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

Programme	Code	Level	ECTS	Duration	Award Type	Embedded Awards
Bachelor of Engineering (Hons) in Manufacturing Engineering Design	GA_EMEDG_H08	8	240	4	Major	Embedded Award: Bachelor of Engineering in Manufacturing Engineering Design
Bachelor of Engineering in Manufacturing Engineering Design	GA_EMEDG_B07	7	180	3	Major	Embedded Award: Higher Certificate in Engineering Manufacturing Engineering Design
Higher Certificate in Engineering Manufacturing Engineering Design	GA_EMEDG_C06	6	120	2	Major	Parent Award: Bachelor of Engineering in Manufacturing Engineering Design
Bachelor of Engineering in Manufacturing Engineering (Apprenticeship)	GA_EMAPG_B07	7	180	3	Major	Embedded Award: Higher Certificate in Engineering in Manufacturing Engineering (Apprenticeship)
Higher Certificate in Manufacturing Engineering (Apprenticeship)	GA_EMAPG_C06	6	120	2	Major	Parent Award: Bachelor of Engineering in Manufacturing Engineering (Apprenticeship)
Bachelor of Engineering in Manufacturing Engineering (Add-on)	GA_EMANG_B07	7	+60	8	Major	N/A
Bachelor of Engineering (Honours) in Industrial Engineering (Add-On)	GA_EINDG_H08	8	+60	1	Major	N/A
Master of Science in Design and Innovation	GA_EDESG_V09	9	90	9	Major	Embedded Awards: Postgraduate Diploma in Design and Innovation, Certificate in Design and Innovation
Postgraduate Diploma in Design and Innovation (Exit)	GA_EDESG_O09	9	60	9	Exit	Parent Award: Master of Science in Design and Innovation
Certificate in Design and Innovation (Exit)	GA_EDESG_N09	9	30	9	Exit	Parent Award: Master of Science in Design and Innovation

Date of Panel:
Wednesday, 30th March 2022

External Peer Review Group:

Panel	
Chairperson	Dr. David Tanner, Snr Lecturer, Manufacturing Process Technology, University of Limerick
Academic representative	Mr. Niall Morris Head of Department, Mechanical, Biomedical & Manufacturing MTU Mr. Mark Mc Grath, Senior Lecturer, TU Dublin Mr. Liam O'Shea, Lecturer, Engineering Technology, Waterford Institute of Technology
Industry Representative	Mr. Tom Reilly, Trane Technologies
Graduate Representative	Mr. Barry Lane, Trane Technologies
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.

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 (Appendices A) which included staff from partner colleges and industry partners to discuss the programme and the documentation provided, as well as meeting a representative sample of students (Appendix B). Representatives of the Apprenticeship Consortium were also present for the review of the Higher Certificate and BEng in Manufacturing Engineering Apprenticeship. The schedule for the review visit is contained in Appendix D.

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.

3   Background to Programme(s) Being Reviewed

Bachelor of Engineering (Hons) in Manufacturing Engineering Design
Bachelor of Engineering in Manufacturing Engineering Design
Higher Certificate in Engineering Manufacturing Engineering Design

The B.Eng. (Hons) in Manufacturing Engineering Design is a full-time 4-year level 8 Degree and is part of a suite of manufacturing programmes offered within the department. This programme has been developed in collaboration with industry, to meet the needs of Industry. The level 8 Manufacturing Engineering Design programme went through an External Validation, an academic quality assurance, process in January 2020, when the level 8 Manufacturing Engineering Design and the Level 8 in Industrial Engineering Part-time were approved. As Part of this external review the Level 7 Programme was altered to allow an extended work placement period (i.e., eight-months) and to facilitate some joint delivery with the Manufacturing Engineering apprenticeship students. These changes have been approved and implemented.

The BEng in Manufacturing Engineering Design programme is currently in its fourth year of roll-out and has no graduates to date. The first cohort of Level 8 students due to graduate in November 2022. The Level 7 programme's first cohort of students graduated in November 2021.   The programme is part of a family of programmes, including an ordinary degree and Higher Certificate, which share a common structure and modules.

Bachelor of Engineering in Manufacturing Engineering (Apprenticeship)
Higher Certificate in Manufacturing Engineering (Apprenticeship)

These programmes represent a novel approach to engineering education, using the apprenticeship model. Following a proposal submitted by Ibec's Irish Medtech Association to the National Apprentice Council (NAC) in 2014, a consortium was formed to develop and deliver these programmes, with partners from Ibec, the Irish Medtech Association and Institutes of Technology (GMIT, IT Sligo, LIT, CIT, LKIT, AIT and WIT). In collaboration with the partners, the proposed programmes were developed by the Department of Mechanical & Industrial Engineering and accredited by GMIT. GMIT is coordinating the roll-out of the programmes in IT Sligo, Technological University of the Shannon (TUS, formerly LIT) and Munster Technological University (MTU, formerly CIT). The performance of the students on the programme has been very satisfactory to date. The structure and content of the programme are serving the needs of learners and industry well. The programmes have been subject to regular review.

Bachelor of Engineering in Manufacturing Engineering (Add-on)

Following a request from industry, the programme was developed and approved in 2017 as a part-time, face to face programme. The programme never ran in that format as, in 2018, the programme went through differential validation to be offered under Springboard. The mode of delivery was changed to be blended including 8 hours/week face to face for 36 weeks. The programme ran for the first time in September 2018 with a cohort of 39 students. In June 2020 the programme went through differential validation to adjust the face-to face delivery and modify some modules following feedback from students.
In the Academic year 2020/21, due to COVID19 restrictions, the programme went fully online. Following the experience with online learning, the main change considered as an outcome of this programmatic review is the increase proportion of online delivery.

