and to the point.

5.1.2 The succinctness of the department's five goals and four roles.

5.1.3 The development and delivery of attractive cross-disciplinary programmes to drive student number growth.

Recommendations

The PRG recommends the following:

5.1.4 Agree a definition of roles and responsibilities between the Department and the research institutes with which it engages.

Response of Departmental Quality Team: We agree with this recommendation.

5.1.5 Offer upgrade opportunities for industry workforce development (such as level 7 to level 8), and education opportunities for unemployed people with a relevant background.

*Response of Departmental Quality Team:
Some initiatives are in place, and further opportunities should be pursued.*

5.2 Design and Content of Curriculum

Commendations

The PRG commends the following:

-
- 5.2.1 The well-established BSc Applied Physics programme which remains attractive to industrial employers who have expressed a very positive view of graduates.
-
- 5.2.2 The active response by the Department to perceived needs, such as in the case of the new BSc Energy and BSc Mathematics and Physics programmes, and its more proactive approach to curriculum development and the marketing of programmes such as the Leaving Cert practicals and Academy of Applied Physics initiatives.
-
- 5.2.3 The use of core modules serving several programmes, thus enhancing efficiency.
-
- 5.2.4 The good collaborations with other departments and the expressed intent to build on this approach in the future.
-

Recommendations

The PRG recommends the following:

- 5.2.5 Address as a matter of urgency at University, Faculty and Department levels the need to ensure the timely staffing, space and facility resources required to match the scale and complexity of the programme suite provision.

Response of Departmental Quality Team:
We fully agree that this should be pursued as a matter of urgency.

- 5.2.6 Develop effective ways in which to engage industry and business in the development and on-going monitoring of the effectiveness and relevance of programmes.

Response of Departmental Quality Team:
We agree that the Department should be more closely engaged with industry.

- 5.2.7 Systematically work towards further accreditation and benchmarking of programmes.

Response of Departmental Quality Team:
The need to accredit and benchmark Faculty of Science & Engineering programmes has been raised by the Dean, and we support this initiative.

- 5.2.8 Investigate a greater role for adjunct staff, particularly from industry, to provide external inputs to programmes.

Response of Departmental Quality Team: This is a good suggestion.

- 5.2.9 Examine the student contact hours for each student group to avoid overloading.

Response of Departmental Quality Team: It is worthwhile to examine this.

5.3 Teaching, Learning and Assessment

Commendations

The PRG commends the following:

-
- 5.3.1 The inclusion of a cooperative placement (Co-op) in all undergraduate programmes.
-
- 5.3.2 The breadth of the curricula which offers flexible pathways to students.
-
- 5.3.3 The positive feedback from students, graduates, external examiners and employers which illustrates the high regard they have for the Department.
-
- 5.3.4 The openness and willingness of staff to take feedback on board and to help students.
-
- 5.3.5 The integration of lectures and research, in particular in the design of final year projects.
-
- 5.3.6 The use of problem-based learning and technology in programme delivery.
-

Recommendations

The PRG recommends the following:

-
- 5.3.7 Include oral presentations and report writing more systematically in programmes to prepare graduates for the workplace and/or further study.
Response of Departmental Quality Team: We agree with this suggestion.
-
- 5.3.8 Review the balance between continuous assessment and examination elements in modules, particularly for first and second year students.
Response of Departmental Quality Team: This recommendation highlights an extremely important issue for the department; it also has significant resource implications.
-
- 5.3.9 Introduce class tests in more first and second year Physics and Energy modules in order to systematically identify underperforming students so that any issues can be addressed as soon as possible.
Response of Departmental Quality Team: This is an excellent suggestion; it has resource implications.
-
- 5.3.10 Actively engage with the Department of Maths & Statistics to achieve a greater emphasis on physics-relevant maths in lectures and tutorials.
Response of Departmental Quality Team: We recognise that the general decline in the mathematical ability of the student body is one of the key obstacles facing physics students.
-
- 5.3.11 Ensure that all postgraduates receive teacher training to prepare them for tutorial work and laboratory demonstrating.
Response of Departmental Quality Team: Initiatives are in place and further opportunities should be explored.
-

- 5.3.12 Consider introducing a policy of mandatory teacher training for academic staff, particularly new appointments.

Response of Departmental Quality Team: This should be considered.

- 5.3.13 Provide external examiners with exam papers from all subjects taken by Physics and Energy students, including those delivered by other departments.

Response of Departmental Quality Team:
This is not University policy; perhaps it should be explored.

- 5.3.14 Reintroduce the C programming module or a similar module in the BSc Applied Physics.

Response of Departmental Quality Team: We recognise the importance of this suggestion.

- 5.3.15 Evaluate and optimise the alignment of lectures with corresponding laboratory practicals.

Response of Departmental Quality Team: This is already underway.

