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REPORT
OF THE EXPERT PANEL
IN THE PROCEDURE OF INITIAL ACCREDITATION OF THE PROFESSIONAL GRADUATE STUDY PROGRAMME APPLIED INDUSTRIAL COMPUTING, MEĐIMURJE UNIVERSITY OF APPLIED SCIENCES IN ČAKOVEC

Date of accreditation: 21st January 2026

March, 2026

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CONTENTS

INTRODUCTION

The Agency for Science and Higher Education (the Agency) is an independent legal entity with public authority, registered in the court register, and a full member of the European Quality Assurance Register for Higher Education (EQAR) and the European Association for Quality Assurance in Higher Education (ENQA).

All study programmes delivered by public and private higher education institutions are subject to the procedure of initial accreditation of study programmes conducted by the Agency in accordance with the Act on Quality Assurance in Higher Education and Science (Official Gazette 151/22) and by following the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG) and good international practice in quality assurance of science and higher education.

The Agency's Accreditation Council appointed an independent expert panel for the evaluation of the professional graduate study programme Applied Industrial Computing, Međimurje University of Applied Sciences in Čakovec.

Members of the Expert Panel (in the same order as in the Decision to Appoint the Expert Panel):

- Prof. Sanda Martinčić-Ipšić, PhD, University of Rijeka, Faculty of Informatics and Digital Technologies, Republic of Croatia, Panel chair,
- Branko Mihaljević, prof. prof. stud., PhD, RIT Croatia, Republic of Croatia,
- Prof. Alok Mishra, PhD, Norwegian University of Science and Technology, Faculty of Engineering, Kingdom of Norway,
- Prof. Ana Maria Neves de Almeida Baptista Figueiredo, Instituto Superior de Engenharia do Instituto Politecnico do Porto, Portuguese Republic,
- Darija Pelengić, student, Bjelovar University of Applied Sciences, Republic of Croatia.

The Expert Panel held meetings with the following groups:

- Management,
- Head of the study programme,
- Full-time teaching staff and external associates that will participate in the delivery of the study programme,
- Students,
- Industry representatives, potential employers.

The Expert Panel visited the laboratories, Metal centre Čakovec, the library, the student administration office and the classrooms.

The Expert Panel drafted this Report on the initial accreditation of the professional graduate study programme Applied Industrial Computing, Međimurje University of Applied Sciences in Čakovec based on the Proposal of the professional graduate study programme Applied Industrial Computing, Međimurje University of Applied Sciences in Čakovec, other relevant documents and the site visit.

The Report contains the following elements:

- Basic information about the study programme;
- Detailed analysis of each quality standard, recommendations for improvement and quality grade for each standard,
- Final recommendation of the Expert Panel,
- Appendices (quality grade summary by each assessment area and standard, and the site visit protocol).

In the analysis of the documents, site visit and the meetings held at the Međimurje University of Applied Sciences in Čakovec and writing of the Report, the Expert Panel was supported by:

- Maja Šegvić, coordinator, ASHE,
- Fran Zanoški, interpreter,
- Marija Omazić, translator of the Report.

BASIC INFORMATION ABOUT THE STUDY PROGRAMME

Name, seat and PIN (Personal Identification Number) of higher education institution: Međimurje University of Applied Sciences in Čakovec, Bana Josipa Jelačića 22/a, PIN: 31444990605

Title and type of study programme: professional graduate study programme: Applied Industrial Computing

CroQF/EQF/QF-EHEA level: 7.1.st/7/2

Scientific or artistic area and field of study programme: Technical Sciences, Computing

ISCED FoET classification: 0613 Software and applications development and analysis

Programme duration: Two years, four semesters

Number of ECTS points acquired on completion of study programme: 120 ECTS

Academic or professional degree / qualification obtained upon the completion of the study programme (if the study programme has several specializations, the issued degree/qualification cannot be named according to the specialization, but at the level of the study programme): Master Engineer of Computing

Language of delivery: Croatian

Place of delivery of the study programme (at the head office or outside the head office of the higher education institution): Čakovec

Method of delivery of the study programme: On-site

Admissions quota (for full-time and part-time students): 20 full-time students and 20 part-time students

Academic year in which the study programme delivery is to commence: 2026 / 2027

In case of joint programmes delivered by Croatian higher education institutions, please include a list co-providers/partners: /

DETAILED ANALYSIS OF EACH STANDARD, RECOMMENDATIONS FOR IMPROVEMENT AND QUALITY GRADE

I. Internal quality assurance

1.1. Clear justification for the introduction of the new study programme has been provided with regard to the mission and strategic goals of the higher education institution, as well as economic and societal needs.