Bachelor of Engineering (Honours) in Industrial Engineering (Add-On)

This programme is a follow-on programme from the level 7 B.Eng. in Manufacturing Engineering (add-on). It was approved in 2020 and ran for the first time in September 2020 as a part-time self-funded programme.

Due to COVID-19 restriction this programme never ran in its intended format and was delivered entirely online for that year. Reflecting on the year, the Programme Board is proposing to move the programme fully online. Applicants for this programme are mainly mature students employed in the Manufacturing Industry and working as Manufacturing Technicians or Engineers. As multinationals do not recognise the level 7 qualification, some students are pursuing this programme for career progression opportunities.

Master of Science in Design and Innovation
Postgraduate Diploma in Design and Innovation (Exit)
Certificate in Design and Innovation (Exit)

The Master of Science in Design and Innovation degree programme has been designed to meet the current needs of a wide number of sectors where a design and innovation approach is required. The programme offers a flexible pathway for working professionals to develop Design and Innovation skills and competence that meet the needs of contemporary organisations. Adopting a blended-learning approach, this degree programme provides a flexible pathway for working professionals to develop design and innovation skills and competence to meet the needs of contemporary organisations. Graduates will become leaders in the implementation of innovative products, services, product service systems (PSS), and processes in their organisations.

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	

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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.

5 Programme-Level Findings – BEng (Hons) in Manufacturing Engineering Design 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

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

There was a discussion on the name of the programme and how well the content related to it. It was felt that it was late to introduce design in the final year. It was clarified that the programme doesn't intend to train product designers. However, design is introduced in stage 1 of the programme with students completing a project on design thinking in the Academic & Professional Skills module.

The unique identity of this programme is not clear in the suite of manufacturing programmes offered by GMIT. There is a lot of overlap between the programmes. This programme has a strong 'Industrial Engineering/Manufacturing Systems' theme with good progression in the learning through the programme. However, the 'design' focus is not clear and therefore clear distinction from other programmes offered by the department is not assured. The new module in 4th year increases ambiguity in this regard.

A motivation week was introduced for first year students as a retention initiative. It aims to reengage those students whose motivation may have slumped and give them time to catch up.

There is a lot of content in the Robotics and Control module. Students are being educated so they can communicate effectively with automation engineers, but they are not being trained to be automation engineers.

Sustainability is embedded in the programme across all stages. Whilst there are 17 Sustainable Development Goals, this programme concentrates on those related to the efficient use of resources and emissions. The Institute has a research centre related to energy. Students learn to design products not just for manufacturability but for reuse and reduction of waste.

The growth in numbers in the Department of Mechanical and Industrial Engineering over the last 10 years has put a strain on resources with high utilisation of laboratories. Laboratories have been upgraded recently and additional space is being sought. There is a need for a dedicated server for cloud access. This would allow students to log onto the server as opposed to logging into laboratories, as it isn't possible to have students in the laboratory and logging in remotely at the same time.

The programme teaches CREO as a lot of local companies use this package. A recent industry survey shows a fairly even split in companies using CREO and SolidWorks. In the future there may be a move to SolidWorks, but at the moment CREO is integrated in the programme with other software used linked in with CREO.

There is a strong demand for manufacturing engineering graduates. However, it remains a challenge to attract students to the programme. The Department has responded by broadening its suite of manufacturing degrees and by introducing a common first year with students having the option to transfer to manufacturing in year two. To date about half of the cohort on this programme come through the common entry route.

Students participate on Programme Boards. Lecturers operate an open-door policy, informally dealing with any issue that may arise. At the end of each module and stage students are afforded an opportunity to provide feedback. Graduates are also surveyed.

Programmes within the Department attract some international students annually, but few students choose to avail of opportunities to study abroad. As the Manufacturing degree becomes established it expects to also have an international intake.

The Department is active in trying to attract female students and has several female staff.

The panel met with students completing the Manufacturing Engineering Design degree. They spoke positively about the college facilities, and the placement and how it was organised. They felt that in the placement they learned how the subjects they studied were applied in the workplace. Students felt they weren't receiving feedback on assessments completed in a timely manner. Covid has been disruptive with students not getting the full on-campus experience. The hybrid approach was challenging with students having to commute for a few classes weekly. Although students had access to the software they required

remotely, this could be impacted by poor broadband. The final year project requires a lot of work but is worth more credits than many other modules.

The Programme Board proposed a number of changes relating to Programme Learning Outcomes, introduction of a new CAD module, provision of a new advanced entry route, and more content in the project module. Individual modules were updated to reflect the findings of the review process. The panel determined that the proposal for a distributive weighted marking scheme required further consideration. 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. The guidelines students are provided with in relation to placement are excellent, and students commented on how organised placement was and how informed and supported they felt.
2. Staff are very enthusiastic and motivated in promoting a student-centred approach which is evidenced by student feedback and the student retention data.

Condition(s):
   None.

Recommendation(s):
1. The programme needs to consider and maintain its identity through a clear mission and vision statement to distinguish itself from other programmes delivered in the suite of programmes offered by the department at GMIT. Given the programme title, design and design tools need to be better reflected in the content of the programme.
2. Make material science more explicit in the learning outcomes e.g., material properties, testing and selection, surface finishes, corrosion, coatings, specialist materials, composites, materials for medical devices etc.
3. Ensure students receive appropriate feedback in a timely manner on assessments (end of semester and continuous assessment) in line with GMIT's policy.
4. Review the value of the module mapping (Table 9.2) against skills development. Some of the scores are questionable, and some modules didn't seem to be of value. If the latter is correct, then their inclusion within the programme should be reconsidered.
5. Review the wording of the learning outcomes outlined below to ensure that they commence with appropriate active measurable verbs in all instances.
6. Consider whether the credit allocation appropriately reflects the workload involved in the 'major' project.
7. Reduce barriers for learners by removing the Leaving Certificate requirement for craft apprenticeship advanced entry.
8. Conduct further research on distributive weighted marking in other colleges before implementing it, specifically identifying evidence that this initiative will impact on retention, the effect it will have on all students, barriers to implementation and how it will be implemented. The panel recognised its potential benefits.
9. For future Programmatic Reviews provide a detailed description of the resources available for the delivery of the programmes to include laboratories and equipment specification.
10. Consider restructuring of documentation for future reviews given the high degree of commonality between programmes.
11. The content and title of the 'Robotics and Control' module should be reconsidered to ensure that the content is not too ambitious, that it 'fits' within the programme and that it provides the pre-requisite learning for consideration of aspects of Industry 4.0 in the final year 'Smart

