Ollscoil
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University

Report of External Peer Review Group for the Programmatic Review of:

Programme	Code	Level	ECTS	Duration	Award Type	Embedded Awards
Bachelor of Science (Honours) Common Science. Entry to BSc in Applied Biology and Biopharmaceutical Science Bsc in Chemical and Pharmaceutical Science, BSc in Physics and Instrumentation, BSc in Applied Freshwater and Marine Biology, BSc in Forensic Science	GA_SCOMG_H08	8	60	1	Entry	N/A
Bachelor of Science Common Science. Entry to BSc in Applied Biology and Biopharmaceutical Science Bsc in Chemical and Pharmaceutical Science, BSc in Physics and Instrumentation, BSc in Applied Freshwater and Marine Biology, BSc in Forensic Science	GA_SCOMG_B07	7	60	1	Entry	N/A
Bachelor of Science (Honours) in Applied Biology and Biopharmaceutical Science	GA_SABBG_H08	8	240	4	Major	Bachelor of Science in Applied Biology and Biopharmaceutical Science Higher Certificate in Science in Applied Biology and Biopharmaceutical Science
Bachelor of Science in Applied Biology and Biopharmaceutical Science	GA_SABBG_B07	7	180	3	Major	Higher Certificate in Applied Biology and Biopharmaceutical Science
Higher Certificate in Science in Applied Biology and Biopharmaceutical Science (Exit)	GA_SABBG_C06	6	120	2	Exit	Parent Award: Bachelor of Science in Applied Biology and Biopharmaceutical Science
Bachelor of Science (Honours) in Quality for Industry	GA_SQUAG_H08	8	+60	1	Major	Certificate in Quality for the Medical Device Industry (40 ECTS)
Certificate in Quality for Medical Device for Industry	GA_SQMDG_N08	8	40	1	Minor	Parent Award: Bachelor of Science (Hons) in Quality for Industry
Bachelor of Science in Quality for Industry	GA_SQUAL_J07	7	+60	1	Major	Embedded Awards: Certificate in Science in Quality and Regulatory Affairs Certificate in Science in Quality Management

						Certificate in Science in Quality Statistics and Management
Certificate in Science in Quality and Regulatory Affairs	GA_SSCIE_N07	7	20	1	Minor	Parent Award: Bachelor of Science in Quality for Industry
Certificate in Science in Quality Management	GA_SSCIE_N07	7	20	2	Minor	Parent Award: Bachelor of Science in Quality for Industry
Certificate in Science in Quality Statistics and Management	GA_SQSMG_S07	7	20	1	Minor	Parent Award: Bachelor of Science in Quality for Industry
Certificate in Medical Device Technology	GA_SMEDG_E06	6	30	1	SPA	N/A
Higher Certificate in Good Manufacturing Practice	GA_SGMPG_C06 temporary code	6	120	2	Major	N/A
Bachelor of Science (Honours) in Chemical and Pharmaceutical Science	GA_SCHPG_H08	8	240	4	Major	Bachelor of Science in Chemical and Pharmaceutical Science
						Higher Certificate in Science in Chemical and Pharmaceutical Science
Bachelor of Science in Chemical and Pharmaceutical Science	GA_SCHPG_B07	7	180	3	Major	Higher Certificate in Science in Chemical and Pharmaceutical Science
Higher Certificate in Science in Chemical and Pharmaceutical Science (Exit)	GA_SCHPG_C06	6	120	2	Exit	Parent Award: Bachelor of Science in Chemical and Pharmaceutical Science
Bachelor of Science (Honours) in Forensic Science and Analysis	GA_SFSCG_H08	8	240	4	Major	Bachelor of Science in Forensic Science & Analysis
						Higher Certificate in Science in Forensic Science & Analysis
Bachelor of Science in Forensic Science and Analysis (Exit)	GA_SPHYG_B07	7	180	3	Exit	Parent Award: Bachelor of Science (Hons) in Forensic Science and Analysis
Higher Certificate in Science in Forensic Science and Analysis (Exit)	GA_SFSCG_C06	6	120	2	Exit	Parent Award: Bachelor of Science (Hons) in Forensic Science and Analysis

Date of Panel:
May 13th, 2022

External Peer Review Group:

Panel	
Chairperson	Dr Michael Hall, Head of School, Health Social Science, MTU Kerry
IoT/ Uni Representative	Dr Eileen O'Leary, Lecturer in Chemistry, MTU Cork Dr Ariane Perez Gavilan Lecturer Chemical & Pharmaceutical Science, SETU
IoT/ Uni Representative	Dr Dina Brazil, Senior Lecturer, Dept of Science & Health, SETU Carlow. Dr Padraig Darcy, Senior Lecturer, Department of Biomedical & Clinical Sciences, Linköping University
Industry Representative	Dr Brian Gibson, Toxicology Team Manager, Forensic Science Ireland
Graduate Representative	Ms. Roisin Lantham, Analyst at the State Laboratory Mr. Simon Faulkner, IDA
Secretary	Ms. Carmel Brennan Assistant Registrar (Quality)

1   Introduction to Programmatic Review

Programmatic review involves a periodic, formal, systematic, comprehensive and reflective review and evaluation of each programme and award offered by the Institute for purposes of programme development, quality enhancement and revalidation. It is an important means of ensuring and assuring, *inter alia*:
- that required academic standards are being attained.
- that programmes and awards remain relevant and viable;
- that student needs, including academic and labour-market needs, are addressed;
- that the quality of programmes and awards is enhanced and improved;
- public confidence in the quality of GMIT's programmes and awards.

GMIT last conducted Programmatic Review in 2014 and was due to undertake it again in 2019/20. The process was delayed until this year due to the COVID-19 pandemic.

The objective of a programmatic review is to review the development of the programme over the previous five to seven years, with particular emphasis on the achievement and improvement of educational quality. The focus is principally on the evaluation of quality and the flexibility of the programmes' responses to changing needs in light of the validation criteria and relevant awards standards. In particular, a programmatic review seeks to confirm that the promise evidenced at the original validation (or since the last programmatic review) in terms of academic quality, relevance and viability has been realised, and that the programme is adapting appropriately to evolving circumstances.

The specific objectives of a programmatic review are, *inter alia,* to:
- analyse and evaluate the effectiveness and efficiency of the programme, including details of student numbers, retention rates and success rates;

- review the development of the programme in the context of the requirements of employers, industry, professional bodies, the Irish economy and international developments;
- evaluate the response of the programme to regional and societal requirements and to educational developments;
- evaluate the feedback mechanisms for students and the processes for acting on this feedback;
- review the feedback from students relating to the student experience of the programme
- evaluate stakeholder engagement including links and collaboration with industry, business and the wider community;
- review feedback from employers and graduates;
- evaluate the physical facilities and resources provided for the provision of the programme;
- review any research activities in the field of learning in the disciplinary areas and their impact on teaching and learning;
- consider likely future developments in the disciplinary areas;
- make proposals in relation to updating programmes and modules, and to discontinuing programmes or parts of programmes.

Academic Council identified three themes to be specifically addressed during the 2021/22 Programmatic Review namely:
- Assessment – ensure the assessment strategy and methodology are appropriate and aligned with learning outcomes and that students are not over-assessed.
- Employability – ensure that students develop career skills necessary to prepare them for employment. Embed professional practice (e.g., work placement, work-based projects in the programme, ensuring that there is an appropriate plan for their management)
- Sustainability – review modules and learning outcomes to ensure that the sustainability agenda is addressed, debated, and applied within student learning and assessment, as appropriate.

2   Methodology

The programmatic review process involves a self-evaluation by each programme board followed by an external peer review. The Programme board engaged in a process of the collection and review of data related to the programme and feedback from stakeholders including students, graduates, and industry. The overall programme and each individual module have been reviewed and recommendation(s) for updates made as required.

The External Peer Review Group (EPRG) received a copy of the Self Evaluation Review documentation and the programme documentation including any proposed changes. The EPRG then met the Programme Board (Appendix A) to discuss the programme and the documentation provided, as well as meeting a representative sample of students (Appendix B). The schedule for the review visit is contained in Appendix C.

3   Background to Programme(s) Being Reviewed

Bachelor of Science Common Science L7 and L8.
Entry to:
BSc in Applied Biology and Biopharmaceutical Science L7 and L8
BSc in Chemical and Pharmaceutical Science L7 and L8
BSc in Physics and Instrumentation L7 and L8
BSc in Applied Freshwater and Marine Biology L7 and L8
BSc in Forensic Science L8

The School of Science & Computing delivers a wide range of science courses from Levels 6 to 10. At undergraduate level, there are 16 separate intakes from the CAO which yield 14 separate degree qualifications. For well over two decades, students of a subset of these programmes have been taught together in what is termed 'Common first year science', and in total, 11 programmes constitute the common first year science cohort, and complete the same year 1 subjects. Upon completion of year 1, students must decide which of degree programme they wish to transfer into, and they have a choice to progress into any of the other programmes represented in common first year science. All other students in common year 1 science can progress into year 2 of their chosen programme or they can also switch into year 2 of any of the other programmes represented in common year 1 science. In semester 2 of year 1, a survey is taken of all students to determine which programme they wish to progress into.

