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

Programme	Code	Level	ECTS	Duration	Award Type	Embedded Awards
Engineering Common Entry L8 to the Agricultural, Biomedical, Energy, Manufacturing and Mechanical Engineering programmes	GA_EOMMG_H08	8	N/A	1	N/A	N/A
Engineering Common Entry L7 to the Agricultural, Biomedical, Energy, Manufacturing and Mechanical Engineering programmes	GA_EOMMG_B07	7	N/A	1	N/A	N/A
Bachelor of Engineering (Honours) in Mechanical Engineering	GA_EMEAG_H08	8	240	4	Major	Embedded Awards: Bachelor of Engineering in Mechanical Engineering
Bachelor of Engineering in Mechanical Engineering	GA_EMECG_B07	7	180	3	Major	Embedded Award: Higher Certificate in Engineering in Mechanical Engineering
Higher Certificate in Engineering Mechanical Engineering	GA_EMECG_C06	6	120	2	Major	Parent Award: Bachelor of Engineering (Hons) in Mechanical Engineering
Certificate in Computer Aided Design - Parametric Modelling	GA_MCOMP_N06	6	15	2	Major	Parent Award: Bachelor of Engineering (Hons) in Mechanical Engineering
Bachelor of Engineering (Honours) in Energy Engineering	GA_EENAG_H08	8	240	4	Major	Embedded Awards: Bachelor of Engineering in Energy Engineering
Bachelor of Engineering in Energy Engineering	GA_EENEG_B07	7	180	3	Major	Embedded Award: Higher Certificate in Engineering in Energy Engineering
Higher Certificate in Engineering in Energy Engineering	GA_EENAG_C06	6	120	2	Exit	Parent Award: Bachelor of Engineering (Honours) in Energy Engineering
Bachelor of Engineering (Honours) in Biomedical Engineering	GA_EBIOG_H08	8	240	4	Major	Embedded Award: Bachelor of Engineering In Biomedical Engineering
Bachelor of Engineering in Biomedical Engineering	GA_EBIOG_B07	7	180	3	Major	Parent Award: Bachelor of Engineering (Honours) in Biomedical Engineering
Higher Certificate in Engineering in Biomedical Engineering	GA_EBIOG_C06	6	120	2	Major	Parent Award: Bachelor of Engineering (Honours) in Biomedical Engineering
Bachelor of Engineering (Honours) in Agricultural Engineering	GA_EAGRG_H08	8	240	4	Major	Embedded Award: Bachelor of Engineering in Agricultural Engineering
Bachelor of Engineering in Agricultural Engineering	GA_EAGRG_B07	7	180	3	Major	Parent Award: Bachelor of Engineering (Honours) in Agricultural Engineering
Higher Certificate in Engineering in Agricultural Engineering	GA_EAGRG_C06	6	120	2	Major	Parent Award: Bachelor of Engineering (Honours) in Agricultural Engineering

Date of Panel:

Tuesday, March 29th, 2022

External Peer Review Group:

Panel	
Chairperson	Dr. David Tanner, Senior Lecturer, Manufacturing Process Technology, University of Limerick
Academic Representative	Dr. Andrew Niven Senior Lecturer, School of Engineering, University of Limerick Dr. Niall Burke, Lecturer, Mechanical Engineering, TUS Dr. William Finnegan, Senior Research Fellow, School of Engineering, NUI Galway Dr. Anthony Callanan, Senior Lecturer, Mechanical Engineering, University of Edinburgh
Industry Representative	Mr. Dylan Farrell, Design Engineer, Trane Technologies Mr. William Hickey, Research & Development Engineer, Boston Scientific
Graduate Representative	Mr. Terence Killeen Mc Hale, Co. Mayo
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

(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.

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

Engineering Common Entry Level 8 and Level 7 to the Agricultural, Biomedical, Energy, Manufacturing and Mechanical Engineering programmes

The Common Entry programme was first delivered in the academic year 2018/19. This programme is a one-year programme that, upon completion, allows progression into five separate programmes of Engineering. GMIT offer both a level 7 (L7) and level 8 (L8) Common Entry programme. These are:

- **BEng (Honours) in Engineering** (Common Entry to Agricultural, Biomedical, Energy, Manufacturing Engineering Design and Mechanical Engineering). Students transfer to a specialist award on successful completion of stage 1.
- **BEng in Engineering** (Common Entry to Agricultural, Biomedical, Energy, Manufacturing Engineering Design and Mechanical Engineering). Students transfer to a specialist award on successful completion of stage 1.

Bachelor of Engineering (Honours) in Mechanical Engineering
Bachelor of Engineering in Mechanical Engineering
Higher Certificate in Engineering Mechanical Engineering

Mechanical Engineering is one of the broadest, most diverse, and versatile engineering disciplines. It touches virtually every aspect of modern life and society and combines creativity, knowledge, and analytical tools to convert ideas and solutions into reality. Mechanical engineering enhances modern life, society and the experience and safety of its citizens. Mechanical Engineering graduates are always in demand. Mechanical engineers play key roles in a wide range of industries including automotive, aerospace, biotechnology, computers, electronics, microelectromechanical systems, energy conversion, robotics and automation, and manufacturing. The Mechanical Engineering programme is a vital component of the department's portfolio. Since its inception as a Regional Technical College, mechanical engineering has been delivered at GMIT and has been a one of its leading programmes with regards to student applications, student performance, and as a means of gaining worthwhile employment post-graduation. The mechanical engineering courses delivered at GMIT have helped to put it on the academic map both nationally and internationally.

