

1.	Title of Programme(s): (incl. Award Type and Specify Embedded Exit Awards)	<p>BEng (Hons) in Manufacturing Engineering Design BEng in Manufacturing Engineering Design Higher Certificate in Manufacturing Engineering Design</p> <p>Exit Awards: The BEng in Manufacturing Engineering Design and the Higher Certificate in Manufacturing Engineering Design will act as exit awards for the BEng (Hons) in Manufacturing Engineering Design The Higher Certificate in Manufacturing Engineering Design will act as exit awards for the BEng in Manufacturing Engineering Design</p>
2.	NFQ Level(s)/ No. ECTS:	<p>8 240</p>
3.	Duration:	4
4.	ISCED Code:	0720
5.	School / Centre:	School of Engineering
6.	Department:	Department of Mechanical and Industrial Engineering
7.	Type of Review:	New Programme
8.	Date of Review:	16 th December 2019
9.	Delivery Mode:	Full-time
10.	Panel Members:	<p>Ms Fiona Cranley, Head of School of Engineering, TU Dublin (Chair) Dr Sinéad Mitchell, Lecturer in Engineering, NUI Galway Mr Albert Byrne, Head of Department of Engineering Technology, Waterford Institute of Technology Mr Alan Heneghan, Senior Program Manager, Thermoking Ms Carmel Brennan, Assistant Registrar (Quality), GMIT, (Secretary)</p>
11.	Proposing Staff:	<p>Mr Gerard MacMichael Dr Carine Gachon Dr Paul O'Dowd Dr Denis O'Mahony Dr Kate Goggin Mr Martin Conneely Mr Gerard O'Donnell Ms Eilish Zaletel Dr Gabriel J Costello Mr Pdraig Audley Mr Eddie Dunbar Dr Fiona Malone Ms Rachel Gargan</p>

		<p>Ms Clare Lundon Dr Aurora Dimache Mr Sean Howe Mr Vlad Teleanca Mr James McGivern Dr Tom Roche Mr Gerard O'Donnell</p>
12.	<p>Programme Rationale:</p>	<p>Data released in 2012 showed that there were 12,790 manufacturing enterprises in Ireland, accounting for approximately €92.9 billion exports. In 2010, the manufacturing sector represented almost 40 percent of net corporation tax receipts, and, in 2009, manufacturing sales accounted for approximately 22 percent of GDP (Future Skills Requirements of the Manufacturing Sector, 2012)¹. Manufacturing output rose by 9.7% from April 2014 to April 2015 (Dashboard statistics, Dept. of Jobs Enterprise and Innovation, 2015)². In 2014, Ireland's manufacturing operations provided direct employment for 218,500 people (Action Plan for Jobs, Dept. of Jobs Enterprise and Innovation)³.</p> <p>The MedTech sector in Ireland, a significant portion of which is clustered in the west, employs 27,000 people alone, with over 2000 jobs publicly announced between 2013 and 2016 (IMDA, 2016)⁴. Its exports amount to €8bn in product annually and have grown substantially from 2011 to 2016.</p> <p>Manufacturing is expected to grow significantly in the near future (Ireland's National Skills Strategy 2025, Dept of Education and Skills)⁵. Enterprise 2025 identifies the potential for growth in Irish owned manufacturing and services exports of between 6 and 8 percent annually to 2020 (Enterprise 2025, Dept of Jobs, enterprise and Innovation).</p>

¹ Forfás Expert Group on Future Skills Needs, 2012, "Future Skills Requirements of the Manufacturing Sector to 2020" <https://www.djei.ie/en/Publications/Publication-files/Forf%C3%A1s/Future-Skills-Requirements-of-the-Manufacturing-Sector-to-2020.pdf>

² Department of Jobs Enterprise and Innovation, 2015 "Dashboard Statistics" <https://www.djei.ie/en/Publications/Publication-files/Dashboard-Statistics-26-June-2015.pdf>

³ Department of Jobs Enterprise and Innovation, 2016 "Action Plan for Jobs" <https://www.djei.ie/en/Publications/Publication-files/Action-Plan-for-Jobs-2016.pdf>

⁴ Irish Medical Devices Association, 2016 "Proposal to Develop a New Apprenticeship Programme" Submission document to the Apprenticeship Council

⁵ Dept of Education and Skills, 2016, "Ireland's National Skills Strategy 2025" http://www.education.ie/en/Publications/Policy-Reports/pub_national_skills_strategy_2025.pdf

	<p>Other trends and developments indicate a strong future for manufacturing in Ireland. Demand for pharmaceuticals, medical devices and specialised agricultural equipment is predicted to grow, as is demand for niche electronic offerings, and for manufactured products used in the construction industry (The Future of Manufacturing in Ireland - Interim Report, Irish Academy of Engineering, 2013)⁶.</p> <p>Enterprise 2025 has identified the need to build on existing strengths in Complex manufacturing – in areas such as medical devices, pharma/bio engineering, food and packaging (Enterprise 2025, Dept of Jobs, enterprise and Innovation). Productivity improvements and increased cost competitiveness are needed in the short term (Enterprise 2025: Innovative, Agile, Connected, 2015)⁷ whereas “Factories of the Future” (Smart, Virtual and Digital) is the new drive with a focus on lean principles, sustainable manufacturing and the use of advanced ICT.</p> <p>The availability of suitably qualified manufacturing/industrial engineers is critical if Ireland is to continue to grow its indigenous base and continue to compete internationally for investment (IMDA, 2016).</p> <p>The Irish MedTech Association (IMA- the IBEC group representing the MedTech sector in Ireland - 180 medical technology companies employing 25,000+ people) and individual companies, like Johnson & Johnson, have approached GMIT to develop programmes to upskill their employees. They realise that the manufacturing environment is rapidly changing, and the profile of their staff needs to evolve by increasing their knowledge, skills and competences in the fields of automation, computer applications, as well as good manufacturing practices and management. These resulted in the development of the HC/B.Eng. (level 7) in Manufacturing Engineering by apprenticeship, and the B.Eng. (add-on level 7) in Manufacturing Engineering delivered in a blended part-time mode.</p> <p>When the Industry Consortium leading the B.Eng. in Manufacturing Engineering by apprenticeship met in May</p>
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⁶ The Irish Academy of Engineering , 2013, “The Future of Manufacturing in Ireland - Interim Report” <http://www.iae.ie/news/2013/12/12/en-IE/the-future-of-manufacturing-in-ireland-interim-rep/>

