EXTERNAL REVIEW REPORT OF NEW PROGRAMMES

1.	Title of Programme(s):	BEng in Manufacturing (One Year Add-on)					
2.	School / Centre:	School of Engineering					
3.	Duration:	This is a single stage programme. Delivery on a part-time basis is planned to take two years.					
4.	NFQ Level: ISCED:	Level 7 0720					
5.	Type of Review:	New Programme:		Yes:	X	No:	
		Differential Validation:		Yes:		No:	X
6.	Date of Review:	17th February 2017					
7.	Delivery Mode:	Full-time		Part-time	X	Blended	X
8.	Panel Members:	Mr Tom Cullivan, Retired HETAC Secretary (Chair) Dr Claire Broughan, DIT Dr Kathryn Cormican, NUIG Mr. Sean Finnerty, Valeo Vision Systems Ireland (Note: Unable to attend on the day) Ms Carmel Brennan, GMIT (Secretary)					
9.	Proposing Staff:	Mr Gerard MacMichael Dr Carine Gachon Dr Patrick Delassus					
10	Programme Rationale:	The programme is in line with GMIT's mission, as it offers learning opportunities to a wider cohort of students, and support regional development, by providing skilled graduates for the national medical technology. Many Government reports have identified the shortage of technicians and engineers for the engineering sectors, specifically the medical technology sector. The Forfás Expert Group on Future					

		Skills Report[1] and the Forfás Manufacturing 2020[2] report both highlight the need for increased levels of skilled technicians and engineers.
		The medical technology industry requires appropriately qualified individuals to better meet Ireland's current and future business needs. The manufacturing environment is rapidly changing and the profile of technical 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.
		This Programme is specifically designed to upskill manufacturing technicians, holding a level 6 qualification, to a level 7 B.Eng. in Manufacturing, while working full-time.
11	Potential Demand for Entry:	Whilst this programme has been developed in response to a company who wishes to upskill up to 150 manufacturing technicians, commencing with a cohort of 44, the flexibility of this programme will also make it attractive to other manufacturing companies.
12	Stakeholder Engagement:	This programme was designed in conjunction with the company seeking to upskill its staff, taking cognisance of the needs of industry and the academic requirements for a programme of this type and level.
13	Graduate Demand:	Students on this programme will already be in employment, but the attainment of this qualification will enhance their promotion and future employment opportunities.
14	Entry Requirements:	The following entry requirements apply 1. Higher Education level 6 major award in Engineering or a cognate Sciences discipline with two years' experience in a technical role in a manufacturing environment OR 2. Further Education level 6 major award in a cognate discipline (examples: toolmaking, fitting, electrical installation) with two years' experience in a technical role in a manufacturing environment.

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[1] *National Skills Bulletin 2016* available at http://www.skillsireland.ie/Publications/2016/National-Skills-Bulletin-2016-Web-Final.pdf
[2] Forfás*: Making it in Ireland - Manufacturing 2020* available at
https://www.djei.ie/en/Publications/Publication-files/Forfás/Making-it-in-Ireland-Manufacturing-2020.pdf

15	Programme Structure:	This is a single stage programme, but is designed to be delivered using a blended methodology i.e. face-to-face classes and online delivery. The proposed part-time delivery will take two years.
16	LTA:	The Teaching and Learning strategy of the proposed programmes revolves around Kolb's Experiential Learning Theory[3] in general, and the Theories of Situated Learning[4] and Cognitive Apprenticeship[5] in particular, in transferring the acquisition of some of the skills and most of the competences to the workplace. In his theory of Experiential learning, Kolb argued that learning is most effective when following the cycle presented in Fig. 1.

Figure 1 Kolb's Experiential Learning Cycle

The first element of the cycle is "Concrete Experience", referring to the fact that students learn better by "doing". In traditional Programmes of education, work experience is offered at the end of the curriculum and used as a capstone rather than an experience to be built on. In the model presented here, students are working in the industry before (minimum two years) and during the Programme, providing them with an ideal "Concrete Experience". Lave and Wenger (1991) also argued, with their "Situated Learning Theory", that students learn better when immersed in an environment relevant to their learning. Accordingly, their work in the Industry will give context, facilitate "Abstract Conceptualisation", and offer extended opportunities for "Active Experimentation". "Abstract Conceptualisation" is particularly important since students will be expected to, not only acquire practical skills, but also develop cognitive and metacognitive ones. According to Collins et al. (1989) this type of learning fosters intrinsic motivation by developing learning goals, which result in more