Manufacturing' module. Sensors and instrumentation learning is core to this, some of this content could be moved to earlier in the programme.

Observation:
The panel noted the facilities issue and the constraints around this.   A plan is needed to ensure that the facilities and equipment required to deliver programmes are available.

Module Recommendation(s)

Module Title	Recommendation(s)
Manufacturing Engineering Mathematics 1	Reword LO 2 [generally quite broad LO's considering the extent of the syllabus]
Manufacturing Engineering 1	Reword LO 5
Engineering Science for Manufacturing	Reword LO 5
Mechanical Dissection	Reword LO's 3, 4 & 6
Manufacturing Automation 2	Reword LO 4
Manufacturing Engineering Mathematics 2	Reword LO's 4 & 5 [Too specific and detailed]
Project Management and Project	Reword LO's 3, 4 & 6
Engineering Software Systems	Reword LO 1 & 2 Remove references to specific software within the module descriptor.
Robotics and Control	Reword LO 5 This title of this module appears as 'Robotics & Control' and 'Instrumentation & Control' within documentation [including within the Module Descriptor]. There is significant 'instrumentation' content so perhaps the title 'Instrumentation, Robotics & Control' would be more appropriate.
Engineering Work Experience	Reword LO 4 & 5
Energy Management	Reword LO's 1 & 3
Innovation and Enterprise	Reword LO 5
Six Sigma Engineering	Reword LO 5 [Too extensive and detailed, many LO's included within]
Smart Manufacturing	Reword LO 1
Major Project	Reword LO's 1 & 4 Should consider the inclusion the LO's which more explicitly acknowledge learning in 'Problem Definition/Specification', 'Feasibility Analysis', 'Decision-making Methodologies – Equipment Selection Strategies' 'Literature Review'

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Changes due to be implemented in:	
Changes to be implemented on phased or simultaneous basis:	
NB: If the programme changes are to be implemented simultaneously (all stages at once) then the Academic Information Systems Office must be notified immediately where modules have moved stages and an interim APS is required.	

6 Programme-Level Findings – BEng in Manufacturing Engineering Apprenticeship and Embedded Award

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[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
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

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

Initially the uptake on these programmes was low, but it has now begun to take off, and there appears to be demand for a level 8 offering. The level 8 offering will consider Industry 4.0. The newly formed National Apprenticeship Alliance has been approached about the level 8 programme. At the moment the programme is being delivered by GMIT, TUS Midwest, MTU Cork and IT Sligo. TU Dublin have been approached to see if the programme can be rolled out there to. TUS Midwest who currently offer only the level 6 is investigating the feasibility of offering the level 7 programme.

Students have performed very well in the programmes to date. This is a reflection of the students selected to undertake the programme. A large multinational can have up to 50 people applying for the course, and the company puts them through a rigorous selection process. Students are of a high calibre and are also very committed and motivated. This is reflected in their results. Not all students on the programme are mature. There are some school leavers. The programme is building its reputation for excellence. As the programme has matured, some of its graduates are becoming mentors.

It was clarified that academic staff are responsible for grading. Industry mentors are involved in the process and provide comments on student performance and ranking.

The programme consists of alternative blocks in college and in industry. Some of the modules have been pushed into industry blocks, with students completing assessments related to the academic content completed in the prior semester. In other modules assessment is based on the student's experience in industry. Where possible, an integrated approach is taken to learning. For example, students learn CAD in college, they apply it in their workplace and finally may use it in their technical projects.

Class sizes are limited to 20, although two intakes per year are feasible. GMIT have done this in the past and TUS Midwest continue to do so.

The programme is general, so it works for all industries from large machinery to small medical device producers. There is a relatively even split between students originating in multinational companies and SMEs. It has been identified that there is a need for another apprenticeship in robotics and automation, as that is not the focus of this apprenticeship. Given the different nature of the proposed apprenticeship, it is not anticipated that it will impact on student numbers on this programme.

Lecturers are very supportive of students an informally counsel them on career direction. Students are encouraged to continue their studies, progressing up the National Framework of Qualifications.

Students must have an employer to undertake the apprenticeship. If an issue arises in relation to the student's employment status every effort is made to assist the student in continuing and completing the apprenticeship.

Some initiatives have been put in place to align the programme in each of the Institute's e.g. lecturers forum, some module lecturers interact with others in relation to assessment, two of the colleges had common External Examiners for the first few years.

New mentors receive training. A webinar introduces them to best practice. It was agreed that it would be useful to have a mentor support group for the industry module. Work is ongoing on the development of digital badges and a level 8 module to recognise the work of mentors.

The panel met with students undertaking the Manufacturing Apprenticeship. They were extremely positive about the programme and the support received from staff. They get good feedback on their performance in a timely manner. There was strong support during the transition phase as some students had been out of the education system for a while. Lecturers are generally helpful. Those lecturers who have worked in industry often have a better insight in relation to the knowledge and skills required. Students can access machines and software required through the cloud, and there is no issue with speed. There is student representation on the Programme Board, and any issues arising are responded to effectively and in a timely

manner. Guest speakers aren't a feature of the programme. Some students would like to use SolidWorks rather than CREO as that is the package being used in their workplace. Students prefer continuous assessment as it reduces stress. The material studied is generally very applicable to the workplace.

