European Approach for Quality Assurance of Joint Programmes

EVALUATION REPORT

Electric Vehicle and Control Plus (E-PiCo+)

École Centrale de Nantes (France) Christian-Albrechts-Universität zu Kiel (Germany)
National University of Science and Technology Politehnica Bucharest (Romania)
Università degli Studi dell'Aquila (Italy)
Centro de Investigación y de Estudios Avanzados del Instituto Politécnico Nacional (Mexico)

July 2025

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High Council for the evaluation of research and higher education

The consortium of E-Pico+ has mandated the Hcéres to carry out the evaluation of its Joint Master programme. The evaluation is based on the "European Approach for Quality Assurance of Joint Programmes", adopted in May 2015 by European Higher Education Area Ministers. These standards are available on the Hcéres website (hceres.fr).

In the name of the expert panel[1] :

Benoit EYNARD, Chair of the panel

In the name of Hcéres[1] :

Coralie CHEVALLIER, President

[1]In accordance with articles R. 114-15 and R. 114-10 of the Research Code, evaluation reports are signed by the chairman of the expert panel and countersigned by the President of Hcéres.

CONTENTS

I. STUDY PROGRAMME IDENTITY SHEET

- **Study programme name**: Electric Vehicle and Control Plus (E-PiCo+)
- **Speciality**: Engineering sciences
- **Year of creation and context**: fist cohort in 2019. The aim of this degree is to train engineers in electric vehicle.

- **Sites where the programme is taught** :
  - France : Nantes
  - Germany : Kiel
  - Romania : Bucharest
  - Italy : L'Aquila
  - Mexico : Guadalajara

- **Partner institutions** :
  - École Centrale de Nantes, Nantes, France Coordinator
  - Christian-Albrechts-Universitat zu Kiel, Kiel, Germany
  - National University of Science and Technology Politehinica Bucharest, Bucharest, Romania
  - Università degli Studi dell'Aquila, L'Aquila, Italy
  - Centro de Investigacion y de Estudios Avanzados del Instituto, Guadalajara, Mexico

- **Academic degree(s) awarded:**
  - École Centrale de Nantes : master Automatique, robotique, track : Electric Vehicle, Propulsion and Control
  - Christian Albrechts Universitat zu Kiel: Electric Vehicle Propulsion and Control (E-Pico)
  - National University of Science and Technology Politehnica Bucharest : Master in Electric Vehicle Propulsion and Control
  - Universita degli Studi dell'Aquilla : Ingegneria dei Sistermi di Controllo e dell'Automazione
  - Centro de Investigacion y des Estudios Avanzados del Instituto Politecnico Naciona : Ciencas en Ingeneria Electrica

- **Regular study period**: 2 years
- **Number of ECTS**: 120 ECTS
- **Tuition fees per year:** €18 000, €9 000 for partner country students, €4 500 for programme country students.

HUMAN AND MATERIAL RESOURCES DEDICATED TO THE PROGRAMME

	Academic coordinators	Teaching staff	Administrative staff	Total by institutions
École Centrale de Nantes (ECN)	2	2	4	7
Christian Albrechts Universitat zu Kiel	1	7	2	6
National University of Science and Technology Politehnica Bucharest	1	10	3	8
Universita degli Studi dell'Aquilla	1	10	2	13
Centro de Investigacion y des Estudios Avanzados del Instituto Politecnico Naciona	1	8	1	2
Total (The consortium)	6	20	10	36

STUDENT POPULATION: EVOLUTION AND TYPOLOGY OVER THE LAST 2/3 YEARS (including number of graduates)

- No information about the student population over the last 2 or 3 years.

I. VISIT DESCRIPTION

COMPOSITION OF THE EXPERTS PANEL

- Benoît Eynard, Chair of the panel and academic expert, full professor at Université technologique de Compiègne
- Matthias Schirmer, Academic expert, full professor at Ernst-Abbe-Hochschule Jena
- Florence Terranova, Socio-professional expert, consultant at Sofreco
- Petrica Leanca, Student expert, master student at Universitatea Tehnică din Cluj-Napoca

Hcéres was represented by Bastien Torres, project manager, European and International Department.

VISIT DESCRIPTION

The online visit, held on 25 July 2025, was a comprehensive one-day review consisting of a series of meetings with various stakeholders involved in the E-PiCo+ programme.
Throughout the visit, the experts engaged with representatives and coordinators from each partner university, including administrative staff, quality assurance officers, lecturers, students and socio-economic partners. Further details of the visit and the outcomes of these meetings are set out in the following sections.

VISIT AGENDA

Timetable	Session		Participants
9 am – 9:30 am	**1**	**Kick-off Session** ▪ Introduction by Hcéres representative ▪ Introduction of the expert committee to the E-Pico+ joint master's programme representatives ▪ Summary of the online evaluation visit ▪ Roundtable from the E-Pico+ Joint Master representatives	- E-Pico+ Programme Coordinators - Hcéres committee of experts + Hcéres representative
9:30 am – 10:30 am	**2**	**Presentation of the E-Pico+ Joint Master's Programme by E-Pico+ representatives (10/15 min.) & Discussion**	- E-Pico+ Programme Coordinators - Hcéres committee of experts + Hcéres representative

10:30 am – 11:30 am	**3**	**Panel of academics (<u>without</u> programme coordinators)**	Representative panel of lecturers, academics and research staff involved in the programme: permanent, contract and part-time lecturers from the different Higher Education institutions and different disciplines, excluding programme coordinators.
Coffee Break			
11:45 am – 12:45 pm	**4**	**Quality Assurance**	Staff involved in QA and course management, excluding programme coordinators.
12:45 pm - 2 pm		**Lunch Break**	
2 pm – 3 pm	**5**	**Socio-economic Partners**	Representative panel of socio-economic partners (public sector, private sector, national, international) and *alumni* (recent graduates, employers of current students) excluding programme coordinators.
3 pm – 4 pm	**6**	**Panel of students**	Representative panel of student and alumni.

II. EVALUATION REPORT

1. ELIGIBILITY

Level of compliance		
Compliant	Compliant with conditions	Non-compliant

1.1 STATUS

The *Electric Vehicle Propulsion and Control* Master's programme (E-PiCo+) is a joint initiative coordinated by a consortium of five recognised higher education institutions. Four of these institutions are located within the European Higher Education Area (EHEA): École Centrale de Nantes (France), Christian-Albrechts-Universität zu Kiel (Germany), the National University of Science and Technology Politehnica Bucharest (Romania), and Università degli Studi dell'Aquila (Italy). They are joined by an associated partner outside the EHEA: the Centro de Investigación y de Estudios Avanzados del Instituto (CINVESTAV) in Mexico.

All consortium members are accredited by national or regional quality assurance agencies recognised within their respective higher education systems. École Centrale de Nantes is evaluated by the High Council for the Evaluation of Research and Higher Education (Hcéres) in France; Christian-Albrechts-Universität zu Kiel is accredited under the *Interstate Study Accreditation Treaty* and the *Higher Education Act of Schleswig-Holstein* in Germany; Università degli Studi dell'Aquila by the *Agenzia Nazionale di Valutazione del Sistema Universitario e della Ricerca* (ANVUR) in Italy; the National University of Science and Technology Politehnica Bucharest by the *Agenția Română de Asigurare a Calității în Învățământul Superior* (ARACIS) in Romania; and CINVESTAV by the *Secretaría de Educación Pública* in Mexico.

The programme awards a joint Master's degree aligned with Level 7 of the European Qualifications Framework (EQF), primarily covering the ISCED fields of control systems, electrical engineering, and electric vehicles.

École Centrale de Nantes (ECN) acts as the coordinating institution, with responsibility for financial management, overall programme coordination, and chairing the student selection committee. The other four institutions hold equal status as full partners, each with specific responsibilities: the National University of Science and Technology Politehnica Bucharest (UNSTPB) leads on promotion and dissemination; Christian-Albrechts-Universität zu Kiel (CAU) oversees internal quality assurance; Università degli Studi dell'Aquila (UAQ) is responsible for research and innovation; and CINVESTAV coordinates promotion and outreach beyond Europe. The consortium also benefits from the support of 18 industrial partners, including Groupe Renault and NXP, as well as seven associated academic partners outside Europe.

