

CORK INSTITUTE OF TECHNOLOGY

**PROGRAMMATIC REVIEW
OF THE SCHOOL OF SCIENCE
& INFORMATICS**

PHASE 1: STRATEGIC REVIEW
(NOVEMBER 2016)

REPORT OF THE

EXTERNAL PEER REVIEW GROUP

1.1 PROGRAMMATIC REVIEW AT CORK INSTITUTE OF TECHNOLOGY

Programmatic Review is a statutory five-yearly quality process in which peer evaluators analyse the effectiveness of the suite of programmes of a CIT faculty, college or school, with an emphasis on quality and flexibility of response to changing needs.

Under the CIT quality system, Programmatic Review is conducted in two phases. While Phase 1 looks at strategic and high-level issues, Phase 2 is devoted to a detailed programme review. Each phase is built on a self-study by the unit under review, supplemented by meetings of the Peer Review Group with staff, students and other stakeholders.

The overall aims of the 2016 School of Science & Informatics Review were to ensure that the

- programmes of School remain relevant to learners, employers and other stakeholders;
- strategy, resources and systems of the School are sufficient to support and develop the academic activities;
- demand for the graduate profile produced by the School's programmes exists;
- Programme Outcomes correctly describe the desired graduate profile; and
- School's programmes deliver the Programme Outcomes.

The two review phases address these aims with different emphases and to a different extent.

Externally, Programmatic Review contributes to the enhancement of public confidence in the Institute and its awards. Internally, it is an important 'way stage' in a continuous quality improvement cycle which affords the opportunity to step back from the ongoing business of programme delivery to reflect on the current status and future direction of a school and its programme portfolio.

1.2 2016 PROGRAMMATIC REVIEW OF THE SCHOOL OF SCIENCE & INFORMATICS

On November 16th and 17th 2016, the School of Science & Informatics undertook Phase 1 of the current Programmatic Review. Over the two days of the site visit, the Peer Review Group met with academic management, staff, employers and students of the Faculty.

Phase 1 panel meetings was arranged in line with developmental strategy of the Institute as a whole with meetings focusing on the three strands of teaching & learning, research and engagement. This report contains the interim findings and recommendations of the Peer Review Group based on the desk-review of the School Submission and the meetings held during the site visit (see timetable of meetings and a list of participants in Appendix 1 and 2 respectively).

1.3 PANEL MEMBERSHIP

Dr Stephen Jackson (Chair)

Director of Quality Assurance (retired)
Quality Assurance Agency
UK

Dr Jim Duggan

Vice-Dean of Research & Graduate Studies
& Senior Lecturer in Information Technology
College of Engineering & Informatics,
National University of Ireland Galway

Garrett Dee

Senior Development Advisor – Food Industry
Enterprise Ireland

Dr Edel Healy

Head of School
School of Health and Science
Dundalk Institute of Technology

Ian Manning

Lead Developer
IBM Operations Analytics – Predictive Insights
Cork Business Park

Dr Stephen Cassidy

Dean of Academic Quality Enhancement
Office of the Registrar
Cork Institute of Technology

1.4 SCHOOL OF SCIENCE & INFORMATICS

The School of Science & Informatics consists of the following departments

- Department of Biological Sciences
- Department of Computer Science
- Department of Physical Sciences
- Department of Mathematics

At a glance:

- There are 130.66 staff in the School, accounting for 13% of overall CIT staff.
- There are 1,665 students in the School accounting for 18% of overall CIT students.
- Female students make up 38.9% of the student cohort.
- International students make up 14% of the student cohort.
- 73.21% of students come from the Cork City or County area.
- The School of Science & Informatics has 2 of the 3 strategic research clusters within CIT, winning in excess of €2Million in research grants annually.
- The School has the highest number of Research postgraduates (45, MSc/PhD) in CIT.

In the School, a total of 60 programmes across Level 6 to 10 are offered which are listed in Appendix 3. The School offers a range of programmes in full-time, part-time and online modes, including both major and special purpose awards.

1.5 SUMMARY OF DEVELOPMENTS SINCE THE LAST PROGRAMMATIC REVIEW

Since the previous programmatic review, the more significant developments can be summarised as follows:

Student Enrolment and Progression

- Student numbers (FTE) on full-time courses increased by 21%.
- Student applications: total applicants for full-time Level 7 and 8 courses have increased in Life Sciences and Computing.
- Student retention has increased by 12.1%.
- Graduate surveys show that students are very satisfied with the quality of programme and delivery by staff.

