TUS

Technological University of the Shannon:
Midlands Midwest
Ollscoil Teicneolaíochta na Sionainne:
Lár Tíre Iarthar Láir

www.tus.ie

Dámh na nEolaíochtaí Feidhmeacha agus na Teicneolaíochta
Faculty of Applied Sciences and Technology

# Report of Peer Review Panel

# Programmatic Review

# of the

# Department of the Applied Science

## 1. INTRODUCTION

This report outlines, in summary form, the proceedings of the External Panel visit to TUS for the Programmatic Review of the Department of the Applied Science, and the findings and conclusions of the External Panel.

The Programmatic Review visit was undertaken in accordance with Section 3 of the LIT document 'Academic Council Regulations and Procedures for Taught Programmes (ACRP): Academic Year 2021/2022'. The ACRP is published on the TUS website. An external Panel makes an impartial judgement on the Critical Self Study and programme changes proposed within the Programmatic Review.

## 2. GENERAL INFORMATION

### 2.1 Higher Education Provider

| | |
|---|---|
| Institute: | TUS: Midlands Midwest |
| Faculty/School: | Faculty of Applied Sciences and Technology |
| Department: | Applied Science |
| Date of Visit: | 24th March 2022 |

### 2.2 Programmes Evaluated

Department of Applied Science

### 2.3 External Programmatic Review Panel of Expert Assessors

Dr Dermot Douglas – Formerly IOTI (Chairperson)
Dr Rosemary Rea – MTU Cork
Dr Michael Whitehead – Wolverhampton University
Dr Deirdre A. Buckley – Eli Lilly Cork
Ms. Ciara McHale – Eli Lilly Cork
Ms Anne-marie Ryan – MeiraGT Shannon
Ms Bernadette Whelan – WIT
Dr Gemma Kinsella – TU Dublin
Ms Catherine O'Keeffe – Stryker Cork
Ms Anita Lombard – Stryker Limerick
Dr Fiona McArdle – IT Sligo
Dr Arjan van Rossum - DKIT
Dr Gerard Cummins – University of Birmingham
Dr Philip Richard Walsh – WIT
Dr Stephen Costello – SPV Healthcare
Mr. Ruairi Driscoll – IT Sligo
Mr. Michael Galvin – Beckton Dickinson
Mr. David Murray – Cook Medical Denmark
Dr Thomas Smith – University of Munich
Prof. Conor Murphy-Maynooth University
Mr. John O'Shaughnessy – Clancy Construction
Mr. Alan Lauder – Alan Lauder Consulting
Ms. Victoria Decristoforo - Student Representative

Mr. David Normoyle - Student Representative
Mr. Bryan Curtin – Student Representative
Dr Katie Shiels – Shannon ABC Student Representative
Dr Norma Browne – Briston Myers Squib – Student Representative

2.4 Institute Staff

Prof. Vincent Cunnane, TUS President
Dr Terry Twomey, Vice President Academic Affairs & Registrar
Dr Maura Clancy, Dean of Faculty of Applied Sciences and Technology
Dr Daniel Walsh, Head of Department of Applied Science
*Department of Applied Science – Lecturing Staff*

2.5 Selected Stakeholders

2.5.1 Employers/Industry & Alumni Representatives

Jim Croke – Lawter - Env
James Mulcahy- Env
David McGuire – Altratech - DMPA
Eddie McSherry - Zimmer- DMPA
Richie Butler – Technopath - FPS
Bill O'Brien – Technopath- FPS
Marie O'Loughlin -J&J – FPS/ MedTech/Bio
Mary Denton – MedTech
Mary McKenna – Regeneron - Bio
Enya Doolan – Edwards - Bio
Joanne Nolan – Qmul - Bio
Barbara Kelly – Serosep – Bio
Ciara Mullen – Serosep – Bio
Rebecca Coughlan – Regeneron - Bio

2.5.2 Current Students

Jade Whyte- Env
Eoin Gleeson- Env
Aaron Tuohy - Env
Stephanie Driscoll - DMPA
Alex Pearse- DMPA
Robyn O'Neill- DMPA
Robert Cleary - FPS
Thomas Bourke- FPS
Callum Wixon- FPS
Rachel Linnane – Med Tech
Jack Prior– Med Tech
Shane Roche– Med Tech
Scott Culloty - Bio
Michaela Fitzgerald - Bio
Alexander Ciszewicz - Bio

2.6 Documentation

2.6.1 Faculty Document

2.6.2 Department Document

2.6.3 Programme Documents:

Bachelor of Science in Applied Biology
Higher Certificate in Science in Applied Biology

Bachelor of Science (Honours) in Biotechnology with Biopharmaceutical Science
Bachelor of Science in Biotechnology with Biopharmaceutical Science
Higher Certificate in Science in Biotechnology with Biopharmaceutical Science

Bachelor of Science (Honours) Bioanalysis and Biotechnology (One year add-on)
Higher Certificate in Science in Bioprocessing (L6, Special Purpose Award)