The Programme Board proposed a few changes relating to module learning outcomes and embedding sustainability within the programme. 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. As represented in the documentation the Programme Board have conducted a very comprehensive review of the programme, gathered considerable stakeholder feedback and conducted a detailed analysis of statistical data.
2. The management and coordination of this programme is very comprehensive, inclusive and professional.
3. Student feedback was exceptionally positive with no issues raised, which is a clear reflection of the support and communication that students are receiving from both academic and industry staff.

Condition(s):
   None.

Recommendation(s):
1. Ensure that there is fuller representation of students on the Programme Board so that there is sufficient feedback on the issues experienced by students from each stage of the programme.
2. Consider how careers development can be formalised within the programme and how the Careers Office can contribute to this.
3. Consider the formal communication mechanisms that are in place and whether they adequately ensure consistency of student experience and equity of standards of assessment across partner colleges.
4. Ensure that software used in the programme is accessible and appropriate. Consider whether CREO should be replaced by SolidWorks.
5. Consider whether the Robotics and Control module in year 3 should be split into two 5 ECTS modules, each with a specific focus which assures contribution to the Learning Outcomes of the Programme. The content of this module appears to be very extensive for a 10 ECTS module.
6. Industry 4.0 and 5.0 learning should be more explicit within the programme i.e., through the inclusion of specific learning outcomes within appropriate modules.
7. Review the wording of the learning outcomes outlined below to ensure that they commence with appropriate active measurable verbs in all instances.
8. Continue with the development of the level 8 add-on to provide a progression route for students.
9. For future Programmatic Reviews provide a detailed description of the resources available for the delivery of the programmes, to include laboratories and equipment specification.

Observation:
The panel noted the facilities issue and the constraints around this.   A plan is needed to ensure that the facilities and equipment required to deliver programmes is available.

Module Recommendation(s)

Module Title	Recommendation(s)
Engineering Mathematics 1 (Apprenticeship)	Reword LO 2 [generally quite broad/generic LO's considering the extent of the syllabus]

Manufacturing Engineering 1 (Apprenticeship)	Reword LO 2
Learning and Innovation Skills (Apprenticeship)	Reword LO 5
Manufacturing Automation (Apprenticeship)	Reword LO's 6 & 7
Manufacturing Engineering 2 (Apprenticeship)	Reword LO's 2 & 5
Manufacturing Design of Fixtures (Apprenticeship)	Reword LO 5
Robotics and Control	Reword LO 5 This title of this module appears as 'Robotics & Control' and 'Instrumentation & Control' within documentation [including within the Module Descriptor]. There is significant 'instrumentation' content so perhaps 'Instrumentation, Robotics & Control' may be more appropriate.
Engineering Software Systems	Reword LO 1 & 2 Remove references to specific software packages from the module descriptor.
Project Management (Apprenticeship)	Should a LO similar to LO 4 [Define, plan and manage team-based projects] be included earlier in the programme. Page 52 SER states that 'The student will work as part of a team' in 2nd year

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Changes due to be implemented in:	
Changes to be implemented on phased or simultaneous basis:	
NB: If the programme changes are to be implemented simultaneously (all stages at once) then the Academic Information Systems Office must be notified immediately where modules have moved stages and an interim APS is required.	

7 Programme-Level Findings – BEng (Hons) in Manufacturing Engineering (Add-on) and BEng (Hons) in Industrial Engineering (Add-on)

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[4])? 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)	No
Does the programme encompass sustainable development principles and ethos?	Partially
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

These are Springboard+ funded programme targeting those that are unemployed and those in employment who require upskilling and a higher-level qualification to be eligible for promotion. The level 7 add-on commenced in 2018 with the level 8 coming onstream in 2020 providing a progression route for level 7 graduates. There are approximately 25 students per year and retention is good. The workload required from students is heavy as students are completing 60 ECTS in one year on a part-time basis. Students often do not anticipate the work involved. The programmes are delivered over 52 weeks. As part of the programme students complete a work-based project. Students are on-campus two evenings per week. This changed during the Covid-19 pandemic when classes moved online. This worked very well, hence the proposal to formally alter the delivery mode. Level 7 students will be onsite once per month with the remainder of teaching and learning taking place online. Level 8 will be fully online other than for the first week of semester. There is high demand for the level 7 programme.

Sustainability was not a requirement when the programmes were validated, but it is covered during level 8 modules (Energy Management, The Engineer in Society, Lean Enterprise Engineering) and to a lesser extent in level 7 modules (Operations Management, Manufacturing Process Planning).

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

Most students are working. However, the Communication and Professional Development module includes a work placement for unemployed students. Students find their own work placements.

The Programme Board utilise a number of strategies to ensure academic integrity given the programme's online delivery mode. For example, Moodle quizzes are different for each student, plagiarism detection software is utilised. Lecturers use student-centred online teaching and support modalities including use of Moodle functionality, online drop-in centres, workshops, lectures are recorded. Remote logins allow student access the software they require, and student licences are available for some applications whilst others are open source. An induction day is used to help students get to know each other.

Given the cohort of students are typically in the workplace assessment deadlines are flexible and students' individual circumstances accommodated. Continuous Assessment scaffolds student learning with feedback important for students to know how they are performing. Students are regularly asked for feedback, and it is incorporated into the programme where feasible.