Bachelor of Science (Honours) in Applied Biology and Biopharmaceutical Science
Bachelor of Science in Applied Biology and Biopharmaceutical Science
Higher Certificate in Science in Applied Biology and Biopharmaceutical Science (Exit)

In September 2005, the old structure of the 2+1+1 (Higher Certificate, add-on one-year Diploma, add-on one-year honours degree) was discontinued, and two Ab Initio programmes at level 7 and level 8 were launched. The programme titles were also changed at this time, and the two programmes were named B.Sc. in Applied Biology & Biopharmaceutical Science and B.Sc. Honours in Applied Biology & Biopharmaceutical Science. The first graduates of the B.Sc. ordinary programme graduated in November 2008, and the first graduates of the B.Sc honours programme graduated in November 2009.
Both Level 7 and Level 8 students complete the same material for the first three years. At the end of year 3, the Level 7 learners graduate with a B.Sc. Ordinary. These graduates can apply for admission into year 4 of the programme, and thus join their Level 8 colleagues to complete year 4. There is an opportunity for a student to exit after two successful years, with a Higher Certificate award.
The programme promotes the enhancement of the individual experience- by providing our students with an excellent learning experience on a high-quality programme, in a stimulating and supportive learning environment. The course offers studies with equal emphasis on practice and theory using an applied learning (Apl) educational approach where students learn by engaging in direct application of skills and theories in laboratory sessions enabling them to reach their full potential. The placement module in the second semester of the 4th year further embraces the Apl approach.

Bachelor of Science (Honours) in Quality for Industry
Certificate in Quality in Medical Devices for Industry
Bachelor of Science in Quality for Industry
Certificate in Science in Quality and Regulatory Affairs
Certificate in Science in Quality Management
Certificate in Science in Quality Statistics and Management
Certificate in Medical Device Technology
Higher Certificate in Good Manufacturing Practice

The Departments offers a range of quality programmes from stage 6 to 8 targeted at mature, part-time learners who are primarily in employment. These quality programmes offer a structured, flexible, and progressive programme of study to students and equip them with the skills to play key roles in quality management and quality engineering in the med tech sector. These programmes are Industry-based, and the students are typically working in various local, highly regulated industries. Modules are blended and hosted in the evening times to facilitate those working. Delivery includes a mix of blended, online, onsite, workshops, guest speakers, experimental work, peer learning, lectures, and seminars. The lecturing team bring an innovative, experienced, practical approach in the application of the various technical aspects and regulatory nuances of these modules. These quality programmes develop confident, professional, knowledgeable, and skilled graduates equipped to contribute as global citizens.

Bachelor of Science (Honours) in Chemical and Pharmaceutical Science
Bachelor of Science in Chemical and Pharmaceutical Science
Higher Certificate in Science in Chemical and Pharmaceutical Science (Exit)

The traditional aim of these programmes is to provide the student with the knowledge and skills to enable them to be employed as a scientist within a range of industries and/or to progress to post-graduate level in Chemistry. Graduates are expected to find employment in the Chemical, Pharmaceutical, Bio-Pharmaceutical and Medical Device sectors, as well as more broadly in analytical science.
There is a demand locally, nationally, and internationally for graduates of chemistry-based degrees who have the necessary skills to work in the broad pharmaceutical/medical device sectors. This programme is designed to address this need.
In September 2005, the old structure of the 2+1+1 (Higher Certificate, add-on one-year Diploma, addon one-year Honours Degree) was discontinued, and two ab initio programmes at level 7 and level 8 were launched. The programme titles were also changed at this time, and the two programmes were named B.Sc. (Ordinary) in Chemical and Pharmaceutical Science and B.Sc. (Honours) in Chemical and Pharmaceutical Science.
In September 2007, a significant change was made to the structure of the Chemical and Pharmaceutical Science programme in that a six-month, 30 credit, semester-long industrial placement was introduced into semester 6 of the programme. This initiative received significant funding from the Higher Education Authority under the Strategic Innovation Fund (SIF). To facilitate this change, the programme schedules of years 2, 3 and 4 of the programmes were modified in 2007.

Bachelor of Science (Honours) in Forensic Science and Analysis
Bachelor of Science in Forensic Science and Analysis (Exit)
Higher Certificate in Science in Forensic Science and Analysis (Exit)

The programme has a strong emphasis on analytical science which is delivered in the following four pillars: Trace Evidence, Forensic DNA, Computer Forensics and Analytical Chemistry. There is a significant practical and project component to the programme and students learn skills such as project management, time management, decision making and laboratory practical skills. Students discover how a crime scene is investigated and how to collect and analyse crime scene evidence. They learn about computer forensics, digital footprint, DNA analysis and how to present scientific results as an expert witness in court. On completion, graduates have a qualification that provides opportunities for employment in a range of areas

and will facilitate career advancement to managerial positions. These areas include employment in Forensic Science, Analytical and Pharmaceutical Sciences, the Biotechnology and Biomedical sectors and Environmental Protection. Students are also able to progress into further studies in niche areas of Forensic Science where they can obtain postgraduate qualifications.

4   General Findings of the External Peer Review Group

Having considered the documentation provided and discussed it with the Programme Board, the External Peer Review Group recommends the following:

Accredited until the next programmatic review	
Accredited until the next programmatic review subject to conditions and/or recommendations[1]	X
Re-design and re-submit to the same External Peer Review Group after additional developmental work	
Not Accredited	

5   Programme-Level Findings – Common Science

The panel complimented the presentation of statistics in relation to the common first year entry route. An analysis of same led to a discussion on the levels 7 and 8 programmes.   It was clarified that the entry points for both programmes were dictated by demand and that the differentiation in ability between both cohorts is small.   However, sometimes those that enter on the level 7 programme may be less sure about their programme choice.

The Programme Board is proactive in relation to student retention. One example given related to maths whereby students are required to achieve mastery, and this results in more engagement than normal and boosts confidence of those who had previously considered themselves poor at maths. Additional support is provided through the Maths Learning Centre. The programme also uses a dashboard using information from Moodle which identifies students who have stopped engaging. Such students are contacted in an effort to identify the underlying cause(s) and to put in place suitable interventions. Overall performance can be predicted as early as week five. The model is being further refined through the work of a Master in Teaching and Learning student.

No changes proposed to year 1 at this time. It is working well and any interventions that can be used to enhance student success are in place.   Retention initiatives are focussed on student engagement and sense of belonging. Tutorial group sizes are being considered. It is viewed to be a

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[1] **Note:**
Approval is conditional on the submission of a revised programme document that takes account of the conditions and recommendations outlined in the report and a response document describing the actions to address the conditions and recommendations made by the External Peer Review Group (EPRG). In this report, the term 'condition' is used to indicate an action or amendment which in the view of the EPRG must be undertaken prior to the commencement of the next delivery of the programme. Conditions are mandatory if the programme is to be approved. The term 'recommendation' indicates an item to which the Programme Board should give serious consideration for implementation at an early stage and which should be the subject of on-going monitoring.

strength of programme that it is the lecturing staff who are involved in delivery of laboratories and tutorials.

The volume of assessment is a regular topic of conversation. Whilst first year students may have 6 or 7 assignments per week, these do not involve a large volume of student work. The Programme Team works to manage student workload. The use of regular low stake assessments is part of the programme's philosophy of assessment as learning as well as assessment of learning. Student feedback has not highlighted any issues with the volume of assessment.

It was clarified that whilst no changes have been proposed to stage one, that there has been an evolution in relation to how teaching and assessment is undertaken. Students undertake work with Micro:bit across many modules, and there is evident progress in student coding ability as the stage progresses. Integration takes place across modules where feasible e.g., data from students' biology project is used within the maths module.

Commendation(s):
1. Quality of documentation presented to the panel. The review documents were clear and comprehensive and assisted in the panel's review work.
2. Innovative and evidence-based teaching and assessment strategy, with an ongoing perspective of continuous improvement. There is a strong emphasis on student retention, engagement, and support.

Condition(s):
None.

Recommendation(s):
1. Consider how further integration of knowledge between modules can be accomplished.
2. Clarify failed elements within module descriptors and include the failed element rule in the special regulations at each stage of the Approved Programme Schedule.