Programme Portfolio Changes

- CPD and Part-time courses: the School of Science & Informatics is the largest provider of Springboard programmes in the Institute
- Master of Science in Biomedical Sciences (jointly with UCC) discontinued.
- New programmes developed include
 - Common Entry Biological Sciences
 - Higher Diploma in Science in Data Science and Analytics
 - Higher Diploma in Science in Cloud Computing
 - Higher Diploma in Science in Cloud Computing and Mobile Development
 - Bachelor of Science (Hons) in Industrial Physics (jointly with UCC)
 - Master of Science in Information Design and Development
 - Master of Science in Information Security

Existing Programmes titles have been modified to better reflect content and improve brand recognition.

- Bachelor of Science in Information Technology Support has been retitled Bachelor of Science in Information Technology
- Bachelor of Science (Hons) in Software Development and Computer Networking has been re-titled Bachelor of Science (Hons) in Computer Systems.

Since 2011, 602 student portfolios have been reviewed and have received exemptions/credits/awards on the basis of Recognition of Prior Learning (RPL).

Delivery

- Work Placement is integrated into all of our undergraduate programmes.
- Additional option of Common Entry route for Biosciences has been introduced.
- School of Science & Informatics has been at the fore in Online delivery of module content with the following programmes delivered exclusively online:
 - Master of Science in Cloud Computing
 - Master of Science in Information Design & Development
 - Master of Science in Information Security

Staff Development

Staff development has taken place under both Institute and Department funding in discipline-specific ongoing professional training and more general pedagogical training, both formal and non-formal offered through the Teaching & Learning Unit. Since the last programmatic review, the Institute has instigated a specific staff development scheme to support staff wishing to pursue doctoral studies. This funding, awarded on a competitive basis, covers fees and travel as well as a remission of up to 6 hours from teaching to the successful applicant. There are currently 12 staff from the School being supported by the scheme.

Research

- Delegated Authority to Level 10 for all strategic research areas of the School
- Recently designation of Research Group status for the Computing Research Group Riomh.

1.6 PRINCIPAL PHASE 1 FINDINGS, COMMENDATIONS AND RECOMMENDATIONS

1.6.1 Principal Phase 1 Findings

The Panel was very impressed by the clear sense of engagement by the School staff and learners whom they met. The Panel was also pleased by the positive assessment of the School by the learner representatives. The Panel recognises the high level of engagement with industry across a broad range of activities. In discussions with employers, the high quality of the programmes delivered by the School was acknowledged. The Panel notes that the School has considered, evaluated and addressed, where appropriate, the recommendations of the previous programmatic review. The Panel wishes to

acknowledge the significant progress made by the School across a broad spectrum of activity including, course development, staff development, research and student engagement since the last Programmatic Review.

The panel acknowledges that the external context in which the Institute and the School operate presently is challenging. External factors impinging on School operations include

- a) Funding: The overall recurrent funding levels available for Higher Education, the absence of funding for capital projects in Higher Education and the current funding allocation model which disincentivises STEM programmes are negatively impacting on the School's ability to develop and grow its operations across a broad spectrum of activities including undergraduate provision, research and engagement with industry.
- b) Space: The availability of physical facilities to support School activity is a significant cause of concern. In particular, the lack of laboratory space for undergraduate programmes is constraining the number of undergraduates that can be enrolled on the School's programmes. With the recent increase in undergraduate enrolments together with improved progression rates through programmes, there is an acute need to address laboratory and other space requirements (e.g. lecture room capacity) to maintain current enrolment levels without negatively impacting on the quality of the programmes provided. Similarly, the School requires additional space to support its increasing research activity.
- c) Equipment: Some of the School equipment is in need of upgrading to keep pace with technological advances in industry. Much of the School equipment has seen extensive use and increasing maintenance costs associated with this equipment is a growing feature.
- d) Staff Recruitment: The Employment Control Framework and the recruitment of academic staff at the first point of the Assistant Lecturer scale regardless of qualifications or experience is having an impact on the School's ability to attract and retain high quality staff.
- e) Munster Technological University: The ongoing uncertainty with respect to Technological University status and the timelines associated with its achievement has the potential to create a period of stasis where key strategic decisions are deferred awaiting resolution of the issue.