Bachelor of Science (Honours) in Drug and Medicinal Product Analysis
Bachelor of Science in Drug and Medicinal Product Analysis
Higher Certificate in Science in Drug and Medicinal Product Analysis

Bachelor of Science (Honours) in Forensic and Pharmaceutical Science
Bachelor of Science in Forensic and Pharmaceutical Science
Higher Certificate in Science in Forensic and Pharmaceutical Science

Bachelor of Science (Honours) in Medical Technology
Bachelor of Science in Medical Technology
Higher Certificate in Science in Medical Technology

Bachelor of Science (Honours) in Clinical Technology

Bachelor of Science (Honours) in Medical Technology (One Year Add-on)
Bachelor of Science (Honours) in Clinical Technology (One Year Add-on)

Postgraduate Diploma in Science in Advanced Medical Technologies

Bachelor of Science (Honours) in Environmental Science and Climate
Bachelor of Science in Environmental Science and Climate
Higher Certificate in Science in Environmental Science and Climate

Bachelor of Science in Quality
Embedded Special Purpose Awards:
Certificate in Quality Documentation, GMP and Data Integrity
Certificate in Quality Management & Statistics
Certificate in Regulatory Affairs and Quality

Postgraduate Certificate in Advanced Communication & Presentation Skills (SPA Level 9)

## 3.0 FINDINGS AND RECOMMENDATIONS OF EXTERNAL PROGRAMMATIC REVIEW PANEL

3.1 The Bachelor of Science (Honours) in Clinical Technology is being validated for two years to allow remaining cohorts to complete the programme.

The Bachelor of Science (Honours) in Clinical Technology (One Year Add-on) is being validated for two years to allow remaining cohorts to complete the programme.

The External Validation Panel of Assessors recommends the on-going approval and re-validation for a further five years of all the remaining programmes and associated amendments in the Department of Applied Science, subject to the following conditions and recommendations.
Bachelor of Science in Applied Biology
Higher Certificate in Science in Applied Biology

Bachelor of Science (Honours) in Biotechnology with Biopharmaceutical Science
Bachelor of Science in Biotechnology with Biopharmaceutical Science
Higher Certificate in Science in Biotechnology with Biopharmaceutical Science

Bachelor of Science (Honours) Bioanalysis and Biotechnology (One year add-on)

Higher Certificate in Science in Bioprocessing (L6, Special Purpose Award)

Bachelor of Science (Honours) in Drug and Medicinal Product Analysis
Bachelor of Science in Drug and Medicinal Product Analysis
Higher Certificate in Science in Drug and Medicinal Product Analysis

Bachelor of Science (Honours) in Forensic and Pharmaceutical Science
Bachelor of Science in Forensic and Pharmaceutical Science
Higher Certificate in Science in Forensic and Pharmaceutical Science

Bachelor of Science (Honours) in Medical Technology
Bachelor of Science in Medical Technology
Higher Certificate in Science in Medical Technology

Bachelor of Science (Honours) in Clinical Technology

Bachelor of Science (Honours) in Medical Technology (One Year Add-on)
Bachelor of Science (Honours) in Clinical Technology (One Year Add-on)

Postgraduate Diploma in Science in Advanced Medical Technologies

Bachelor of Science (Honours) in Environmental Science and Climate
Bachelor of Science in Environmental Science and Climate
Higher Certificate in Science in Environmental Science and Climate

Bachelor of Science in Quality
Embedded Special Purpose Awards:
Certificate in Quality Documentation, GMP and Data Integrity
Certificate in Quality Management & Statistics
Certificate in Regulatory Affairs and Quality

Postgraduate Certificate in Advanced Communication & Presentation Skills (SPA Level 9)

3.2 Conditions

None

3.3 Recommendations

General

3.3.1 Continue to explore how best to integrate and manage resources for undergraduate and postgraduate research activities going forward with the Department.

3.3.2 Confirm the retention rates that have been mentioned in the SER report for the Department and look carefully at the breakdown from year to year and how the retention rates are calculated.

3.3.3 Consider how work placement will be addressed as the number of students increases across programmes and ensure the learning experience for those not on work placement addresses the same learning outcomes.

3.3.4 Consider allowing flexibility in the duration of the work placement (shorter 3 - month placement), or longer options to ensure work placement aligns to the criteria of specific industry partners.

3.3.5 Consider the staff supports that need to be put in place to allow staff to become more research active going forward. Look at other incentives beyond the 2hr teaching remission allocation allowance to ensure staff are conducting research led teaching instead of research informed teaching.

3.3.6 Where appropriate, review and incorporate flexible approaches to teaching, learning and assessment that were developed in response to emergency remote teaching during Covid 19 pandemic.

3.3.7 Review lab equipment to ensure suitability and consider a rolling budget for the replacement and maintenance of such equipment.

Programme Suite: Breakout Room 1 AM (Applied Biology, Biotechnology,)

3.3.8 Consider aligning the assessment elements or the two approaches to work placement, given that both approaches aim to meet the same learning objectives.

3.3.9 Consider making the Professional Development module mandatory for those students who do not secure a placement in industry.