Bachelor of Engineering (Honours) in Energy Engineering
Bachelor of Engineering in Energy Engineering
Higher Certificate in Engineering in Energy Engineering

The energy sector is in a period of transition and rapid growth as Ireland and the EU move towards a low-carbon economy and society. This poses a series of challenges but also provides significant economic and societal opportunities.

Ireland's first Draft National Energy and Climate Plan (NECP) 2021-2030 was submitted to the European Commission in December 2018. It outlines Ireland's energy and climate policies in detail for the period from 2021 to 2030 and looks onwards to 2050. Ireland has established an objective of achieving a 34% share of renewable energy in energy consumption (up from 16% 2020 target) by 2030. A substantial part of this is to be achieved by increasing the share of electricity from renewable sources from 36% in 2020 to 70% in 2030. Moreover, the plan aims to contribute towards the EU wide target of achieving at least 32.5% improvement in energy efficiency and reducing emissions from sectors outside the EU's Emissions Trading System by 30%.

GMIT's Energy Engineers possess the skills required for this transition and are filling key roles as facilities managers, energy engineers, new product, and service development engineers, and building services engineers across a wide range of business sectors in Ireland. These opportunities are only likely to increase as Ireland and the EU are committed to achieving the United Nations' Sustainable Development Goals, the Paris Agreement on Climate Change, and further achieving a net-zero target by 2050.

Bachelor of Engineering (Honours) in Biomedical Engineering
Bachelor of Engineering in Biomedical Engineering
Higher Certificate in Engineering in Biomedical Engineering

The Biomedical Engineering programme was established and first run in 2017/18. The BEng in Biomedical Engineering programme has graduated its first cohort of Level 7 students in 2020 and Level 8 students in November 2021. All Level 7 graduates progressed to and completed the Level 8 in 2020/2021.

The performance of the programme has been very satisfactory to date with most surveyed students stating that the programme is meeting their expectations and they are satisfied with the development of their interdisciplinary and transferable skills. In the long term, a biomedical engineering laboratory is planned for the new STEM building which will be located on the Dublin Road campus.

Bachelor of Engineering (Honours) in Agricultural Engineering
Bachelor of Engineering in Agricultural Engineering
Higher Certificate in Engineering in Agricultural Engineering

The BEng (level 7 and 8) in Agricultural Engineering programmes were developed in collaboration with Mountbellew Agricultural College (MAC) and introduced to the CAO in 2017, with the first cohort of students graduating in November 2021.

In 2019 the programme went through a Differential Validation process, to include content related to the Green Cert, thereby providing students with an added benefit for completion of the programme. This is appropriate given the cohort for students who apply for this programme.

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   Findings - Engineering Common Entry L8 & L7 to the Agricultural, Biomedical, Energy, Manufacturing and Mechanical Engineering programmes

This entry route is appropriate and provides students with an opportunity to be exposed to each of the specialist degrees prior to choosing a pathway at the end of first year. As this is an entry route which is embedded in each of the remaining awards in this report (and Manufacturing Engineering) all matters pertaining to it are contained in each of the specialist reports.

To date all students who enter through the Common Engineering route have progressed to their preferred choice of programme in year 2, but it is important that each specialist programme remains viable in the future. The main reason students leave the programme is a misconception about what the programme entails, and work is ongoing in relation to creating realistic expectations in advance of course selection.

A week is set aside for induction with a key aim to socialise the students as well as create awareness of the support available both academically and personally for students in the college. A motivational week occurs in week 6 to recentre and reengage students, if necessary. A lot of group work occurs early in the programme with students building a small car during induction, taking apart and reassembling a machine in Mechanical Dissection, three multi-purpose projects in Engineering in Business, and working in groups to identify a project to improve community in LIS.

Maths lecturers keep up to date with Leaving Certificate changes. They screen students in the first week to identify gaps. Students are encouraged to engage with the Maths Learning Centre. There is a lot of formative assessment in maths classes with regular and timely feedback. Students work in groups in tutorials and get marks on an ongoing basis in addition to those allocated to the final examination.

As there is considerable overlap between the Mechanical Engineering programme and the other undergraduate programmes in the Department it was decided to deal with all common issues in that session, allowing the other sessions to be used for more specialist topics.

The two module title changes outlined in Appendix D were approved.

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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.

6 Programme-Level Findings - Bachelor of Engineering (Honours) in Mechanical Engineering 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)	Partially
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.

Sustainability is a key issue within the programme given its importance, the emphasis put on it by GMIT and the requirement from Engineers Ireland to have it incorporated in all programmes by 2030. There is a programme learning outcome related to sustainability. Students are taught about sustainable use of resources at all stages in the programme and learn about design optimisation, responsible production and consumption, the physical environment and holistic design. Specific modules examine sustainability, which include Engineering Ethics and Engineering and Society. The topic is introduced very early in the programme with students taking a tour of the campus as part of Energy Day, which is organised by the Green Campus committee, with students being exposed to energy use in the college, the generation of renewable energy and sustainability transport initiatives. To emphasise the importance of this, learning from the day is assessed in the LIS (now renamed Academic and Professional Development) module. The new STEM building has sustainability incorporated in its design. Generally, there is a move towards technologies that are more energy efficient, and this is very evident in the equipment in the energy lab. Whilst the focus on sustainability is more focussed on engineering, energy and physical production aspects of the Sustainable Development Goals, there is some emphasis on the social aspects. For example, as part of final year project, some students looked at sustainable waterless toilets in India where water can't be used due to the risk of contamination.