Analysis:
The introduction of this study programme – professional graduate study programme Applied Industrial Computing – complies with the Strategy for the Development of Međimurje University of Applied Sciences in Čakovec for the period 2020–2026, as the latter clearly outlines that the launch of new study programmes is part of the University's future activities and also the link between education at the University and the labour market. It also supports the achievement of the key objectives of the Development Plan of Međimurje County for the period until 2027 (Development Plan of Međimurje County for the period until 2027) focused on improving higher education and strengthening its alignment with labour market needs.

This study programme belongs to the STEM field (Science, Technology, Engineering and Mathematics), which has been identified as a priority area in education in several documents at the EU and Republic of Croatia (RH) levels, also, labour market research has confirmed the need for educating professionals in the STEM field. It contributes to achieving key goals of the National Plan for the Development of the Education System until 2027, focusing on improving the quality of higher education and strengthening the link between education and labour market needs.

The information supplied by the Croatian Employment Service (HZZ) for the period 2020–2024 reveals that more than 80.42% of students of the professional undergraduate study programme in Computing are employed within a short period after completing their studies.

Considering that informatics, computing, and industry are three important areas for Međimurje County development, and the stakeholders' general opinion, in particular the incubator representative opinion, we can project that the employment rate for this study programme will be similar.

There is no overlap with similar programmes in the region or in the Republic of Croatia, which are in general of Computing area, not in Industrial Computing. This programme distinguishes itself with the application to computing to industry.

The launch of this programme is justified with the demand for qualified professionals in the field of computing and good employment opportunities. This demand was observed in the analysis of the opinion provided by the Croatian Employment Service along with feedback from alumni, as well as labour market research conducted by the University.

The revised documentation includes support letters from nine Međimurje County companies operating in manufacturing, energy, and industrial automation sectors. The documentation specifically identifies PLC programming, embedded systems, industrial networks, and process automation as the competences most in demand — precisely the competences forming the mandatory programme core — which demonstrates substantive and traceable alignment between employer needs and curriculum design.

The Panel notes, however, that the majority of the support letters are generic in nature and do not demonstrate meaningful institutional commitment to the programme. With the exception of Kolektor, none of the letters include a commitment to accepting students for professional practice, thesis work, or potential employment, and none reference applied industrial computing topics relevant to the programme's educational objectives. The letter submitted by V-Elin consists of a blank form, indicating no substantive engagement with the process. Kolektor remains the sole partner whose letter both references programme-relevant content and explicitly commits to cooperation in programme implementation. The institution is encouraged to secure more substantive letters of commitment from the remaining partner companies in future iterations, ensuring that documented industry involvement reflects genuine and ongoing engagement with the programme rather than formal participation in the accreditation process alone.

It is also referred that the “Regulations on the Procedure for the Development, Approval, Improvement, and Revision of Study Programmes” were followed, so an evaluation procedure was initiated for the new study programme, which is considered aligned with the University’s goals, market, and environmental needs.

For the academic year 2026/2027, the number of students to be admitted to the programme is 20 full-time students and 20 part-time students. The Expert Panel believes that most alumni from the undergraduate programme will apply for this programme in a part-time or full-time status.

Recommendations:

- Consider including industrial computing practitioners in the University's Economic Council.
- The HEI should emphasize the unique character of this study programme within its geographical area of influence and across the country.
- The HEI is encouraged to secure more substantive and programme-specific letters of commitment from partner companies in future programme iterations, explicitly addressing cooperation in student professional practice, thesis mentorship, and potential employment as evidence of genuine and ongoing industry engagement.

Quality grade: **Fulfilled**

1.2. The study programme has undergone an appropriate internal quality assurance process and has been formally approved by the higher education institution.

Analysis:

The development of the new study programme (professional graduate study programme in Applied Industrial Computing) was conducted in line with the UAS internal quality assurance policy, which is publicly available (https://www.mev.hr/wp-content/uploads/2024/03/Politika-osiguravanja-kvalitete.pdf).

It involved internal and external stakeholders, the University's Quality Assurance Committee, the University's Economic Council, practitioners from industry, and experts in the field of IT technologies.

The Economic Council expressed its support for the launch of the proposed study programme, as informatics, computing and industry are three important areas for Međimurje County development.