6   Programme-Level Findings - Bachelor of Science (Honours) in Applied Biology and Biopharmaceutical Science and Embedded Awards

Consideration for the panel	Overall finding: Yes/No/Partially
Is there an ongoing need for the programme and has evidence been provided to support it?	Yes
Is the level and type of the award appropriate?	Yes
Are the entry requirements for the proposed programme clear and appropriate?	Yes
Is there a relationship between this programme and further education?	Yes
Are the access, transfer and progression procedures appropriate?	Yes

Does the programme comply with the Institute norms for retention, both in first year and subsequent years? Where not, does the Programme Board proactively take appropriate measures to optimise student engagement and retention?	Yes
Does the programme meet the required standards for programmes at its NFQ level (i.e., conform to GMIT Award Standards[2])? For Parent Award? For Embedded Award(s) (if applicable)? For Exit Award (if applicable)? For Minor Award (if applicable)?	Yes
Is the programme structure logical, well designed, and can the stated programme intended learning outcomes, in terms of employment skills and career opportunities, be met by this programme?	Yes
Have appropriate learning and teaching strategies been provided for the programme that supports Student Centered Learning (SCL)?	Yes
Have appropriate programme assessment strategies been provided for the programme taking account of the student workload?	Yes
Is there evidence that learning, and teaching is informed by research?	Yes
Have appropriate quality management procedures been implemented in line with GMIT's Quality Assurance Framework? (e.g., Induction, Programme Handbook, Programme Board, Student Feedback, External Examiners)	Yes
Does the proposed programme demonstrate an international dimension? (e.g., content, mobility, collaboration)	Yes
Does the programme encompass sustainable development principles and ethos?	Yes
Does the programme embed employability through the inclusion of work placements, employment preparatory module(s) and/or work-based projects?	Yes
Is there evidence of strategies to promote diversity and inclusion?	Yes
Is entrepreneurship, creativity and innovation embedded in the programme?	Yes
Has the efficiency of the programme's design been considered? For example, does the programme meet the Institute norms on staff:student ratios for programmes of this type?	Yes
Is the programme externally facing? (e.g., Stakeholder engagement, guest speakers, fieldtrips, applied projects)	Yes

An extensive discussion took place on placement which occurs at the end of the programme and is of 9 weeks duration. The Programme Board did consider increasing the duration of the placement. They determined that its location at the end of stage four allows for students to remain in the placement for a longer period gaining valuable experience, and possibly transitioning into employment with their placement company. Based on experience during the pandemic when an alternative to placement was used a new approach to placement is proposed. The variability in placement experience, particularly as the student cohort has increased, is accounted for by changing to a Pass/Fail mode of grading, whilst all students undertake an equally challenging project. The Programme Board consider that students will remain motivated as they seek to gain experience in the workplace. Students who do not gain external placement are placed inhouse in laboratories. There is a detailed rubric for placement. Employers are asked for feedback on students. However, it was clarified that it is ultimately the lecturer who is responsible for making the final determination in relation to grade. It was suggested that there should be some evidence provided by students in addition to employer feedback to inform that determination.

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[2] GMIT has adopted QQI's award standards which are available HERE.

The changes proposed by the Programme Board were considered. It was clarified that the removal of electives did not mean removal of content in all instances as there had been a degree of overlap in the programme and there was some redistribution of content. Previously all electives had not been offered due to resource constraints and students seemed to choose the same electives annually.

Feedback from industry informs this programme. There is ongoing liaison with employers through work placement. The Programme Board also engaged with industry partners through the development of two new programmes in this discipline. The programme incorporates site visits and guest lecturers whilst staff engage in continuous professional development.

Whilst opportunities for student exchanges have been considered, it is difficult to align learning, but in the future, it may be considered how the placement may be internationalised.

Sustainability is embedded in the Academic and Professional Skills module, whilst in stages 2 and 4 there are module learning outcomes relating to the topic. In addition, the School is seeking green labs accreditation.

Discussions with the Programme Board revealed that in some instances the module learning outcomes understated what was being done. This was particularly the case in stage 2 of the programme.

Feedback from students was positive. The programme was considered to give graduates a range of opportunities on graduation. Potential improvements included a longer placement and Quality Management becoming a yearlong module. Undertaking the research project whilst on placement was considered challenging.

The primary changes proposed for the programme involved removal of electives, module name changes, content changes, reduced exam time, two new modules, an amendment to grading mode for the placement, and restructuring of modules. All changes as outlined in Appendix D were approved and the programme was accredited until the next programmatic review subject to the recommendations below.

Commendation(s):
1. The use of spiral curriculum, building student knowledge and skills progressively in each stage of the programme.
2. Integration of feedback from students, industry and staff into the programme design and delivery. The programme has close links with industry, and this is reflected in the employment opportunities for students.
3. Staff appreciation of the volume of assessment undertaken by students, and the work of the Programme Board to develop a coherent assessment strategy.
4. Quality of documentation presented to the panel. The review documents were clear and comprehensive and assisted in the panel's review work. A clear rationale was presented for changes proposed.
5. Engagement of the Programme Board with the panel, the open discussion and willingness to consider suggestions for improvement.

Condition(s):
   None.

Recommendation(s):
1. Consider elucidating the evidence the students' perception of their own learning during placement and using this as part of the evidence to determine the attainment of the relevant learning outcomes.

2. Ensure that the work placement preparation element of the programme is sufficiently visible within the programme documentation.
3. Clarify failed elements within module descriptors and include the failed element rule in the special regulations at each stage of the Approved Programme Schedule.
4. Review module learning outcomes to ensure that they do justice to the learning achieved by students in all instances.
5. Explicitly describe how students' digital capacity is being enhanced throughout the programme.

7   Programme-Level Findings - Bachelor of Science (Honours) in Quality for Industry and Embedded Awards

Consideration for the panel	Overall finding: Yes/No/Partially
Is there an ongoing need for the programme and has evidence been provided to support it?	Yes
Is the level and type of the award appropriate?	Yes
Are the entry requirements for the proposed programme clear and appropriate?	Yes
Is there a relationship between this programme and further education?	N/A
Are the access, transfer and progression procedures appropriate?	Yes
Does the programme comply with the Institute norms for retention, both in first year and subsequent years? Where not, does the Programme Board proactively take appropriate measures to optimise student engagement and retention?	Yes
Does the programme meet the required standards for programmes at its NFQ level (i.e., conform to GMIT Award Standards[3])? For Parent Award? For Embedded Award(s) (if applicable)? For Exit Award (if applicable)? For Minor Award (if applicable)?	Yes
Is the programme structure logical, well designed, and can the stated programme intended learning outcomes, in terms of employment skills and career opportunities, be met by this programme?	Yes
Have appropriate learning and teaching strategies been provided for the programme that supports Student Centered Learning (SCL)?	Yes
Have appropriate programme assessment strategies been provided for the programme taking account of the student workload?	Yes
Is there evidence that learning, and teaching is informed by research?	Yes
Have appropriate quality management procedures been implemented in line with GMIT's Quality Assurance Framework? (e.g., Induction, Programme Handbook, Programme Board, Student Feedback, External Examiners)	Yes
Does the proposed programme demonstrate an international dimension? (e.g., content, mobility, collaboration)	Yes
Does the programme encompass sustainable development principles and ethos?	Yes

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[3] GMIT has adopted QQI's award standards which are available HERE.

Does the programme embed employability through the inclusion of work placements, employment preparatory module(s) and/or work-based projects?	Yes
Is there evidence of strategies to promote diversity and inclusion?	Yes
Is entrepreneurship, creativity and innovation embedded in the programme?	Yes
Has the efficiency of the programme's design been considered? For example, does the programme meet the Institute norms on staff:student ratios for programmes of this type?	Yes
Is the programme externally facing? (e.g., Stakeholder engagement, guest speakers, fieldtrips, applied projects)	Yes

The Programme Board coordinate assessments to ensure appropriate scheduling. They also engage in some co-assessment which lightens the student workload.

Students bring the own work experiences into the classroom. Modules are very practically based, and projects are designed to be work-based. In general, the Programme Board have a very student centric approach and a philosophy of authentic assessment. Students are treated as partners throughout their learning journey. Students tend to be a mature cohort that may not previously have had the opportunity to study at third level.

Students have the opportunity to provide feedback at the end of each module and this informs module and programme changes.

Whilst students are entitled to all the student supports full-time students can avail of, not all are accessible in the evenings.

Research undertaken with students in relation to preferred mode of delivery is inconclusive, so further research is to be undertaken in relation to onsite, online or hybrid. Some students favour face-to-face classes and the peer-support which arises from this, while others prefer the flexibility that online gives. The final decision on delivery mode will consider student characteristics and needs, staff preferred delivery mode, type of content and the facilities, equipment, and resources to support the move. The Programme Board have decided to further consult students.

During the pandemic a variety of online methodologies were used including videos, knowledge checks, Padlets, OneNote, visualisers, podcasts and interactive tools such as Mentimeter. Attendance was good in online classes, and there was no perceptible difference in student performance with the previous years.

A discussion took place on the entry requirements for the level 7 minor awards, and the lack of alignment with the level 7 add-on degree of which they are components. The Programme Board were strongly of the opinion that the entry requirements were appropriate and outlined that students who did not meet the minimum entry requirements for the degree had to complete a comprehensive RPL process before becoming eligible for the BSc. Furthermore, they outlined that students undertaking the minor awards continued to gain experience and promotions throughout their studies which left them in a better position to meet the learning outcomes assessed through RPL.

Sustainability is embedded throughout the programme. In addition, GMIT has a centre for sustainability which leads out on embedding sustainability into courses and helps increase lecturer awareness.

The primary changes proposed for the programme involved approval of multiple modes of delivery and updates to modules.   All changes as outlined in Appendix E were approved and the programme was accredited until the next programmatic review subject to the recommendations below.

