

New Programme (Major Award) External Validation Report

Section A

Report of the External Review Panel

Programme Reference Number:	40
Faculty/School(s):	Engineering and Technology
Department(s):	Electronic and Mechanical Engineering

Details of Programme(s) Reviewed

Title:	BEng (Hons) in Electric Vehicle Engineering
Type of Award:	Honours Degree
NFQ (National Framework of Qualifications) Level:	8
ECTS:	240
ISCED:	0716
Duration:	4
Proposed Student Intake:	24
Proposed Start Date:	2024
Delivery Mode(s):	Full-time, Blended

Title:	BEng in Electric Vehicle Engineering
Type of Award:	Ordinary Degree
NFQ (National Framework of Qualifications) Level:	7
ECTS:	180
ISCED:	0716
Duration:	3
Proposed Student Intake:	24
Proposed Start Date:	2024
Delivery Mode(s):	Full-time, Blended

Title:	Higher Certificate in Electric Vehicle Engineering
Type of Award:	Higher Certificate
NFQ (National Framework of Qualifications) Level:	6
ECTS:	120
ISCED:	0716

Duration:	2
Proposed Student Intake:	24
Proposed Start Date:	2024
Delivery Mode(s):	Full-time, Blended

Date of Review:	10 th May 2024
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Review Panel

Panellist Role	Title	Name	Organisation	Job Title
Chair	Ms	Carmel Kelly	IADT	Assistant Registrar
External Academic Discipline Expert	Ms	Irene Caulfield	TUS	Senior Lecturer
External Academic Discipline Expert	Dr	Niall Seery	TUS	Chair of Technological Education
Industry/ Community Representative	Dr	Fiona Gilchrist	Jaguar Land Rover	R&D Strategy Lead
Student Representative	Ms	Aoife Gallagher	ATU	Research Student
Vice President for Academic Affairs and Registrar (VPAAR) Nominee (Academic Secretary)	Ms	Carmel Brennan	ATU	Assistant Registrar

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 Design Team

The panel met the staff listed below during the review process.

Dr Thomas Dowling	Dr Emmet Kerr
Charles Young	Brendan Corry
Colin Gibson	

Introduction

The BEng (Hons) in Electric Vehicle Engineering at ATU aims to equip students with the knowledge, skills, and expertise necessary to become leaders in the rapidly evolving field of electric vehicle technology. Through a comprehensive curriculum that integrates mathematics, sciences, data science, analytics, and engineering principles, students will develop a deep understanding of electric vehicles and their impact on the automotive industry and the environment. By fostering critical thinking, problem-solving abilities, and a commitment to professional and ethical responsibilities, the programme prepares graduates to address complex engineering challenges and contribute to the development of sustainable transportation solutions. With a focus on teamwork, communication, and lifelong learning, the programme cultivates versatile engineers capable of driving innovation and shaping the future of electric mobility both nationally and globally.

In the academic year 2020/21, a Level 7 programme, BSc in Electric Vehicle Technology, was developed for holders of the Advanced Level 6 Certificate in Motor Mechanics. In the same year a two-year full-time Higher Certificate in Electric Vehicle Engineering was developed for Leaving Certificate students and mature applicants who wanted to work in the rapidly changing Electric Vehicle industry. This course was then developed into a three-year, Level 7 BEng degree in Electric Vehicle Engineering. The Programme Development Team have now further developed the programme into a four-year ab initio level 8 degree.

See Appendix for Entry Requirements, Programme Learning Outcomes and Approved Programme Schedule.

Rationale for Programme(s)

Transportation creates more than 15 percent of global emissions. In some major economies, the sector's emissions exceed those of electricity generation according to nonpartisan energy and climate policy firm Energy Innovation [1]. To meet the Paris goal [2], electric vehicle (EV) use would need to increase rapidly, from fewer than 10 million EVs today to more than 1.5 billion by 2050, according to an analysis of global climate policies by Morgan Brazilian and Dolf Gielen in 'The Conversation' [3]. If half of all vehicles made were fully electric, 10 million net jobs would be added globally economy-wide by 2030 according to the UN and International Labour Organisation. This includes jobs in EV assembly plants, in battery manufacture, and EV maintenance education. Consumers would also save money on maintaining their cars and thus spend more money on more labour-intensive goods and services, the report says.

ATU's Electric Vehicle programmes were born in 2021 and their future is positive given that automotive are manufacturers 'committed' to phasing out fossil fuel based automotive transport in favour of renewable alternatives [4][5]. In addition to this, an increased uptake in climate active courses is a necessity if Ireland is to attain the national ambitions to halve emissions by 2030 and reach net zero no later than 2050 according to the Climate Action Plan 2023 [6]. Emphasis in this plan however is placed on infrastructure and how the technology will be implemented, rather than how the technology will be created and developed for local industry i.e. the key metric outlined in this plan to deliver abatement in industry is to "Expand and enhance supports from the Sustainable Energy Authority of Ireland (SEAI), IDA Ireland and Enterprise Ireland (EI) with a focus on achieving

energy efficiency, electrification and biomass adoption”. This gap presents the opportunity that this course proposal is designed to address.¹

Furthermore, electrification holds significant importance beyond the realm of electric vehicles, extending its impact across various industrial sectors. One crucial aspect is the electrification of hydraulic systems, which offers substantial benefits in terms of efficiency, environmental sustainability, and operational flexibility. By replacing traditional hydraulic systems, which rely on fossil fuels and are inherently less efficient, with electric alternatives, industries can achieve higher overall efficiency levels. Electric systems allow for precise control and optimisation of energy usage, resulting in reduced energy consumption and operating costs. Electrification also contributes to environmental sustainability by eliminating emissions associated with fossil fuel combustion and reducing reliance on finite natural resources. Additionally, electric systems offer greater flexibility in terms of integration with advanced automation and control technologies, enabling industries to enhance productivity and adapt to evolving market demands more effectively.