The Economic Council is a permanent body that includes the president of the county chamber of commerce, who is also the president of the council, alumni students, and companies where their alumni work, as well as representatives of institutions such as the Technology Innovation Center. It provides guidance to the UAS in aligning teaching and study programmes closely with labour market needs and technological developments.

The UAS Council adopted the decision on the acceptance of the Feasibility Study for the professional graduate study programme in Applied Industrial Computing in December 2024.

The Governing Board adopted the Decision on the submission of the Request for the initiation of the initial accreditation procedure for the professional graduate study programme in Applied Industrial Computing in July 2025.

Recommendations:

- Ensure that records of the Economic Council meetings and other meetings with stakeholder participation, and feedback analysis remain systematically archived. This will provide traceable documentation in future audits and help monitor continuous alignment with evolving industry demands.
- A dedicated Curriculum Committee, including academic staff, external experts, and student representatives, would bring added value as it would include different perspectives to the process of defining the learning outcomes and curriculum structure.

Quality grade: **Fulfilled**

1.3. The higher education institution will collect, analyse and use relevant data for the effective management and continuous enhancement of the study programme in accordance with the published quality assurance policy.

Analysis:

It is referred that the programme will be subject to continuous improvement of teaching processes through the alignment of curricula with the latest developments in the scientific and professional fields, technological advancement, and scientific and research activities, as defined in the University quality assurance policy.

The quality assurance system is composed of several different areas in which the following are included:

- Study programmes and the functioning of the teaching process (status of study programmes, student enrolment, learning process, teaching process, mentoring, evaluation of teaching quality and course delivery, content and learning outcomes, and the process of student work assessment);
- Social responsibility and contribution to the community.

Data is collected annually through ISVU (Information System of Higher Education Institutions) and internal surveys.

- Data from ISVU (Information System of Higher Education Institutions) is used to produce reports on the number of graduates, the average length of study, and the average study grades for each academic year and on student withdrawals;

- The UAS conducts various types of surveys to gather relevant data and indicators that serve as the basis for guiding further development, promotion, and quality enhancement of institutional operations. These surveys are a key tool for collecting feedback, including employers' opinions on the quality of education and student competencies, alumni surveys related to employment rates, as well as surveys on graduate satisfaction with the study programme. Also, twice per academic year, students can evaluate the curricula, completed courses and lecturers, and they can also propose changes and improvements.
- The amended documentation demonstrates a commendable and systematic approach to programme-level quality monitoring. The three-tier **key indicators framework** — operating at course, thesis, and programme level — provides a coherent and proportionate structure for tracking the achievement of learning outcomes across the full student lifecycle. At course level, the uniform adoption of three quantified indicators across all syllabi — a minimum 75% student success rate per learning outcome, an average course evaluation score of at least 3.5 out of 5, and an expected final grade range of 3.0 to 4.0 — ensures that quality monitoring is both standardised and directly linked to outcome achievement rather than to process compliance alone. The specification of exact target values, measurement frequency, and the identification of the Quality Assurance Committee as the body responsible for reviewing results and initiating corrective action further strengthens the credibility and operationalisability of the framework. The institution is encouraged to ensure that the data collection instruments, reporting timelines, and escalation procedures associated with each indicator are formally documented in the programme's internal quality assurance procedures, so that the framework transitions fully from a set of stated intentions into a verifiable and consistently applied monitoring system across all programme cohorts and course iterations.

There is a Regulation (*The Rulebook on the procedure for the development, approval, improvement and revision of study programmes at Međimurje University of Applied Sciences*) the purpose of which is to regulate the processes of developing, continuously monitoring, evaluating, and improving study programmes.

Recommendations:

- The higher education institution must publish information on admission requirements, intended learning outcomes, teaching and assessment methods, and qualifications which may be gained. Specifically, programme-level outcomes need to be published on the HEI website, also for the undergraduate programme Computing.

- The HEI should establish clear benchmarks for programme completion and satisfaction rates and provide visual summaries in publicly accessible reports to communicate progress and accountability.
- The HEI is advised to formally document the data collection instruments, reporting timelines, and escalation procedures (when the indicator is not met) for each defined indicator within its internal quality assurance procedures, ensuring the framework is consistently and verifiably applied across all programme cohorts.

Quality grade: **Fulfilled**

1.4. The higher education institution informs the public about the study programmes it offers, as well as plans to offer new programmes, i.e. changes made to existing ones.

Analysis:
Although this standard cannot be assessed to this programme because it is still not running it is possible to assess UAS behaviour related to their running programmes.