⁷ Department of Jobs Enterprise and Innovation, 2015 “Enterprise 2025 Ireland’s National Enterprise Policy, 2015-2025” <https://www.djei.ie/en/What-We-Do/Business-Sectoral-Initiatives/Enterprise-2025/>

		2009, its industry members expressed the need to develop a level 8 programme in the field.
13.	Potential Demand for Entry:	The expected intake in this programme is of 20 students per annum for both the level 7 (already approved) and level 8 combined.
14.	Stakeholder Engagement:	The Mechanical & Industrial Engineering Department is continuously engaged with its external stakeholders, which principally encompass employers, professional bodies and graduate students. In addition to continuous formal engagements, there is ongoing informal communication and consultation at institute, school and individual level. In addition, specific consultation was undertaken with industry which influenced the content of the programme.
15.	Graduate Demand:	<p>Graduates from the programme will have knowledge, skills, and competences which will allow them to build a career in the following areas:</p> <ul style="list-style-type: none"> • Manufacturing engineering; • Quality engineering, maintenance and reliability; • Lean / Six Sigma engineering; • Production and process engineering; • Process improvement and smart manufacturing; • Operations management, production planning and supply chain engineering; • Project management; • Energy management; • Facilities, maintenance and safety. <p>Furthermore, some graduates may become self-employed.</p>
16.	Entry Requirements, Access, Transfer & Progression:	<p>The minimum entry requirement is Grade O6/H7 or better in six Leaving Certificate subjects including English or Irish and Mathematics, two of which must be passed in higher level papers at Grade H5 or higher.</p> <p>Foundation programmes, QQI FE awards or RPL can also be used to gain entry in line with GMIT's Access and Progression and RPL policies.</p>
17.	Programme Structure:	Stage 1 of the programme consists of year-long modules to allow students more time to transition to higher education with stages 2, 3 and 4 consisting of a mixture of semester

		<p>long and year-long modules. Students will spend semester 6 on work placement.</p> <p>The programme develops students in three interlaced streams:</p> <ul style="list-style-type: none"> - Manufacturing processes - Automation and smart-manufacturing - Troubleshooting, optimisation and enhancement.
18.	<p>Learning, Teaching & Assessment Strategies:</p>	<p>Where possible, traditional laboratories and tutorials will be replaced with problem-based learning, project based learning, and experienced based learning teaching methods. Delivery will be through lectures, tutorials, labs and workshops. Student presentations and projects will be used throughout. A wide range of assessment methodologies will be used throughout the programme.</p>
19.	<p>Resource Implications:</p>	<p>Teaching will be shared with programmes which are currently running. Presuming only one student group in stage 4 the additional staff resource to deliver this programme will be 3 hours plus agreed supervision rates. If an additional group needs to be created in year 4, then the requirement will be 12 lecturing hours/ week plus agreed project supervision rates.</p> <p>It is anticipated that the agreed investment in the School of Engineering will cover most of the space and equipment requirements of this programme. In addition, the provision of a dedicated project room for all stage 4 students in the department is viewed as essential. This space should be populated by adequate computer system, printers and plotters. The anticipated cost of this equipment is €35,000. Software requirements will amount to approximately €10,000.</p>
20.	<p>Synergies with Existing Programmes:</p>	<p>Many modules are common with other programmes in the Department of Mechanical Engineering including with the BEng in Manufacturing Engineering (Apprenticeship).</p>

21.	Findings and Recommendations:	General:	
		The programme was approved subject to the following conditions (2) and recommendations (6).	
		Special conditions attaching to approval (if any):	
		<ol style="list-style-type: none"> 1. Revise all modules relating to Operations and Lean Engineering to ensure that there is progression of student learning and removing unnecessary duplication. 2. Ensure the correct module version for 'Energy Management' is included in the programme document. 	
22.	FAO: Academic Council:	Recommendations of the panel in relation to award sought:	
		<ol style="list-style-type: none"> 3. Review modules to identify scope for providing stronger evidence of robotics and Smart Technology in the titles of modules. 4. Reconsider the appropriateness of the module title 'Six Sigma Green Belt Quality' given that students do not achieve the Green Belt award. 5. Reconsider the title and module learning outcomes for the Industrial Design Module. Consider including sustainability in the learning outcomes. 6. Ensure that all modules include a Grading Mode, Teaching and Learning Strategy, Assessment Strategy and Repeat Assessment Strategy and ensure that book lists are up-to-date for all modules. 7. Update the Innovation and Enterprise module to reflect modern innovation thinking, universal design and user centered design. 8. Ensure that sustainability is more explicitly threaded throughout the programme and specifically within module learning outcomes and syllabus content. Consider including sustainability in the title of the 'Energy Management' module. 	
		Approved:	
		Approved subject to recommended changes:	
		Not approved at this time:	
		Signed:	
		Chair	