The Institute was recently granted an Athena Swan bronze award. This assists in awareness of removing Equality, Diversity and Inclusion (EDI) barriers for students. The college has an EDI policy and events related to this are organised throughout the year. A few staff in the Department of Mechanical and Industrial Engineering are learning about Universal Design for Learning as this is being rolled out throughout the college.

Internationalisation is incorporated in the programme through the Erasmus scheme and inviting international researchers to provide guest lectures.

There was an extensive debate on placement. Growing numbers means that it can be difficult to get placements for all students. The Programme Board feel that students who do not get placement are not disadvantaged due to the practical nature of the programme and the fact that the collaborative project undertaken prepares students very well for the fourth-year project. The new Professional Practice module combines project management, project and work placement. It was stated that placement opportunity can't be guaranteed due to the large number of students. It was suggested by the panel that increased onus should be put on students to find their own placement, with assistance provided only when necessary. It was emphasised that all students should meet the same learning outcomes. The Programme Board would like a central placement office to assist in the placement of students.

Students are provided with an assessment schedule at the start of each semester providing an even workload distribution. Students are assessed using a blend of formative and summative assessments. A wide variety of assessment methodologies are used, and increasingly technology is being exploited in relation to increased provision of formative assessment. There is evidence of good practice which would benefit from being shared across the Department or School. Two external examiners, one academic and one drawn from industry, are used per programme. It was acknowledged that there is a large volume of work for external examiners and that staff must draw on their own contacts to find externs.

There is no standardisation of rubrics or peer review of feedback given to students. However, staff operate an open-door policy meeting with students in relation to any issues arising. Class representatives sit on the Programme Board. Students are surveyed at the end of each module and at the end of each stage, and in addition fill out studentsurvey.ie and the graduate survey.

An in-depth discussion took place in relation to the proposal to use a distributive weighted marking scheme for award calculation. The intent of this is to reward students for work in earlier years and increasing retention in stage two. At the moment some modules are not contributing to the award classification. There is no evidence that it will achieve intended aims, as it was the opinion of the Programme Board that they would need to implement it first to measure its impact.

A second CAD module is being introduced. This displaces Project Management, but the content of this is being moved into the Project Management module.   The Programme Board had conducted research into the specific CAD software being used by industry and found that a lot of the large companies are using CREO.

Whilst a lot of improvements have been implemented in laboratories over the last few years, it was acknowledged that further investment is required.

Minor awards are being developed as there is demand for CPD type courses and the Department wishes to facilitate cohorts in work who require upskilling.

The accommodation of craft apprentices through advanced entry was welcomed by the panel, with the proposers being asked to remove the additional barrier of a Leaving Certificate requirement. The content required for bridging studies has been identified and staff are working with instructional designers to develop online materials which will be completed on a self-paced basis.

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, a mandatory Professional Practice module and an Engineering Design 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. Very well thought out programme which is reviewed and revised regularly. The programme learning outcomes are well aligned with the pedagogy and there is a clearly defined assessment strategy.
2. Quality of the documentation provided to the panel.
3. The provision of a choice of pathways to students following the successful completion of stage 1. The inclusion of an introduction to each specialisation in first year assists students in making an informed decision.
4. The Programme Board's commitment to student retention and the innovative solutions which they have introduced which seem to be impacting retention.
5. Lecturers are student-centred and a range of supports are provided to students e.g., motivation week.
6. Since the last Programmatic Review, the Department has introduced a number of new programmes which have been very successful in attracting students and providing enhanced choice.
7. The introduction of minor awards and targeting of Springboard funding is very positive.

Condition(s):
    None.

Recommendation(s):

1. There needs to be further emphasis on sustainability throughout the programmes and it also needs to be embedded across the Institute so that students can see sustainability in practice throughout the college. For example, model sustainability in the design and development of new and existing facilities in the Institute.
2. Devise a plan for internationalisation across the school to include outgoing students/staff, incoming students/staff and internationalisation at home e.g., engagement in projects with international

partner colleges.   All students should get some type of international experience during the programme.

3. 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 and were generally supportive of its introduction.
4. Remove the Leaving Certificate requirement for craft apprenticeship advanced entry.
5. Utilise discipline specific examples in modules throughout the degree allowing students to see their relevance to their chosen programme.
6. Consider restructuring of documentation for future reviews given the high degree of commonality between programmes.

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

Module Recommendation(s):

Module Title	Findings
CAD 2	Remove reference to specific software to allow the use of alternatives if required in the future.
Professional Practice	Ensure that work placement is mandatory. All students should have equivalent assessment workload.

For office use only (To be completed by Head of Department)	
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 - Bachelor of Engineering (Honours) in Energy Engineering 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[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)	Partially
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

There was much discussion around module names / titles, and a general recommendation by the review panel for the programme board to consider the potential for re-titling some modules to better reflect their actual content, particularly in the context of attracting students. There was a suggestion that prospective students need to see (through specific module titles) that they will be studying energy engineering from an early stage in the programme (at years 1 and 2 in particular).

The panel also discussed assessment, transfer routes, and the innovative approaches being used for student retention.

The Programme Board proposed a number of changes relating to Programme Learning Outcomes, the introduction of a new BIM modules and provision of a new advanced entry route. 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 F

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

were approved and the programme was accredited until the next programmatic review subject to the recommendations below.