1. www.energyinnovation.org
2. The Paris Protocol COM(2015)81 final/2 04.03.2015
3. <https://theconversation.com/5-years-after-paris-how-countries-climate-policies-match-up-to-their-promises-and-who's-aiming-for-net-zero-emissions151722>
4. www.bbc.co.uk/news/business-56072019
5. IPORES 2018, A Review of Irish Ports Offshore Renewable Energy Services.
6. <https://www.gov.ie/en/publication/7bd8c-climate-action-plan-2023/>

Validation Criteria

ATU’s Developing and Validating New Taught Programmes Policy specifies that new programmes must comply with the following criteria for validation:

1. The programme aims and learning outcomes are clear and aligned with the proposed award title.
2. The rationale for the programme is well informed and justified.
3. The design of the programme is suitably structured and fit for purpose.
4. The design of the programme ensures that students can successfully achieve the Programme Learning Outcomes.
5. The teaching, learning and assessment strategy is well planned and appropriate for the discipline area and type of award.
6. Assessment techniques are fair, valid, reliable, consistent and a credible measure of the academic standard attained by students.
7. The planned resources, including staff, physical, online, library and student supports, sufficiently support the teaching, learning and assessment strategy for the programme.
8. The programme facilitates lifelong learning for a diverse student population by setting out appropriate entry requirements and opportunities for access, transfer, and progression.
9. There is demand for potential graduates from the programme.
10. The learning environment and mode of delivery are consistent with the needs of the intended students of the programme and accessible and appropriate support services for students have been provided for.
11. Students will be well informed on the requirements of the programme, guided to relevant resources and supported in their studies in a caring environment.

Findings

Overall Finding

Validated without changes	
Validated subject to condition(s) and/or recommendation(s)	X
Rejected	

Reason for Overall Finding

The panel are satisfied that there is evidence of both a need and demand for this programme, and that the Faculty is well prepared and equipped to deliver it. The panel recognise that there is some commonality of modules across programmes, and welcome the commitment to review these at the earliest opportunity, which is likely to be the next programmatic review.

Commendations

The Validation Panel advises Academic Council of the following commendations:

1. The development of the first Level 8 electric vehicle engineering programme in Ireland is recognised as is the associated support of industry to assist in the promotion and delivery of the programme.
2. There is strong ambition for the programme by the Programme Development Team. It is strategically positioned in the marketplace, with forward thinking content, industry connectiveness, embraces Problem Based Learning, and has a clear direction and purpose.
3. The early use of Quicksan screening when students register to identify learning difficulties and preferred learning styles is very positive and will aid student success.
4. The Communications Learning Centre providing support and guidance in academic writing and communication skills will be a positive support for students on this programme.
5. The availability and use of virtual laboratories has improved delivery of the current suite of programmes.

Conditions

The Validation Panel advises Academic Council that subject to satisfying any condition(s) detailed below, the panel is satisfied that the proposed programme(s) meets the validation criteria as set out in Atlantic Technological University's Developing and Validating New Programmes Policy.

1. As part of the next Programmatic Review cycle include a mandatory, substantial work placement in the programme ensuring that the duration and timing of the placement is appropriate for industry. This will benefit students, and through industry linkages the programme development team and the programme itself.


Recommendations

The panel advises Academic Council that the Programme Development Team and/or the Department should take cognisance of any recommendations outlined below.

1. Clarify in the entry requirements the recency of IELTS test results required for both EU and non-EU applicants, ensuring consistency of wording.
2. The teaching and learning strategy should highlight the applied nature of learning on the programme outlining the techniques used including problem-based learning. Show progression in the techniques used throughout the programme and the transferable and other skills gained by students as they advance through the degree.
3. Review the programme assessment strategy considering whether there is an over reliance on final examinations.
4. Engage students in the discipline and the future of the industry using undergraduate innovation challenges, hackathons, guest speakers, demonstrations or similar. Utilise industry to assist with this.
5. Set the scene for students early in the programme by including content on sustainability and the regulatory environment which is driving electric vehicle adoption.
6. Ensure that students receive an introduction to electrical vehicle architecture in the programme prior to engaging with control systems, low and high voltage systems and manufacturing.
7. Devise a graphic to illustrate the themes in the programme giving visibility to the breadth and depth of content in the programme. A flow-chart showing the pathways from common engineering would also be useful to applicants and students.
8. Review the programme considering whether the balance of maths and programming content is appropriate. Consider whether there is sufficient software engineering content in the programme.
9. Develop a marketing strategy to target and attract more female students to the programme, working with industry in this regard. Consider targeting potential students early (primary, secondary level) to create awareness of this programme and potential careers.
10. Consider engaging with the electric vehicle industry to establish scholarships/bursaries targeting specific underrepresented student cohorts.
11. Ensure that module descriptors explicitly include the development of discipline specific transferable skills, and that these are assessed.
12. Review the titles of modules considering whether they can be more explicit in relation to their content and consequently more appealing to students.
13. Review the categorisation of assessments as CA, Project, Practical and Final Examination in module descriptors, ensuring that there is correct visibility of each in the Approved Programme Schedule (APS).
14. Each module should have an individual teaching and learning strategy tailored to the specific requirements of the module.
15. Ensure, as the programme rolls-out that there are sufficient and appropriate software licences and library resources available.

Report Approval

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

<p>Signed:</p>  <p>Name: Carmel Kelly Validation Panel Chair</p>	<p>Date 07.06.24</p>
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