Report of the Quality Review Group

to

Faculty of Science and Engineering

Review dates	23 to 26 January 2023
Issued by QSU	31 January 2023
UL QSU Website	www.ul.ie/quality
Unit Website	https://www.ul.ie/scieng
QQI Website	www.qqi.ie

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1   *The UL Quality Review Process*

The University of Limerick (UL) follows an established process for quality assurance (QA) and quality improvement (QI) in line with that originally developed jointly by the Irish Universities Association (IUA) and the Irish Universities Quality Board (IUQB), the latter whose functions are now carried out by Quality and Qualifications Ireland (QQI). The review process involves an approximate seven-year cycle during which each unit works to improve the quality of its programmes and services and undergoes a rigorous self-evaluation prior to a quality review by internationally recognised experts in the relevant field.

The common framework adopted by the Irish universities for their QA/QI systems is consistent with both legislative requirements and international good practice. The process itself evolved as a result of the Universities Act, 1997, in which the responsibility for QA/QI was placed directly on the individual universities. The process now complies with the Qualifications and Quality Assurance (Education and Training) Act 2012, as amended by the *Qualifications and Quality Assurance (Education and Training) (Amendment) Act 2019*. The UL Quality Support Unit (QSU) website (www.ul.ie/quality) provides details on the process.

All units are reviewed against quality assurance standards as described in the tailored quality review guidelines, which is available on the QSU website. The planned schedule of quality reviews is available on the QSU website.

The UL quality review process comprises the following three phases:
1. Pre-review phase, in which the unit under review conducts a self-evaluation exercise and writes a self-assessment report (SAR).
2. Review phase, in which a quality review group comprising external experts, both national and international, review the SAR, visit the unit, meet with stakeholders and produce a report (this report), which is made publicly available on the QSU website.
3. Post-review phase, in which the unit considers and formally responds to the recommendations of the QRG, devises plans to implement them and reports implementation progress to the University Quality Committee and UL senior management.

The recommendations made by the quality review group (QRG) form the basis of a quality improvement plan (QIP) prepared by the QSU for the unit under review. Once the site visit is over, the unit sets about evaluating and implementing the recommendations, as appropriate.

Approximately seven to nine months after receiving the QIP template from the QSU, the head of unit provides a summary overview of progress to the university's Quality Committee. Committee members are afforded the opportunity to discuss and evaluate progress.

Approximately 18-24 months after receiving the QIP template, the Dean, Quality Team Leader, Provost/Deputy President and Director of Quality meet to formally review progress and to agree on any remaining actions to be taken.

2   Summary Details of Faculty of Science & Engineering

The Faculty of Science and Engineering (S&E) in the University of Limerick (UL) is the largest of four faculties. Based on a broad platform of natural sciences, engineering, mathematics and statistics, computing, architecture and design, S&E was established when three colleges were merged in 2008 (College of Science, College of Informatics & Electronics and College of Engineering). S&E has been led by three executive deans, who served on the UL Executive Committee under three UL presidents and helped to deliver on two UL strategic plans (and currently on UL@50). The current structure of schools and departments was put in place in 2016.

The mission of S&E is to be a distinctive, national hub for innovative education, scholarship and integrated research in science and engineering. S&E pursues its mission through teaching, research, outreach, and related activities. With over 600 staff: 223 full time academic and 100 part-time academics; 16 University teachers; 168 professional, managerial and support; 189 research (mainly postdoctoral), 68 research administrative support, the Faculty currently delivers 125 taught academic programmes (32 undergraduate, i.e., Level 8 on the National Framework of Qualifications and approximately 93 professional development and postgraduate taught and research programmes (NFQ levels 6, 7, 9 and 10) and has an annual net student fee income of over €36 million. S&E offer a range of undergraduate degree programmes in Computing, Architecture, Design, Engineering, Mathematics and Natural Sciences
and taught and research postgraduate programmes at Graduate Diploma, Masters and Ph.D. levels.

