Differential Validation Report Form

Report of the Review Panel

Reference AQAE046 *Procedure for Approving and Implementing Changes to Programmes and* AQAE047 *Procedure for Approving and Implementing Changes to Modules.* Used for Major Changes to Programme(s) (Type A).

Programme Reference Number:	M148
Faculty/School(s):	Faculty of Engineering and Technology
Department(s):	Department of Electronic and Mechanical Engineering

Details of Programme(s) Reviewed (include embedded awards):

Title:	Award Type:	NFQ Level:	ECTS:	Duration	Delivery Mode:
Master of Engineering in Advanced Manufacturing	Major	9	90	1 Stage	Full-Time Part-Time Blended
Postgraduate Diploma in Engineering in Advanced Manufacturing	Major	9	60	2 Sems	Full-Time Part-Time Blended
Postgraduate Certificate in Advanced Manufacturing	Minor	9	30	1 Sem	Full-Time Part-Time Blended

Date of Review:	29 May 2025

Review Panel

Panellist Role	Title	Name	Organisation	Job Title
Chair	Dr	Kim McFadden	ATU	Head of Department of Life and Physical Sciences
External Academic/Industry Discipline Expert*	Ms	Joanne Cassidy	Abbott Diabetes Care	Learning and Development Specialist
Academic/Head of Department	Dr	Carine Gachon	ATU	Transcend Project Manager
Vice President for Academic Affairs and Registrar (VPAAR) Nominee/Academic Secretary	Mr	Declan Courell	ATU	Assistant Registrar

*One or two external members of panel in total.

All external members of the panel have declared that they are independent of ATU (Atlantic Technological University), and all have declared that they have no conflict of interest.

Programme Board

The panel met the staff listed below during the review of the proposed modifications.

Christopher Crossan	Eoin Byrne
Christopher Roulston	Paddy Hannigan
Emmett Kerr	
Charles Young	
Paul Ferry	
Dean Harron	

Summary of Proposed Modifications

The proposed changes have been implemented to reflect significant changes in Advanced Manufacturing over the past 5 years and to rejuvenate the course, so it aligns with current industry trends and standards. The changes address a strong need for digital skills in the areas of automation, Machine Learning, IIoT & CPS, Digital Twins, Digital Inspection, Quality Assurance, Lean Systems and Sustainable Manufacturing. The following table details the changes from the original programme document.

Original Modules	Proposed Modules	Change type	Credits
Computer Aided Engineering	Digital Inspection & Quality Assurance	The module title is changed. However, the MLO's and indicative content in this module closely aligns with the original Computer Aided Engineering module. Also, some of the operations management content has been included as the original Operations Management Module has been removed.	10
Data Science & Machine Learning	Data Science & Machine Learning	MLO's and the indicative content is updated to reflect current trends in the manufacturing setting.	10
Intelligent Embedded Systems	Industrial Internet of Things & Cyber Physical Systems	Title change and the MLO's and the indicative content is updated to reflect current trends in the manufacturing setting.	10
Manufacturing Automation	Manufacturing Automation	MLO's and the indicative content is updated to reflect current trends in the manufacturing setting.	10
Additive Manufacturing	Virtual Manufacturing & Digital Twins	New module to reflect the current shift towards virtual simulation and digital twins for manufacturing processes. Also, as the Operations Management module has been removed there is a strong focus on Lean Manufacturing in this module which overlaps with the original offering.	10
Operations Management	Sustainable Manufacturing Systems	New module to reflect a strong focus on Life Cycle Analysis, Circular Economy and Sustainable Development Goals from both industry, academia and accrediting bodies such as Engineers Ireland.	10
Dissertation	Dissertation	No change	30

Rationale for Modifications

The changes to existing modules and the replacement of two completely new modules reflect the rapidly changing landscape of the manufacturing industry, particularly in response to advancements in Industry 4.0, artificial intelligence (AI), and digital transformation. Key drivers for these changes include:

- Adapting to Industry 4.0: The shift towards smart manufacturing and the integration of AI, IoT, and cyber-physical systems necessitates updated content that aligns with current industry practices.
- Focus on Sustainability: With increased emphasis on sustainability and circular economy principles from both industry and accrediting bodies like Engineers Ireland, the programme now includes dedicated modules on sustainable manufacturing.
- Integration of Digital Technologies: The rise of digital twins, virtual manufacturing, and advanced data analytics has transformed traditional manufacturing processes, requiring a stronger focus on digital tools and techniques.
- Enhanced Practical and Analytical Skills: The revised modules emphasize real-world application, critical thinking, and problem-solving to ensure graduates are prepared for complex, interdisciplinary challenges.
- Alignment with Industry Expectations: The updated modules reflect the skills most in demand by employers, including data science, machine learning, and advanced process automation.
- Future-Proofing the Curriculum: By integrating emerging technologies like edge AI, 5G, and digital twins, the programme prepares graduates for leadership roles in next-generation manufacturing environments

Findings

Overall Finding

Approved without changes	
Approved subject to recommendation(s)	**X**
Rejected	

Recommendations

- Review the volume of content in general, particularly the technical skills associated with the Virtual Manufacturing & Digital Twins and Manufacturing Automation Modules.
- Include a statement on the use of practicals in the teaching and learning section of the document
- Review the number of assessments associated with the proposed changes

Report Approval

This report has been agreed by the evaluation panel and is signed on their behalf by the chairperson.

Signed: Kim McFadden. **Name: Kim McFadden** **Differential Validation Panel Chair**	**Date 29/05/2025**