Commendation(s):

1. Enthusiastic, dynamic, and cohesive team who are experienced and knowledgeable, and clearly passionate about the programme and students.
2. Innovative and evidence-based teaching and assessment strategy, with an ongoing perspective of continuous improvement.
3. Quality and comprehensiveness of documentation presented to the panel.
4. The clear link between the programme and the career progression of participants.

Condition(s):

1. Review the entry requirements for the level 7 minor awards in consultation with the Registrar.

Recommendation(s):

1. The University needs to consider how it can expand services to this and other cohorts studying onsite outside of normal day time hours.
2. Provide indicative information on the blended approach to teaching strategy and delivery in the programme document.
3. The panel recognised that the Programme Board perceives barriers to the initial application process and onboarding. These issues should be addressed for the benefit of students.

8 Programme-Level Findings - Bachelor of Science (Honours) in Chemical and Pharmaceutical Science and Embedded Awards

Consideration for the panel	Overall finding: Yes/No/Partially
Is there an ongoing need for the programme and has evidence been provided to support it?	Yes
Is the level and type of the award appropriate?	Yes
Are the entry requirements for the proposed programme clear and appropriate?	Yes
Is there a relationship between this programme and further education?	Yes
Are the access, transfer and progression procedures appropriate?	Yes
Does the programme comply with the Institute norms for retention, both in first year and subsequent years? Where not, does the Programme Board proactively take appropriate measures to optimise student engagement and retention?	Yes
Does the programme meet the required standards for programmes at its NFQ level (i.e., conform to GMIT Award Standards[4])? For Parent Award? For Embedded Award(s) (if applicable)? For Exit Award (if applicable)? For Minor Award (if applicable)?	Yes

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[4] GMIT has adopted QQI's award standards which are available HERE.

Is the programme structure logical, well designed, and can the stated programme intended learning outcomes, in terms of employment skills and career opportunities, be met by this programme?	Yes
Have appropriate learning and teaching strategies been provided for the programme that supports Student Centered Learning (SCL)?	Yes
Have appropriate programme assessment strategies been provided for the programme taking account of the student workload?	Yes
Is there evidence that learning, and teaching is informed by research?	Yes
Have appropriate quality management procedures been implemented in line with GMIT's Quality Assurance Framework? (e.g., Induction, Programme Handbook, Programme Board, Student Feedback, External Examiners)	Yes
Does the proposed programme demonstrate an international dimension? (e.g., content, mobility, collaboration)	Yes
Does the programme encompass sustainable development principles and ethos?	Yes
Does the programme embed employability through the inclusion of work placements, employment preparatory module(s) and/or work-based projects?	Yes
Is there evidence of strategies to promote diversity and inclusion?	Yes
Is entrepreneurship, creativity and innovation embedded in the programme?	Yes
Has the efficiency of the programme's design been considered? For example, does the programme meet the Institute norms on staff: student ratios for programmes of this type?	Yes
Is the programme externally facing? (e.g., Stakeholder engagement, guest speakers, fieldtrips, applied projects)	Yes

The review of the programme involved engagement with current students, graduates, employers and self-reflection by the Programme Board. This feedback informs the proposed changes.

There is a high chemistry content in programme which some students do not expect. While students would prefer more pharmaceutical content, employers want graduates with a strong chemistry background. The nature of the programme needs to be better communicated to students.

All students are provided with a handbook at the start of the year with clear communication about the programme.

Retention levels are strong with no major difference between the performance of level 7 and level 8 students. Retention appears lowest in stage 3 of the programme which was considered unusual. It was explained that year 3 is intense due to placements and students who had not applied themselves in the earlier stages of the programme could find it challenging. To date level 7 students have always been permitted progress to year 4 as space has not been an issue. Space is increasingly becoming a challenge. Recruitment of academic staff is underway to accommodate growing student numbers.

Health & safety was focused on writing risk assessment for chemicals. It was explained that college labs are different to those in industry and health and safety may not be fully understood by students until they experience it in placement.

A discussion took place on assessment grading. It was suggested that the weighting of marking in labs could be adjusted, as it is currently possible to obtain a high GPA, even though students may not be as strong in theoretical areas.

Placement is competitive, resources are required to broaden where students can obtain placement. A liaison person be useful to assist with international connections. In house placement is used as a last resort. It was suggested that the Programme Board should consider defining troubleshooting instrumentation methods during inhouse lab placements so that students gain this experience.

There was a discussion in relation to the proposed two paper final examination with one occurring at the end of semester one. It was clarified that the reason for the paper to be considered as part of the final examination rather than CA was that the latter would occur during the semester and consume valuable class time.

Feedback from students was positive. The programme was considered to give graduates a range of opportunities on graduation, but more assistance in relation to applying for research masters would be useful. Students felt prepared for employment. The end of the year is top heavy with assessment workload.

The primary changes proposed for the programme involved additional laboratories, assessment weighting changes, module title changes, content changes and new exam durations. All changes as outlined in Appendix F were approved and the programme was accredited until the next programmatic review subject to the recommendations below.

Commendation(s):
1. The use of spiral curriculum, building student knowledge and skills progressively in each stage of the programme.
2. Quality of documentation presented to the panel. The review documents were clear and comprehensive and assisted in the panel's review work. A clear rationale was presented for changes proposed.
3. Staff are very committed to this programme, and this is reflected in the student feedback.
4. An innovative approach to the micro:bit project.
5. Engagement of the Programme Board with the panel, the open discussion and willingness to consider suggestions for improvement.

Condition(s):
1. The precise mechanism and reasons for the request to average two exam papers in some modules requires further consideration in conjunction with the Office of the Registrar.

Recommendation(s):
1. Ensure adequate additional resource to coordinate sourcing, monitoring and assessment and in particular exploring new opportunities for placement and international engagement.
2. Reconsider the fundamental questions associated with perceived high grades in practical assessments. This should involve ensuring the assessment design and rubrics are appropriate in the first instance.
3. The panel noted inconsistency of weighting of practicals in modules which had a similar number of laboratory practicals. This should be reviewed by the Programme Board.
4. Clarify failed elements within module descriptors and include the failed element rule in the special regulations at each stage of the Approved Programme Schedule.
5. Consider renaming modules, to include the term 'Pharmaceutical' to reflect their content e.g., Analytical Techniques 2.2, Spectrophotometric Methods of Analysis 3.1.
6. Ensure all laboratory and related activities have an explicitly embedded health and safety - first approach.

7. Consider adjusting the content of module risk assessments across all modules, to include more practical risk assessment, and Health and Safety.
8. Consider including troubleshooting instrumentation methods, in situations where placement is on-site, as students would be exposed to this within an industry placement.
9. Explore the possibility of obtaining more space on campus, especially labs, to facilitate growing students' numbers.

9 Programme-Level Findings - Bachelor of Science (Honours) in Forensic Science and Analysis and Embedded Awards

Consideration for the panel	Overall finding: Yes/No/Partially
Is there an ongoing need for the programme and has evidence been provided to support it?	Yes
Is the level and type of the award appropriate?	Yes
Are the entry requirements for the proposed programme clear and appropriate?	Yes
Is there a relationship between this programme and further education?	Yes
Are the access, transfer and progression procedures appropriate?	Yes
Does the programme comply with the Institute norms for retention, both in first year and subsequent years? Where not, does the Programme Board proactively take appropriate measures to optimise student engagement and retention?	Yes
Does the programme meet the required standards for programmes at its NFQ level (i.e., conform to GMIT Award Standards[5])? For Parent Award? For Embedded Award(s) (if applicable)? For Exit Award (if applicable)? For Minor Award (if applicable)?	Yes
Is the programme structure logical, well designed, and can the stated programme intended learning outcomes, in terms of employment skills and career opportunities, be met by this programme?	Yes
Have appropriate learning and teaching strategies been provided for the programme that supports Student Centered Learning (SCL)?	Yes
Have appropriate programme assessment strategies been provided for the programme taking account of the student workload?	Yes
Is there evidence that learning, and teaching is informed by research?	Yes
Have appropriate quality management procedures been implemented in line with GMIT's Quality Assurance Framework? (e.g., Induction, Programme Handbook, Programme Board, Student Feedback, External Examiners)	Yes
Does the proposed programme demonstrate an international dimension? (e.g., content, mobility, collaboration)	Yes
Does the programme encompass sustainable development principles and ethos?	Yes
Does the programme embed employability through the inclusion of work placements, employment preparatory module(s) and/or work-based projects?	Yes
Is there evidence of strategies to promote diversity and inclusion?	Yes
Is entrepreneurship, creativity and innovation embedded in the programme?	Yes

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[5] GMIT has adopted QQI's award standards which are available HERE.

Has the efficiency of the programme's design been considered? For example, does the programme meet the Institute norms on staff: student ratios for programmes of this type?	Yes
Is the programme externally facing? (e.g., Stakeholder engagement, guest speakers, fieldtrips, applied projects)	Yes

The Self Evaluation Report was informed by feedback from students, graduates and industry as well as self-reflection. Modules have changed over the years to align with accreditation by the Chartered Society of Forensic Scientists. Reaccreditation takes place every six years and is due again during the next academic year.