The Faculty has a strong record of accomplishment in combining research excellence and applications to meet industrial and societal needs. It hosts three national research centres in pharmaceutical materials, software and advanced manufacturing, and three national technology centres in composite materials, pharmaceutical processing and dairy processing and two research institutes in science and software and an applied Mathematics Consortium (MACSI). During 2021, UL researchers published 1,323 WoS article and review publications. Of these, 49% (648) were published by S&E academics. This number of publications represents a 13% increase on the Faculty's publication output in the previous year. Fifty-nine of these papers were Covid-19-related publications. S&E produced 173 top-decile publications in 2021, representing 64% of all UL top-decile publications. This figure represented a 40% increase in the S&E Faculty's top-10 percentile publication output compared to the previous year. Citation numbers have also increased by 25% for S&E publications in the five-year window (2017-2021) compared to the previous five years. Citations of S&E publications represented 58% of all UL citations in this period.

S&E engagement with Athena Swan (AS) has been significant. Along with Trinity College Dublin, UL was the joint first university in Ireland to secure Bronze accreditation for two of its academic departments (both in S&E) in 2015. In 2021, S&E was the first faculty in Ireland to secure a Silver award for one of its academic departments (Department of Physics). The only S&E academic unit yet to be accredited, is currently working on a Bronze award submission.

The S&E Faculty Office coordinates, organises, promotes and operates a wide variety of outreach and public engagement activities on behalf of individual academic units, collectively across disciplines and for the Faculty as a whole. By raising awareness among the general public of the capabilities and expertise of the Faculty through these activities, S&E's ambition is to be the first port of call for advanced training in science and engineering regionally and nationally.

3 Preliminary Comments of the Quality Review Group (QRG)

3.0 Preliminary Comments of the Quality Review Group (QRG)

The Quality Review Group (QRG) had access to the Faculty of Science & Engineering self-assessment report (SAR) and other support materials in advance of the in-person visit held 23rd to 26th January 2023, and would like to thank the Faculty for the clarity of this evidence-based report. The QRG is also grateful to the University of Limerick (UL) for the professional support and guidance provided throughout the quality review process.

Prior to the review visit, an online meeting was held 16th January 2023 and comprised a briefing by the QRG Chair and the Quality Support Unit (QSU), with a brief overview by each of the QRG members of their findings from the SAR, together with a plan for the site visit. Requests by the QRG for additional information and meetings with key personnel during the visit were honoured with notable efficiency.

The in-person visit to UL comprised a programme of meetings covering mission, strategy and outcomes; organisation structure, management and governance; teaching, research and related activities; and additional faculty linkages. As well as meeting a good cross-section of staff, the QRG also met with a representative group of undergraduate and postgraduate students, along with internal and external stakeholders, the latter representing employers who participated online.

The review began with an introductory meeting with the Provost/Deputy President, Professor Shane Kilcommins, and the Executive Dean, Professor Seán Arkins. This provided an overview of the University and the Faculty, and the wider political landscape of UL as a third-level education provider in terms of its influence and impact and the pressures on the higher education sector generally.

The QRG noted the Faculty's strengths and distinguishing features, which attract a growing number of home and international students and academic staff. The open engagement with academic and professional services staff facilitated a constructive dialogue throughout, enabling the QRG to question and probe elements of the SAR, which proposes a range of enhancements. It was evident that the staff with whom the QRG engaged had a clear understanding of their areas of jurisdiction and could contextualise these within the Faculty and its structures, and UL more widely. The QRG was satisfied that it had consulted the appropriate personnel at all levels.

The students were positive and complimentary about their student experience and praised their tutors for supporting them in their studies. They were satisfied with the learning resources available to them and appreciated the wider support provided by UL for their personal development and to enhance their student experience. The students noted the role of class representatives in having their voice heard and complimented academic staff as being approachable when they had any concerns to address. Most of the students who spoke to the QRG were enjoying their time at UL and were taking advantage of the sporting and leisure facilities, and the clubs and societies available to them.

The QRG noted the commitment of the Executive Dean, supported by the Faculty Office, to advancing the ambitions of the Faculty in relation to its mission and its academic units. The structure of the Faculty, based on schools and departments as academic units, along with its lines of management, appears unnecessarily complex. Streamlining this structure would provide transparency for staff and promote equality for all. External recognition of working practices in supporting equality, such as through Athena SWAN (AS), is commended. The AS action plan must now be realised.

The QRG welcomed the opportunity to meet with the Provost/Deputy President and appreciated his commitment to the process and the helpful understanding of UL's wider institutional strategic and operating contexts he provided.

