VALIDATION REPORT

1.	Title of Programme(s): (incl. Award Type and Specify Embedded Exit Awards)	BEng (Hons) in Industrial Engineering (Add-on)
2.	NFQ Level(s)/ No. ECTS:	8 60
3.	Duration:	1
4.	ISCED Code:	0715
5.	School / Centre:	School of Engineering
6.	Department:	Department of Mechanical and Industrial Engineering
7.	Type of Review:	New Programme – External Validation
8.	Date of Review:	16th December 2019
9.	Delivery Mode:	Full-time
10.	Panel Members:	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)
11.	Proposing Staff:	Mr Gerard MacMichael Dr Carine Gachon Dr Paul O'Dowd Mr Martin Conneely Mr Gabriel J Costello Mr Padraig Audley Dr Tom Roche
12.	Programme Rationale:	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

[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

		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]. 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. 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). 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]. 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

[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

[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/

		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. 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). 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. When the Industry Consortium leading the B.Eng. in Manufacturing Engineering by apprenticeship met in May 2009, its industry members expressed the need to develop a level 8 programme in the field.
13.	Potential Demand for Entry:	GMIT is running part-time and apprenticeship programmes in the discipline of Manufacturing Engineering with students expressing demand for a follow-on route. The expected intake for this programme is 20 students per annum.
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:	The programme is designed to align with Engineers Ireland programme outcomes and meet the needs of the industry.

16.	Entry Requirements, Access, Transfer & Progression:	This programme is open to: Any graduate from a B.Eng. (level 7) in manufacturing / industrial engineering (or cognate qualification) who has knowledge and understanding of Lean Six Sigma. Graduates from a cognate science background with a knowledge and understanding of Lean Six Sigma and a minimum of one-year's relevant work experience are also eligible to apply.
17.	Programme Structure:	The part-time programme runs over 52 weeks starting with two 19 weeks semesters (from September to June) where 40 credits of the programme are covered. The other 20 credits are for an Industry based capstone project which starts in September and finish in August (52 weeks). The add-on concentrates on troubleshooting, optimisation and enhancement at enterprise level as reflected in the Industrial Engineering title.
18.	Learning, Teaching & Assessment Strategies:	This programme shall utilise a blended teaching approach (face-to-face and online learning) in order to facilitate students in employment. Work-based learning is also a feature of the programme, as is a major project. A range of assessment methodologies are utilised as appropriate to assess the module and programme learning outcomes, including the development of transferable skills. To ensure the integrity of the assessment strategy, a number of learning outcomes are assessed through project which will be specific to each student or student team.
19.	Resource Implications:	The part-time programme will be self-financing and will require 17 teaching hours per week (including 7hr/week supervision in semester 2) for 38 weeks. It is anticipated that the agreed investment in the School of Engineering will cover the space and equipment requirements of this programme. Software requirements will amount to approximately €10,000.
20.	Synergies with Existing Programmes:	None.
21.	Findings and Recommendations:	General:
		The panel approved the programme with the following recommendations (5):

		Special conditions attaching to approval (if any):	
		None	
		Recommendations of the panel in relation to award sought:	
		1. Review jobs in industrial and manufacturing engineering to examine the language used, ensuring that this is used throughout the programme making the programme more relevant to industry. 2. Rename the module 'Operation Research and Supply Chain Engineering' as 'Operations and Supply Chain Engineering' and remove lean enterprise and lean supply chains from this module as this material is covered elsewhere. 3. Revise the module learning outcomes for the 'Innovation and Enterprise' module ensuring that they are stated appropriately for level 8. Review the articulation of the repeat assessment strategy for this module. Update the module to reflect modern innovation thinking, universal design and user centered design. 4. Consider the use of an alternative project to cover instances where an employer does not engage with the industry project. 5. Ensure that sustainability is more explicitly threaded throughout the programme particularly in module learning outcomes and syllabus content. Specifically, include sustainability in the Supply Chain modules.	
22.	FAO: Academic Council:		
		Approved:	
		Approved subject to recommended changes:	
		Not approved at this time:	
	Signed:		
		Chair	Secretary