A discussion took place on Failed Elements which were explained in full. Detailed explanation of the rule is required in module descriptors.

Applicants' perception of the programme is that they will be on-site investigating crime scenes, rather than in a laboratory analysing evidence. This programme has a high chemistry content, with modules shared with the Chemical and Pharmaceutical programme. No data was available in relation to the number of graduates who progress into careers in the chemical industry. There is strong availability of employment in the analytical field. Graduates are employed in a variety of roles as they have a range of transferable skills. Computer forensics is introduced in the programme, but graduates would have to pursue further education to specialise in this discipline.

The programme has been running since 2010, and the current intake is 40 students. There is a lot of interest in the programme annually, and students perform well with over 80% retention. The SER would have benefitted from a narrative explaining the retention table. The common first year can be challenging for students as there is no specific coverage of forensics.

The panel engaged in a discussion of each of the proposed changes.

Equipment always requires updating, but there is a budget for this. The more pressing issue is space which continues to be an issue even through the college has been converting rooms into laboratories.

Feedback from students was largely positive. Some students do not research the programme properly and have incorrect expectations about what the programme will entail, they anticipate more biology, but the programme is essentially a chemistry degree. More biology content would be welcome e.g. forensic DNA, molecular biology. Students felt that they are well equipped to get a job following completion of the programme. Undertaking the project whilst on placement is challenging. Lecturers were viewed as very helpful, particularly throughout Covid. Onsite classes are preferred to online, particularly for practicals. The transition from stage 2 to 3 was challenging. Students would welcome more information and support in seeking postgraduate research opportunities.

The primary changes proposed for the programme involved module name changes, assessment weighting, addition of a tutorial hour and module content changes. All changes as outlined in Appendix G were approved and the programme was accredited until the next programmatic review subject to the recommendations below.

Commendation(s):

1. The use of spiral curriculum, building student knowledge and skills progressively in each stage of the programme.
2. Quality of documentation presented to the panel. The review documents were clear and comprehensive and assisted in the panel's review work. There was coherence across modules.

3. Staff are very committed to this programme, and this is reflected in the student feedback.
4. An innovative approach to the micro:bit project.
5. Engagement of the Programme Board with the panel, the open discussion and willingness to consider suggestions for improvement.

Condition(s):
1. The precise mechanism and reasons for the request to average two exam papers in some modules requires further consideration in conjunction with the Office of the Registrar.

Recommendation(s):
1. Consider the title Forensic Science and Analysis covers elements of forensic sciences and if the title is clear to intended learners. Compare the promotional material with programme content and amend description to highlight the accredited elements with the Chartered Institute of Forensic Sciences.   Prospective students should be made aware of the volume of chemistry contained in the programme prior to making a programme choice.
2. Include ISO17025 in the GMP module.
3. Ensure all laboratory and related activities have an explicitly embedded health and safety - first approach.
4. Consider student workload and consequences for examination performance, particularly as project deadlines and examination dates appear to coincide at the end of Year 4.
5. Reconsider the fundamental questions associated with perceived high grades in practical assessments. This should involve ensuring the assessment design and rubrics are appropriate in the first instance.
6. Review the assessment of the placement module. Consider how students can demonstrate their learning from work placement to future employers.
7. Clarify the failed element rule within relevant module descriptors and include the failed element rule in the special regulations at each stage of the Approved Programme Schedule.
8. The panel noted inconsistency of weighting of practicals in modules which had a similar number of laboratory practicals. This should be reviewed by the Programme Board.
9. Ensure adequate additional resource to coordinate sourcing, monitoring and assessment and in particular exploring new opportunities for placement and international engagement.
10. Explore the possibility of obtaining more space on campus, especially labs, to facilitate growing students' numbers.

Validation Panel Report Approved By:

Signed:

_____
Insert name
Chairperson

Date:

Appendix A   Programme Board Members

The panel met with the following staff:

Name	Position
Dr Des Foley	Head of School of Science and Computing
Dr Ian O Connor	Head of Department of Natural Resources and The Environment
Dr Eugene McCarthy	Head of Department of Analytical Biopharmaceutical and Medical Sciences
Mr Gareth Roe	Head of Department of Computer Science and Applied Physics

The Panel met with the following Common Science academic staff

Ms. Shelia Flaherty	Mr. Garth Roe	Dr Gary Kenny
Dr Cormac Quigley	Dr Etain Kelly	Ms Marilla Keating
Dr Pat Dineen	Mr. Seamus O Donnell	Ms. Shelia Flaherty

The Panel met with the following Applied Chemical and Pharmaceutical Science academic staff

Dr Jean Hughes	Ms. Sarah McMahon	Mr. Seamus O Donnell
Dr Éadaoin Tyrrell	Ms. Carolyn Wrafter	Ms. Emer Quirke
Ms. Aisling Crowley	Dr Cormac Quigley	Mr. David McHale
Dr Frances Martin	Mr. John Keary	Mr. John Graham
Dr Jorge Mendes	Dr Judith Wurmel	Dr Therese Montgomery

The Panel met with the following Applied Biology and Biopharmaceutical Science academic staff

Ms. Una Quigley	Dr Orla Slattery	Ms. Karen Finn
Ms. Teresa Kenirons	Dr Aoife Guiry	Dr Mary McMahon
Dr Anthonia O'Donovan	Mr. Declan Maher	Ms. Fiona Cregg
Dr Trish O'Connell	Ms. Rita Woodings	Ms. Teresa Hanley
Dr Sinead Murphy	Dr Benoit Houeix	

The Panel met with the following Quality academic staff

Dr Joaquin Penide	Dr Aoife Guiry	Ms Marilla Keating
Ms Ita Kelly	Ms Rachel McCarthy	Dr Trish O'Connell
Ms. Una Quigley	Ms. Sharon White	Ms. Rita Woodings
Dr Judith Wurmel		

The Panel met with the following Forensic Science and Analysis academic staff:

Dr Emer Quirke	Dr Jean Hughes	Dr Cormac Quigley
Mr. David McHale	Dr Aisling Crowley	Mr. Michael Duignan
Mr. Seamus O'Donnell	Dr Trish O'Connell	Ms. Rachel Gargan
Ms. Carolyn Wrafter	Dr Frances Martin	Dr Éadaoin Tyrrell
Mr. John Keary	Dr Sarah Mc Mahon	Mr. John Graham
Dr Jorge Mendes		

Appendix B - Student Representatives

The panel met with the following student representatives:

Student Name	Programme	Stage
Sally Webb	Bachelor of Science (Honours) in Forensic Science and Analysis	4
Leon Doringer	Bachelor of Science (Honours) in Forensic Science and Analysis	4
Sara Althabhaney	Bachelor of Science (Honours) in Forensic Science and Analysis	2
Nicole Avedikian	Bachelor of Science (Honours) in Forensic Science and Analysis	2
Chloe White	Bachelor of Science (Honours) in Chemical and Pharmaceutical Science	4
Mariam Afzal	Bachelor of Science (Honours) in Chemical and Pharmaceutical Science	4
Ellen Traynor	Bachelor of Science (Honours) in Applied Biology and Biopharmaceutical Science	4
Josef Lumelay	Bachelor of Science in Applied Biology and Biopharmaceutical Science	3

Appendix C - Schedule of Meetings

Agenda	
Date:	13th May, 2022
9am	Panel Meet
9.30am	Common Science (Year 1)
10.15am	Parallel A: Chemical & Pharmaceutical Programme Board
10.15am	Parallel B: Biology & Biopharmaceutical Programme Board
12.15pm	Break
12.30pm	Meet with Students
1pm	Lunch
1.45pm	Parallel A: Forensics Programme Board
1.45pm	Parallel B: Quality Programme Board
3.45pm	Break
4pm	Private Panel Deliberations
5pm	Initial Feedback
The Agenda may be subject to slight alteration on the day.	