The HEI maintains a well-structured and user-friendly website that provides comprehensive information about its study programmes, although information in English is scarce.

Details available to the public include:

- Programme structure and course content,
- Course learning outcomes,
- Teaching and assessment methods,
- Career opportunities and paths for further study.

The plans for new programmes are not announced.

For existing study programmes **there are no systematically reported PLOs, and this particularly refers to the undergraduate programme Computing.**

UAS communicates actively through digital channels, namely social networks such as Facebook, Instagram, TikTok and YouTube. The YouTube channel is not updated, the last news is from 2021. TikTok and Instagram are mostly about sports and tourism, and Facebook is the most actualized, but all one can find are news about past events. So, only on the website can one find information about the running study programmes. When referring to plans to offer new programmes, and/or changes made to existing ones, there is no information.

Recommendations:

- English website needs to be updated and additional information included. Specifically, **syllabi in English for all undergraduate and graduate studies in Computing need to be publicly available, with all programme and course level outcomes.**
- As the programme is new, the HEI should invest in targeted promotional campaigns emphasizing career outcomes and interdisciplinary competencies. The HEI could plan enhancing career transparency and student engagement by publishing publicly accessible listings of current job openings and organizing events like "Career Speed Dating" that briefly introduce companies to students and facilitate direct connections with potential employers.

Quality grade: **Partially fulfilled**

II. Study programme

2.1. The proposed study programme is compatible with the qualification standard in the Croatian Qualifications Framework Register. - (Table 1)

Analysis:

Currently, there is no registered qualification standard for Applied Industrial Computing at Level 7.1 in the Croatian Qualifications Framework (CroQF) Register. The higher education institution conducted a comprehensive comparison of existing registered standards, such as Professional Specialist in Applied Computing and Professional Specialist in IoT, and found only partial compatibility. The analysis confirms that while these standards share a foundation in software development and networking, the proposed programme is unique in its specific focus on industrial automation, embedded systems, and communication protocols. The Expert Panel concludes that the programme addresses a specific gap in the labour market that existing standards do not cover.

Recommendations:

- In case of the successful completion of the initial accreditation, the HEI should initiate the development of a proposed qualification standard and occupational standard for Applied Industrial Computing in cooperation with the relevant sector councils and competent bodies.

Quality grade: **Not applicable (No existing standard).**

2.2. The intended learning outcomes at the level of the study programme are aligned with the competences a student should gain by completing the study programme, as well as with the CroQF and EQF level.

Analysis:

After receiving the amended documentation, the Panel assesses that the **learning outcomes** of the proposed professional graduate study programme Applied Industrial Computing have been clearly defined. The intended **programme learning outcomes** (PLOs) do align with the **expected level of competencies appropriate for graduate study level** and adhere to the requirements of the profession and internationally recognised professional standards**.**

The number of PLOs has been reduced from 16 to 9, which represents a significant structural improvement; the consolidated outcome set is more coherent, avoids redundancy, and is appropriately scoped for a 120 ECTS programme at CroQF Level 7.1 where each outcome must be demonstrably achievable and assessable within the available curriculum.

The revised PLOs more effectively address the competences required for participation in the contemporary labour market, and the gaps in the coverage of the latest advances in applied industrial computing — particularly in the areas of cybersecurity, digital twins, cloud-based industrial systems, and process optimisation — are meaningfully mitigated compared to the initial submission, better reflecting the technological profile demanded by regional and national employers.

The revised PLOs are now more comparable with the intended outcomes of related professional graduate programmes in EU member states, demonstrating that the institution has engaged substantively in the study programme revision and has positioned its graduate profile within the broader European higher education landscape for computing at Level 7.

The PLOs show clear improvement in the integration of both generic and profession-specific competences, with graduate-level action verbs consistently applied across all 9 PLOs with explicit reference to leadership, ethical responsibility, and professional communication alongside the technical dimensions, bringing the outcome set into closer alignment with the CroQF Level 7.1 descriptor requirements and the corresponding EQF level 7 reference framework.

The revised graduate-level PLOs are clearly distinguished from the intended learning outcomes of the existing undergraduate foundation programme — the professional undergraduate study programme in Computing (*Stručni prijediplomski studij Računarstvo*), delivered at Međimurje University of Applied Sciences in Čakovec across two tracks (Software Engineering, and Computer Systems and Network Engineering) - accredited in 2007. Where the undergraduate outcomes focus on the application of established computing methods and tools, the graduate PLOs consistently operate at Bloom's Levels 5–6, requiring students to design, critically evaluate, optimise, and professionally justify complex solutions in industrial environments — a level of cognitive demand and professional autonomy that is appropriate to CroQF Level 7.1 and meaningfully advances beyond the competence profile of the undergraduate programme.