3.3.10 Review the TUS ACRP to consider a policy around the wording of 'and' and 'with' in overall programme titles.

3.3.11 Examine opportunities to reduce, where possible, over-assessment within the modules. Review assessments where learning outcomes are being over assessed.

3.3.12 Include guest lecturers, industry representatives and site visits to supplement core programme content.

3.3.13 Consider the contents of the module *Topics in Biotechnology Level 7* to be more relevant to Bio Pharmaceutical science.

3.3.14 For the BSc *Applied Biology*, consider changing the classifying Level 7 award, to include work completed in Year 2.

Programme Suite: Breakout Room 2 AM (Drug and Medicinal, Forensics)

3.3.15 Ensure professional practice skills are adequately covered within the modules. Explore the opportunities for students to further develop these skills in their assessments.

3.3.16 Consider covering the topic of Intellectual Property IP in the programmes as this is very relevant within Industry currently.

3.3.17 Consider encouraging students to align their FYP to the work they completed as part of their work placement in collaboration with Industry partners.

3.3.18 Consider reviewing the titles of the *Instrumental Analysis* modules, to distinguish these for students, *Instrumental Analysis* is mentioned 5 times as module title, across the programme(s).

3.3.19 Continue to review and look at opportunities for students to complete their work placement abroad building on existing networks that are in place such a within the RUN-EU (ERASMUS).

3.3.20 Consider the importance of covering current data integrity and advanced analytics and its application to the biopharmaceutical industry.

3.3.21 Consider the inclusion of the breakdown of the marks for the work placement modules in percentages, currently listed as 100% CA.

Programme Suite: Breakout Room 1 PM (Medical Technology)

3.3.22 Consider adding content on Statistical Sampling and allow more time for Statistics content to be covered (example MSA and problem-solving techniques).

3.3.23 Expand content to include Cyber-physical systems and Cybersecurity, Data Literacy, Software as Service (SAS), 5g and GDPR/Patient Information Protection.

3.3.24 Develop information on, reference and link relevant to ISO's eg ISO14971 and link MDR to ISO14971, IEC 62366-1, 2015 Usability Engineering

3.3.25 Emphasise Cleanroom environment, cleanroom controls, sterilisation and other sterilisation other modalities to enhance the overall programme content. Reference No.14644-1.

3.3.26 Ensure that course content contains referencing to relevant standards and regulations.

Programme Suite: Breakout Room 2 PM (Environmental Science)

3.3.27 Review the reading lists in the modules to incorporate more peer-review journals and literature in addition to textbooks (some of which are relatively old now). Consider setting up a journal club or reading based module to help students develop their research skills, could be linked to assessment and creates opportunities for cross-disciplinary assessment.

3.3.28 Ensure the core field study skills are covered across the programme to ensure graduates have the essentials skills to prepare them for industry across multiple fields. Place greater emphasis on taxonomy and identification skills.

3.3.29 Incorporate use of programming tools such as R to move beyond just the use of Excel. These are highly transferable skills and in demand by a range of employers

3.3.30 One of the key challenges identified by the department was integration of climate change across other modules. It may be possible to increase opportunities for inclusion of climate related content into modules particularly through fieldwork and project based work. A key strength seems to be water and hydrology, looking closer at links between atmospheric and hydrology would be encouraged, maybe under the theme of hydro-climatology.

3.3.31 Incorporate the use of national and international data sets into modules that students can use for student project work. It is not clear if students get to work with climate projections at all. Sites like the Copernicus Data Store offer huge possibilities for research led teaching and for student projects.

3.3.32 A key aspect for graduates to learn about is the science policy interface and how to navigate uncertainties for better decision making. It would be useful to ensure that students get critical perspectives on this topic.

Programme Suite: Student Session

3.3.33 Consider the balance between CA and Final Exams. Students expressed a preference for CA over Final Exams. Students were asking for more timely feedback from the CA and this is more beneficial.

3.3.34 Consider the use of more formative assessment opportunities for students such as weekly Moodie quizzes and 'Mentimeter' activities to encourage participate and engagement among the class.

3.3.35 Consider providing students with access to pre-recorded lecturers (where appropriate) as resources for students to go over their modules.

3.3.36 Consider providing students with an assessment schedule at the beginning of the semester to support them in managing their assessments and course work.

Programme Suite: Industry and Alumni

3.3.37 Consider the communication in relation to how procedures and practices in Biotech are aligned to the regulations and standards.

3.3.38 Consider the integration of GMP and Data Integrity more throughout the programme where suitable.

## 3.4 Commendations and Observations

3.4.1 The Panel commended the department on its presentation as a coherent team and thanked the staff.

3.4.2 The Panel commends the programme teams on the quality of the programme documentation which has been developed to a high standard.

3.4.3 The Panel notes and commends the degree of work conducted by the Department during the Programmatic Review and notes the extensive stakeholder consultation in particular.

3.4.4 The panel would like to have had more time with the programme team to discuss the individual programmes.

3.4.5 Consider bringing students, Alumni and Employers into relevant breakout rooms specific to the programme rather than a wider general session.