The panel met students completing these programmes. Overall, the programmes are considered good but do require minor modifications. It is felt that the delivery of 60 ECTS in one year creates too heavy a workload for those in industry. It leaves little time to digest topics. Two of the modules – Project Management and Six Sigma Quality – consume a disproportionate amount of time, impacting on the study of other modules. The Communications module content could be integrated into other modules. It was suggested that the Project Management module could be titled 'People Management' and that constructive criticism could be included in the module. The submission times for assignments should recognise the fact that students are in work and not be during the working day. 23.59pm was suggested. Whilst the level 8 programme was 52 weeks in duration, the level 7 students submitted their project on 25th May.

The Manufacturing Engineering (Add-on Level 7) Programme Board proposed a few changes relating to entry requirements online delivery mode and changes to individual modules. The Industrial Engineering (Add-on Level 8) made changes to the delivery mode and to individual modules. All changes as outlined in Appendix G and H were approved and the programme was accredited until the next programmatic review subject to the recommendations below.

Commendation(s):
1. Demand for this programme is high. The Programme Board have responded to a need for this programme in the region.
2. Excellent feedback from students, evidencing good communication between students and academic staff.
3. Flexible approach to programme delivery, which is appropriate for students who may be in full time employment.
4. Good quality programme content.

Condition(s):
   None.

Recommendation(s):
1. Review the Programme Learning Outcomes ensuring that they are all achievable in a 60 ECTS programme.
2. Consider whether it would be beneficial to extend the duration of this Programme, given the workload and time constraints which impact students.
3. Clearly articulate the duration of Level 7 and Level 8 programmes on the APS. This can be done in the special regulations if it cannot be facilitated in the APS itself.

4. There needs to be further emphasis on sustainability within the programme. It also needs to be embedded across the Institute so that students can see sustainability in practice.
5. There needs to be more clarity for students in relation to timetabling of assessments. Students should be provided with an assessment schedule at the start of each semester.
6. Consider developing a standard online learning software template for Moodle, enabling ease of navigation for students
7. Avoid naming specific software on module descriptors to increase flexibility.
8. Encourage interaction amongst students. This could be facilitated through E-tivities, synchronous classes etc.
9. Consider increasing the ECTS on Project Management module from 5 to 10 credits, to reflect workload, and removing the Communication and Professional Development module (5 credits). Communications can then be explicitly incorporated within other modules.
10. Consider increasing Six Sigma module to 10 credits, reflecting the workload involved.

Observation:

The panel noted the facilities issue and the constraints around this. A plan is needed to ensure that the facilities and equipment required to deliver programmes are available.

As this is a Springboard+ funded programme, the panel recognise that international students cannot apply.

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Changes due to be implemented in:	
Changes to be implemented on phased or simultaneous basis:	
NB: If the programme changes are to be implemented simultaneously (all stages at once) then the Academic Information Systems Office must be notified immediately where modules have moved stages and an interim APS is required.	

8　　Programme-Level Findings – MSc in Design and Innovation 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[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)	No
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

This programme was designed by a multi-disciplinary team. The programme has only had its first intake. The motivation to develop the programme was the need for upskilling in relation to research, design and innovation in the region. It is inspired by Stanford University. The programme does not just focus on products in relation to innovation but also on services and processes.

There are 15 students on the programme and an intake is planned every two years. The students on the programme are very committed and come from a range of backgrounds including medical device industry, furniture design, tool manufacturing and refrigeration.

Online delivery works well as students come from across Ireland. There is also some face-to-face contact at the start of the semester. Online delivery facilitates easier access to guest lectures, and these lectures have resulted in engaging debate.

Sustainability is covered in semester 1 in Applied Design Thinking and Product and Development Processes. Students self-select their dissertation topics and topics can relate to topics such as circular economy, food waste reduction, avoidance of defects and packaging.

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

There is student representation on the Programme Board. Their feedback is useful. It helped find a balance in relation to student workload.

There is an online design lab to stimulate creativity. It is a relaxed space which allows participants to come up with ideas and bring their design through the process. Miro software is used which is like a whiteboard, and technicians undertake any 3D printing necessary. There is funding in place for a maker space in the Atlantic Technological University.

The Programme Board proposed a few changes relating to online delivery mode and additional induction time. All changes as outlined in Appendix I were approved and the programme was accredited until the next programmatic review subject to the recommendations below.

Commendation(s):
1. This is an excellent programme with quality content.
2. The panel was impressed with content and quality of the Expo Video.
3. An innovative approach to online delivery has been used e.g., Virtual Design lab.
4. The documentation presenting the findings of the review to the panel was of a high quality.
5. The panel extends their congratulations to the Programme Board on achieving a National Education Award.
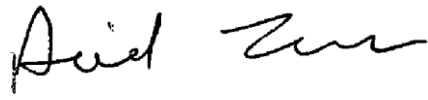
Condition(s):
    None.

Recommendation(s):
1. Learning Outcome No. 5 should include sustainability, as it is covered in the programme content.
2. Ensure that there is careful scrutiny around the RPL process, when considering prospective students whose highest academic award achieved is at Level 7 and below.
3. Incorporate an international element within the programme to benefit students and expose them to different perspectives.
4. Ensure modules are listed for delivery in the correct semester on the APS.
5. Review how module hours are represented in module descriptors, clearly identifying which hours are online and which will be delivered on-campus.

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Changes due to be implemented in:	
Changes to be implemented on phased or simultaneous basis:	
NB: If the programme changes are to be implemented simultaneously (all stages at once) then the Academic Information Systems Office must be notified immediately where modules have moved stages and an interim APS is required.	