However, the Panel identifies several points for improvement. The PLO–CLO mapping provided in the revised submission represents a genuine and commendable effort to establish transparent vertical alignment across the programme. The Panel notes, however, four structural issues that the institution is encouraged to address in future revisions of the study programme. First, LO4's societal impact sub-component — explicitly stated in the PLO formulation — is not operationalised in any contributing course CLO; the courses linked to LO4 address critical evaluation of technologies and their professional implications, but none require the student to analyse or assess broader societal consequences, leaving this dimension of the PLO without a verifiable assessment pathway. Second, the primary analytics course — Applied Machine Learning — is mapped to LO3, LO7, and LO8, but not to LO5, which is the PLO that explicitly addresses data analytics competences; this creates a structural disconnection between the programme's most directly relevant analytics course and the analytics learning outcome it should principally support. Third, LO7's process optimisation dimension relies disproportionately on Data Warehouse and Process Identification, while Digital Twins and Cyber-Physical Systems — the courses most directly concerned with process modelling and optimisation — contribute only minimally to this outcome. Fourth, the overall PLO coverage profile is imbalanced: LO6 and LO8 receive contributions from twelve and thirteen courses respectively, while LO1, LO2, and LO4 are each supported by only five to six courses, suggesting that the integration and software architecture dimensions of the programme are systematically over-assessed relative to the leadership, project management, and societal awareness dimensions that are equally central to the graduate profile at CroQF Level 7.1.

Recommendations:

- The institution is encouraged to revisit the PLO–CLO mapping to ensure that LO4's societal impact dimension is explicitly operationalised at course level, that Applied Machine Learning is aligned with LO5, that Digital Twins and Cyber-Physical Systems contribute more substantively to LO7, and that the overall PLO coverage profile is rebalanced to emphasize the leadership, project management, and societal awareness outcomes alongside the technical integration and software architecture dimensions.

Quality grade: **Partially fulfilled**

2.3. The intended course outcomes are aligned with the intended learning outcomes at the level of the study programme. – (Table 2)

Analysis:

In the amended documentation the HEI has defined intended course learning outcomes (CLOs) for all elements of the study programme. Specifically, learning outcomes are specified in the "Thesis" course. CLOs now adhere to higher-order Bloom's taxonomy verbs appropriate for CroQF Level 7.1.

The Thesis syllabus (Semester IV, 30 ECTS) defines five learning outcomes addressing problem definition, solution development, critical analysis, testing, and professional defence. This structure is well-conceived and appropriate for an applied professional programme at CroQF Level 7.1. The outcomes demonstrate a clear understanding of the integrative role the thesis plays in the programme.

To further strengthen the outcome set, the institution is encouraged to consider making three **competence dimensions more explicit in future revisions**. The first is the critical application of professional and technical knowledge — specifically the student's ability to survey existing industrial solutions and relevant technical standards and to use that survey to justify the approach taken. The second is a systematic design methodology as a distinct graduate-level competence, particularly the evaluation of alternative technical approaches and the justification of design decisions against defined industrial constraints, which would more clearly distinguish Level 7.1 from undergraduate-level project work. The third is the specification of professional communication expectations, including the production of technical documentation to professional standards and the ability to engage with expert critique through technically grounded argumentation during the oral defence. Addressing these dimensions in the learning outcome formulations and their associated assessment criteria would further consolidate the already solid foundation of the thesis course and ensure full transparency of graduate-level expectations for students, mentors, and external stakeholders alike.

However, the Panel notes a recurring structural pattern across the programme syllabi whereby **individual CLOs bundle multiple active verbs** — such as design, implement, and evaluate — into a single outcome statement. While each verb reflects a legitimate and distinct cognitive demand, their consolidation within a single CLO makes precise mapping to course activities, teaching methods, and assessment instruments difficult, and undermines the transparency of constructive alignment. The institution is encouraged to disaggregate such compound formulations into separate, focused CLOs,

each targeting a single cognitive operation that can be independently taught, practised, and assessed. Specifically, the institution is encouraged to avoid listing multiple active verbs within a single CLO formulation, as this practice makes it difficult to map individual outcomes to specific course activities and assessments with precision; outcomes that bundle design, implementation, and evaluation into a single statement are better separated into distinct, independently assessable CLOs.