The E-PiCo+ programme was designed to address the growing demand in both research and industry for expertise in electric vehicle technologies within Europe. Like other Erasmus Mundus programmes, it also aims to attract talented future researchers and professionals to contribute to the European knowledge and innovation landscape. The entire curriculum is delivered in English across all partner institutions.

The two-year programme (120 ECTS) is structured into four semesters, which may be completed at different partner institutions:

- Semester 1 (at ECN, France) provides foundational knowledge in automatic control, signal processing, and electric vehicle systems.
- Semester 2 (at one of the four other institutions) builds upon this foundation, focusing on energy storage, renewable energy, and non-linear control systems.
- Semester 3 (at one of the five partner institutions) offers specialised tracks depending on the host university:
    - Germany: Power electronic converters, fast charging stations, drives and battery technologies;
    - Mexico: Artificial intelligence applied to electric vehicles;
    - France: Control, optimisation, observation, diagnostics/prognostics, and energy management for electric propulsion systems;

- Italy: Embedded systems implementing advanced control strategies;
- Romania: Battery storage systems.

- Semester 4 is dedicated to the Master's thesis, which may be undertaken at one of the partner institutions, at an associated academic partner outside Europe, or within one of the industrial partner organisations, thereby fostering strong links with professional practice.

1.2 JOINT DESIGN AND DELIVERY

Students enrolled in the E-PiCo+ Master's programme are awarded a national Master's degree from the institution at which they are formally registered, specifically the institution where they complete and defend their Master's thesis during the fourth semester. Consequently, graduates may obtain one of the five national degrees offered by the consortium partners. In addition, every graduate receives a Diploma Supplement, issued in English, certifying that the qualification is an international Master's jointly designed and implemented by all consortium members, regardeless of the final host institution for the thesis defence.

Overall coordination of the programme is carried out by École Centrale de Nantes (ECN), which hosts the first semester for all students and organises the initial integration week. This opening period is designed to build a sense of community and to provide a common academic foundation. In the second semester, students may choose among four partner institutions; although mobility academic pathways vary, the core modules are harmonised to ensure that all participants acquire equivalent knowledge. Cohort cohesion is further maintained through joint events such as the Winter School and the Career Enhancing Day, where students regroup, interact with teaching staff from across the consortium, and participate in additional training activities. In the second year of study, mobility options become more specialised, allowing students to focus on thematic areas aligned with the expertise of the host university. This design enhances specialisation but inevitably reduces the degree of jointness across the curriculum compared with the first year.

The governance of the programme is ensured through a comprehensive committee structure distributed across the partner institutions. All universities are represented in each body, but responsibilities are clearly allocated according to institutional areas of expertise. ECN chairs the Selection Committee (SC) and provides overall programme coordination. The National University of Science and Technology Politehnica Bucharest (UNSTPB) is responsible for the Advertising and Dissemination Committee (ADC), ensuring outreach and visibility within Europe. Christian-Albrechts-Universität zu Kiel (CAU) leads the Quality Assurance Committee (QC), which oversees internal monitoring processes. Università degli Studi dell'Aquila (UAQ) chairs the Advisory Committee for Academic Innovation and Sustainability (ACAIS), while also playing a key role in academic development. Finally, CINVESTAV is responsible for the Advertising and Dissemination Committee outside Europe (ADCOE), reinforcing the global visibility of the programme beyond the EHEA.

Associated academic partners also contribute to the programme. They extend the mobility opportunities available to students, particularly for the fourth semester, by hosting students for the preparation of their Master's theses. They also offer valuable opportunities for further study, including doctoral research pathways, and for professional employment, thereby reinforcing the external impact of the programme.

Since the admission of its first students cohort, the E-PiCo Master's has demonstrated both the robustness of its organisational structure and the effectiveness of collaboration among its partners. The broad range of mobility options provides students with highly individualised academic trajectories, which result in significant differences in experience after the first semester. This diversity can be regarded as a deliberate pedagogical choice, but it may also reflect a degree of structural fragmentation which does not leave room for joint reflection on the developments of the programme. Evidence from the self-evaluation report and interviews suggests that limited reflection has taken place so far on the long-term evolution of the programme, both in terms of its organisation and in with regard to strengthening the mechanisms of collective design and development.

1.3 COOPERATION AGREEMENT

The functioning of the E-PiCo+ Master's programme is formally regulated by the Consortium Agreement, signed by all partner institutions. This legally binding document sets out the roles and responsibilities of each member, providing a clear framework for the governance and operational management of the programme. It specifies the duties of the coordinating institution and the partner universities, and establishes shared procedures for decision-making, programme delivery, and financial administration.

Among its annexes, the Consortium Agreement includes several practical instruments essential to the programme's implementation. These comprise the common evaluation grid used in the selection of students, the language requirements, particularly in relation to English proficiency, and a harmonised grade conversion table designed to address the discrepancies between the national grading systems of the partner universities. Such tools are crucial to ensuring both fairness in admissions and transparency in the recognition of academic achievements across the consortium.

With regards to financial management, the European Education and Culture Executive Agency (EACEA) allocates the overall budget of the Erasmus Mundus directly to École Centrale de Nantes (ECN), which acts as the sole financial intermediary for the consortium. ECN is therefore responsible for managing the overall budget, including the distribution of tuition fees and mobility scholarships, and for ensuring compliance with European financial regulations. However, based on the documentation available to the evaluation panel, it remains unclear how funds are redistributed among the partners in practice, and what specific mechanisms exist for resolving disputes related to financial matters. This lack of transparency could represent a potential limitation in terms of accountability and long-term sustainability.

The evaluation panel also observed that the documentation provided did not allow for a full comparison between the current version of the programme and its earlier versions. Given that E-PiCo has been running for five years, such comparative data, highlighting improvements, adjustments, or lessons learned, would have been of considerable value in assessing the programme's development and responsiveness to past challenges. The apparent absence of such reflection does not necessarily imply shortcomings in implementation, but it does suggest limited systematic monitoring of innovation and continuous improvement.

That said, the programme has demonstrated effective collaboration among its members since its inception, with responsibilities distributed in a manner that has functioned efficiently over time. The stability of this governance framework, combined with the proven capacity of the consortium to deliver high-quality education and student support, provides a strong foundation for the continued success of the E-PiCo+ Master's. Looking ahead, the durability of this foundation will depend on the consortium's ability to maintain transparency in financial procedures and to integrate structured feedback and innovation into its collective practices.

2. LEARNING OUTCOMES

Level of compliance		
Compliant	Compliant with conditions	Non-compliant

2.1 LEVEL [ESG 1.2]

The E-PiCo+ Master's programme has been designed in alignment with the Framework for Qualifications of the European Higher Education Area (FQ-EHEA) at Master's level (Second Cycle, EQF Level 7). Furthermore, the programme ensures compliance with the national qualification frameworks governing higher education in the partner countries, namely—France, Germany, Italy, Romania, and Mexico— thereby guaranteeing both academic comparability and formal recognition across the consortium.

As described in Annex 4 of the Self-Evaluation Report (SER), the Intended Learning Outcomes (ILOs) are appropriately aligned with this EQF level. They place a strong emphasis on the acquisition of specialised knowledge in advanced concepts of electric mobility, power electronics, and control systems, alongside an understanding of renewable energy integration, electric vehicles, and smart grids.

Students further develop their analytical and problem-solving abilities, for instance through the modelling and design of complex e-mobility systems or by undertaking independent research and development projects. In addition to technical expertise, the E-PiCo+ programme also prioritises the development of professional and strategic responsibility and autonomy through collaborative projects. Such projects are developed with academic and industrial partners, integrating ethical considerations and sustainable practices into engineering decision-making, and are presented during the winter school held in February (Semester 1 and 3). The multinational approach of the programme also ensures a comprehensive interdisciplinary perspective, preparing graduates for international mobility and adaptability. Furthermore, the involvement of the associated

industrial partners combines academic knowledge with industrial expertise, equipping students for careers in research and PhD programmes as well as for high-level professional positions.

