VALIDATION REPORT

1.	Title of Programme(s): (incl. Award Type and Specify Embedded Exit Awards)	Higher Diploma in Science in Advanced Analytical Chemistry
2.	NFQ Level(s)/ No. ECTS:	8 60 ECTS
3.	Duration:	1 Year
4.	ISCED Code:	0531
5.	School / Centre:	School of Science and Computing
6.	Department:	Department of Natural Science
7.	Type of Review:	New Programme External Validation
8.	Date of Review:	4th November 2020
9.	Delivery Mode:	Blended
10.	Panel Members:	Mr Billy Bennett, Vice President for Academic Affairs and Registrar, Letterkenny Institute of Technology (Chair) Dr Eileen O Leary, Chemistry Lecturer, Cork Institute of Technology Dr Kim McFadden, Chemistry Lecturer, Letterkenny Institute of Technology Dr Diego Cobice, Director of the Mass Spectrometry Centre, University of Ulster Ms Carmel Brennan, Assistant Registrar (Quality) (Secretary)
11.	Proposing Staff:	Dr Lisa Ryan Dr Cormac Quigley Dr Eadaoin Tyrrell Mr John Keary Dr Philip White Ms Rita Woodings Dr Ian O'Connor Dr Aisling Crowley
12.	Programme Rationale:	The Higher Diploma in Advanced Analytical Chemistry is a conversion course to gain the skills required to work in analytical science in e.g. pharmaceutical, medical device and chemical industries. The course will provide learners with hands-on experience of instrumentation. The course deals with creating and processing analytical data including the integration of analysis within quality management systems and the statistical treatment of analytical results.

		Key areas of skills need filled by this course are in Chemistry, and particularly its application in the areas of Medical Technology, (Bio)pharmaceutical Sciences and Validation. The modules which make up this course combine a knowledge of chemical analysis with the regulatory, quality and statistical frameworks required to apply it to a range of industries. Graduates with the ability to combine a knowledge of chemical analysis with a knowledge of validation are highly sought after in Chemical, Medical Device and Biopharmaceutical industries. Of particular relevance to local employers are the suitability of these graduates to the medical device and pharmaceutical industries. The National Skills Bulletin 2019 identified a skills shortage for scientists in high tech manufacturing in quality control and process which graduates of this course would directly contribute to addressing. Moreover, the course caters for future needs of the life science sector in the west of Ireland to ensure the region's continued reputation as a recognised Life Sciences cluster, a strategic objective of the West Regional Enterprise Plan to 2020.
13.	Potential Demand for Entry:	16 students per intake.
14.	Stakeholder Engagement:	Staff proposing the programme engaged with local industry through site visits and email/phone. As part of GMIT's 2020 programmatic review cycle the proposing programme team also conducted extensive industry engagement through questionnaires and feedback received via the work placement coordinator for chemistry programmes in the School of Science and Computing. In addition to engaging with industry the programme team met with the Regional Skills Forum manager and outlined the rationale and objectives of the programme based on industry feedback. The RSF subsequently provided a letter endorsing the programme and highlighting the range of sectors and roles that are relevant for the proposed programme. The proposed programme will provide upskilling/reskilling opportunities for graduates in sectors experiencing change as a result of automation. A number of local employers were also engaged in discussion on specific module learning outcomes. Consultation by email resulted in detailed and considered feedback from multiple levels within local companies engaged in medical device production and chemical analysis.
15.	Graduate Demand:	The Western Region has a globally recognized cluster of life science multinationals and indigenous companies. Given that global and local challenges will impact on the life sciences sector in both the short term and long term including the demand for skilled workers and the changing profile of skills needs, the demand for this proposed programme is evident based on focused exploration the sector's current and future needs. The National