Topic	Proposed Change	Rationale
Programme Learning Outcomes	Only minor changes have been made to the programme learning outcomes for the Level 7 and 8 programmes	Upon review, the stated programme learning outcomes reflected the current delivery of the programme.
Overall Contact Hours	Increase practical in Analytical techniques 2.1 by 4 hours in year 2.	Re-instate lab time which was previously removed to provide students with a more complete suite of lab skills and exposure to analytical instruments.
	Deliver the Introduction to Pharmacology and Drug Delivery Systems module in year 3 by 2 hours of lectures and a 1-hour tutorial.	A full module in pharmacology and drug delivery will prepare students for the delivery of the module Molecular and Cellular Pharmacology in semester 7. Included in this new module would be drug delivery which was noted in the feedback from industry as a necessity in biopharmaceutical design and manufacturing.
	Increase Molecular Biology labs in year 4 from 12 hours to 24 hours.	Molecular Biology is now a 10-credit module.
	Increase Regulatory Compliance for biotherapeutics labs in year 4 from 12 hours to 20 hours	1-hour labs are too short, and this module will be delivered now over a 10-week duration.
	Decrease Biopharmaceutical Science in year 4 by 6 hours 6	The biopharmaceutical science module will be delivered over a 10-week duration
	Decrease Statistical Methods for Manufacturing in year 4 by 6 hours	Statistical Methods for Manufacturing will be delivered over a 10-week duration.
	Decrease Molecular and Cellular Pharmacology in year 4 by 6 hours	Molecular and Cellular Pharmacology will be delivered over a 10-week duration.
Structure or Sequencing of Modules Year 2	N/A	N/A
Year 3	Move Pharmaceutics to semester 5.	To enable the delivery of the new module Introduction to Pharmacology and Drug Delivery Systems in semester 6.
Year 3	Move the new module Professional and scientific communications to semester 6	To enable the co-assessment of this module with the project and it will benefit the students in researching/ writing their thesis and presenting their project.
Year 4	Reduce Semester 7 from 12 to 10 weeks of teaching and increase semester 8 from 7 to 10 weeks of teaching	This will allow modules that are 5 credits to be delivered equally over the same time frame, thus enabling students to reflect and engage with the

		module material being delivered equally.
Addition of New Module(s)	Introduction to Pharmacology and Drug Delivery Systems – Semester 6	Pharmacology is introduced in semester 6, however, it forms part of the module Introduction to Pharmaceutics and Pharmacology. A full module in pharmacology and drug delivery will enable the delivery of the module Molecular and Cellular Pharmacology in semester 7 and create a stream. Included in this new module would be drug delivery which was noted in the feedback from industry as a necessity in biopharmaceutical design and manufacturing.
	Scientific and Professional communications - Combine the mandatory module Scientific Topics and the elective module Professional and Scientific Communications into one mandatory module in semester 6	The elective module Professional and Scientific communications and Scientific topics were merged as one module as professional communication is an attribute sought by prospective employers in industry and it was deemed that by merging these two modules all students would benefit hugely from the learning outcomes. There will also be assessment of this module with the project module in semester 6.
	Statistical Methods for Manufacturing - Split the 10 credit Quality Management and Regulatory affairs module into two 5 credit modules and make appropriate name changes	By breaking up this 10-credit module will improve the delivery and assessment of this module. Make name changes where necessary to reflect the current climate in Applied Biology and Biopharmaceutical science. Also, create a stream with regards to statistics which will be evident to students by the name change to include in the title 'statistics.
	Regulatory Compliance for Biopharmaceuticals - Split the 10 credit Quality Management and Regulatory affairs module into two 5 credit modules and make appropriate name changes	By breaking up this 10-credit module will improve the delivery and assessment of this module. Make name changes where necessary to reflect the current climate in Applied Biology and Biopharmaceutical science with regards to the regulation of biotherapeutics.
	Bioprocessing Technology - Split up the 15-credit module ADAT in semesters 7 and 8 to 5 two credit modules	This module is 100% CA, and it has been noted by the programme board and External examiners that it may be inflating the GPA score obtained by students. Also, by creating two new modules and focusing the content of these two new modules would be

		meeting the current requirements of the Biopharmaceutical Industry. Make name changes where necessary to reflect the current climate in Applied Biology and Biopharmaceutical science.
	Biopharmaceutical Analysis - Split up the 15-credit module ADAT in semesters 7 and 8 to 5 two credit modules	This module is 100% CA, and it has been noted by the programme board and External examiners that it may be inflating the GPA score obtained by students. Also, by creating two new modules and focusing the content of these two new modules would be meeting the current requirements of the Biopharmaceutical Industry. Make name changes where necessary to reflect the current climate in Applied Biology and Biopharmaceutical science.
Minimum Entry Requirements	No Change	No Change
Changed transfer or progression routes	No Change	No Change
Assessment Strategy	Reduce exam time of all 5 credit modules to 2 hours and examine how modules are assessed with regards to continuous assessment and final exams.	Reducing exam time to 2 hours is in line with institute guidelines. Increase or decrease the continuous assessment and final exam ratios with regards to every module as the module leader deems fit.
	All 5 credit modules to have 2 CA assessment components as part of their assessment strategy if the module is examined by a final terminal exam	Reduce CA workload on students over the academic year as some modules have practical components that require weekly/biweekly lab report submissions during the academic year.
Module Changes		
Pharmaceutics (Semester 5)	Remove the pharmacology element from the module Introduction to Pharmaceutics and Pharmacology and deliver this module in semester 5	By removing the pharmacology from this module and creating a new module, the pharmaceutics module would now focus only on pharmaceuticals thus enabling more efficient delivery and assessment. It also creates streams with regards to pharmacology and pharmaceutics/biopharmaceuticals which will be evident in the title of the modules to students of the programme.
Project Module (Semester 6)	Introduce pass/fail elements in the project module in semester 6 - repeat attends the module the following academic year.	This will allow students to repeat only parts of this module if they fail some elements of the module that do not require Laboratory attendance (written thesis, presentation, or oral

		examination). This eliminates the need for students to
Biopharmaceutical Science (Semester 7)	Name change and update content to approved and unapproved Biopharmaceuticals	Make name change to the module which was necessary to reflect the current climate and needs of the Biopharmaceutical science industry
Molecular and Cellular Pharmacology (Semester 7)	Name change and update content to focus on Biotherapeutics.	Make name change to the module which was necessary to reflect the current climate and needs of the Biopharmaceutical science industry
Molecular Biology (Semester 7 & 8)	The 5-credit module Molecular Biology module in semesters 7 and 8 to become a 10-credit module with more emphasis on the practical content.	As there is no Molecular Biology in semesters 5 and 6, the molecular biology module credits were increased to 10 credits so that the practical element of the module could be increased. By increasing the practical element of this module, students will be able to engage better with the material as it was noted by the external examiners that students commented on finding this module difficult and hard to process the concepts. Thus, by making this module year long and with an increased practical element it was deemed it would be of benefit to students.
Immunology, Immunotherapeutics and Vaccines (Semester 8)	Name change and update content focus on Immunology, Immunotherapeutics and the trends with regards to vaccine technology	Make name to the module which was necessary to reflect the current climate and needs of the Biopharmaceutical science industry
Research Project (At the end of semester 8 - 9 Weeks of placement in an industry/academic lab related to the programme of study)	Make the Industrial placement element of the research project in year 4 a pass/fail and introduce a capstone project in year 4 which will be based on a topic aligned to the programme.	Introducing a pass/fail element with regards to the industrial placement and designing a capstone project based on a topic aligned to the programme of study would remove from this module the vast differences in quality and types of projects carried out by students in their industrial placement. A capstone project was introduced during the COVID 19 pandemic, and it was well-received by the staff of the programme, students and external examiners. It will focus on topics aligned to the programme of study and students were able to draw from their breath and knowledge of all modules if the programme

Appendix E   Proposed Changes for:
Bachelor of Science (Honours) in Quality for Industry and Embedded Award.
Bachelor of Science in Quality for Industry and Embedded Awards
Higher Certificate in Good Manufacturing Practice

Topic	Proposed Change	Rationale
Programme Learning Outcomes	Some minor changes	
Overall Contact Hours	None	
Structure or Sequencing of Modules	Updates to Programme schedule	To reflect delivery patterns
Addition of New Module(s)	None	
New APS Regulations	None	
Minimum Entry Requirements	None	
Changed transfer or progression routes	None	
Teaching & Learning Strategy	Options on delivery and assessment	Ensuring flexible options including face to face, online or a combined blended methodology.
Assessment Strategy	Options on delivery and assessment	Ensuring flexible options including face to face, online or a combined blended methodology.
Module Changes Level 7		
Quality Management I	Teaching and Learning Strategy Current: Lectures and groupwork. Proposed: The delivery of this module is flexible and includes face to face, online or a combined blended methodology.	To incorporate additional flexibility to module delivery as required.
	Assessment Strategy Current: Exam and assessment Proposed: Mixture of project-based assignments, case studies and other assessments.	To incorporate additional flexibility to module delivery as required.
	Repeat Assessment Strategies Current: As per GMIT procedures. Proposed: Repeat assessment available	To incorporate additional flexibility to module assessment as required.
	Assessment Current: Continuous Assessment: Project 30%, Week 16, LOs: 1,2,3,4,5,6,7 Final Exam, End of semester exam, 70%, Week 16, LOs: 1,2,3,4,5,6,7 Proposed: Continuous Assessment, Assessment, Assignment, 30%, Week 16 LOs: 1,2,3,4,5,6,7 Final Exam, Final Assessment End of year assessment, Assessment, 70%, Week 26, LOs 1,2,3,4,5,6,7	To incorporate additional flexibility to module assessment as required.