- 5.3.16 Consider ways of making more use of web-based support for students, such as podcasts of recorded lectures.

Response of Departmental Quality Team: Initiatives are taking place in this area.

5.4 Staff

Commendations

The PRG commends the following:

-
- 5.4.1 The high level of qualifications of the academic staff as well as their commitment and professionalism, all underpinned by a well-led, collegiate team approach.
-
- 5.4.2 The commitment of the technical staff to supporting the students and the academic staff.
-
- 5.4.3 The excellent cooperation between academic, technical and administrative staff.
-

Recommendations

The PRG recommends the following:

-
- 5.4.4 Appoint the Chair in Energy without delay to give vital support to the new undergraduate BSc Energy.
[Response of Departmental Quality Team: The post will be advertised soon.](#)
-
- 5.4.5 Implement a system based on some objective measure such as FTEs to ensure that the necessary academic, technical and administrative staff are appointed to meet the needs of the Department in the medium term.
[Response of Departmental Quality Team: We strongly support this recommendation.](#)
-
- 5.4.6 Given the anticipated increase in student numbers, replace staff who retire without delay.
[Response of Departmental Quality Team: We strongly support this recommendation.](#)
-
- 5.4.7 Consider recruiting foreign students, particularly European students, into years 3 and 4 of the BSc Applied Physics.
[Response of Departmental Quality Team: This should be explored.](#)
-

5.5 Facilities and Learning Resources

Commendations

The PRG commends the following:

-
- 5.5.1 The provision to final year students of 24-hour access to the computer laboratory (with a free printing facility).
-
- 5.5.2 The daily access to the library, the large range of electronic journals available and the budget made available for books for the new BSc Energy programme.
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- 5.5.3 The efficient use of the limited laboratory space that is currently available.
-
- 5.5.4 The management of the tight equipment budget.
-

Recommendations

The PRG recommends the following:

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- 5.5.5 Make greater use of evidence-based arguments to support proposals to the Dean of Science & Engineering for extra experimental laboratory and computer laboratory space.
Response of Departmental Quality Team: We strongly support this recommendation.
-
- 5.5.6 Promote a clearer identity of the Department of Physics and Energy through better signage and by enhancing the appearance of laboratories and postgraduate workspace areas.
Response of Departmental Quality Team: We recognise the importance of this suggestion.
-
- 5.5.7 Ensure the inclusion of postgraduates and staff based in MSS1 and Lab LG-005 in departmental activities to avoid a feeling of isolation from the Department.
*Response of Departmental Quality Team:
We are exploring ways to increase inclusiveness of postgraduates and staff.*
-
- 5.5.8 Address at UL level, as a long-term objective, the need to integrate the Physics and Energy facilities in a contiguous manner.
Response of Departmental Quality Team: We strongly support this recommendation.
-
- 5.5.9 Build on the current work in developing the Department website as a key tool for promoting the activities of Physics and Energy to a wide public audience and enhancing the external visibility of the Department.
Response of Departmental Quality Team: We agree with this suggestion.
-
- 5.5.10 Evaluate the commercial potential for enhanced provision of technical services to industry.
Response of Departmental Quality Team: It is worthwhile to examine this.
-

5.6 Student Guidance and Support

Commendations

The PRG commends the following:

- 5.6.1 The Academic Advisor system in operation in the Department.

- 5.6.2 The ready availability of both academic and technical staff to help students experiencing difficulties.

- 5.6.3 The provision of the specialist learning centres for maths and science.

- 5.6.4 The arrangements to meet the needs of students with special needs.

- 5.6.5 The First Seven Weeks initiative to support new students.

Recommendations

The PRG recommends the following:

- 5.6.6 Encourage students in the Department to set up a Nexus society and to elect a student IOP Nexus representative.
[Response of Departmental Quality Team: We support such a suggestion.](#)

- 5.6.7 Actively seek Co-op assessment reports from CECD so that the Department has access to this essential feedback from industry.
[Response of Departmental Quality Team: This should be explored with CECD.](#)

- 5.6.8 Develop and implement a strategy to increase the number of international Co-op placements.
[Response of Departmental Quality Team: This is a good suggestion.](#)

5.7 Research Activity

Commendations

The PRG commends the following:

-
- 5.7.1 The well-established materials area, with its focus on nanophysics, energy and medical physics.
-
- 5.7.2 The good involvement with research institutes and multidisciplinary activities, and Physics and Energy leadership in some of these, including the Materials & Surface Science Institute (MSSI), the Charles Parsons Initiative (CPI) and the National Biophotonics and Imaging Platform (NBIP).
-
- 5.7.3 The increasing numbers of graduating postdoctoral fellows and PhDs and the associated growing numbers of publications and citations.
-
- 5.7.4 The potential for growing effective research collaborations between UL and the National University of Ireland, Galway (NUIG).
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Recommendations

The PRG recommends the following:

-
- 5.7.5 Develop, in conjunction with the Dean of Science & Engineering, a clear path towards filling key staffing positions, taking research needs and succession challenges into account.
[Response of Departmental Quality Team: We strongly support this recommendation.](#)
-
- 5.7.6 As proposed by the Department, clarify the roles and expectations between the Department and associated research institutes through formal bi-annual meetings.
[Response of Departmental Quality Team: We agree with this recommendation.](#)
-
- 5.7.7 Develop a practical suite of appropriate Key Performance Indicators (KPIs) to recognise, track and publicise research achievements and impact, and to enable external benchmarking nationally and internationally.
[Response of Departmental Quality Team: This is a good suggestion.](#)
-
- 5.7.8 Develop and implement a clear strategy for encouraging and facilitating sabbatical leave arrangements, particularly for staff relatively early in their career. Use the flexibility of the semester system to enhance the take-up by staff.
[Response of Departmental Quality Team: This is a very good suggestion; it presents significant resource implications.](#)
-
- 5.7.9 Develop a well-considered approach towards structured PhD provision, which recognises different funding models and fits in with the wider UL approach to this issue.
[Response of Departmental Quality Team: We strongly support structured PhD provision and will explore suitable approaches.](#)
-
- 5.7.10 Include Research as a standing item on Department meeting agendas.
[Response of Departmental Quality Team: Agreed.](#)
-

5.8 Quality Management

Commendations

The PRG commends the following:

- 5.8.1 The ongoing commitment by the Department to quality and quality improvement.
-
- 5.8.2 The use of data such as pass and fail rates, feedback from student surveys, module Quality Point Values (QPVs) and external examiner reports to monitor quality.
-

Recommendations

The PRG recommends the following:

- 5.8.3 Develop a Department management structure to include an Executive Group working with the Head of Department (HoD) that will ensure load sharing and provide experience for potential future HoDs. The composition of the Executive Group should reflect the full range of the Department's activities.
[Response of Departmental Quality Team: This is a good suggestion.](#)
-
- 5.8.4 Put in place a HoD succession plan with the support of the Dean of Science & Engineering that takes into account the impending transition and the one after that.
[Response of Departmental Quality Team: This will be explored.](#)
-
- 5.8.5 Reach and implement an agreement with senior management at UL on the appropriate staffing levels required to guarantee Department sustainability.
[Response of Departmental Quality Team: We strongly support this recommendation.](#)
-
- 5.8.6 Develop a set of numerical metrics that supports management decision making, allows for effective benchmarking and satisfies the university's data needs.
[Response of Departmental Quality Team: This will be considered.](#)
-
- 5.8.7 Put in place an Industrial Advisory Board.
[Response of Departmental Quality Team: This is an excellent idea.](#)
-

5.9 Quality Improvement Plan

Commendations

The PRG commends the following:

- 5.9.1 The wide range of developmental activities identified by the Department, which will make a major contribution to addressing the issues identified in the SAR.
-
- 5.9.2 The engagement of a significant proportion of the Department's staff in taking ownership of the actions in the plan.
-

Recommendations

The PRG recommends the following:

- 5.9.3 Develop a more explicit rationale for the actions identified in the plan, and revise and prioritise these actions in the light of the PRG's report.
Response of Departmental Quality Team: Agreed.
-
- 5.9.4 Identify key SMART (Specific, Measurable, Achievable, Realistic and Timed) targets and outcomes to allow achievement of the plan's objectives to be tracked and evaluated more effectively.
Response of Departmental Quality Team: We will explore this suggestion.
-
- 5.9.5 Seek to quantify or specify more precisely the resource implications (money, staff inputs and accommodation) associated with key actions in the plan.
Response of Departmental Quality Team: The Quality Team agrees.
-

Appendices

A Membership of the Peer Review Group:

Dr Emily Gleeson	Met Eireann
Dr Bill Harvey	Director, QAA Scotland (Chair)
Dr John Higinbotham	Napier University, retired.
Prof Eugene Kennedy	Dublin City University
Ms Ailish O'Farrell	Technical writer. (secretary)
Mr Frank Turpin	Quality Consultant

B Membership of the P&E Quality Team:

Prof. D.N (Noel) Buckley	Chair of Physics (Chair of the Quality Team)
Dr David Corcoran	Head of Department, Senior Lecturer
Dr George McClelland	Director of the NCE-MSTL, Senior Lecturer
Dr Colm O'Dwyer	Stokes Lecturer
Dr Ian Clancy	Lecturer (bb)
Dr Christophe Silien	Lecturer (bb)
Dr Fernando Rhen	Lecturer (bb)
Ms Maria Quinn	Chief Technical Officer

C Contact

The Peer Review Group were given the opportunity over three days to talk to the Physics and Energy Quality Team both formally and informally. Meetings with staff, postgraduate & 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.