		Skills Bulletin 2019 identified a skills shortage for scientists in high tech manufacturing in quality control and process. The proposed Higher Diploma in Advanced Analytical Chemistry will future proof graduates with industry relevant skills for emerging technologies. Graduates will be equipped for a wide variety of roles including Laboratory Analyst, QC Analyst, Analytical Technician, QC Analyst, QC HPLC Analyst, Technical Development Analyst and Chemistry Analyst.
16.	Entry Requirements, Access, Transfer & Progression:	<u>Minimum Entry Requirements</u> A Bachelor degree at level 8 in any cognate discipline. <u>English Language Requirements</u> English Language Requirements will be as determined by GMIT and as published in the Access, Transfer and Progression code. <u>Alternative Admission Routes</u> GMIT is committed to the principles of transparency, equity and fairness in recognition of prior learning (RPL) and to the principle of valuing all learning regardless of the mode or place of its acquisition. For applicants without this qualification, the RPL process of GMIT will be used to determine admission to the programme. Academic Code of Practice No. 6 outlines the policies and procedures for the Recognition of Prior Learning and guidance for applicants is provided on myexperience.ie
17.	Programme Structure:	The programme is a one-year programme which will be run on a semesterised basis using a blended delivery mode. The course is structured in order to maximise student success. The modules start in the first semester with a strong grounding in analytical techniques, both Spectroscopy and Chromatography. At the same time, foundations for an understanding of how they integrate within different systems and processes is begun with and Introduction to Quality. Semester two then extends the chemical analysis with Advanced Analytical Techniques. At this point a greater emphasis is put on grounding this knowledge with a strong understanding of Validation and Metrology as well as the Statistics for Analytic Chemistry needed for reporting the results of chemical analysis. There are two main themes within this programme, chemical analysis and quality and validation. Each of these builds progressively through both semesters. The project which acts as a capstone will run during the second semester. It will bring together learning from each of the modules in particular taking advantage of the foundational knowledge from the first term. Throughout the programme there will be an emphasis on the relationship between chemical analysis and the role of chemical analysis within various quality frameworks. This will include an

		emphasis on developing the technical writing and communication skills.
18.	Learning, Teaching & Assessment Strategies:	This programme will be delivered in a blended format. An initial on-campus day will be used for introductions, sharing of experiences and teambuilding. The modules will consist of weekly face to face practical classes in combination with online delivery of theoretical content. The weekly practical classes will be used to engage students and promote a learning environment where learner development is nurtured through staff – student interactions. The practical classes will be task oriented and provide focus to students online learning. This will enable students to meaningfully engage with the online portion of the module and also become adept at self-directed learning. The profile of incoming student who will already have completed a level eight will make them particularly suited to developing skills in self-directed learning. The online learning environment will also be adapted to encourage student interaction through the use of scaffolding and workflow creation with students able to engage with materials that allow for self-assessment. Topic sections will be identified and planned in advance. A varied mix of content will be developed and delivered. Content will be developed in bite size elements. Each week there will be an activity planned. Activities can include (but not exclusive) discussion forums, quizzes etc. The activity instructions will be defined & posted in advance. The lecturer will actively participate and give timely feedback in an appropriate manner, monitor students' progress, read the online "body language" via participation, progression, lurking and respond appropriately. In addition, use of automated personalised feedback and progress reports will provide students with an oversight of their own development and promote learner engagement. At the same time, the lecturer as facilitator and moderator will encourage and enable quality communication both offline and online. Ground rules for acceptable and expected communication will be outlined at the start of the module. The lecturer will lead by example, by initiating discussion, giving prompts/questions, participating. Online and offline discussion will be encouraged and enabled as part of the learning process. A variety of assessments will be used throughout the programme. There is a heavy emphasis on practical learning with 30 ECTS of the course containing practical class work. This will be promoted and assessed through formative and summative continuous assessment as well as ongoing laboratory work each week. Theoretical work will also be assessed by ongoing continuous assessment through Moodle using a structured workflow to promoted active student engagement. Students will again be given a high degree of formative assessment opportunities and actively