The amended submission demonstrates a commendable effort to establish constructive alignment between CLOs and PLOs, and the addition of explicit mapping tables represents a meaningful improvement in transparency. The Panel notes, however, that the alignment framework still offers room for further refinement. As an illustrative example, the IT Project Management course provides a well-structured CLO-to-PLO mapping and a detailed assessment table with performance indicators — a model that approaches best practice. Nonetheless, the course would benefit from an overarching course objective that explicitly frames the integrative purpose of the CLOs; a statement such as "students will develop and apply project management methodology through the full lifecycle of a project assignment" would contextualise the individual outcomes and clarify their collective contribution to the graduate profile. Furthermore, while the four CLOs are individually well-mapped to PLOs, the connection between O3 — which assesses team leadership — and PLO1 would be strengthened by ensuring that the team project work assessment explicitly documents and evaluates each student's leadership contribution rather than general participation, so that the PLO1 commitment to strategic team leadership is verifiably assessed rather than implied. The institution is encouraged to apply this level of alignment granularity consistently across all courses, using IT Project Management as an internal benchmark for constructive alignment quality, which can lead to formulation like “CLO, Assessment Method, Weight, Assessment Criteria / Performance Indicators: O1, **Case study analysis,** 25%, Student evaluates at least three agile frameworks against specific project parameters; analysis addresses applicability, risk, and team dynamics; conclusions are argued with reference to project characteristics rather than general assertions O2, **Project assignment:** methodology selection and justification, 25%, Student provides a structured justification of Scrum selection that explicitly compares Kanban, XP, and at least one hybrid approach; justification addresses team size, uncertainty level, stakeholder requirements, and delivery constraints O3, **Team project work**, 25%, Student demonstrates leadership in a team assignment; evaluation covers role definition, conflict management, progress monitoring, and adaptation to changed conditions; peer and self-assessment contribute to the grade O4, **Oral project defence**, 25%, Student evaluates project performance against planned scope, budget, and quality targets; identifies deviations; proposes and argues corrective measures with reference to methodology and stakeholder impact “.

The programme demonstrates clear awareness of **generic competences** at PLO level, with PLO1 and PLO2 explicitly committing to team leadership, project management, and professional cooperation. At course level, these competences are already visible in IT Project Management, the Final Project, and the Master's Thesis, which represents a sound and appropriate foundation. The institution is encouraged to strengthen vertical alignment by making generic and soft skill competences — particularly teamwork, ethical responsibility, and professional communication — explicitly visible as assessable CLOs in the remaining core project-based courses, especially PLC Systems, Internet of Things, and Cloud Computing, where these competences already occur implicitly through project assignments.

The Panel notes, however, a more fundamental structural concern regarding teamwork. No course in the programme includes a CLO explicitly targeting collaborative work or team leadership, and teamwork does not appear in the content or monitoring sections of any syllabus. The only references to team-based work appear in the assessment sections of IT Project Management, PLC Systems, IoT, and the Final Project, where the formulation "individually and/or in teams" renders team participation optional rather than required. This means a student may complete the entire programme without participating in a formally structured team assignment, which constitutes a clear vertical misalignment: PLOs LO1 and LO2 commit to graduate-level team leadership competences that the existing course structure cannot demonstrably deliver. The institution is encouraged to address this by designating at least two or three mandatory courses in which structured team-based work is a required and assessed learning activity, ensuring that team leadership competences are developed and verified in a structured and verifiable way across the programme.

Additionally, the programme currently offers only six elective courses in total — three in Semester II and three in Semester III — which, in practice, provides students with very limited curricular choice. The institution is encouraged to consider **gradually expanding the elective offer** in future programme versions to enhance flexibility and allow students to develop more personalised specialisation pathways within the industrial computing field.

Recommendations:

- The institution is encouraged to disaggregate compound CLO formulations into separate, focused outcomes, each targeting a single cognitive operation that can be independently mapped to a specific course activity and assessment instrument.
- The institution is advised to explicitly incorporate in future revisions the critical application of professional and technical knowledge, systematic design

methodology, and graduate-level professional communication as distinct and independently assessable dimensions of the Master's Thesis learning outcomes.