Validation Panel Report Approved By:

Signed:

Dr David Tanner
Chairperson

Date: 27th June 2022

Appendix A - Programme Board Members

The panel met with the following staff:

Name	Position
Dr. Carine Gachon	Transcend Project Manager
Dr. Oliver Mulryan	Head of Department Mechanical & Industrial Engineering

Academic Staff Representatives Manufacturing Engineering Add-on, Industrial Engineering Add on:

Mr. Padraig Audley	Dr. David Gorman	Mr. Martin Conneely
Dr. Carine Gachon		

Academic Staff Representatives Manufacturing Engineering Apprenticeship:

Dr. Aurora Dimache	Dr. Paul O'Dowd	Dr. Fiona Malone
Dr. Aoife OBrien	Dr. Alan Hannon	Dr. Christoph Schellenberg

Academic Staff Representatives MSc in Design & Innovation:

Dr. Carine Gachon	Dr. Martin Taggart	Dr. Gabriel J Costello

Academic Staff Representatives Manufacturing Engineering Design:

Mr. Padraig Audley	Dr. Oliver Mulryan	Mr. Eddie Dunbar
Dr. Nireeksha Karode	Dr. David Gorman	Mr. Martin Conneely
Dr. Aurora Dimache	Dr. Paul Tierney	Dr. David Gorman
Dr. Kate Goggin	Dr. Eoin Parle	

Appendix B - Student Representatives

The panel met with the following student representatives:

Student Name	Programme	Stage
Mr. Gavin Burke	Level 8 Industrial engineering Springboard	4
Mr. Kieran Burke	Level 8 Industrial engineering Springboard	4
Mr. Martin Dervan	Level 7 Part-time Springboard	3
Mr. Alan Healy	Level 7 Part-time Springboard	3
Mr. Declan Hynes	Level 7 Part-time Springboard	3
Mr. Lorraine Connell	Manufacturing Apprenticeship	1
Mr. Paul Mc Cormack	Manufacturing Apprenticeship	3
Mr. Pat Heffernan	Manufacturing Engineering Design	4
Ms. Niamh Heneghan	Manufacturing Engineering Design	4
Mr. Séamus McGurran	Master of Science in Design and Innovation	2

Appendix C – Industry Partners

The panel met with the following IBEC, industry and partner institutes representatives:

Name	Position
Mr. Sean Conway	Section Head of Electrical Apprenticeship, TUS
Ms. Trish Breen	Apprenticeship Project Manager, IBEC
Dr. Xavier Velay	HoD Mechanical & Manufacturing Engineering, IT Sligo
Mr. David McMoreland	Programme Chair manufacturing Engineering Apprenticeship, IT Sligo

Appendix D - Schedule of Meetings

Agenda	
Date:	Wednesday, 30th March 2022
9am	Panel Meet
9.45am	Parallel A: Manufacturing Engineering (Add-on) and Industrial Engineering (Add-on)
9.45am	Parallel B: Manufacturing Engineering (Apprenticeship)
11.45pm	Break
12.00pm	Meet with Students (Panel will break into groups to meet with individual cohorts)
12.30pm	Lunch
1.30pm	Parallel A: MSc in Design & Innovation
1.30pm	Parallel B: Manufacturing Engineering Design (MED)
3.30pm	Break
3.45pm	Panel Discussion
4.45pm	Initial Feedback
The Agenda may be subject to slight alteration on the day.	

Appendix E - Proposed Changes Bachelor of Engineering (Hons) in Manufacturing Engineering Design and embedded Awards

Topic	Proposed Change	Rationale
Programme Learning Outcomes	Yes	Adopt EI Programme Learning Outcomes
Overall Contact Hours	None	The addition of ½ hour to the Major Project module in stage 4 of all Level 8 programmes.
Structure or Sequencing of Modules	None	
Addition of New Module(s)	None	
New APS Regulations	None	
Minimum Entry Requirements	None	
Changed transfer or progression routes	None	
Teaching & Learning Strategy	None	
Assessment Strategy	None	
Module Changes		

Manufacturing Engineering 1 MECH06010	Change to assessment strategy and Module Content.	The overall Marks breakdown remains the same. 60% for the Practical Element of the module and 40% for the Theory. But the number of assessments has been reduced from three assessments per year to two online quiz assessments in line with the GMIT guidelines. The Theory Content has also been updated.
Engineering Science Fundamentals ENGI06036	Name change Change to assessment strategy	Engineering Science for Manufacturing It was 40% CA - 60% final exam; now it's 50% CA - 50% final exam. The focus is more on the practical aspect of the module.
Engineering in Business ENGI06035	Changes to learning outcomes	Reduced from 7 to 5, in line with best practice recommendations. Replaced assembly line enhancement with Project Management, to prepare students for future projects. Merged similar LOs on data analysis.
Mechanical Dissection MECH06006	Changes to learning outcomes	Number of LOs reduced to align with EI guidelines
Mathematics Fundamentals MATH06019	Name change Change to learning outcomes. Change to assessment strategy	Manufacturing Engineering Mathematics 1 Reduced the number as per requirements and reflected peer review objectives. Incorporated a greater variety of assessment types in line with learning outcomes.
Manufacturing Engineering 2 MECH06013	Change to learning outcomes.	Learning outcomes reduced to 5
Maintenance and Safety ENGI06042	Change to learning outcomes.	To align with manufacturing apprentices. Reduced number to 5 - reworded and tidied them up in line with Bloom's Taxonomy.
Manufacturing Automation 1+2 51560+51473	Change to learning outcomes.	Learning outcomes reduced to 5
Metrology MECH06001	Change to learning outcomes. Change to assessment strategy	Reduction of Learning outcomes. Module is now 100% continuous assessment
Quality ENGI06040	Name change Change to assessment strategy	Quality and Regulatory Affairs Changes to the Assessment strategy to allow more AFL. Module will now be 100% continuous assessment. The exam is removed, the theory element will be assessed using online training quizzes and Moodle Quizzes. It allows the theory element of programme to be divided into smaller manageable chunks, giving fair reward for individuals attending and taking part in the training quizzes.
Project Management and Project ENGI06061	Change to assessment strategy	Changes to the Assessment strategy to allow more AFL, the theory element will be assessed using online training quizzes and Moodle Quizzes. It allows the theory element of programme to be divided into smaller manageable chunks, giving fair reward for individuals attending and taking part in the training quizzes.
Six Sigma Quality MANU07033	Change to assessment strategy	The assessment strategy needs to be modified to allow for the fact full time Manufacturing Engineering Design Students and Manufacturing Apprentices both do the module. The apprentices