2.2 DISCIPLINARY FIELD

The E-PiCo+ Master's programme responds to the increasing demand of the e-mobility sector for experts who combine comprehensive knowledge in electrical engineering, digitalisation, and sustainability. The rapid global transition towards decarbonised transport systems and the European Green Deal, which place electric mobility at the centre of future energy and transport policies, requires highly skilled professionals capable of bridging academic knowledge with industrial innovation.
The disciplinary field of the E-PiCo+ programme is rooted in electrical engineering. Core foundations in automatic control, statistical signal processing, embedded computing, and electric/hydrogen vehicle systems modelling are provided to all students in the first semester at ECN. In the following semesters, depending on the profile of the partner university, specialisation is possible in areas such as propulsion technologies, power converters, battery systems or artificial intelligence.

In addition to in-depth knowledge in the aforementioned areas, graduates are trained to design and simulate electric propulsion systems, develop advanced control strategies for electric and hybrid vehicles, and apply AI to optimise energy management and autonomous functions. They also gain experience in experimental research and industrial projects in an international context. Alongside theoretical, technical, and experimental knowledge, students receive training in key non-technical competencies, including communication and dissemination skills, as well as project management and leadership. In summary, students are well prepared both for responsible industrial activities in the e-mobility or transportation sector and for PhD programmes and other research-oriented activities.

2.3 ACHIEVEMENT [ESG 1.2]

To ensure that the intended learning outcomes are achieved, diverse teaching and assessments methods are combined. Continuous formative assessments such as exercises, group projects, quizzes, and continuous feedback from lectures are complemented by written exams and applied projects integrated into courses. Winter Schools, held in the first and third semesters, enable students to benefit from feedback and evaluation of their work from academic and industrial partners.

Progress is tracked through clear indicators: students demonstrate mastery of fundamental concepts through written exams, apply analytical and problem-solving skills in practical projects, and showcase research and innovation capabilities by producing technical reports or conducing technical experiments.

In addition, students' skills are assessed upon admission. This entrance test identifies areas where tutoring is required. "To address the heterogeneous prior knowledge of students, the consortium introduced several measures, presented during the online visit: ECN launched a preparatory/introductory week and refresher courses, while CAU provided targeted video sequences to help harmonise student competencies."The final assessment consists of a Master's thesis (30 ECTS) and an oral defence before an academic and industrial jury, demonstrating research and technical competence.

Tracking surveys of graduates and employer feedback confirm the high employability of alumni, who pursue careers in automotive and electric transport, renewable energy, power electronics, advanced control, and smart mobility. Typical roles include Controls Engineer, R&D Engineer, Systems Engineer, Embedded Software Engineer, and Design Engineer in power electronics and control systems.

The expert panel would nevertheless recommend that these surveys be presented to the Joint Master Board (JMB) at regular intervals to monitor the programme's progress and ensure the achievement of the intended learning outcomes.

2.4 REGULATED PROFESSIONS

Not applicable.

3. STUDY PROGRAMME [ESG 1.2]

Level of compliance		
Compliant	Compliant with conditions	Non-compliant

3.1 CURRICULUM

The curriculum provides a strong foundation in e-mobility while ensuring a coherent and progressive learning path over two years. It balances theoretical knowledge, practical application, and international exposure. Student mobility includes study in at least two countries (and up to three during the first three semesters). In the fourth semester, students may study at a partner university — subject to EACEA regulations for Erasmus Mundus scholarship holders — or undertake a placement with an industrial partner. Each semester corresponds to 30 ECTS credits, in total 120 ECTS credits upon completion and awarding the Master's degree.

In the first semester, all students are hosted by ECN, where they complete a common curriculum following academic integration. They attend lectures on automatic control, signal processing, embedded systems, and electric vehicles (fundamentals and simulation). The winter school, which takes place every February in Nantes, serves as a transition period before students move to their institutions for the second semester. Soft skills training and teaching focused on industrial best practices are delivered during these Winter Schools, which are organised in the first and third semesters. Given the importance of this component of the study programme, it would be advisable to formally include it in the syllabus and curriculum, with clearly defined course content and scope.

In the second semester, students join one of the following partner institutions: UNSTPB, CAU, UAQ or CINVESTAV, where they must attend the following four core modules: design of power electronics converters, electric drives for EVs, renewable energy systems, and nonlinear control systems. The remaining two modules are offered as electives that further strengthen students' intermediate knowledge in the field of e-mobility. This flexibility is viewed positively, as it supports specialisation. However, there is currently no standardised, nor formalised description of the four core modules ensuring that the teaching content is clearly explained. The content is documented in module descriptions which vary considerably in some cases between partners. The expert panel therefore recommends that teachers exchange information on the teaching content and standardise the module descriptions as far as possible. This is the only way to ensure that students acquire a uniform knowledge base in accordance with the ILO.

During the third semester, depending on the host institution, students focus on one or more of the following areas:

- Control, optimisation, observation, diagnostic/prognostic, and energy management issues for electric propulsion systems (ECN)
- Battery storage systems (UNSTPB)
- Power electronics converters, fast charging stations, drives, and battery technologies (CAU)
- Embedded systems implementing advanced control laws (UAQ)
- Artificial Intelligence with applications to EVs (CINVESTAV)

"The content and learning objectives of the associated modules are thoroughly outlined in the syllabus. However, details about the examination formats are incomplete. To effectively assess the intended learning outcomes (ILO), the partner institutions should coordinate and include the missing examination format information in the syllabus."

The final semester is dedicated to the Master's Thesis. A set of thesis topics is proposed by the Joint Programme Board (JPB). Students may begin researches for their thesis project as soon as they progress to semester two. In parallel, students are encouraged to take initiative in identifying and securing other research topics with associated research or industry partners. "At the start of the third semester, a dedicated Career-Enhancing Day is provided to students with detailed information about these options." In the SER, this opportunity is referred to as an internship, which may be confusing for students. This should be clarified in the information provided to students (website, student handbook). Each master thesis candidate is assigned a principal supervisor from the semester three hosting institution, which is responsible for ensuring that the research is conducted in accordance with the institution's good practice guidelines. In addition, a second and/or third co-supervisor from the first-year host institution(s) may be appointed. The thesis defence is organised in coordination with the supervisors from

the second or third involved institution. Based on statements made during the online visit, thesis defenses are typically held in a hybrid format at the host institution of the fourth semester.

Depending on the chosen mobility scheme, the partner institutions award different degrees in accordance with their national requirements. This appear confusing for applicants and does not support the visibility of a uniform Master's programme. It is recommended that the degree and title be standardised across all partner universities in line with the programme title 'International Master in Electric Vehicle Propulsion and Control'.

3.2 CREDITS

The ECTS structure is clearly defined for each semester and each course, with a total of 120 credits to be completed over the two-year programme, divided into 30 ECTS per semester. The detailed credit distribution across modules for each semester is provided in Section 3.1 of the SER through a module table, which specifies the individual courses and their corresponding ECTS allocations. The semester-wise breakdown comprises a combination of compulsory modules, elective modules, and, in the final semester, the Master's thesis.
A credit alignment table, based on the ECTS grading scale from A (excellent) to F (fail), is provided to the students in the student handbook and is part of the consortium agreement (Section 10.12. and 10.13). This framework enables each partner institution to maintain its own standards for awarding modules while ensuring comparability. The consistent application of ECTS standards should be seen as an important step toward strengthening the integration of European higher education practices among the partner institutions.