1.6.2 Commendations

1.6.2.1 The panel commends the retention initiatives undertaken by the Institute, School and Departments in fostering and supporting student engagement. The panel were impressed with the range of initiatives in this area undertaken since the last programmatic review. In particular, the panel would like to commend the obvious

partnership model in place between Departments and the Institute's Student Engagement and Retention Initiative.

- 1.6.2.2 The panel commends the extensive engagement by the School with industry. The panel found clear evidence of good practice across a range of engagement activities including work placement, industry-based undergraduate projects, meaningful and ongoing dialogue with industry regarding programme and module content, consultancy and industry-based research programmes.
- 1.6.2.3 The panel commends the significant increase in the level of research activity within the School, its associated research centres and groups.

1.6.3 Phase 1 Recommendations

Teaching and Learning

- 1.6.3.1 The panel recommends that the School develop a detailed physical plan to identify immediate and more long-term learning space requirements. The panel recommends that the School work with Faculty and Institute colleagues to seek to address immediate space requirements.
- 1.6.3.2 The panel supports the strategic aim of the School to increase female participation on its programmes particularly those in computer science. The panel notes the range of activities currently in place. The panel would suggest that the School review the work of Carnegie Mellon University in this area, which successfully increased female participation in core computer science programmes. The panel recommends that the School develop an evaluation framework to review the impact of its initiatives in terms of increasing female participation, and that this framework could also be used to assess the effectiveness of outreach and recruitment activities.
- 1.6.3.3 The panel notes the ongoing development of programmes within the School particularly at taught masters level. The majority of these new programmes are being delivered successfully wholly online. In its various meetings with part-time learners and employers, the panel heard how the face-to-face part-time delivery model was valued by learners. The panel recommends that the School reflect on whether more traditional face-to-face or blended part-time delivery options are feasible delivery modes for its increasing range of continuing professional development programmes.

1.6.3.4 The panel supports the continuing development of closer cooperation between staff and students across the school and encourages more formal representation of students on Course Boards and other deliberative committees.

Research

1.6.3.5 The panel notes the high-level of research activity within the School. In its meeting with researchers, the difficulty for early stage researchers, particularly in basic research domains, to obtain research funding was highlighted. The panel also heard from early stage researchers who were collaborating with more established colleagues in other discipline areas to build their research profile and track record. The panel would support this approach. The panel recommends that the Institute look to provide some funding to support early stage researchers through a bursary or scholarship scheme.

Engagement with Industry

1.6.3.6 The panel commends the School on its engagement with industry across a broad spectrum of activity. It heard how the School had developed a range of formal and informal networks with industry to sustain activities such as work placement, industry-based projects and consultancy. Some of these informal networks consisted of individual-to-individual relationships. The panel recommends that the School look to formalise, where practicable, these informal relationships to support the ongoing mutually beneficial relationships between industry and the School.

1.7 Conclusion

In conclusion, the panel were impressed with the professionalism of the School management and staff and their commitment to providing a supportive learning environment for their students whilst maintaining high academic standards in a challenging operating environment. It is noteworthy that the School and its activities received strong endorsements from both learners and employer panels.

APPENDIX 1 TIMETABLE OF PHASE 1 MEETINGS

Wednesday, November 16th Venue Faculty of Business and Humanities Boardroom

9.15 AM – 10.15 AM	Panel Convenes – Identification of Areas for Discussion
10.15 AM – 10.45 AM	<i>Institutional Context</i> <i>Mr Tadhg Leane, Head of Strategic Development CIT</i>
11.00 AM – 12.30 PM	Overview of actions and developments in past 5 years (incl. recommendations of last Programmatic Review) <i>Head of School, Heads of Department, Nominated Staff</i>
1.30 PM – 3.00 PM	Academic Portfolio. Plans for next 5 years <i>Head of School, Heads of Department, Nominated Staff</i>
3.00 PM – 4.30 PM	Engagement with Enterprise <i>Head of School, Heads of Department, Nominated Staff</i>
4.45 PM – 5.30 PM	Plenary Session with Industry Representatives <i>External Stakeholder Group Only</i>

Thursday, November 17th Venue Council Chamber Room

9.00 AM – 10.00 AM	Research <i>CIT Head of Research, Head of School, Heads of Department, Research-Active Staff</i>
10:00 AM – 11:00 AM	Meeting with Staff <i>Academic, Technical and Support Staff</i>
11:15 AM – 12:15 AM	Meeting with Students