	Delivery Current: Location - Tiered Classroom Proposed: Location - Not specified	To incorporate additional flexibility to module assessment as required.
Quality Management II	Indicative Syllabus change to point 4 to remove specific named standards to allow relevant current standards 'Review of Quality Standards including those used in the medical device, pharma and other industries' Teaching & Learning Strategy: included this wording: Delivery for this module is flexible and includes face to face, online or a combined blended methodology Repeat assessments wording amended as follows: Repeat assessments are available according to the GMIT Code of Practice Repeat final examination/assessment available. Some syntax corrected	To incorporate additional flexibility to module delivery and assessment for the future
Clean Room Management	Outcomes & Indicative Syllabus: amended to reflect application for Industry in general rather than specifically for pharmaceutical application, to clarify content and remove duplication. Assessment: CA revised to allow flexibility – Assessment, report and project Teaching & Learning Strategy: included this wording: Delivery for this module is flexible and includes face to face, online or a combined blended methodology Repeat assessments wording amended as follows: Repeat assessments are available according to the GMIT Code of Practise Repeat final examination/assessment available. Delivery 3hrs per week corrected from existing 1.5hrs Resources & Booklist section updated	To incorporate additional flexibility to module delivery and assessment for the future
Regulatory Affairs and Compliance Auditing	Clarify the learning outcomes to reflect blooms taxonomy Reflect multiple modes of delivery	To provide options on delivery and assessment ensuring flexible options including face to face, online or a combined blended methodology.
Validation	Module description updated to: "This module covers the science and practice of validation, as it applies within the pharmaceutical and medical device sectors, with particular focus on computerised/automated systems. The use of risk management as part of the validation process is also covered" Learning Outcome (LO) added: " 3 Appreciate the growing dependence on automated systems, software and data in a manufacturing context and the importance of equipment and automated system validation and data integrity. " LO added: "Recognise opportunities for more sustainable practice within Industry, specifically with respect to electronic record and data management. "	To reflect current industry trends and practice with respect to validation. To reflect continuous industry trend towards more automation and further dependence on software and data. To embrace sustainability goals within the growing area of data management, which is attracting increasing regulatory focus.

	The following was added to the T&L strategy: "The mode of delivery for this module is flexible and may include face to face, online or a combined blended methodology."	To incorporate additional flexibility to module delivery as required.
Production And Supervisory Management	Clarify the learning outcomes to reflect blooms taxonomy Reflect multiple modes of delivery.	To provide options on delivery and assessment ensuring flexible options including face to face, online or a combined blended methodology.
Six Sigma for Quality Management	Learning Outcomes Current: Apply probability and statistical rules and concepts. Proposed: Apply probability and statistical rules and concepts. (Fixed typo) 2. Teaching and Learning Strategy Current: The delivery of this module will involve lectures, case studies and group work. Proposed: The delivery of this module is flexible and includes face to face, online or a combined blended methodology.	To correct the typographical error "probability".
	Assessment Strategy Current: With a considerable amount of case study and group work involved, the assessment is skewed towards the continuous assessment mode. Final exam 30%, Continuous assessment 70% Proposed: Mixture of project-based assignments, case studies and other assessments.	To incorporate additional flexibility to module delivery as required.
	Repeat Assessment Strategies Current: Repeat exam available Proposed: Repeat assessment available	To incorporate additional flexibility to module delivery as required.
	End of Semester / Year Formal Exam Current: End of Semester / Year Formal Exam: 70% Proposed: End of Semester / Year Assessment: 30 %	To incorporate additional flexibility to module assessment as required.
	End of Semester / Year Formal Exam Current: Closed Book Exam Assessment 70 % Week 15 1,2,3,4,5 Proposed: Assessment 30% Week 15 LOs assessed:1,2,3,4,5	To incorporate additional flexibility to module assessment as required.
Project L7	Update learning outcomes to include more work-based references and report writing	To reflect the student population/programme
Module Changes Level 8		
Quality management systems and frameworks	Clarify the learning outcomes to reflect blooms taxonomy Reflect multiple modes of delivery.	To provide options on delivery and assessment ensuring flexible options including face to face, online or a combined blended methodology.
Technical Writing and Case Studies	Removed reference to 'collecting data'. Provided more detail of content. Modified mode of delivery to include all options.	To reflect all options of delivery/assessment. To provide options on delivery and assessment ensuring flexible options including face to face, online or a combined blended methodology
Statistics And Experimental Design	Learning outcomes: Minor updates to the verbiage of the learning outcomes to remove references to specific methodologies.	The changes outlined above are necessary to structure the module such that it is

	Teaching and Learning Strategy: Clarification added to outline flexible delivery method (face-to-face, online, or blended). Assessment Strategies: Updated to clarify assessment methodologies to support flexible delivery method above.	conducive to a flexible delivery method (face-to-face, online, or blended).
Design Quality Assurance	Learning outcomes: Minor updates to the verbiage of the learning outcomes to remove references to specific methodologies. Teaching and Learning Strategy: Clarification added to outline flexible delivery method (face-to-face, online, or blended). Assessment Strategies: Updated to clarify assessment methodologies to support flexible delivery method above. Assessment: Reduced the weighting of the individual project and added an in-class assessment.	The changes outlined above are necessary to structure the module such that it is conducive to a flexible delivery method (face-to-face, online, or blended). The addition of an in-class assessment will broaden the types of assessment used to allow for different student learning and assessment needs.
Regulatory Affairs	Clarify the learning outcomes to reflect blooms taxonomy Reflect multiple modes of delivery.	To provide options on delivery and assessment ensuring flexible options including face to face, online or a combined blended methodology.
Microbial Quality Assurance	Updated one module learning outcome to encompass the introduction to cleanroom microbiology topic Elaborated on the Teaching and Learning Strategy section and included elements such as Universal Design for Learning (UDL) and sustainability. Included a project-based assessment where students will be given choice on how they present their project work. Updated some of the textbooks and included more resource references.	To facilitate clear mapping of assessment to LOs. To update and give more clear detail on Teaching and Learning strategy. Gives students the opportunity to carry out self-directed learning, to practice presenting skills, and to engage in peer review and discussion. To include more recent editions of textbook that are available from the GMIT library.
Risk Management	Updated LO to refer to 'FMEA' and 'Hazard Analysis' for risk assessment rather than FMECA and HAZOP. Included LO to: "Examine the processes of Risk Management Planning, Communication and Review." Updated LOs to include reference to "postproduction activities". Included Lo to: "Review the acceptability of assessed risks, instigate mitigation to control/remove risk, and analyse the overall residual risk." Added: "The mode of delivery for this module is flexible and may include face to face, online or a combined blended methodology." to the TLA strategy to enable online mode of delivery if low intake numbers dictate such a strategy. Clarified assessment strategy	Rewrote the learning outcomes to: • Ensure emphasis on the bigger picture of risk management, instead of focussing only on risk assessment. • To embrace Industry best practice as advised by Industry expert practitioner • To reflect the updates to: ISO14971:2019 Medical Devices - Application of risk management to medical devices, including concepts like 'Overall residual risk' and renewed emphasis on postproduction activities and medical device manufacturer responsibilities in terms of risk to patient. As instructed by programme leads and head of department. To clarify assessment strategy
Quality Management	Teaching & Learning Strategy: included this wording: Delivery for this module is flexible	To bring assessment strategy in line with current practise and to embed the

Operational Excellence	and includes face to face, online or a combined blended methodology Repeat assessments wording amended as follows: Repeat assessments are available according to the GMIT Code of Practise no 3 Student Assessment Marks and Standards. Repeat final examination/examination available. Assessment strategies: refined as follows to reflect current practise Learners will be assessed by a mixture of CA and Final Exam. Continuous assessment will include individual and group assignments both written and oral. 30% Case study analysis: For example: an assessment could require students to analyse an Industry or business-based operations scenario deriving core operations, structure, process, management, and operational challenges. 30% Group project: For example: Group Project: the group will be required to address a range of issues and recommend a strategy for change focussed on quality and operational excellence for an organisation, produce a technical report and/or present recommendations in a presentation. 40% Final assessment/examination.	flexibility of delivery and assessment for the future.
Research Project	Learning Outcomes: Change to the wording of learning outcome number 6. Current: "Answer technical and other questions on the work conducted and the placement experience." Proposed: Answer technical and other questions on the project work conducted. Teaching and Learning Strategy Current: "Academic and Industry supervisor assigned to each student." Proposed Academic supervisor assigned to each student. Assessment strategies Current: "Workplace performance; maintenance of a Logbook/Laboratory Notebook; presentation of a written dissertation; oral presentation. The industrial supervisor has a role in assessment. See the Project handbook for more details on the assessment strategy." Proposed: Presentation of a written dissertation and an oral presentation. Assessment Propose that presentation of project changed from 40% to 30% and written dissertation/project report to 70%.	Learning Outcomes: Changed wording as these students do the project in their current place of work. Teaching and Learning Strategy an Industry supervisor/manager will already be in existence for these students in their current place of work. Assessment strategies A workplace performance and the maintenance of a Logbook/Laboratory Notebook are not required as these students are in a permanent role in Industry and not on a work placement from college. Assessment Presentation mark was quite high at 40%