3.3 WORKLOAD

The Master's programme is delivered over two years and comprises 120 ECTS credits. The workload for each lecture or module is clearly detailed, with definitions outlining the content, volume of hours, type of teaching, etc. This workload includes all learning-related activities, such as lectures, tutorials, practical work, seminars, self-study, project work, and assessment preparation. The number of ECTS credits allocated to each lecture also provides students with a clear indication of the expected workload.
There are significant variations in the number of contact hours—such as lectures, tutorials, and laboratory sessions—allocated per ECTS credit across different modules. While some differences are to be expected, particularly in modules with a greater emphasis on laboratory work, the extent of the variation is notable. At CINVESTAV, for example, 14 hours of attendance per ECTS are standard, while for the module `Romanian culture´, less than 3 hours of attendance per ECTS are required. The workload information should therefore be critically reviewed and adjusted if necessary. In addition, information on the calculated self-study times is missing for all modules. This should be added, as it can be an important comparative indicator in later evaluations and student surveys. It will also be important to assess whether these projections are realistic. Unfortunately, the SER only provides very general information regarding workload monitoring. The issue of implementing continuous and systematic workload monitoring should therefore be clarified.

4. ADMISSION AND RECOGNITION [ESG 1.4]

Level of compliance		
Compliant	Compliant with conditions	Non-compliant

4.1. ADMISSION

The admission requirements and the selection procedures are well defined. A selection committee, in which all partners are represented, has been established to manage this important task. The committee oversees a process divided into three phases: pre-selection and eligibility check, application assessment, and interview with final selection. To be eligible, applicants must hold a bachelor's degree in Electrical Engineering, Automatic Control, Mechatronics, or a related field. In addition, they must demonstrate a B2 level of English proficiency through a recognised certification, such as TOEIC or TOEFL. The assessment procedure is based on clear criteria including profile relevance, academic performance, English proficiency, motivation letter, and CV. The E-Pico+ programme is highly selective and competitive in order to attract a large number of highly skilled and qualified students. After ranking applications according the above-mentioned criteria, top 40 applicants are invited to an interview. Following this last step, applicants are ranked for admission.

The admission process incorporates a diversity and inclusion policy. The programme adheres to strict regulations

to foster an international and inclusive learning environment. These regulations align with EACEA guidelines, promote gender diversity in Science, Technology, Engineering, and Mathematics (STEM) fields with particular attention to female applicants, and ensure appropriate support for students with special needs.

Through a rigorous process, the programme selects top-ranked students who possess the necessary skills, expertise, and motivation to succeed in a demanding curriculum, supported by a diverse and equitable learning environment.

4.2. RECOGNITION

Students' prior learning is taken into account, with the requirement of a bachelor's degree or equivalent corresponding to 180 ECTS for admission. All European partners of the programme have signed the Erasmus+ Charter for Higher Education (ECHE) and automatically recognise the credits obtained at another partner institution. For non-European partners, such as CINVESTAV in Mexico, a dedicated agreement has been signed for Erasmus+ collaborations. CINVESTAV formally acknowledges and agrees to the principles, objectives and organisation of the E-Pico+ programme.

This framework ensures transparency, fairness, and efficient management of student mobility between partners, while also guaranteeing consistent recognition of learning outcomes. Graduates receive an E-Pico+ diploma supplement, ensuring transparency of certification, with full details regarding the level of qualifications obtained, teaching content, and learning outcomes. The completed programme also specifies the partner universities where the study path and semesters were undertaken. Graduates receive a combination of joint and national degrees according to their mobility scheme. ECN, as programme coordinator, delivers the joint degree in accordance with French higher education legislation and regulations.

5. LEARNING, TEACHING AND ASSESSMENT [ESG 1.3]

Level of compliance		
Compliant	Compliant with conditions	Non-compliant

5.1 LEARNING AND TEACHING

The self-evaluation report presents a well structured programme in which the intended learning outcomes are clearly aligned with the teaching and learning methodologies. The E-PiCo+ consortium delivers a progressive and highly specialised curriculum across its five full partner institutions. The programme begins with a common foundational semester for all students at ECN, ensuring a uniform knowledge base before they embark on diverse specialisation tracks.

The curriculum effectively balances theoretical knowledge with hands-on applications through a variety of teaching methods, including lectures, laboratory work, and project-based assignments. Key academic events such as the Winter School and Career-Enhancing Days are central to the student experience, providing valuable opportunities for practical projects, industry collaboration, and the development of professional skills. These events, along with the initial Integration Weeks, are designed to foster intercultural exchange and build a strong cohort identity among a diverse student body.

To facilitate student adaptation, language courses are integrated into the curriculum. The programme demonstrates a strong commitment to student welfare through comprehensive support services, addressing the specific challenges of mobile students by offering assistance with administrative tasks such as visas and accommodation, as well as promoting cultural and social integration. Support for students with special needs is also a stated priority, with tailored assistance available at each partner institution to ensure an inclusive learning environment.

The programme benefits significantly from the complementary expertise of its partner institutions and the active involvement of 18 industrial and 6 academic associate partners. This strong industry connection ensures the curriculum remains relevant and prepares students for high-level careers in the e-mobility sector. Student

participation in programme governance is secured through representation on the Joint Master Board (JMB), allowing student voices to contribute to the programme's continuous improvement. While the mobility path for the first three semesters is largely defined, the programme offers flexibility through elective courses and the choice of an academic or industrial partner for the fourth-semester Master's Thesis.

Current students and alumni have expressed strong satisfaction with the programme, highlighting the relevance of its learning outcomes, the effectiveness of its teaching, and the quality of student support provided by the academic body.

5.2 ASSESSMENT OF STUDENTS

According to the self-evaluation report, student learning is evaluated through a diverse and consistent range of assessment methods, including written examinations, projects, presentations, laboratory work, and continuous assessment. This multi-faceted approach ensures that the assessment methods are well-aligned with the intended learning outcomes and can effectively measure the acquisition of theoretical knowledge, practical skills, and professional competencies.

The programme has an established grading harmonisation system. The consortium uses a common grade conversion table to ensure that assessments are consistent and fair across all partner institutions, which is critical for maintaining academic integrity in a joint programme with multiple mobility paths. This transparency in grading ensures that student evaluations are equitable regardless of the host institution.

The evaluation of the Master's Thesis is jointly organised, supervised, and evaluated by the partners, culminating in a defence before an international jury composed of academic supervisors and external experts. The assessment is based on clear criteria, including the quality of the written report, the oral presentation, and the overall project. This centralised and harmonised approach to the final thesis evaluation ensures objectivity and a consistently high academic standard for all graduates.

In line with its commitment to inclusivity, the programme provides for adapted assessments for students with special needs, with each case being considered individually to ensure appropriate arrangements are made.

In view of the increasing role of artificial intelligence in higher education, the programme is encouraged to develop and formalise its assessment policies to provide clear guidelines on the ethical use of AI tools, thereby safeguarding academic originality and authorship in student work.

6. STUDENT SUPPORT [ESG 1.6]

Level of compliance		
Compliant	Compliant with conditions	Non-compliant

The student support framework within the E-PiCo+ programme is comprehensive and specifically designed to address the unique challenges faced by mobile students. The consortium provides a multi-faceted support system that contributes directly to the achievement of learning outcomes by ensuring personalised assistance and access to essential resources throughout the academic journey.

According to the self-evaluation report, the support services are robust and cover administrative, cultural, academic, and professional needs. A cornerstone of the framework is the extensive administrative support provided to students, which includes assistance with obtaining visas, securing accommodation, setting up bank accounts, and navigating health insurance procedures. This practical support is essential for facilitating smooth integration into the academic and cultural environments of the partner institutions. Each local international office plays a key role in this process, ensuring consistency and reliability of support.

Significant emphasis is placed on cultural and social integration to foster a cohesive and collaborative student community. The consortium organises events such as Integration Weeks, Winter Schools, and other cultural activities, which encourage interaction between international and local students. These initiatives are designed to promote intercultural exchange and to support students in adapting successfully to the diverse settings of the partner universities.

Students also benefit from targeted academic and professional support that fosters their development. Mentoring programmes, academic counselling, and career-enhancing workshops form part of this structure.