APPENDIX 2 PARTICIPANTS AT STAKEHOLDER SESSIONS

Session 2 Overview of actions and developments in past 5

Mr Michael Loftus	Head of Faculty, Faculty of Engineering and Science
Dr Hugh McGlynn	Head of School, School of Science & Informatics
Dr Aine Ni She	Head of Department, Department of Mathematics
Dr Brendan O'Connell	Head of Department, Department of Biological Sciences
Mr Tim Horgan	Head of Department, Department of Computer Science
Dr Stephen Hegarty	Department of Physical Sciences
Ms Marese Bermingham	Head of CIT Strategic Student Engagement and Retention Initiative
Ms Roisin O'Grady	Student Retention and Engagement Officer

Session 3 Academic Portfolio. Plans for next 5 years

Dr Hugh McGlynn	Head of School, School of Science & Informatics
Dr Aine Ni She	Head of Department, Department of Mathematics
Dr Brendan O'Connell	Head of Department, Department of Biological Sciences
Mr Tim Horgan	Head of Department, Department of Computer Science
Dr Stephen Hegarty	Department of Physical Sciences

Session 4 Engagement with Enterprise

Dr Hugh McGlynn	Head of School, School of Science & Informatics
Dr Aine Ni She	Head of Department, Department of Mathematics
Dr Brendan O'Connell	Head of Department, Department of Biological Sciences
Mr Tim Horgan	Head of Department, Department of Computer Science
Dr Stephen Hegarty	Department of Physical Sciences
Dr Liam Lewis	Centre for Advanced Photonics and Process Analysis
Mr Ray Wolfe	Centre for Advanced Photonics and Process Analysis
Dr Fiona O Halloran	Department of Biological Sciences
Dr Karen Finn	Department of Biological Sciences
Ms Richenda Kiernan	Department of Biological Sciences
Mr Eamonn Butler	Department of Physical Sciences
Mr Aengus Daly	Department of Mathematics
Mr Daithi Fallon	Faculty of Engineering and Science Representative, Extended Campus

Session 5**Industry Representatives**

Aileen Deasy	Seafood Technologist, BIM Seafood Development Centre
Siobhan Dean	Education Executive, BioPharmaChem Ireland
John Dunne	Division Head, Administrative Data Centre, Central Statistics Office
Michael Phelan	Head of Supply Chain Data Science Group, DePuy Synthes Companies
Edward Dixon	Data Scientist, Intel Security
James Collins	Engineering Manager, Intel Security
Nelson Abbey	Principal Information Developer, Johnson Controls
Anthony O'Leary	Director of Operations & Strategy, Global Support Services, VMware EMEA

Session 6**Research**

Dr Hugh McGlynn	Head of School, School of Science & Informatics
Dr Aine Ni She	Head of Department, Department of Mathematics
Dr Brendan O'Connell	Head of Department, Department of Biological Sciences
Mr Tim Horgan	Head of Department, Department of Computer Science
Dr Stephen Hegarty	Department of Physical Sciences
Dr Will Whelan-Curtin	Department of Physical Sciences
Dr Roy Sleator	Department of Biological Sciences
Dr Helen O'Shea	Department of Biological Sciences
Dr Brigid Lucey	Department of Biological Sciences
Dr Shane O' Rourke	Department of Mathematics
Dr Sean Lacey	Department of Mathematics
Dr Noreen Quinn	Department of Mathematics
Dr Catherine Palmer	Department of Mathematics
Dr Ignacio Castiñeiras	Department of Computing
Dr Donna O'Shea	Department of Computing
Dr Nicolay Petkov	Department of Physical Sciences
Dr David Williams	Department of Physical Sciences
Dr Josh Reynolds	Department of Physical Sciences
Dr Niall Smith	Head of Research

Session 7 Meeting with Staff

John Creagh	Academic Staff, Department of Computer Science
Seamus Lankford	Academic Staff, Department of Computer Science
David Murphy	Academic Staff, Department of Computer Science
Chris O’Sullivan	Senior Technical Officer, IT
John Murphy	Senior Technical Officer, School of Science and Informatics
Ivan Coombes	Senior Technical Officer, Department of Physical Sciences
William Whelan-Curtin	Academic Staff, Department of Physical Sciences
Martin Woods	Academic Staff, Department of Physical Sciences
Anne-Marie Keaveney	Academic Staff, Department of Biological Sciences
Jim O’Mahony,	Academic Staff, Department of Biological Sciences
Michael Healy	Academic Staff, Department of Biological Sciences
Noreen Lucey	Assistant Staff Officer, Department of Mathematics
Donal O’Shea	Academic Staff, Department of Mathematics
Hannah Lordan	Academic Staff, Department of Mathematics
Michael Brennan	Academic Staff, Department of Mathematics
Patricia Cogan	Academic Staff, Department of Mathematics