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[3] Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development* (Vol. 1). Englewood Cliffs, NJ: Prentice-Hall

[4] Lave, Jean; Wenger, Etienne *(1991). Situated Learning: Legitimate Peripheral Participation. Cambridge: Cambridge University Press. ISBN 0-521-42374-0.*; first published in 1990 as Institute for Research on Learning report 90-0013

[5] Collins, A., Brown, J. S., & Newman, S. (1989). Cognitive apprenticeship: teaching the crafts of reading, writing, and mathematics. In L. B. Resnick (Ed.), *Knowing, learning, and instruction: Essays in honor of Robert Glaser* (pp. 453-494). Hillsdale, NJ: Erlbaum

		relevant motivation than performance goals[6] [7]. Students are more motivated if they understand the value of the skills they are learning. In preparing the assessment strategy, the programme design team reflected again on Kolb's experiential learning cycle. If the Industry experience could clearly provide a "concrete experience", and the Institute facilitate the "abstract conceptualisation", the two other elements of the cycles were not as straight forward. There is a need for students to develop their reflective skills as well as their ability to implement "active experimentation". In order to guide students through the "active experimentation process", students will have to complete projects that will assist their active experimentation. In order to reduce the workload and to highlight the relationship between some of the modules, some of the assessments will be integrated. Regarding the reflective part of the cycle, this will facilitated by the lecturers since the modules will be delivered in parallel to the students' industry work and all students will be employed by the same company. Lecturers will be able to use examples taken directly from the students' workplace and help them in their reflection. In designing the programme, the programme design team considered the balance between formative and summative assessments. They have also ensured that a range of assessment methodologies are utilised as appropriate to assess the module and programme learning outcomes, including the development of transferable skills.
17	ATP:	Graduates of the Ordinary Bachelor Degree in Engineering in Manufacturing Engineering (Part-Time mode) programme may progress to a cognate one-year add-on or final year Bachelor (Level 8) Degree in Engineering programme.
18	Resource Implications:	It is envisaged that this programme will be self-financing. The IT labs and associated software packages currently available should be adequate for the generic needs of the programme. Some more specific software will necessary but have been included in the costing of the Programme. The employer will provide a dedicated IT Lab for students on site. Due to the delivery mode of this Programme, students will have limited access to the library. However, the Library has an extensive

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[6] Elliot, E.S. & Dweck, C.S. (1988), "Goals: an approach to motivation and achievement", in *Journal of Personality and Social Psychology,* 54, pp.5-12

[7] Dweck, C.S. & Legget, E.L.(1988), " A social cognitive approach to motivation and personality", in *Psychological Review*, 95, pp.256-273

		range of resources that can be accessed remotely by students registered on the Programme. Lecturers will include links to online resources in their Moodle page. The employer will also purchase some of the necessary materials that students will be able to consult in their workplace.
		Required upgrading of laboratories and equipment has been costed to other programmes.
19	Synergies with existing programmes:	Whilst many modules are common with other programmes, for logistical reasons delivery will be separate and depending on the company requiring the corporate staff development, may be delivered primarily in the company's premises, with laboratories being delivered in GMIT.
20	Findings and Recommend-ations:	The panel are recommending approval of the proposed programme, subject to the following recommendations:
		Special conditions attaching to approval (if any):
		• None
		Recommendations of the panel in relation to award sought:
		• Ensure that the module learning outcomes for the Quality module align better with the content as specified in the indicative syllabus. Consider including a specific learning outcome on validation. • Annually review the programme in the early years of delivery taking remedial action, as relevant. In addition, the programme structure and modules should undergo a comprehensive programmatic review in accordance with GMIT's schedule, based on the programme board's experience of delivery and considering the views of all stakeholders. • Consider how best to ensure maximum student engagement with essential elements of assessment, thereby confirming that the learning outcomes are achieved. • Articulate clearly the progression routes open to graduates of these programmes, and ensure communication same to applicants.

22.	FAO: Academic Council:		
		Approved:	
		Approved subject to recommended changes:	X
		Not approved at this time:	
	Signed:		
		Chair	Secretary