Notably, a dedicated Career-Enhancing Day, provides detailed information on thesis and internship opportunities. In parallel, online services extend support through access to course materials, discussion forums, and other digital resources, enabling flexible learning and communication across mobility pathways.

The consortium demonstrates a clear commitment to inclusivity. Particular attention is given to students with special needs, with support available from the application stage through to graduation, ensuring appropriate accommodations and resources are consistently in place.

Building on this strong student-centered foundation, feedback gathered during the online visit have highlighted areas for further enhancement. Participants emphasised the importance of more consistent and timely responses from administrative staff, noting that prompt communication is critical for resolving issues in the context of a multi-country programme. A seconf recurring concern was the need for greater investment in mental health provision. Students stressed that the distinctive pressures of a demanding, high-mobility programme warrant more accessible and proactive psychological services to safeguard their well-being.

In summary, while the E-PiCo+ programme offers a well-coordinated and holistic student support system, its commitment to providing an exceptional academic experience could be further strengthened. Addressing key areas for improvement, such as enhancing mental health support and improving the timeliness of administrative communication, would address key student concerns and significantly enhance the overall quality of the programme for future cohorts.

7. RESOURCES [ESG 1.5 & 1.6]

Level of compliance		
Compliant	Compliant with conditions	Non-compliant

7.1 STAFF

The Self-Evaluation Report demonstrates that the complementary academic expertise and research activity across the partners institutions cover the full scope of the E-PiCo+ Joint Master programme.

Faculty members are recognised scholars in areas such as electrical engineering, power electronics, control systems, electric vehicle and e-mobility, all central to the programme's objectives, although the SER does not include profiles from the CINVESTAV staff. The motivation to include a non-European partner in the consortium was, however, justified during the hearings in terms of academic and research expertise (AI techniques for electric vehicules) and increased funding opportunities. Overall, the international visibility of the staff is well evidenced by their participation in international and European research projects, scientific networks, and collaborations with industry, providing students with exposure to advanced knowledge and applied practice from the target sectors. This combination of disciplinary expertise and research-led teaching illustrates the staff's capacity to deliver high-quality education and supervision aligned with the programme's objectives.

The consortium agreement stipulates that each partner provides qualified academic and administrative staff for programme delivery, and that the Joint Master Board (JMB) oversees allocation and adjustments in staffing as well as supervision of teaching quality. In addition, the Quality Assurance Committee (QC) ensures the monitoring of the adequacy and commitment of the personnel involved in the programme (scholars, lecturers, administrative personnel). Staff professional development is also under the responsibility of local coordinators, although the SER does not provide detailed information on structured pedagogical training or a systematic staff development policy, which could be an area of improvement. However, the quality plan has included a dedicated task regarding staff mobility to enrich pedagogical practices and strengthen staff collaborations.

The current academic staff (including local coordinators) is distributed as follows according to the SER's section 7.1 : Ecole Centrale Nantes (ECN) has three staff members, although the mandatory annex presents additional profiles, Christian-Albrechts-Universität zu Kiel (CAU) has five staff members, Università degli Studi dell'Aquila (UAQ) has 11 staff members, National University of Science and Technology Politehnica Bucharest (UNSTPB)

has eight staff members, and Centro de Investigación y de Estudios Avanzados del Instituto Politécnico Nacional (CINVESTAV) has one staff member.

With an intake of 35 students per cohort, the distribution of teaching responsibilities across the five universities appears adequate to support both coursework and thesis supervision as shown in the syllabus document. However, detailed staff information is not provided for all courses at CAU and CINVESTAV. To gain greater insight into staff workload and facilitate monitoring, an area of improvement would be to consider specific indicators (e.g. staff-to-student ratio) to help better identify potential resource gaps and define contingency plans (staff replacement).

The consortium agreement lists academic and industrial associated partners whose main responsibilities in the programme are broadly outlined and justified. Although the SER does not provide detailed information on their mobility among partners institutions, their specific roles in semester 4 and during the Winter schools are well mapped in the Quality Plan.

Industrial partners located in the five partner countries are well integrated into the programme, ensuring a strong connection with the needs of the target sectors in terms of employability, career pathways, research and innovation. Their contributions include financial support for students through tuition fee coverage and scholarships provided via paid internships. They also enrich the academic offer by proposing and co-supervising Master's and Doctoral theses, teaching specialised modules on topics such as innovation, cooperative projects, and intellectual property, and contributing to the definition of job profiles and skills required by industry.

In addition, these partners are actively engaged in the programme governance, participating in management, selection, and quality committees. They help shape both the academic and professional dimensions of the programme by participating in education and research planning, supporting graduate employability initiatives, and contributing to events such as the Winter School and Career Days. Nevertheless, the SER would benefit from a clearer description of the modalities of this involvement, including the mechanisms through which their specific feedback informs programme development.

Complementing the academic team, the SER also highltights the role of administrative staff. Each partner institution has appointed dedicated personnel to support core functions such as student admissions, mobility coordination, financial management, and programme governance. Their previous experience in the Joint Master E-Pico Programme and other international projects represents a major asset, ensuring familiarity with the complex procedures of transnational higher education. In addition, communication processes between administrative teams across the consortium are well-established, ensuring efficient effective exchange of information and collaboration. As for the academic staff, greater visibility on administrative staff development policies and mobility would further consolidate this strength.

Overall, governance arrangements are well elaborated around several committees including the JMB, the Academic Committee hosted at each partner institution, Local coordinators, and E-PiCo+ Management Office. They enable efficient programme management by providing clear definition of respective roles and responsibilities, well defined decision-making processes within the consortium, and effective communication mechanisms.

In conclusion, the E-PiCo+ Joint Master Programme benefits from an high quality, internationally engaged, and complementary staff body, supported by motivated administrative teams and enriched by strong industry collaborations. The teaching and research capacities of the partners are appropriate for the programme's ambitions. Further strengthening could be achieved by completing the description of staff profiles and their allocation to enhance resources visibility, formalising staff development initiatives, and clarifying the involvement of associated industrial and academic partners. These refinements would ensure stronger alignment with European quality assurance expectations and reinforce the long-term sustainability of the programme.

7.2 FACILITIES

The SER provides a general overview of the facilities supporting the E-PiCo+ Joint Master Programme. It clearly demonstrates the commitment of each institution to offer fully equipped, accessible, and high-quality installations that adequately align with its intended learning outcomes and a student-centered approach. These include well-equipped classrooms with advanced audiovisual technology, digital workspaces for online

materials and videoconferencing, and libraries stocked with relevant literature in both print and digital formats. These online resources support remote learning and communication with faculty and fellow students.

The Student Handbook also lists the resources available to E-PiCo+ students at each host institution including library, rooms equipped with computers, Wi-Fi, and contact information for teachers and researchers involved in the programme. In addition, specialised laboratories, such as electric motor test benches, power electronics, and battery labs, as well as collaborative workspaces, contribute to enhancing teaching, research, and student learning experiences. Although these elements are appropriately aligned with European quality assurance guidelines, a more detailed description of partner facilities would further enrich the SER, in particular concerning their specific capacity to accommodate future E-PiCo+ students. The extent to which associated partners' facilities will be accessible to students during and beyond master thesis or internship periods (Semester 4) is also not specifically addressed.

The SER highlights the added value of the administrative support in providing direct help to students and access to each partner's facilities. Their responsibilities extend to visa assistance, housing, inclusiveness measures such as barrier-free access and IT equipment loans, and the coordination of Winter and Summer Schools as well as career-related activities. These contributions reflect a strong commitment to both inclusiveness and student welfare, fully in line with ESG standards to ensure an equitable learning environment. The consortium pays a special attention to student selection, gender diversity, and assistance to students with special needs (hearing impairment, visual impairment, mobility difficulties, dyslexia, etc.), providing specific adjustments where necessary.

The integrated mobility scheme is supported by clear coordination arrangements at both consortium and partner institutions levels. Additionally, the Quality Plan includes several tasks dedicated to student's onboarding, personalised follow-up and progress reports, which substantiate the consortium's commitment to delivering a comprehensive learning and mobility experience across the partner institutions while contributing to the overall cultural and personal development of the E-PiCo+ students.