Finally, the QRG is grateful to the Faculty and, in particular, to QSU Quality Officer, Kim O'Mahony, for leading the helpful support throughout the quality review process.

The commendations below recognise the achievements of the Faculty, with the recommendations intended as a guide for the full realisation of its ambitions.

4 QRG Commendations and Recommendations

4.1 Commendations

The QRG commends the following:

1.	The openness, honesty, and frankness of the Faculty of Science & Engineering staff in addressing issues within the Faculty.
2.	The strong leadership shown by the Executive Dean, Assistant Deans, Heads of School, Heads of Department, and the Faculty Manager.
3.	The recognition by staff that the Faculty is seen positively across the institution for its standing within UL and its achievements.
4.	The clear commitment of the Faculty to align with the strategic goals of the University.
5.	The positive student experience offered within the Faculty as described enthusiastically by students during discussions with the QRG.
6.	The strong commitment to providing an interactive and hands-on experience for students.
7.	The significant industry-focused engagement of the Faculty, particularly with advisory boards and through its programmes and exemplary co-operative work placement programme (Co-op), resulting in impressive numbers of graduates being recruited within industry.
8.	The impressive suite of lab and workshop facilities, including the recently refurbished and renovated teaching labs.
9.	The success of the Faculty in educating graduates who are regarded as mature, articulate and well prepared for the world of work and are highly sought after and valued by employers, with demand exceeding supply.
10.	The remarkable number of students (98%) going straight into employment or further education following graduation, in part due to their Co-op experience.
11.	The collaboration with industry in relation to curriculum development, teaching and research supervision.
12.	The participation in the Athena SWAN accreditation scheme, which is helping staff to recognise the work that needs to be done within the Equality, Diversity & Inclusion (EDI) framework in addition to gender, and which is motivating them to bridge the gaps.

4.2   Recommendations

4.2.1   Level 1 recommendations

No.	Recommendation	Commentary
1.	Streamline the Faculty structure into clear academic units.	The current Faculty structure is the amalgamation of an earlier merger which retained a legacy of schools and departments. A comprehensive and clear structure of groupings of disciplines would enable clear and consistent lines of management and implementation of university policies and processes, as well as providing opportunities for interdisciplinary working for both staff and students.
2.	Improve the leadership culture, with a greater emphasis on disciplinary and academic leadership, making leadership positions attractive to staff and emphasising the responsibility of senior academics.	Leadership is key to the development of the Faculty and staff. Promotions to leadership positions such as Head of Department or School are largely through an internal process with limited apparent incentives. A succession plan should be developed which would include shadowing or deputy positions supported by training. Remuneration is up to the level of associate professor only, which is a disincentive to senior staff to take up leadership roles and can lead to the egregious situation of junior staff line managing senior staff. Remuneration should be by role and not position.
3.	Develop a more clearly articulated and distinctive Faculty identity.	The identity as currently articulated remains generic. Strong focus on industry-connectedness could shape identity. Teaching and research across the Faculty could also demonstrate a focus on the core values of creativity and sustainability as well as on emerging technologies.
4.	Ensure the new Faculty structure includes effective student representation throughout.	There is a structure of class representatives. However, to be effective, their impact within Faculty boards should be greater.
5.	Prioritise the development of a Faculty-wide workload allocation model (WAM) with clear transparency in its implementation.	There is a requirement for staff to operate according to a 40:40:20 model for teaching, research, and service. The model, however, should account for variation in staff development and key strengths, and focus on roles and responsibilities. Transparency is key, with clarity concerning expectations and recognition of different roles based on the size of the academic unit.
6.	Work with UL senior management to revisit the unweighted funding model by discipline to restore weightings for more expensive subjects.	Without a satisfactory resolution of this issue, the Faculty could work through industry and professional organisations to lobby the University and the Government.