Commendation(s):

1. Very well thought out programme which is reviewed and revised regularly. The programme learning outcomes are well aligned with the pedagogy and clearly defined assessment strategy.
2. Quality of the documentation provided to the panel.
3. The provision of a choice of pathways to students following the successful completion of stage 1. The inclusion of an introduction to each specialisation in first year assists students in making an informed decision.
4. The Programme Board's commitment to retention and the innovative solutions that they have introduced which seem to be impacting on retention.
5. Lecturers are student-centred and a range of supports are provided to students e.g., motivation week.
6. Since the last Programmatic Review, the Department has introduced new programmes which have been very successful in attracting students and providing enhanced choice.

Condition(s):
None.

Recommendation(s):
1. There needs to be further emphasis on sustainability throughout the programmes and it also needs to be embedded across the Institute so that students can see sustainability in practice throughout the college. For example, model sustainability in the design and development of new and existing facilities in the Institute.
2. Devise a plan for internationalisation across the school to include outgoing students/staff, incoming students/staff, and internationalisation at home e.g., engagement in projects with international partner colleges. All students should get some type of international experience during the programme.
3. 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 and were generally supportive of its introduction.
4. Remove the Leaving Certificate requirement for craft apprenticeship advanced entry.
5. Utilise discipline specific examples in modules throughout the degree allowing students to see their relevance to their chosen programme.
6. Consider restructuring of documentation for future reviews given the high degree of commonality between programmes.
7. Consider the names of modules so that they are appropriate and interesting to potential students. This will strengthen the energy focus of the modules and identity of the programme e.g., Heat Transfer.

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

Module Recommendation(s):

Module Title	Findings
Heat Transfer	Consider the names of modules so that they are appropriate and interesting to potential students strengthening the energy focus of the modules and identity of the programme.
Professional Practice	Ensure that work placement is mandatory. All students should have equivalent assessment workload.

For office use only (To be completed by Head of Department)	
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 - Bachelor of Engineering (Honours) in Biomedical Engineering 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
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

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

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)	Partially
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

One of GMIT's three research centres is in the field of biomedical engineering. 3D imaging technology is available in the MET Centre. Students are exposed to this equipment, but less so since Covid. A biomedical laboratory is required and is planned for the new STEM building. Students use the ultrasound machines, but there are health and safety concerns around student use of x-ray equipment. The new medical imaging suite is a useful facility, but it will take time to incorporate this into the programme.

The maths on the programme seemed to be very engineering based not biomedical based. The Programme Board stated this was being addressed.

Graduates need further practical laboratory skills e.g., tensile tests, FDR tests. The panel was informed that a new tensile test machine had recently been installed in GMIT in line with ISO standards. A stent cutting machine had been donated by Boston Scientific and this is an asset to the programme.

Students felt that the introduction of computer aided engineering was too late in the degree. Mimics software was used in GMIT previously, but it is not financially viable to continue using it. Lab simulations are used.

Programming is not included as a module on this programme as there are time constraints which dictate what can be taught. However, the Automation and Control module covers a little programming. Python is used to problem solve rather than Excel.

The panel met a number of students on the programme. Students identified a gap between when CAD was learned (stage 1) and when it was used for a project (stage 4), and therefore would like if CAD content was included in stage 3 of the programme. Students would like to see more biomedical examples used in common modules e.g., bone or tissue examples in maths. Students enjoyed modules where they got to use medical devices. They felt it would be useful if Excel was integrated more into the programme so they would become more proficient. It can be challenging to get rooms to use computers or access to equipment such as tensile connectors. They would welcome more choice of modules in the programme with tasters of each provided. Two of the three students the panel met would like to see some of their award calculated based on stage 3

but felt that stage 2 was too early, and it would put a lot of pressure on students. Students were satisfied that they got to feedback through end of module questionnaires but there was no evidence of the feedback loop being closed.

The Programme Board proposed a number of changes relating to Programme Learning Outcomes, provision of a new advanced entry route, a mandatory Professional Practice module and renaming of some modules. 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 G were approved and the programme was accredited until the next programmatic review subject to the recommendations below.

Commendation(s):
1. Very well thought out programme which is reviewed and revised regularly. The programme learning outcomes are well aligned with the pedagogy and clearly defined assessment strategy.
2. Quality of the documentation provided to the panel.
3. The provision of a choice of pathways to students following the successful completion of stage 1. The inclusion of an introduction to each specialisation in first year assists students in making an informed decision.
4. The Programme Board's commitment to retention and the innovative solutions that they have introduced which seem to be impacting on retention.
5. Lecturers are student-centred and a range of supports are provided to students e.g., motivation week.
6. Since the last Programmatic Review, the Department has introduced a number of new programmes which have been very successful in attracting students and providing enhanced choice.

Condition(s):
   None.

Recommendation(s):
1. There needs to be further emphasis on sustainability throughout the programmes and it also needs to be embedded across the Institute so that students can see sustainability in practice throughout the college. For example, model sustainability in the design and development of new and existing facilities in the Institute.
2. Devise a plan for internationalisation across the school to include outgoing students/staff, incoming students/staff and internationalisation at home e.g., engagement in projects with international partner colleges. All students should get some type of international experience during the programme.
3. 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 and were generally supportive of its introduction.
4. Remove the Leaving Certificate requirement for craft apprenticeship advanced entry.
5. Utilise discipline specific examples in modules throughout the degree allowing students to see their relevance to their particular programme.
6. Consider restructuring of documentation for future reviews given the high degree of commonality between programmes.
7. Consider including further programming within the programme and/or make the programming that is contained therein more visible.
8. Integrate CAD in other modules giving students an opportunity to apply their learning and see that this is an integrated curriculum.
9. Improve students' practical laboratory and tensile testing skills to prepare them for employment.
10. Consider introducing a more varied elective choice in Stage 4.