In conclusion, The E-PiCo+ Joint Master Programme offers high-quality and accessible facilities in accordance with ESG standards concerning infrastructure and learning resources. Facilities including classrooms, laboratories, collaborative spaces, and digital resources, are well-aligned with programme objectives. They support high-quality teaching and research while ensuring accessible, and resource-rich environment for E-PiCo+ students. In addition, the coordinated mobility and support measures demonstrate a commendable commitment to equity and inclusiveness.

8. TRANSPARENCY AND DOCUMENTATION [ESG 1.8]

Level of compliance		
Compliant	Compliant with conditions	Non-compliant

The key information of the E-Pico+ programme, such as admission requirements and procedures, and examination and assessments rules, is available online via the official website inherited from the previous E-Pico programme. The website is the main source of information and consolidates all necessary resources. It also provides information about the mobility scheme and opportunities proposed to students for Master Thesis. The information is regularly updated to support the programme's attractiveness and relevance for prospective applicants and enrolled students.

Additionally, open days and webinars are organised to introduce and promote the programme, answer the queries of prospective applicants, and facilitate their application process. A large number of documents are available on the website to provide an overview of the programme, curriculum details, and administrative procedures, particularly those concerning applications.

Social media are used to promote and support advertising of the programme to future applicants. On the institutional side, academic platforms for international mobility are used to share updates and engage with potential applicants from universities and higher education institutions worldwide.

A specific e-mail address and contact points within each partner institution allow effective interaction with students, providing accurate answers and resolving issues related to applications, academic matters, administration, and enrollment. The international office of ECN is strongly engaged in this work and has dedicated staff for these tasks and support.

Overall, organisation and management provide appropriate and efficient support to students for their application and enrollment process. Information is transparent and easily accessible.

9. QUALITY ASSURANCE [ESG 1.1 & PART 1]

Level of compliance		
Compliant	Compliant with conditions	Non-compliant

The Self-Evaluation Report (SER) demonstrates a strong commitment to establishing a coherent quality assurance (QA) framework consistent with the European Standards and Guidelines (ESG). The consortium agreement sets out minimum QA standards to be applied by all partner institutions, ensuring that principles of continuous improvement, academic excellence, inclusiveness and transparency are upheld. Building on the previous experience of E-Pico, a structured system of governance supports these objectives, with QA embedded across the entire programme lifecycle, from curriculum design and student admissions to course delivery, mobility scheme, monitoring, progression, assessment rules and feedback. In addition, the SER provides a highly relevant Quality Control and Monitoring Plan (QCMP) which defines the Quality Assurance Strategy of the consortium and aims to systematically gather and analyse data to evaluate the programme's effectiveness. Using both internal and external resources, it contributes to improving the joint master implementation, ensuring that learning outcomes are met and that areas of innovation are properly addressed.

At the governance level, QA responsibilities are clearly distributed among several bodies. The Joint Master Board (JMB) serves as the central decision-making body, bringing together academic and industrial representatives to oversee programme coordination, quality monitoring, curriculum development and student-related matters. Complementing this structure, the Quality Committee (QC), managed by CAU, brings together representatives from all partner institutions as well as external experts to monitor both academic and organisational quality. More specifically, the QC is responsible for monitoring and managing the quality of the programme, updating, and applying evaluation tools, overseeing staff and infrastructure, assessing promotion strategies, tracking student performance and graduate careers, and implementing feedback for continuous improvement.
In addition, the Advisory Committee for Academic, Innovation and Sustainability (ACAIS) managed by UAQ, provides strategic input from external academic and industrial stakeholders, reinforcing the relevance of the programme to the labour market and to evolving trends in research and innovation. Finally, an External Quality Assessment Board will oversee the integrity and coherence of the QA system, providing independent evaluation of outcomes.

Internal QA processes are well described in the QCMP, with the definition of two distinct work packages (WPs) and individual tasks with corresponding objectives, timelines and deliverables. They mainly rely on qualitative and quantitative data collected through regular surveys (anonymous and semester questionnaires) on quality programme management (programme updates, manual updates, staff mobility, graduates 'career trajectories and professional integration, student sponsoring) directed to students, academic partners (peers), associated partners and employers. They also assess student arrival preparation and student follow-up. Internal quality control (QC) will perform regular process and deliverable reviews to ensure that the joint programme meets the defined quality standards.

Despite this well-structured QA framework, several areas require further clarification. The SER does not present a consolidated set of key performance indicators (KPIs) against which quality can be systematically measured, nor does it provide evidence and specific mechanisms of how survey results will be translated into corrective actions or curriculum revisions. However, it reports very relevant tools and outputs included in each WP that can generate performance data and from which additional measurable indicators (and targets) could be extracted.

Similarly, whereas staff and students are engaged in QA processes, the extent of student involvement in programme design and approval remains limited. The QA policy also does not appear to be publicly available

on the programme's website. Finally, although staff development and training are mentioned, they are not formalised as part of the QA cycle other than mobility arrangements.

On the positive side, the joint master benefits from the strong engagement in quality assurance activities of multiple external stakeholders across several internal and external bodies, which could be further strengthened through an enhanced visibility on how their feedback will be documented and integrated (or taken in consideration) into programme revisions.

In conclusion, the QA arrangements of E-PiCo+ are robust in their conception and show a meaningful alignment with ESG Part 1 through clearly defined governance structures, inclusive stakeholder involvement, and multiple instruments for evaluation and feedback. Dedicated internal bodies overseeing QA activities are to meet systematically, which ensures transparent decision-making and continuous improvement of the Programme.

The consortium benefits and capitalises upon the previous experience of E-PiCo to reevaluate and redesign its internal QA processes and tools, which is an asset. At the SER stage, not all surveys are yet redefined, and some internal bodies are still to be installed. A better formalisation of the integration of external inputs, with information regarding follow-up actions and their publicity, a more structured approach to staff development and student involvement, and finally the public availability of the QA policy would all contribute to the full effectiveness of the QA framework of the joint master programme and would further consolidate its long term quality and sustainability.

III. CONCLUSION

The E-Pico+ programme is a renewal of E-Pico Erasmus Mundus Joint Master's programme is well-structure definition for updating the programme. The programme awards a joint Master's degree aligned with Level 7 of the European Qualifications Framework (EQF), primarily covering the ISCED fields of control systems, electrical engineering, and electric vehicles. L' École Centrale de Nantes (ECN) acts as the coordinating institution, with responsibility for financial management, overall programme coordination, and chairing the student selection committee. The other four institutions hold equal status as full partners: the National University of Science and Technology Politehnica Bucharest (UNSTPB) leads on promotion and dissemination; Christian-Albrechts-Universität zu Kiel (CAU) oversees internal quality assurance; Università degli Studi dell'Aquila (UAQ) is responsible for research and innovation; and CINVESTAV coordinates promotion and outreach beyond Europe. The E-PiCo+ programme was designed to address the growing demand in both research and industry for expertise in electric vehicle technologies within Europe. The programme structure follows a classic four-semester model, with three semesters dedicated to lectures, tutorials or practical work, and a final semester devoted to the Master's thesis or an internship. The programme's content and focus significantly enhance the employability and professional visibility of its graduates. The Intended Learning Outcomes (ILOs) are appropriately aligned with this EQF level. Students further develop their analytical and problem-solving abilities, for instance through the modelling and design of complex e-mobility systems or by undertaking independent research and development projects. Continuous formative assessments such as exercises, group projects, quizzes, and continuous feedback from lectures are complemented by written exams and applied projects which are integrated into courses. At the Winter Schools in the first and the third semester students benefit from feedback and evaluation of their work from academic and industrial partners. The curriculum balances theoretical knowledge, practical application, and international exposure. Student mobility includes study in at least two countries (and up to three during the first three semesters). In the fourth semester, students may continue at a partner university—subject to EACEA regulations for Erasmus Mundus scholarship holders—or undertake a placement with an industrial partner. The admission requirements and the selection procedures are well defined. A selection committee where all partners are represented is organised for managing of this major task. The key information of the E-Pico+ programme such as admission requirements and procedures, examination and assessments rules are available online via the official website coming from the past E-Pico programme. The consortium agreement sets out minimum QA standards to be applied by all partner institutions, ensuring that principles of continuous improvement, academic excellence, inclusiveness and transparency are upheld. The QA arrangements of E-PiCo+ are robust in their conception and show a meaningful alignment with ESG Part 1 through clearly defined governance structures, inclusive stakeholder involvement, and multiple instruments for evaluation and feedback.