		continue the module into work placement and manufacturing do not. Changes to the Assessment strategy to allow more AFL. Module will now be 100% continuous assessment. The exam is removed, the theory element will be assessed using online training quizzes and Moodle Quizzes.
Operations Management MGMT07064	Change to learning outcomes. Change to assessment strategy	Module learning outcome 6 amalgamated into learning outcome 5. Incorporate budgetary concerns into LO5. The assessment strategy needs to be modified to allow for the fact full time Manufacturing Engineering Design Students and Manufacturing Apprentices both do the module. The apprentices continue the module into work placement and manufacturing do not.
Engineering Work Placement WORK07022	Name change. Change to assessment strategy	Engineering Work Experience (MFG) Added Assessments for CV Preparation (15%) & Mock Interviews (10%). Added CV Preparation & Mock Interview's to be completed by the careers office and marked as part of the module. Students must also secure a placement by the end of semester 1 of the Academic year, otherwise the student must complete a project in semester 2 to pass the module.
Advanced Manufacturing Processes MECH07031	Change to assessment strategy	Final exam (assessment 40%) in MCQ/Essay format. Quiz Exam-type Assessment provides or defines a broader spectrum of knowledge based questions for the learner. Secondly the covid situation has not gone away and may not for the foreseeable future. In the Indicative Syllabus - Theory - Included a few new topics to keep in line with the current Advanced Manufacturing Processes. Several meetings were conducted with all Institutes to agree on the LOs (Only ISO for M & G codes were removed) and Indicative Syllabus (Theory - minor changes - sustainability included etc.).
Polymer Processing Technology MANU07022	Change to learning outcomes. Change to assessment strategy	Reduced the LOs from 8 to 5 LOs. Reason being, this is a 5-credit module and we were advised by management and Module Manager to use this as a guide going forward. Also, 2 to 3 of the LOs were similar in content and were blended together, to achieve the 5 LOs. These LOs were agreed with all Lecturers in collaboration with our partnership IOT's(SLigo IT. LIT & MTU) from the different Institutes over a number of meetings, to suit each colleges resource(s) and achieve the students LOs. Final exam (assessment 40%) in MCQ/Essay format. Quiz Exam-type Assessment provides or defines a broader spectrum of knowledge-based questions for the learner. Secondly the covid situation has not gone away and may not for the foreseeable future.
Manufacturing Process Planning ENGI07056	Change to learning outcomes.	Learning outcomes reduced from 7 to 5. Some sections not relevant / obsolete have been removed.
Industrial Design MECH08013	Name change	Product and Service Development

Innovation & Enterprise ENGI08003	Change to learning outcomes.	Combined 2 previous learning outcomes under learning outcome No.3 to reduce the number to 5 per GMIT Quality Guidelines.
Lean Enterprise Engineering ENGI08009	Change to learning outcomes. Change to assessment strategy	Learning outcomes reduced from 6 to 5. assessment strategy changed t0 70% exam 30% CA from 80% Exam-20% CA
Six Sigma Engineering ENGI08010	Change to learning outcomes.	Changed learning outcomes from 7 to 5 in line with best practice recommendations. removed a LO on the control phase, covered in 3rd year, to allow more focus on statistics and experimental design.
Supply Chain Engineering ENGI08046	Change to learning outcomes.	Learning outcomes reduced from 6 to 5. Changed from two 15% practical's to 30% CA

Appendix F - Proposed Changes Bachelor of Engineering in Manufacturing Engineering (Apprenticeship) and embedded Awards

Topic	Proposed Change	Rationale
Programme Learning Outcomes	None	
Overall Contact Hours	None	
Structure or Sequencing of Modules	None	
Addition of New Module(s)	None	
New APS Regulations	None	
Minimum Entry Requirements	None	
Changed transfer or progression routes	None	
Teaching & Learning Strategy	None	
Assessment Strategy	None	
Module Changes	**Proposed Change**	**Rationale**
Stage 1 Modules		
Engineering Mathematics 1	Reduced LOs from 7 to 4	Reduced LOs from 7 to 4, in line with new guidelines
Engineering Science	NO CHANGE	
Electrical Sciences	Reduced LOs from 6 to 5 (remove LO3 as it is part of LO2)	In line with GMIT guidelines and best practice for a 5 credit module
Manufacturing Engineering 1	Reduced LOs from 8 to 5, introduced sustainability and employability in LO's, No change to delivery or marking scheme	Re-drafted syllabus to bring it in line with Leaving Cert. New introduction to CAD/CAM (bridging into year 2) in indicative content
Computer Aided Design	NO CHANGE	
Learning and Innovation Skills	NO CHANGE	
Quality 1	NO CHANGE	
Industry Module 1	NO CHANGE	