Observation:

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

Module Recommendation(s):

Module Title	Findings
CAD	Integrate into other modules

For office use only (To be completed by Head of Department)	
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.	

9   Programme-Level Findings - Bachelor of Engineering (Honours) in Agricultural Engineering 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

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

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)	Partially
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 recently went through a Differential Validation to include modules and content necessary to attain the Green Certificate. This did involve removing some mechanical content, but it gives students additional options as they come predominantly from farming backgrounds. It was clarified that the certification only applies to the level 8 programme.

While numbers on the programme have been low, initial indicators show an increase in applicants this year. There are jobs available in this sector for graduates. Unfortunately, the programme lost a number of students from the programme during the pandemic due to the move to online teaching.

Retrospective recognition from Engineering Ireland will be sought for this programme.

The panel met students from this programme. They were very positive about the work placement and the Green Certificate. They found that the additional work required for the agriculture modules was high, but this may be because the programme was going through a transition period. They found that typically lecturers used generic examples in classes and would prefer if there was increased use of examples relating to agricultural engineering.

The Programme Board proposed a number of changes relating to Programme Learning Outcomes, provision of a new advanced entry route, a mandatory Professional Practice module and resequencing of some modules to align with programmes in business and science. 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 H were approved and the programme was accredited until the next programmatic review subject to the recommendations below.

Commendation(s):
1. Very well thought out programme which is reviewed and revised regularly. The programme learning outcomes are well aligned with the pedagogy and clearly defined assessment strategy.
2. Quality of the documentation provided to the panel.

3. The provision of a choice of pathways to students following the successful completion of stage 1. The inclusion of an introduction to each specialisation in first year assists students in making an informed decision.
4. The Programme Board's commitment to retention and the innovative solutions that they have introduced and which seem to be impacting on retention.
5. Lecturers are student-centred and a range of supports are provided to students e.g., motivation week.
6. Since the last Programmatic Review, the Department has introduced a number of new programmes which have been very successful in attracting students and providing enhanced choice.
7. The inclusion of the Green Cert in the programme provides students with additional benefits for undertaking the programme.
8. A student-centred approach was applied to the restructure of the programme.

Condition(s):
     None.

Recommendation(s):
1. There needs to be further emphasis on sustainability throughout the programmes and it also needs to be embedded across the Institute so that students can see sustainability in practice throughout the college. For example, model sustainability in the design and development of new and existing facilities in the Institute.
2. Devise a plan for internationalisation across the school to include outgoing students/staff, incoming students/staff and internationalisation at home e.g., engagement in projects with international partner colleges. All students should get some type of international experience during the programme.
3. 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 and were generally supportive of its introduction.
4. Remove the Leaving Certificate requirement for craft apprenticeship advanced entry.
5. Utilise discipline specific examples in modules throughout the degree allowing students to see their relevance to their chosen programme.
6. Consider restructuring of documentation for future reviews given the high degree of commonality between programmes.
7. Provide a dedicated lecturer for the Agricultural Engineering programme, ensuring that students can identify with the programme and receive discipline specific content.
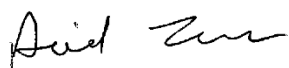
Observation:
The panel noted the facilities issue and the constraints around this. Need a plan to ensure that the facilities and equipment required to deliver programmes are available.

For office use only (To be completed by Head of Department)	
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
Prof. Graham Heaslip	Head of School of Engineering
Dr. Oliver Mulryan	Head of Department Mechanical & Industrial Engineering
Dr. Carine Gachon	Transcend Project Manager

Academic Staff Representatives Common Entry Engineering

Dr. Oliver Mulryan	Dr. Carine Gachon	Prof. Graham Heaslip
Mr. Joseph Herron	Dr. Aoife O'Brien	Dr. Alan Hannon
Dr. Aurora Dimache	Mr. Alan Connors	Dr. Christoph Schellenberg
Ms. Clare Lundon	Dr. Cormac Flynn	Mr. David McDonnell
Mr. Eddie Dunbar	Dr. Brian De Souza	Mr. Padraig Audley
Mr. Gerard O'Donnell	Dr. Kate Goggin	Dr. Paul O'Dowd
Dr. Nireeksha Karode	Mr. Willie Geraghty	Dr. Cormac Flynn
Dr. Jack Saad	Dr. Paul Fahy	Dr. Fiona Malone

Academic Staff Representatives Mechanical Engineering

Dr. Oliver Mulryan	Mr. Gerard O'Donnell	Dr. Gabriel J Costello
Mr. Alan Connors	Dr. Aoife O'Brien	Dr. Alan Hannon
Dr. Aurora Dimache	Dr. David Gorman	Dr. Christoph Schellenberg
Mr. Vlad Teleanca	Dr. Cormac Flynn	Mr. David McDonnell
Mr. James McGivern	Dr. Denis O'Mahoney	Dr. Fiona Malone
Dr. Brian De Souza	Mr. Liam Morris	Dr. John Lohan
Dr. Eoin Parle	Dr. Tom Roche	Mr. Joseph Herron
Mr. Padraig Audley	Dr. Paul O'Dowd	Dr. Nireeksha Karode
Dr. PJ McAllen	Mr. Gabriel Costello	Dr. Paul Tierney
Mr. Willie Geraghty		

Academic Staff Representatives Energy Engineering

Mr. Gerard O'Donnell	Dr. Aoife O'Brien	Dr. Christoph Schellenberg
Dr. Tom Roche	Mr. Willie Geraghty	Mr. David Keary
Mr. David Keary		