In conclusion, the design and implementation plans of the E-PiCo+ Joint Programme are highly relevant and supported by a teaching body of exceptional international calibre. The academic curriculum is coherent and well-structured, with clearly defined learning outcomes. Throughout the programme, students will benefit from comprehensive academic and mobility support, enabling them to gain valuable professional experience through the programme's strong industrial partnership.

The table below summarises the level of compliance of each standard and the overall alignement of the joint programme with the European Approach for quality assurance of joint programmes.

Standard	Assessment
1. Eligibility	Compliant
2. Learning outcomes	Compliant
3. Study programme	Compliant
4. Admission and recognition	Compliant
5. Learning, teaching and assessment	Compliant
6. Student support	Compliant
7. Ressources	Compliant
8. Transparency and documentation	Compliant
9 Quality assurance	Compliant
Programme as a whole	**Compliant**

STRENGTHS

- The consortium demonstrates strong scientific and technology expertise in control systems, electrical engineering, and electric vehicles.
- The industrial partners are actively involved, providing students with substantial professional exposure and a high number of placement opportunities.
- The learning outcomes and the study programme are clearly and well-structured.

WEAKNESSES

- The transition from the previous programme to the renewed E-Pico+ programme is not presented in a clear continuous improvement perspective.
- The standardisation and implementation of quality assurance measures vary across partner institutions, with uneven maturity.
- Students are not sufficiently familiar with the pedagogical specifics and available support services before their mobility to partner institutions after the first semester.

RECOMMENDATIONS

- Manage the transition to the renewed programme using a continuous improvement approach informed by past programme indicators and performance data.
- Leverage industrial partnerships across all level of teaching and professional exposure.
- Enhance transparency regarding the specific features and practices of each partner institution to provide students with more effective guidance and preparation for mobility.

IV. COMMENTS OF THE INSTITUTION

Ecole Centrale de Nantes
M. Jean-Baptiste AVRILLIER
1 rue de la Noë
44300 NANTES

Dossier suivi par :
Mme Cécilia PROVOST
Chargée de projets européens
Direction des relations internationales

À l'attention de :
M. Pierre COURTELLEMONT
Directeur du département Europe et International
HCERES

Nantes, le 15/12/2025

Objet : Transmission du courrier d'observations – Rapport d'évaluation HCERES du programme E-PiCo+

Monsieur Courtellemont,

Le développement de programmes européens innovants, tels que les Masters d'excellence *Erasmus Mundus Joint Masters* (EMJMs) labellisés par la Commission européenne, constitue un axe central de la stratégie internationale de Centrale Nantes. Les engagements actifs au sein de l'espace européen de l'enseignement supérieur et de la recherche ont permis à Centrale Nantes de mettre en place le diplôme joint européen et de contribuer à la diffusion d'une approche européenne de l'assurance qualité.

C'est donc dans ce cadre que j'ai le plaisir de vous transmettre, ci-joint, le courrier d'observations en réponse au rapport d'évaluation mené par le HCERES sur le programme E-PiCo+

Mon équipe et moi-même restons à votre entière disposition pour tout renseignement complémentaire.

Je vous prie d'agréer, Monsieur Courtellemont, l'expression de mes salutations distinguées.

Jean-Baptiste AVRILLIER
Directeur

Co-funded by the European Union

Observation report to the HCERES' evaluation report

Erasmus Mundus Joint Master Degree E-PiCo Plus

CENTRALE NANTES	**CENTRALE NANTES**
C A U Kiel University Christian-Albrechts-Universität zu Kiel	**CHRISTIAN-ALBRECHTS-UNIVERSITÄT ZU KIEL**
POLITEHNICA BUCHAREST 1818	**NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY POLITEHNICA BUCHAREST**
	UNIVERSITÀ DEGLI STUDI DELL'AQUILA
Cinvestav	**CENTRO DE INVESTIGACION Y DE ESTUDIOS AVANZADOS DEL INSTITUTO POLITÉCNICO NACIONAL**

Joint Master Programme E-PiCo+: **Erasmus Mundus Joint Master Degree on electric vehicle propulsion and control**

POLITICAL LETTER

The E-PiCo+ consortium would like first to extend its sincere appreciation to the expert panel for the quality of the exchanges and the constructive dialogue throughout the evaluation.

We hereby submit the following observations and clarifications regarding the evaluation report received on 3rd October 2025.

The **full official name of the study programme** is "Electric Vehicle and Control Plus – E-PiCo+

1. STUDY PROGRAMME

1.1. **Study programme name**, the official name of the study programme is "Electric Vehicle and Control Plus – E-PiCo+

1.2. **Sites where the programme is tought**:

- France: Nantes
- Germany: Kiel
- Romania: Bucharest
- Italy: L'Aquila
- Mexico: Guadalajara

1.3. Academic degree awarded:

- Ecole Centrale de Nantes: master Automatique, robotique, track: Electric Vehicle, Propulsion and Control
- National University of Science and Technology Politehnica Bucharest: Master in Electric Vehicle Propulsion and Control
- Centro de Investigacion y de Estudios Avanzados del Instituto Politecnico Nacional : Ciencas en Ingeneria Electrica

1.4. The **tuition fees amount per year** should be precised: € 9000 for Partner Country students and € 4500 for Programme Country students[1]

1.5. **Student population**:

- Intake 1: 21 students graduated (18 Erasmus Mundus Scholarship Holders – EMSH) + 3 SF
- Intake 2: 24 graduates (16 EMSH + 8 SF)
- Intake 3: 24 graduates (12 EMSH + 12 SF)
- Intake 4: 20 graduates (14 EMSH + 6 SF)

[1] ***Programme countries"*** *include students whose nationality is one of the 27 Member States of the European Union, and additionally, Iceland, Norway, Republic of North Macedonia, Liechtenstein, Turkey, Serbia.* ***Partner countries*** *include students whose nationality is the rest of the world.*

2. EVALUATION REPORT

2.1. Programme Design, Coherence and Joint Delivery

2.1.1. Joint Design and Pedagogical Coherence

E-PiCo+ was designed based on joint discussions among consortium partners, with the objective of providing progressive and complementary learning pathways. Graduates obtain a combination of joint and/or national degrees depending on their individual mobility schemes, in accordance with national requirements.
It is important to precise that, the last semester dedicated to the thesis may be undertaken at one of the partner institutions, or at an associated partner (academic or industrial) or in any other company or laboratory in the world, thereby fostering strong links with professional practice.

Through this European Approach for for Quality Assurance, the objective is the joint accreditation of the E-PiCo+ programme itself (running for 6 years), and the awarding of a joint degree that de facto carries a single, common and unique degree title. The objective is indeed to harmonise the title of the joint degree.

2.1.2. Continuous Improvement and Transition from E-PiCo to E-PiCo+

The transition from E-PiCo to E-PiCo+ is grounded in a clear continuous improvement approach, building on lessons learned from the 2019–2025 implementation period.

Key improvements include:

- **Extension and deepening of academic content** in response to emerging challenges (AI-based EV technologies, hydrogen integration, grid stability, fast charging, new batteries);
- **Strengthening of the consortium** through the integration of CINVESTAV as a full academic partner;
- **Reinforcement of institutional** capacity through new infrastructures and laboratories (test benches at different scales (including scales 1);
- **Consolidation of governance and quality assurance**, including preparation of a joint degree and a European Quality Assurance framework;
- Considering the possibility to **support tuition fees** by industrial partners.