Stage 2 Modules		
Engineering Mathematics 2	Reduced LOs from 6 to 4 and amended LOs accordingly	Amended LOs in line with new guidelines
Metrology	Reduced LOs from 8 to 5. No change to delivery or marking scheme	In line with GMIT guidelines and best practice for a 5 credit module
Manufacturing Automation	NO CHANGE	
Manufacturing Engineering 2	Reduced LOs from 7 to 5, introduced sustainability and employability in LO's, Marking scheme changed in line with delivery breakdown of 4hrs Practical and 1 hr Theory, Marking scheme breakdown 80% Practical vs 20% Theory	In line with GMIT guidelines and best practice for a 5 credit module
Manufacturing Design of Fixtures	NO CHANGE	
Maintenance and Safety	Reduced LOs from 6 to 5 – reworded and amended LOs accordingly	LOs needed updating and were too specific regarding some methods and techniques (some of which are no longer relevant)
ENGI06039 Quality 2	Change the LO's from 8 to 6.	LO 2 changed and to *"Explain the purpose, content and interrelationship of quality management standards ISO9000, ISO13485, auditing and assessment standards ISO9004, ISO19011 and sustainability standards ISO14000, ISO15001 and ISO2600."* *Combine LO 7 & LO 8 to one Learning outcome.* *LO 4 reference HACCP.*
Lean Manufacturing	Change Ethics LO 5 to specifically identify sustainabilty.	To accommodate the Programmatic review Theme of Sustainability
Industry Module 2	NO CHANGE	
Stage 3 Modules		
Robotics and Control	NO CHANGE	
Advanced Manufacturing Processes	Reworded LO 1, 2 & 4, introducing sustainability into LO 4. No change to delivery or marking scheme	LO 1 – make the LO more general & compatible for all Institutes. LO 2 – reworded to suit the content in the Indicative Syllabus. LO 4 – There are other standards apart from ISO standards. Different colleges might use other standards in their module. Added sustainability to LO4
Polymer Processing Technology	Reduced LOs from 8 to 5, introduced sustainability into LO 1. LOs 2 and 3 were merged. LO 7 & 8 were removed. No change to the marking scheme.	In line with GMIT guidelines and best practice for a 5 credit module. CAM software in LO 7 was removed, due to it overlapping in Advanced Manufacturing Processes.

Manufacturing Process Planning	Reduced LO from 7 to 5. LO 5 addresses sustainability. Indicative Syllabus addresses green manufacturing.	In line with GMIT guidelines and best practice for a 5 credit module
Engineering Software Systems	Reduce LOs from 6 to 5.	In line with GMIT guidelines and best practice for a 5 credit module
Six Sigma Quality	NO CHANGE	
Operations Management	Change LO 2 wording to "for sustainable organisations"	Incorporate theme of Sustainability into programme Systems Stream of modules.
Project Management	Updated learning outcomes (converting to 5). Removed reference to PMI from the content	In line with GMIT guidelines and best practice for a 5 credit module. PMI too specific.
Industry Module 3	NO CHANGE	

Appendix G - Proposed Changes Bachelor of Engineering in Manufacturing Engineering (Add-on)

Topic	Proposed Change	Rationale
Programme Learning Outcomes	No	
Overall Contact Hours	No	
Structure or Sequencing of Modules	No	
Addition of New Module(s)	No	
New APS Regulations	No	
Minimum Entry Requirements	No	
Changed transfer or progression routes	No	
Teaching & Learning Strategy	All modules were changed to increase the online delivery and reduce the on-site attendance to once per month.	This is to make the programme more flexible.
Assessment Strategy	No	
Changes to modules		
Six Sigma Quality	The assessment strategy is changing from a 50% exam to 100% CA	As the module is online, this assessment strategy is more appropriate to keep students engaged in the module.

Appendix H - Proposed Changes Bachelor of Engineering (Honours) in Industrial Engineering (Add-On)

Topic	Proposed Change	Rationale
Programme Learning Outcomes	NA	
Overall Contact Hours	NA	
Structure or Sequencing of Modules	NA	
Addition of New Module(s)	NA	

New APS Regulations	NA	
Minimum Entry Requirements	The need for ICT skills was added.	
Changed transfer or progression routes		
Teaching & Learning Strategy	The programme moved from blended to fully online	The experience from the emergency Covid-19 response was positive as it is far more flexible for students.
Assessment Strategy	NA	
Module Changes		
Operations & Supply Chain	Moved the 50% practical to 100% CA LO rewritten but no change to the overall outcomes	As everything is online, there is no distinction between practical and CA.
Lean Enterprise Engineering	LO rewritten but no change to the overall outcomes	
Six Sigma Engineering	Final exam is 50%, CA 25% and project 25%. the module. Learning Outcomes were reviewed	The project was introduced in order to focus more on the practical aspect of the module.
Energy Management	Final exam 40%, Project 30%, and CA 30% Number of LOs was reduced to suit 5-credit module by integration of closely related LOs.	This breakdown suits the online delivery better
The Engineer in Society	Final exam 40%, Project 30%, and CA 30%	This breakdown suits the online delivery better

Appendix I - Proposed Changes Master of Science in Design and Innovation and embedded Awards

Topic	Proposed Change	Rationale
Programme Learning Outcomes	None	
Overall Contact Hours	None	
Structure or Sequencing of Modules	None	
Addition of New Module(s)	None	
New APS Regulations	None	
Minimum Entry Requirements	None	
Changed transfer or progression routes	None	
Teaching & Learning Strategy	Design Labs to be primarily online	Based on experience during emergency online teaching together with feedback from students and lecturers.
Assessment Strategy	None	
Module Changes		
Applied Design Thinking Process and Methodologies	All classes will be online except for two onsite Saturday classes each semester.	Based on experience during emergency online teaching together with feedback from students and lecturers.

Product and Service Process Development	All classes will be online except for two on-site Saturday classes each semester.	Based on experience during emergency online teaching together with feedback from students and lecturers.
Research Methods for Design and Innovation	All classes will be online except for two onsite Saturday classes each semester.	Based on experience during emergency online teaching together with feedback from students and lecturers.
Design Innovation Project	All classes will be online except for two onsite Saturday classes each semester.	Based on experience during emergency online teaching together with feedback from students and lecturers.