7.	Develop and implement a marketing and communications strategy for the Faculty supported by appropriate resources.	Marketing and communication activities were identified as a significant weakness. New programmes are not attracting the student numbers or gaining the recognition that would be expected. Centralised brand marketing could be reviewed to evaluate its effectiveness in serving the Faculty. Having a Faculty representative for marketing and communications would be a distinct asset.
8.	Develop effective external communications (website and social media) to drive research and industry partnerships, as well as postgraduate and international recruitment.	A more sophisticated digital and social media presence should be developed as a matter of urgency, with Faculty-specific resources put in place. The website needs to improve its attractiveness, accessibility and navigability to attract potential students, particularly from the EU, to come to UL. An improved website would also be valuable in attracting new staff to UL.
9.	Work with senior UL management to ensure that research policy and administration recognise and support the value of creative practice as well as traditional academic research.	It is essential to develop an integrated Faculty framework of benchmarks and performance metrics as well as support for creative practice to demonstrate equivalence with the traditional academic research framework.
10.	Encourage all academics, particularly senior academics, to play a role in inspiring first year students.	All academics can be inspirational leaders. Teaching at UL is both research-led and research-informed depending on the discipline. With potential for recruitment of undergraduates to postgraduates within the Faculty, inspirational teaching at an early stage can stimulate lasting interest in a subject. There is a clear drop in both male and female student numbers as they progress from undergraduate to postgraduate to PhD level. Catching the students' interest from day one could act as a way to prevent this fall-off in female student numbers in particular.
11.	As a faculty, collectively address the relationship and cultural issues that exist between the schools of Engineering and Natural Sciences on the one hand and the School of Design, which includes the School of Architecture, on the other.	Currently, the School of Design and the School of Architecture appear quite separate from the other Faculty schools and to operate in a distinctly different cultural framework. Review documents pertain largely to the other two schools and few architecture and design representatives participated in the review processes. Opportunities for economies of scale, collaboration, and research and teaching synergies are being lost.
12.	Develop more proactive strategies to promote greater diversity in the Faculty.	Staff recruitment practices should be examined from the diversity perspective, with consideration given to more external hiring.

		Women and minority candidates should be brought into the Faculty in the next 18 months as adjuncts, industry professors and/or professionals in residence.
		Continue with longer-term strategies, working with industry on schools' programmes.
13.	Work with senior UL management to ensure that promotion criteria are equitable and give greater recognition to activities beyond research.	Some staff engage in extensive outreach activities or are recognised as inspirational teachers. However, promotion is not possible without success in research. Completing a teaching qualification, for example, should be recognised in promotion criteria. Criteria should also recognise those at different stages of their career and development.
		Promotion criteria need to be clearly articulated, include wider activity, and be evaluated relative to opportunity.
14.	Develop more Faculty-wide initiatives aimed at supporting postgraduate research students.	There appear to be strong support structures in place for postgraduate research students in the Bernal Institute but these are inconsistent across the Faculty. Students also reported that there is no centralised Faculty-wide representative body other than the PSU. Research students were not clear on where to turn for non-academic support within the Faculty.
		PhD students indicated that they were represented through EDI committees, but this resulted in their being requested to sit on several committees (faculty, school, department, institute) depending on their affiliation.
		There should be a more structured and better remunerated approach to providing opportunities for PhD career development and guidance, particularly with teaching support and for future careers as academics. The imbalance between high cost of living and PhD stipends, with the expectation of teaching and demonstrating responsibilities, is causing issues for these students.
15.	Provide clearer support for new academic appointments.	The 40:40:20 ratio for activity lacks nuance for early-career appointees who face significant challenges in developing teaching.
		New academic appointees may also need support in teaching activities where no previous experience is evident. Being given a high teaching workload without space to generate course material can be detrimental to new appointees without previous experience.
16.	Provide start-up packages for new academic appointments across the Faculty.	A master's programme is sometimes taken up, but more tailored start-up support, such as equipment, training, and facility access, may be more appropriate.

17.	Review the progression requirements for Year 1 in relation to delayed starts.	Consider post-Christmas examination or other progression requirements to prevent the increased attrition observed in the current post-pandemic situation and improve the 1st year student experience.
		The Faculty needs to be more agile in response to this significant change, whether it proves to be permanent or temporary.