This evolutionary approach ensures continuity, efficiency and sustainability, while allowing the programme to scale up its ambition and impact in line with EMJM objectives and EU energy and climate priorities.

3. GOVERNANCE, COOPERATION AND FINANCIAL MANAGEMENT

3.1. Consortium Governance

Financial and administrative decisions are jointly discussed during consortium meetings. Administrative and academic frameworks are already in place to ensure efficiency and sustainability.

3.2. Financial Transparency and Sustainability

The project's income is collected by the coordinating institution, which retains a share to cover coordination and management costs. The remaining funds are redistributed among partners proportionally to the number of students hosted. These mechanisms are formally defined in the Consortium Financial Agreement, defining the project's budgetary structure as well as the financial flows between the partners.

4. RESOURCES AND INSTITUTIONAL CAPACITY

4.1. The evolution of the E-PiCo program toward E-PiCo+ is also marked by an increase in human resources.

- Teaching staff at ECN: 2
- Teaching staff at CAU: 7, Administrative staff: 2
- Teaching staff at UNSTPB: 10, Administrative staff: 3
- Teaching staff at UNIVAQ: 10, Administrative staff: 2
- Teaching staff at CINVESTAV: 8

4.2. Material Resources

Each partner contributes specific infrastructures, laboratories and expertise developed since the previous programme, reinforcing the academic quality and sustainability of E-PiCo+.

5. STUDENT SUPPORT AND LEARNING ENVIRONMENT

5.1. Information, Guidance and Mobility Preparation

Following student feedback, several corrective measures were implemented:

- Development of a dedicated E-PiCo+ Student Guidebook;
- Organisation of an online intake start session each September with all partners;
- Reinforced welcome process, including a dedicated administrative session during the reinforcement week.

These measures are now fully integrated into standard procedures.

5.2. Health, Well-being and Inclusion

Health and disability issues are taken into consideration, with part of the budget allocated to medical support arrangements upon request. An action plan addressing mental health has been implemented, including training and a dedicated student guide. All students benefit from enhanced insurance coverage, including non-permanent and non-chronic mental disorders.

6. STAFF DEVELOPMENT AND PROFESSIONALISATION

The development of skills for academic and administrative staff is a priority of the E-PiCo+ programme. Consequently, a dedicated budget line supports staff and scholar mobility as part of a lifelong learning strategy.

6.1. Quality assurance

In line with the ESG 2015 standards, the consortium strengthens its quality assurance framework through the Quality Committee (QC), coordinated by CAU. The QC brings together representatives from all partner institutions, alongside rotating representatives from the student body and industrial partners. It is responsible for overseeing the implementation of the Quality Assurance and monitoring plan and for ensuring the harmonisation of quality assurance practices across the partnership.

The QC systematically reviews feedback collected through a structured evaluation and monitoring system, notably using CAU's Evasys platform. This system is complemented by an easily accessible online tool allowing students to submit anonymous feedback at any stage of the programme. The analysis of this data supports evidence-based decision-making and feeds directly into the continuous improvement process.

Based on this analysis, the QC formulates recommendations that are discussed and validated during the biannual management meetings, attended by all partner institutions. This ensures that quality-related decisions are transparent, documented, and collectively agreed upon, in accordance with ESG principles on governance and stakeholder involvement.

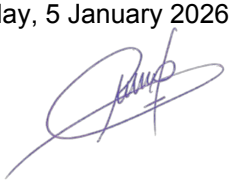
The inclusion of student and industry representatives within the QC plays a central role in ensuring that the perspectives, professional expectations, and learning experiences of all key stakeholder groups are actively integrated into the quality assurance cycle. This participatory approach reinforces the relevance of the programme to labour market needs while maintaining high academic standards.

Overall, this structured and collaborative quality assurance mechanism fosters a culture of continuous enhancement, ensures consistency in the implementation of quality measures across partners, and strengthens the overall coherence, quality, and professional relevance of the programme, in full alignment with ESG 2015 standards.

The E-PiCo+ consortium remains at the disposal of the HCERES expert panel for any further clarification.

On behalf of the E-PiCo+ Consortium
Professor Malek Ghanes, E-PiCo+ Programme Coordinator

Date: Monday, 5 January 2026
Signature:



V. ANNEXES

The evaluation reports of Hceres
are available online : www.hceres.fr/en

Evaluation of higher education institutions
Evaluation of research units
Evaluation of study programmes
Evaluation of research organisation
International evaluation and accreditation

Evaluation · Research · Higher Education
Hcéres

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European Approach for Quality Assurance of Joint Programmes

ACCREDITATION PROPOSAL

Electric Vehicle and Control Plus (E-PiCo+)

École Centrale Nantes (France)
Christian-Albrechts-Universität zu Kiel (Germany)
National University of Science and Technology Politehnica Bucharest (Romania)
Università degli Studi dell'Aquila (Italy)
Centro de Investigación y de Estudios Avanzados del Instituto Politécnico Nacional (Mexico)

December 2025

High Council for the evaluation of research and higher education

SCOPE OF THE PROPOSAL

The E-PiCO+ consortium has mandated the Hcéres to perform the evaluation of its Joint Master programme. The consortium is made of the following universities:

- École Centrale de Nantes (France)
- Christian-Albrechts-Universität zu Kiel (Germany)
- National University of Science and Technology Politehnica Bucharest (Romania)
- Università degli Studi dell'Aquila (Italy)
- Centro de Investigación y de Estudios Avanzados del Instituto Politécnico Nacional (Mexico)

The evaluation is based on the European Approach for Quality Assurance of Joint Programmes[1], adopted in May 2015 by the Ministers of the European Higher Education Area and is compliant with the Standards and guidelines for quality assurance in the European Higher Education Area (ESG)[2].

PROPOSAL

Following a thorough evaluation process coordinated by Hcéres, the expert panel hereby recommends to grant full accreditation to the Master Electric Vehicle and Control Plus (E-PiCo+)

The table below summarises the level of compliance of each standard and the overall compliance of the joint programme with the European Approach for quality assurance of joint programmes.

Standard	Assessment
1. Eligibility	Compliant
2. Learning outcomes	Compliant
3. Study programme	Compliant
4. Admission and recognition	Compliant
5. Learning, teaching and assessment	Compliant
6. Student support	Compliant
7. Ressources	Compliant
8. Transparency and documentation	Compliant
9 Quality assurance	Compliant
Programme as a whole	**Compliant**

Hcéres will communicate the evaluation report together with the accreditation decision to the quality assurance agencies from the countries represented in the E-PiCO+ joint master. Hcéres has also invited the consortium to contact the respective national or regional accreditation bodies regarding the procedure required to accept this accreditation decision.

The following strengths, weaknesses and recommendations are given for further improvement of the programme:

STRENGTHS

- The consortium demonstrates strong scientific and technology expertise in control systems, electrical engineering, and electric vehicles.
- The industrial partners are actively involved, providing students with substantial professional exposure and a high number of placement opportunities.
- The learning outcomes and the study programme are clearly and well-structured.

[1] https://www.eqar.eu/assets/uploads/2018/04/02_European_Approach_QA_of_Joint_Programmes_v1_0.pdf
2 https://www.enqa.eu/wp-content/uploads/2015/11/ESG_2015.pdf

WEAKNESSES

- The transition from the previous programme to the renewed E-Pico+ programme is not presented in a clear continuous improvement perspective.
- The standardisation and implementation of quality assurance measures vary across partner institutions, with uneven maturity.
- Students are not sufficiently familiar with the pedagogical specifics and available support services before their mobility to partner institutions after the first semester.

RECOMMENDATIONS

- Manage the transition to the renewed programme using a continuous improvement approach informed by past programme indicators and performance data.
- Leverage industrial partnerships across all level of teaching and professional exposure.
- Enhance transparency regarding the specific features and practices of each partner institution to provide students with more effective guidance and preparation for mobility.

This proposal together with the evaluation report will be published on the Hcéres website.

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