Academic Staff Representatives Agricultural Engineering

Dr. Oliver Mulryan	Dr. PJ McAllen	Dr. Brian De Souza
Mr. Alan Connors	Mr. Enda Kennedy	Ms. Eilish Zaletel
Mr. Gabriel Costello	Dr. Edna Curley	

Academic Staff Representatives Biomedical Engineering

Dr. Aurora Dimache	Mr. David McDonnell	Dr. Fiona Malone
Mr. Paul Fahy	Dr. Cormac Flynn	Mr. Liam Morris
Mr. Padraig Audley	Dr. Eoin Parle	

Appendix B - Student Representatives

The panel met with the following student representatives:

	Programme	Stage
Mr. Adam Hardy	Bachelor of Engineering (Honours) in Mechanical Engineering	4
Mr. Michael Ahern	Bachelor of Engineering (Honours) in Mechanical Engineering	4
Mr. David Alfred	Bachelor of Engineering (Honours) in Mechanical Engineering	4
Mr. Eoin McLoughlin	Bachelor of Engineering (Honours) in Agricultural Engineering	3
Mr. Darren Fagan	Bachelor of Engineering (Honours) in Agricultural Engineering	3
Mr. Eoin Forde	Bachelor of Engineering (Honours) in Biomedical Engineering	4
Ms. Shalom Brave	Bachelor of Engineering (Honours) in Biomedical Engineering	4
Mr. Marcus Schokker	Bachelor of Engineering (Honours) in Biomedical Engineering	4
Mr. Ewan Berry	Bachelor of Engineering (Honours) in Energy Engineering	4
Ms. Amie Hawkins	Bachelor of Engineering (Honours) in Energy Engineering	4
Ms, Qistina Binti Ab Halim	Bachelor of Engineering (Honours) in Energy Engineering	3

Appendix C - Schedule of Meetings

Agenda	
Date:	Tuesday, 29th March 2022
9am	Panel Meet
9.30am	Meeting with Programme Board(s) re Common 1st Year and Commonality between programmes
10.30am	Break
10.45am	Mechanical Engineering Programme Board No. 1
1pm	Meet with Students (Panel will break into small groups to meet different cohorts of students)
1.30pm	Lunch
2.30pm	Mechanical Engineering Programme Board No. 2
3.30pm	Parallel A: Energy Engineering Programme Board
3.30pm	Parallel B: Agri-Engineering Programme Board
3.30pm	Parallel C: Biomedical Engineering Programme Board
4.15pm	Panel - Private Deliberations
5.15pm	Initial Feedback
The agenda may be subject to slight alteration on the day. The full panel attend all sessions unless otherwise indicated.	

Appendix D - Proposed changes for Engineering Common Entry L8 to the Agricultural, Biomedical, Energy, Manufacturing and Mechanical Engineering programmes

Topic	Proposed Change	Rationale
Module Changes		
Mathematics Fundamentals	Name change to Manufacturing Engineering Mathematics 1	students were reluctant to select the alternative "Fundamental" modules in Mathematics and Engineering Science, with these modules being perceived as inferior options.

Engineering Science Fundamentals	Name change to Engineering Science for Manufacturing	students were reluctant to select the alternative "Fundamental" modules in Mathematics and Engineering Science, with these modules being perceived as inferior options.

Appendix E - Proposed changes for Bachelor of Engineering (Honours) in Mechanical Engineering and embedded Awards

Topic	Proposed Change	Rationale
Programme Learning Outcomes	Aligning the Existing PLO'S to Engineering Ireland POs	Consistency in relation to GMIT and EI standards and reviews.
Structure or Sequencing of Modules		
Addition of New Module(s)	Professional Practice CAD 2 Engineering Design	Combines Project Management, Project and Work Placement Further expose students to required CAD skills New 5 ECTS module as work placement (Professional Practice) now mandatory.
New APS Regulations		
Minimum Entry Requirements		
Changed transfer or progression routes	New entry route for holders of Advanced Craft Certificated who complete bridging studies	Removal of barrier to entry. Successfully used this pathway previously with Energy Engineering.
Overall Contact Hours	Stage 2 reduce 26 hours to 25.5 hours Stage 3 reduce 25.3 hours to 24.8 hours *Stage 4 - Specialisation* 	*Biomedical*	*Energy*	*Product Design*	*Lean Manufacturing*
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21.33	*21.33*	*21.33*	*21.33*
21.83	*21.83*	*21.83*	*21.83*		Allow for training in CAD Allow additional time in Major Project
Teaching & Learning Strategy		
Assessment Strategy		
Module Changes		
Stage 2		
Control Engineering	this ten-credit module is being replaced by two five credit modules these modules are: Manufacturing Automation 1, and Manufacturing Automation 2	allow for the introduction of new programs into the department; Manufacturing Engineering Design
Stage 3		
Automation And Control 1	to be superseded by Instrumentation and Control	allow for the introduction of new programs into the department; Manufacturing Engineering Design

Instrumentation and Control	to be superseded by Manufacturing Automation 3	allow for the introduction of new programs into the department; Manufacturing Engineering Design
stage 4		
Advanced Automation and Control	Change duration from semester long to your long	To give students more opportunity for self-learning and CA work
Advanced Mechanical Engineering	Change duration from semester long to your long	To give students more opportunity for self-learning and CA work
Electrical Machines	Change duration from semester long to your long	It was decided to hold the laboratory component in semester 2 to allow students more time to absorb the theory of semester 1
Biomedical Engineering I	taken in semester 1 this module has been replaced with Medical Devices for Soft Tissues	Integration of the ad initio Biomedical Engineering programme
Biomedical Engineering II	Taken in semester 2 this module has been replaced With Medical Devices for Hard Tissues	Integration of the ad initio Biomedical Engineering programme
Engineer In Society	marks allocations change from 30% final exam from 100% CA	