4.2.2 Level 2 recommendations

No.	Recommendation	Commentary
1.	Provide opportunity for technical support staff to develop their career path and encourage and incentivise them to interact with research.	There is little or no incentive for technical support staff to engage with research activities other than through self-motivation. There is also no clear career pathway or career incentive to engage.
2.	Increase student participation in international exchange programmes.	While there are good partnerships with European institutions, such as through ERASMUS, and with incoming international students, the participation of outgoing students is low. Identification of the language of provision and provision of foreign language support and more general promotion of the opportunities and benefits for participating students would be useful. A centralised support service within the Faculty would enable more consistent promotion and support rather than the current localised approach within units.
3.	Re-evaluate the balance of continuous assessment and examinations to achieve academic progression.	Terminal exams seem to create more pressure for students, especially 1st year students in their first semester. Continuous assessment would alleviate some of this pressure. On top of this, if accreditation of a course is not dependant on a terminal exam, there may not be a need for the exam.
4.	Work with Academic Registry to have staff timetables delivered in a timely manner before semester starts.	Staff are provided with generic timetables two weeks before the semester starts, without specifics as to when they may be teaching labs. Providing them earlier with this specific information is essential.
5.	Implement measures to ensure effective EDI consideration and management across the Faculty.	The Diversity working group is noted as working well at the University level, but this needs to be embedded and rationalised within the units. The scope should be expanded to consider all protected groups in order to be effective.
6.	Provide more financial support to Architecture students to cover course costs.	There appears to be a lack of student support within the School of Architecture. Students have pointed out that they are required to pay for specific software and consumables to be able to complete aspects of certain modules. In other

		cases, such as for Aeronautical Engineering, students are provided with such materials without personal cost.

Appendix One

A   Membership of the QRG

Professor Carl Schaschke	Dean of School of Computing, Engineering and Built Environment, Glasgow Caledonian University, Scotland
Professor Morag McDonald	Dean of College / Professor, Bangor University, Wales
Professor Elizabeth Mossop	Dean of Design Architecture and Building at the University of Technology in Sydney.
Senan Behan	Regeneron Limerick (Employer Representative)
Áine Dooley	Regulatory Affairs Specialist, Switzerland (Student Representative)
Ailish O'Farrell	Technical Writer, Limerick (Recording Secretary)

B   Membership of Faculty of Science & Engineering Quality Team

Member	Primary Committee Role	Faculty Affiliation
Sean Arkins	Chair, Mission Strategy & Outcomes Subcommittee	Executive Dean, Faculty of Science & Engineering. Prof., Biological Sciences
Bernie Quilligan	Chair, Organizational Structure, Management & Governance Subcommittee	Manager, Faculty of Science and Engineering
Teresa Curtin	Chair, Teaching & Related Activities Subcommittee	Assistant Dean, Academic Affairs. Prof., Chemical Sciences
Jeff Punch	Chair, Research & Related Activities Subcommittee	Assistant Dean, Research. Prof. School of Engineering
David Newport	Chair, Additional Faculty Activities and Linkages Subcommittee	Assistant Dean Equality, Diversity, Inclusion and International. Lecturer, School of Engineering
Jim Buckley	Member, Research & Related Activities Subcommittee	Lecturer, Department of Computer Science and Information Systems
Johanna Griffin	Member, Additional Faculty Activities and Linkages Subcommittee	Administrator, Faculty office
Helen Purtill	Member, Teaching & Related Activities Subcommittee and Quality Survey Lead	Lecturer, Dept. Mathematics and Statistics
Caitriona Ni Riordain	Member, Teaching & Related Activities Subcommittee	Final year Undergraduate Student, Chemical & Biochemical Engineering
Rebecca Forde	Member, Research & Related Activities Subcommittee	Postgraduate student, Chemical Sciences & Bernal Institute
Deirdre Ni Eidhin	Member, Additional Faculty Activities and Linkages Subcommittee	Senior Technical Officer, Dept of Physics

Leonard O'Sullivan	Member, Organizational Structure, Management & Governance Subcommittee	Professor, School of Design
Alan Hegarty	Member, Mission Strategy & Outcomes Subcommittee	Lecturer, Dept. Mathematics & Statistics
Ellen Keegan	Administrative co-ordinator, Quality Committee (Jan – July 2022)	Accreditation, Risk, Quality and Compliance Officer (Currently on Leave)
Mary O' Kelly	Administrative co-ordinator, Quality Committee (August 2022 – present)	Accreditation, Risk, Quality and Compliance Officer, Acting.
Gary Walsh	Chair, Quality Committee	Chair, Quality Team. Prof. Industrial Biochemistry