		encouraged to engage online. Each of the modules with the exception of the project culminates in a final exam.
19.	Resource Implications:	The programme is self-financing through subsidised funding of places under Pillar 1 of the Human Capital Initiative. Academic Staff: The delivery of the modules will require 13 hours per week of lecturer delivery time over two terms. In addition, each student will require the assignment of a project supervisor at a ratio of 20 minutes timetable time per week. Technical Staff: Practical Classes will take place for an average of 4.5 hours per week over the two terms. These will require technical support however; this will already be in place for other running practical classes so the resource will be shared.
20.	Synergies with Existing Programmes:	None.
21.	Findings and Recommendations:	General: The panel approve the programmes with the commendations (4) listed below and subject to the following condition(s) (1) and recommendation(s) (14): Commendations: The panel commended the following: 1. The development of a conversion programme aimed at upskilling people where there is a clearly defined industry need in the region and beyond. 2. The use of a blended delivery model responsive to the flexible learning needs of the target cohort. 3. The design of a coherent programme focussed on required graduate skills and the integration of modules and learning throughout the programme. 4. The constructive and robust nature of engagement with the panel. Special conditions attaching to approval (if any): 1. Review the Advanced Analytical Techniques module to ensure that the module title and module learning outcomes and content are aligned. This would be best achieved by expanding the scope of the module beyond mass spectrometry.

		Recommendations of the panel in relation to award sought: 2. Clarify in the entry requirements which cognate areas qualify (or do not qualify) for entry and the RPL route for non-standard applicants. 3. Review the module learning outcomes (MLOs) to ensure that they all reflect level 8 outcomes and use measurable active verbs. Ensure that there is consistency in the number of MLOs per module in line with their ECTS weighting. 4. Ensure that a specific teaching and learning strategy, and particularly an assessment strategy, is stated explicitly and is appropriate for the unique nature of each module. 5. Review the assessment strategy for the programme with a view to reducing both the reliance on final exams and the necessity for failed elements. 6. The programme team should develop and provide an indicative assessment schedule for students ensuring a variety of assessment styles appropriate for each module. 7. Ensure there is consistency in the weeks per semester in the programme schedule. Individual Modules: 8. Chromatography: Avoid non-measurable verbs in module learning outcomes. Provide more detail in the indicative content for this module. The integration of this module with Spectroscopy should be included as part of the teaching and learning strategy rather than the content. Include the use of simulations in the indicative syllabus. Ensure that the wording of the failed element, if retained, is consistent and clear. A case study learning approach should be considered in the assessment of this module. The addition of a troubleshooting section would be recommended. 9. Spectroscopy: Revise module learning outcomes so that they are appropriately expressed at level 8. Include a breakdown of the assessment strategy. A problem-based learning approach should be considered in the assessment of this module. 10. Introduction to Quality: Review the volume of learning outcomes given this is a 5 ECTS module, combining outcomes as appropriate. Include computer system validation in the module. Consider whether appropriate to include general induction hours in an individual module descriptor. Adding guidance on ISO 17025 to the module is recommended. 11. Advanced Analytical Techniques: Stratification of MS analyser is recommended: e.g.: standards MS analysers' vs high resolution or hybrid (orbitrap-Qtof). Mass Spectral Image should read Mass Spectrometry Imaging. 12. Validation and Metrology: Revise module learning outcomes so that they are appropriately expressed at level 8. The indicative syllabus should provide enhanced detail about the

		topics that will be covered. Enhance the detail in relation to the proposed delivery of the module showing the breakdown of the 5 hours. Adding guidance on ICH guidelines to the module is recommended. 13. Statistics for Analytical Chemistry: Revise module learning outcomes so that they are appropriately expressed at level 8. Consider the use of additional statistical packages to those listed. 14. Project: Utilise the term 'research project' or 'project' rather than the term dissertation or thesis within this module. Provide further detail in relation to how the module will operate over both semesters and how students will be supported in the completion of the project. Ensure that the indicative syllabus adequately reflects the content that will be covered by students.	
22.	FAO: Academic Council:	Approved:	
		Approved subject to recommended changes:	X
		Not approved at this time:	
	Signed:		
		Chair	Secretary