- The institution is counselled to make teamwork, ethical responsibility, and professional communication explicitly visible as independently assessable CLOs in core project-based courses where these competences already occur implicitly through project assignments.
- The institution needs to designate at least two or three mandatory courses in which structured team-based work is a required and assessed learning activity, replacing the current optional "individually and/or in teams" formulation with a mandatory team assignment to close the vertical misalignment between PLOs LO1 and LO2 and the existing course structure.
- The institution needs to gradually expand the elective course offer beyond the current six courses to provide students with meaningful elective choice and the opportunity to develop personalized specialization pathways within the industrial computing field.

Quality grade: **Partially fulfilled**

2.4. The study programme content allows students to achieve all the intended learning outcomes.

Analysis:

The amended programme effectively integrates both profession-specific knowledge and generic competences within a coherent and well-structured curriculum, ensuring that graduates acquire the full range of competences required at CroQF Level 7.1. The standardisation of course names, content descriptions, and learning outcome formulations in alignment with comparable programmes at other Croatian and European institutions strengthens the programme's position within the national and European higher education landscape and enhances the conditions for horizontal and vertical student mobility across the European Higher Education Area.

The revised programme provides clear evidence of alignment between course content and intended learning outcomes across all syllabi, reflecting a systematic and commendable approach to curriculum quality. The introduction of explicit CLO-to-PLO mapping tables, the consistent adoption of higher-order Bloom's taxonomy verbs appropriate to CroQF Level 7.1, but linking of each assessment method to specific learning

outcomes is not elaborated and can be improved, to demonstrate the institution's genuine commitment to constructive alignment as a core principle of programme design.

To fully consolidate this progress, the institution is encouraged to **formalise the CLO-to-PLO mapping as a dedicated and visible element within each syllabus,** so that the vertical alignment between course and programme level is immediately transparent to students, instructors, external evaluators, and future accreditation panels. Formalising this mapping as a mandatory structural element of the syllabus template would also provide a durable quality assurance mechanism, ensuring that alignment is maintained and verifiable as the programme evolves and individual syllabi are updated over time.

The major drawback of the amended study programme stems from the course content description of 12 courses (Object-Oriented Programming, Advanced Databases, IT Project Management, Industrial Computer Networks, IT Law and Intellectual Property, Cloud Computing, Applied Machine Learning, Advanced Web Application Development, Mobile Application Development, Cyber-Physical Systems, Embedded Computer Systems in Industry, PLC Systems). They all **repeat specific CLO in the content of the course**. For instance, course Applied Machine Learning (O3: "Implement and apply supervised and unsupervised learning algorithms on real datasets" / content: "Implementation and application of supervised and unsupervised learning algorithms on real datasets" — word-for-word). PLC Systems — O4 is verbatim: (CLO: "Integrate PLC systems with peripheral devices, sensors, actuators, and other control units using network communication protocols (e.g., EtherNet/IP, Modbus, Profinet)-Content: "Integration of PLCs with sensors, actuators, and frequency converters. Industrial communication protocols (Modbus, EtherNet/IP, Profinet)", etc.

The core disciplines for the acquisition of all professional competences are well represented. In the amended study programme the HEI has **enhanced and modernized the core disciplinary content** by incorporating the latest advancements in the field, thereby strengthening the acquisition of current professional competencies. Specifically, the institution has added emerging topics in Digital Twins, Additive Technologies, Cybersecurity, and Cyber-Physical Systems. The current syllabi already establish a clear connection between assessment methods and learning outcomes through the evaluation tables (section 1.8), and the assignment of percentage weights to each outcome reflects a genuine commitment to outcome-based assessment. This is a solid and well-structured foundation that compares favourably with common practice in Croatian higher education.

To further **enhance transparency for students and strengthen the overall coherence of the assessment framework**, the institution is encouraged to consider supplementing the existing tables with a brief explanatory note for each assessment activity — describing

not only what is assessed but what a student is expected to demonstrate in order to satisfy each outcome. This need not be elaborate; even a concise statement of the key performance criteria for each assignment would significantly improve the clarity and usability of the syllabus as a student-facing document, and would provide a more robust basis for consistent grading across different student cohorts and — where relevant — different mentors. Such an addition would also make the already evident alignment between learning, teaching, and assessment more visible and verifiable to external stakeholders, further consolidating the quality of the programme's constructive alignment framework.

A straightforward enhancement would be to add a **brief performance criteria statement alongside each assessment entry** — specifying not only what the student is required to do but what they must demonstrate to satisfy the outcome. To illustrate with one example: rather than stating that O3 in Applied Machine Learning is assessed through a *"project assignment — implementation of supervised and unsupervised learning algorithms"*, the enhanced entry would additionally specify that the student is expected to implement at least one supervised and one unsupervised algorithm, justify algorithmic selection with reference to data characteristics and problem requirements, validate results using appropriate evaluation metrics, and discuss the limitations of the solution in an industrial context. This level of specification need not be extensive — a one to two statements per outcome is sufficient — but it would meaningfully improve transparency for students, ensure consistency of grading across cohorts and mentors, and make the programme's already evident commitment to outcome-based assessment fully visible to external evaluators.