Session 8 Meeting with students

Theo McCabe, Award Year, Higher Diploma in Science in Data Science & Analytics

Jane Delaney, Award Year, Higher Diploma in Science in Data Science & Analytics

Aidan Murphy, Part-time Student, Award Year, Higher Diploma in Science in Data Science & Analytics

Chris O’Donovan, Part-time Student, Award Year, Higher Diploma in Science in Data Science & Analytics

Jack O’Grady, Class Representative, 2nd Year, BSc (Hons) in Nutrition & Health Science

Stephen Walsh, 1st Year, BSc in Software Development

Paddy O’Driscoll, 2nd Year BSc (Hons) Analytical Chemistry with Quality Assurance

Jack O’Grady, Class Representative, 2nd

Kieran O’Halloran

Lisa O’Sullivan

APPENDIX 3 SCHOOL PROGRAMMES BY DEPARTMENT

DEPARTMENT OF BIOLOGICAL SCIENCES

Higher Certificate in Science in Applied Biosciences
Bachelor of Science in Applied Biosciences and Biotechnology
Bachelor of Science in Food and Health Science
Bachelor of Science (Honours) in Biomedical Sciences (jointly with UCC)
Bachelor of Science (Honours) in Pharmaceutical Biotechnology
Bachelor of Science (Honours) in Herbal Science
Bachelor of Science (Honours) in Nutrition and Health Sciences
Biological Sciences (Common Entry)
Postgraduate Diploma in Science in Computational Biology
Master of Science in Computational Biology
Master of Science (Research)
Doctor of Philosophy

Special Purpose Awards

Diploma in Clinical Laboratory Practice

DEPARTMENT OF COMPUTER SCIENCE

Higher Certificate in Science in Computing
Higher Certificate in Science in Information Technology Support
Bachelor of Science in Computing
Bachelor of Science in Information Technology
Bachelor of Science (Honours) in Software Development
Bachelor of Science (Honours) in Software Development and Networking
Bachelor of Science (Honours) in Computer Systems
Bachelor of Science (Honours) in IT Management
Bachelor of Science (Honours) in Web Development
Bachelor of Science (Honours) in Cloud Computing
Higher Diploma in Science in Software Development
Higher Diploma in Science in Cloud Computing
Higher Diploma in Science in Cloud and Mobile Software Development
Postgraduate Diploma in Science in Networking and Security

Postgraduate Diploma in Science in Information Design and Development
Postgraduate Diploma in Science in Information Security
Master of Science in Software Development
Master of Science in Networking and Security
Master of Science in Cloud Computing
Master of Science in Information Development and Design
Master of Science in Information Security
Master of Science (Research)
Doctor of Philosophy

Special Purpose Awards

Certificate in CISCO Certified Network Associate (CCNA)
Certificate in CISCO IT Essentials 1 / CompTIA A+
Certificate in CompTIA Network+
Certificate in CompTIA Server+
Certificate in Computer Networking
Certificate in Web Development Fundamentals
Certificate in IT System Maintenance
Certificate in CompTIA Linux+
Certificate in Cloud Infrastructure Technologies
Certificate in CISCO Certified Network Professional (CCNP)
Certificate in Information Design and Development

DEPARTMENT OF PHYSICAL SCIENCES

Higher Certificate in Science in Industrial Measurement and Control
Higher Certificate in Science in Applied Physics and Instrumentation
Higher Certificate in Science in Chemistry
Bachelor of Science in Applied Physics
Bachelor of Science in Analytical and Pharmaceutical Chemistry
Science Common Entry (Level 7)
Bachelor of Science (Honours) in Analytical Chemistry with Quality Assurance
Bachelor of Science (Honours) in Instrument Engineering
Bachelor of Science (Honours) in Applied Physics and Instrumentation
Bachelor of Science (Honours) in Environmental Science and Sustainable Technology

Science Common Entry (Level 8)

Master of Science (Research)

Doctor of Philosophy

Special Purpose Awards

Certificate in Advanced Industrial Automation

Certificate in Process Control and Automation

Certificate in Quality Assurance

Certificate in Quality Management Part 1

Certificate in Quality Management Part 2

DEPARTMENT OF MATHEMATICS

Higher Diploma in Science in Data Science and Analytics