Topic	Proposed Change	Rationale
Programme Learning Outcomes		
Overall Contact Hours	Y2 Increase by 2 hrs per week Y3 - Increase 4.0 hours per week Y4 - Increase 2.5 hours per week year long And 18 hours for one Sem	Better practice
Structure or Sequencing of Modules	Stage 2 *Analytical Forensic;* additional lab time *Microbiology;* Adjust the delivery of the lab hours from 6 x 3-hr to 8 x 2-hrs *Inorganic Chemistry:* Introduce two additional 3-hr labs, extra 0.5 hours per week Stage 3 *Inorganic and Physical*; additional 1 hour lecture	A better spread of the hours over the module. Re-instate lab time which was previously removed to provide students with time to complete a full synthesis and characterisation. Additional lecture time required to cover lecture material
Addition of New Module(s)	n/a	
New APS Regulations	n/a	
Minimum Entry Requirements	n/a	
Changed transfer or progression routes	n/a	
Teaching & Learning Strategy	Make Semester 5 longer by holding the exams in January.	This proposal is to spread the large volume of work over a greater time scale.
Assessment Strategy	Stage 2, *Analytical Forensics* Change in weighting from: Labs 50% to 40% CA 10% to 20% Exam remains at 40% *Analytical Techniques* Change in weighting from: Labs 50% to 40% CA 10% to 20% Exam remains at 40% Stage 3 *Electrochemistry and Pharmacopeia Methods* Change in weighting from: Labs 50% to 40% CA 10% to 20% Exam remains at 40% Stage 4 Revert to 2 final paper exams for a year-long programme, Paper 1 – winter	Increase in CA from 10% to 20%, labs reduced from 50% to 40% as weighting for labs considered was too high. Increase in CA from 10% to 20%, labs reduced from 50% to 40% as weighting for labs considered was too high.

	Exams, Paper 2 – summer exams which will be averaged to give an overall final exam mark. This will apply to the following modules: *Analytical Chemistry* *Inorganic Chemistry* Weighting from 20 labs: 20 CA: 60 final exams to 20 labs: 80 (paper 1 and 2 average) *Organic chemistry* 20 lab 20 CA (2x10) and 60 exams (2x30 paper 1 and paper 2) *Physical and Computational* will be paper 1 physical term 1 (labs 20: paper 30) and 100% CA (50) for computational term 2 *Medicinal Chemistry* 100% CA- remains	
Module Changes		
Stage 2		
Analytical Forensics 2.1	Introduce two additional 3-hr labs, this an increase of 0.5 hours per week	Re-instate lab time which was previously removed to provide students with a more complete suite of lab skills and exposure to analytical instrumentation.
Analytical Techniques 2.2	Assessment-see above	
Organic Chemistry 2.2	Addition of green chemistry to lectures and labs	To improve the content of the module.
Data Handling, Maths and Statistics	Name change to: *Data Modelling and Statistics*	To accurately reflect the content of the module
Good Manufacturing Practice	*GMP, standards and quality systems* Introduce computer labs and site visits Increase contact hours by 1 hour per week	The computer lab will aid with the investigation of regulatory websites / continuous assessment approach. Site visits to a GMP controlled pharmaceutical and biopharmaceutical company is useful for real world contextualisation of subject matter and student motivation.
Microbiology 2.1	Delivery -See above	A better spread of the hours over the module.
Inorganic Chemistry 2.1	Addition of Labs - See above	Re-instate lab time which was previously removed in order to provide students with time to complete a full synthesis and characterisation.
Stage 3		
Organic	Introduce Green Organic Labs 4 x 3hrs	Need for Organic practical labs in 3rd year, a gap in Organic lab skills observed in 4th-year Organic lab
Electrochemistry and Pharmacopeia Methods	Assessment - See above	
Inorganic and Physical 3.1	Additional 1 hour lecture	required to cover material
Placement	Placement based on student performance Broaden international collaboration In-house placement is a last resort	To broaden national and international collaboration
Stage 4		
Introduction of Computational Chemistry	Introduce into Y4 Sem 2 to replace Industrial and Physical in semester2	There's some overlap with physical and computational chemistry. A computational module would help deepen students' understanding of

	Name change: *Physical and Computational Chemistry* Revert to 3hr/week lectures from 2.5hrs/week	chemistry (thermodynamics, kinetics, molecular structure and bonding, molecular spectra), enhance their IT, visualisation, and analysis skills, and develop critical thinking. It would also be useful, for many students who currently doing computational projects in the 4th year allowing for more expansive projects. It would also be useful for students who plan to pursue postgraduate studies. (b) To consider the changes in the module (c) To allow for the addition of Computational chemistry and the movement of Physical to term 1
Research Method module	Introduce into semester 1 of the year-long research module 1hr/week Term 1 = 0.5Hrs per week- year long	This will allow for preparation for the project and poster and will allow for a literature review to be undertaken in Sem 1
Medicinal Chemistry	Addition of 3 x 3hr labs to Medicinal chemistry 3 x 3hr labs = 09 hrs for one term = 0.5 hr per week - year long Removed computer-based labs	To give a better practical understanding of Medicinal Chemistry The board wishes to decrease the volume of work in year 4.
Inorganic Chemistry	Revert to 3hr/week lectures from 2.5hrs/week 0.5hr/week Year-long	To allow for more time to deliver, the module

Topic	Proposed Change	Rationale
Programme Learning Outcomes		
Overall Contact Hours	Year 2- additional 1 hour Year 3-additional 3 hours Year 4-additional 1 hour	
Sequencing of Modules	Year 2 *Analytical Forensics*- Introduce two additional 3-hr labs – one spectroscopy and one chromatography - Change in weighting from Labs 50% to 40% and CA 10% to 20%, exam remains at 40% - Change contact hours from: Lecture x 2-hrs to Lecture x 1-hr + Tutorial x 1-hr *Inorganic Chemistry* – Introduce two additional 3-hr labs. Addition of green chemistry to lectures and labs and add E1, E2 mechanisms *Forensic DNA*- Change labs from 8 x 3 hours to 12 x 2 hours Year 3 *Organic 3.1*- Introduce Green Organic Labs	Re-instate lab time (which was previously removed) to provide students with a more complete suite of lab skills and exposure to analytical instrumentation. Need for Organic practical labs in 3rd yr., the gap in Organic lab skills observed in 4th yr. Organic lab To improve the content of the module. Additional labs will allow more variety of techniques,
Addition of New Module(s)	n/a	
New APS Regulations	n/a	
Minimum Entry Requirements	n/a	
Changed transfer or progression routes	n/a	
Teaching & Learning Strategy	n/a	
Assessment Strategy	Year 2 *Analytical Forensics*- Change in weighting from Labs 50% to 40% and CA 10% to 20%, exam remains at 40% Year 3 *Organic Chemistry* - Change in weighting from Exam 60% to 40%, CA 10% to 30%, labs remain at 30% *Organic 3.1*- Change in weighting from: Exam 70%: CA 2 x 15% to Exam 60%: Lab 20%: CA 2 x 10% *Analytical Techniques*- Change in weighting from: Labs 50% to 40%, CA 10% to 20%, exam remain at 40% *Forensic DNA*- Change in weighting from: CA 50% & exam 50% to 100% CA only Year 4 *Analytical Chemistry*- Revert to 2 final paper exams for a year-long program, which will be averaged to give an overall final exam mark.	Increase in CA from 10% to 20%, labs reduced from 50% to 40% as weighting for labs was considered too high. Need for Organic practical labs in 3rd yr., the gap in Organic lab skills observed in 4th yr. Organic lab allows more diversity in assessments Averaging the 2 papers allows for a student who didn't perform well/ failed in one paper, not to obtain a pass degree as per the institute's policy. Reducing the weighting from a single final exam would be beneficial to students. Material examined in paper 1 will not be

	Weighting from 20 labs: 20 CA: 60 final exams to 20 labs: 80	examined in paper 2 reducing pressure on students
Module Changes		
Year 2		
Analytical Forensics	See above	
Inorganic Chemistry	See above	
Data Handling, Maths and Statistics	Name change: *Data Modelling and Statistics*	To accurately reflect the content of the module
Good Laboratory Practice	Will be renamed to include forensics in the title Some content changes including more on ISO17025 and lab validation	To accurately reflect the content of the module to improve the content of the module.
Organic Chemistry 2.1	Addition of green chemistry to lectures and labs	
Organic Chemistry 2.2	- Addition of green chemistry to lectures and lab	To improve the content of the module.
Year 3		
Organic 3.1	Introduce Green Organic Labs	To improve the content of the module.
Forensic DNA	Introduction to evaluative reporting, degraded DNA issues and low-level testing, and introduction to new technologies in forensic DNA testing Labs changing from 8 x 3 hours to 12 x 2 hours	These are all new elements that were not covered in detail before.
Chromatographic methods	incorporating a problem-based learning lab assessment in the final week, whereby students must figure out how to make up solutions etc – rather than just carrying out serial dilutions. Makeup from scratch and then analyse.	To improve module content.
Placement	Need for a dedicated person to liaise with other institutes/ industries	To broaden national and international collaboration.
Year 4		
Forensic Chemistry 1	Extra 1 hour tutorial	The tutorial will be used to revise material covered in lecturers and complete problem sheets
Analytical Chemistry	Assessment – see above	