Appendix F - Proposed changes for Bachelor of Engineering (Honours) in Energy Engineering and embedded Awards

Topic	Proposed Change	Rationale
Programme Learning Outcomes	Align to those Programme Outcomes prescribed by Engineering Ireland. Ethics and sustainability are now included in the LOs.	Considered Best Practice Replicating what other IoTs and Universities have already Adopted Sustainability of the Department
Overall Contact Hours	Stage 2 reduce 27.5 hours to 26 hours Stage 4 increase 19.92 hours to 20.42 hours	S1. Rearranged BIM Module S4. Increase Major project hours
Structure or Sequencing of Modules	Stage 2: move the "Programme for Embedded Controllers" and "Project and Project Management" into year 3 Stage 3: remove "Numerical Methods and Programming" combine the elective "Work Placement" and "Project" modules with the "Project and Project Management"	allowing programme board to introduce "Building Information Modelling I" and "Building Information Modelling 2" allow to move "Programming for Embedded Controllers" for stage 2 to Stage 3. to create the "Professional Practice for Energy Engineers" module.
Addition of New Module(s)	Stage 2: *BIM I Fundamentals* *BIM II - Building Services*	The engineering world is moving rapidly towards collaborative design and construction practices, some of which is facilitated using internet-based CAD software packages such as Revit.
New APS Regulations		
Minimum Entry Requirements		

Changed transfer or progression routes		
Teaching & Learning Strategy		
Assessment Strategy		
Module Changes		
Stage 2		
Programme for Embedded Controllers	Move to Stage 3	allowing programme board to introduce "Building Information Modelling I" and "Building Information Modelling 2"
Project and Project Management"	Move to Stage 3	allowing programme board to introduce "Building Information Modelling I" and "Building Information Modelling 2"
Stage 3		
Numerical Methods and Programming	remove	This allows the programme board to move "Programming for Embedded Controllers" for stage 2 to Stage 3.
Building Energy Performance	reduce the volume of learning and credits	This allows the programme board to move "Programming for Embedded Controllers" for stage 2 to Stage 3.
Professional Practice for Energy Engineers	Combination of combine the elective "Work Placement" and "Project" modules with the "Project and Project Management"	
Stage 4		
Nuclear Engineering and Fuel Cells	Rename to Nuclear Engineering and Electrochemical Energy Technology	Reflects the curriculum covered in the modules

Appendix G - Proposed changes for Bachelor of Engineering (Honours) in Biomedical Engineering and embedded Awards

Topic	Proposed Change	Rationale
Programme Learning Outcomes	Aligning the existing Programme Learning Outcomes to Engineering Ireland programme outcomes.	Best practice Replicating what other IoTs and Universities have already Adopted Sustainability of the Department
Overall Contact Hours	Stage 1 increase by 1 hour Stage 4 increase by 0.5 hours	
Structure or Sequencing of Modules	See Table below	
Addition of New Module(s)	No change	
New APS Regulations		
Minimum Entry Requirements	No change	
Changed transfer or progression routes		

Teaching & Learning Strategy		
Assessment Strategy		
Module Changes		
Applied Biology of the Cell	Reduced the number of LOs from 7 to 5 for this 5-credit module	in line with best practice recommendations.
Engineering in Business	Reduced learning outcomes from 7 to 5, Replaced assembly line enhancement with Project Management, Merged similar LOs on data analysis.	in line with best practice recommendations. to prepare students for future projects.
Mathematics 1	Reduced the number of learning outcomes	as per GMIT guidelines.
Electrical Science	Reduced learning outcomes from 6 to 5 The marking breakdown was changed Consequently, the 20% weighting of the end of semester closed book written assessment was reduced to 10% while the 10% for ongoing online quizzes was increased to 20%. The weighting of the other student performance evaluation elements (i.e., practical evaluation - 20%, project - 10% and final exam - 40%) remained unchanged.	Clarity to better reflect the extensive coursework and evaluation carried out using the learning management system (i.e., LearnOnLine)
Mathematics 2	reduced the number of LOs to 5 Changed from 30:70 CA: Exam to 40:60.	Best practice
Quality and Regulatory Affairs	Moved lectures to Online to	allow and facilitate new assessment methodology outlined
Project Management and Project	changed the exam to assess instead the theory element using online and training quizzes. changed the delivery to Online.	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. It allows the students more flexibility in how they attain the learning outcomes. The overall performance of students has not fallen due this methodology introduced as part of the covid emergency and there is evidence they prefer this methodology.
Human Anatomy and physiology for engineers II	Moved two learning outcomes to the first-year module Added one outcome to make connections between physiology and international biomedical technologies. Implemented an e-portfolio assessment, replaced 60% closed-book written exam with shorter in-class assessments spread throughout the module. It is proposed to change this module from a 2-hour lecture to a 2-hour laboratory. The first-year module, Anatomy and Physiology for Engineers I, is delivered by lecture with no practical element.	enables students to integrate their learning in the class with the outside world. It also allows them to reflect on their learning in physiology. Allowing flexibility in how they present their work. Important to give the biomedical students the opportunity to do practical anatomy and physiology activities in this second-year module. Student feedback

Medical Image Generation of Anatomical Structures & Functions	learning outcomes reduced from 6 to 5. The final exam was reduced from 60% to 50%. This facilitates the introduction of more practicals for the CAs.	In line with institute policy
Manufacturing Automation 2	LO reduced to 5	
Mathematics 3	LOs were reduced Assessment strategy changed from 70:30 Exam: CA breakdown to 60:40	Allows for some extra component of CA which is more appropriate to assess statistics than a final paper based exam.
Statics and Dynamics	learning outcomes were reduced to from 8 to 5. Previously the summative terminal exam was weighted at 60% of the overall modules marks this was reduced to 40%. The continuous assessment marks were increased by 20%. The overall mark for the formative assessments is now 50%.	The summative exam is still needed to assess how the student has assimilated the module learning.
Manufacturing Automation 1 (Pneumatics)	Reduced LO to 5.	
Lean Six Sigma	changed 100% continuous Assessment Change to 1 hour in person and 1 hour Online. I moved lectures to Online to allow and facilitate new assessment methodology outlined.	allows the theory element of programme to be divided into smaller manageable chunks and is fairer. Allows more flexibility The overall performance of students has not fallen due this methodology introduced as part of the Covid emergency and there is evidence they prefer this methodology.
Instrumentation and Control	Changed a LO based on LabView to All-in-One Controller technology. The students are now assessed for programming and configuring Horner Controllers using ladder logic, where previously they programmed and configured NI devices using LabView. Formative quizzes were introduced to allow the students to consolidate their learning out of lab hours.	
Machine Design	Added 1 LO which was missing, changed and reworded the remaining LOs	in line with Bloom's Taxonomy.
Engineering Work Placement	Number of LOs remains the same but are changed Duration has been changed from 20 weeks to 15 New assessment strategy reflects current practices (CV, interview, process study, technical project, presentation and reflection).	to reflect current practices (CV, interview prep etc.) and line up with Bloom's Taxonomy. to align with Manufacturing Engineering Design Work Placement module ensuring consistency within the department.
Biomechanics of Soft Tissues	learning outcomes increased from 4 to The final exam was reduced from 60% to 50%. The 60% CAs were further broken down into four parts instead of the previous two. The mode of delivery was changed from a 2-hour weekly lecture to 1 hour weekly lecture and 1 hour laboratory practical work.	This module was deemed to be one of core modules for the Biomedical Engineering. This module is currently taught as a combination of lectures and practices which an allocation of 1 hour lecture and 1 hour laboratory weekly since 2019/2020 academic year. Some of the practicals are demonstrated within the MET research centre, facilitating the integration of research with teaching.

Manufacturing Automation 3	learning outcomes was reduced to 5 A project (20%) was introduced.	as per GMIT guidelines This was a more suitable assessment to examine the learning outcome "Set-up a machine vision system".
Advanced Mechanical Engineering	The final examination mark was changed from 30% to 35%	to better reflect the breakdown of module delivery.
Medical Devices for Soft Tissues	learning outcomes were reduced from 7 to 5 The final exam was reduced from 60% to 50%. The module was renamed to "Medical Devices 1".	as per GMIT guidelines to facilitate more practical work in further assessing medical devices
Medical devices for Hard Tissues	learning outcomes were reduced from 6 to 5 The number of CA assessment types were changed from 2 to 3. The module was renamed to "Medical Devices 2".	as per GMIT guidelines
Intellectual Property & Knowledge Management	The percentage marks awarded for continuous assessment was increased from 20% to 40% and the final exam reduced from 80% to 60%.	This allowed a third coursework project to be conducted.
Six sigma engineering	learning outcomes were changed from 7 to 5	as per GMIT guidelines
The engineer in society	Changed LO from 6 to 5	as per GMIT guidelines

Appendix H - Proposed changes for Bachelor of Engineering (Honours) in Agricultural Engineering and embedded Awards

Topic	Proposed Change	Rationale
Programme Learning Outcomes	Aligning the Existing PLO'S to Engineering Ireland PLOs.	Best practice Replicating what other IoTs and Universities have already adopted Sustainability of the Department
Overall Contact Hours	Stage 2 reduce 27 hours to 26 hours Stage 3 reduce 26.17 hours to 25.17 hours Stage 4 increase 19.53 hours to 20.83 hours	Allow for training in CAD Allow additional time in Major Project
Structure or Sequencing of Modules	Stage 2: Soil Science and Nutrient Management (S2) has moved to stage 4, and the PB are proposing for this to be replaced by Farm Animal Health and Planning module. Programming for embedded Controller (S2) has moved to stage 3 and will be replaced by a more practical module -Computer Aided Design II. Stage 3: Engineering Design module is reduced in volume to 5, the resources will also be reduced. Stage 4: The farm animal and health planning module will be moved to stage 2., and the soil science and nutrient management module will be moved to stage 4	improve retention in stage 2 allows Programming for embedded Controllers to be moved to Stage 3.
Addition of New	CAD stage 2	

Module(s)		
New APS Regulations	No change	
Minimum Entry Requirements	No change	
Changed transfer or progression routes		
Teaching & Learning Strategy	No change	
Assessment Strategy		
Module Changes		
Stage 2		
Soil Science and Nutrient Management	Moved to S4, and to be replaced with Farm Animal Health and Planning module.	improve retention in stage 2.
Programming for embedded Controller	Move to stage 3, and be replace by computer Aided Design II	improve retention in stage 2.
Stage 3		
Engineering Design	Reduce ECTS to 5	allows Programming for embedded Controllers to be moved to Stage 3.
Stage 4		
Farm animal and health planning	Move to stage 2	