The HEI has adjusted the **logical progression and sequencing** of courses. Still there are several points where this can be improved. While the programme submission has addressed the most of **content overlaps** identified in the initial expert panel report, some residual overlaps remain due to insufficiently elaborated course content descriptions. A representative example is the pairing of User Interface Design and Mobile Application Development, both offered as electives in Semester II. The two syllabi share content in usability principles, interface layout, and user requirements analysis without any explicit statement differentiating the scope, depth, or platform-specific focus of each course's treatment. A student enrolling in both courses simultaneously would encounter the same conceptual ground twice without clarity on how the mobile-specific context of one course advances or extends the general UI design principles of the other. The institution is encouraged to resolve this by expanding the content descriptions of the affected courses to clearly delimit their respective scope and make the progression in treatment explicit or change the logical sequence of courses, with more specific content.

The course IT Law and Intellectual Property does not clearly specify the relevant legislation or regulatory frameworks in either the course content or the reading list. Key regulations such as the GDPR, NIS2 Directive, and DORA appear to be addressed within the Cybersecurity course, where they are well aligned with the course objectives. It would therefore be useful to clarify the specific focus and scope of the IT Law and Intellectual Property course. In particular, the programme should indicate which legal frameworks and areas of legislation (e.g., copyright law, intellectual property rights, AI regulation, digital services regulation, etc.) will be covered in this course.

The course Applied Machine Learning does not specify which machine learning methods will be covered in the supervised and unsupervised learning setup. It is therefore unclear what content will be included in the course. The course description should provide a more detailed outline of the main machine learning principles, including feature engineering, machine learning methods, and dimensionality reduction techniques, etc.

The Data Warehouse course prescribes exclusively data mining literature — Bechoo Lal B., *Introduction to Data Mining* (2025) as required reading, and Witten I.H., *Data Mining: Practical Machine Learning Tools and Techniques* (2025) as additional reading — neither of which adequately addresses the core subject matter of the course, including data warehouse architecture, dimensional modelling, ETL processes, and OLAP structures. The institution is encouraged to replace the current literature with titles specifically covering data warehousing concepts, ensuring that the prescribed reading is appropriately aligned with the course content and learning outcomes.

The revised programme demonstrates meaningful progress in the integration of generic competences, with soft skill development now addressed at a level appropriate to CroQF Level 7.1. The Thesis syllabus establishes a sound conceptual framework combining professional relevance and academic rigour; the core structure of independent problem definition, solution development, critical justification, empirical validation, and professional defence is appropriate for the qualification level, and the co-mentorship model with industry partners and the topic approval mechanism represent particularly strong provisions that substantively anchor the thesis to professional practice.

As directions for future development, the institution is encouraged to make **generic competences more explicitly visible as independently assessable outcomes within the thesis syllabus**. Competences such as collaboration with an industry partner, communication of results to professional stakeholders, and critical self-reflection on the limitations of the developed solution are currently embedded as subordinate qualifiers within the existing outcome formulations rather than stated as distinct assessable objectives — a refinement that would ensure soft skills are evaluated with the same

transparency and rigour as technical competences at Level 7.1. The industry-orientation framework would similarly benefit from **clearer specification of what constitutes a qualifying thesis topic and an adequate industrial validation environment**, and from an explicit statement of the mandatory or advisory role of industry co-mentorship, ensuring consistency and comparability across different thesis topics, mentors, and student cohorts and making the programme's already strong commitment to industrial relevance fully verifiable in future quality assurance reviews.

The revised programme submission demonstrates a strongly positive approach to **literature contemporaneity,** with the majority of required reading titles — 14 out of 26 courses with a fixed publication year — dating from 2023 onwards, and the additional reading skewing even more heavily toward 2025–2026. This reflects a genuine and commendable commitment to ensuring that students engage with contemporary professional and technical literature appropriate to a rapidly evolving field.

Recommendations:

- The institution is encouraged to continue aligning course names, content descriptions, and learning outcome formulations with comparable programmes at Croatian and European institutions, further strengthening student mobility conditions and consolidating the programme's position within the European Higher Education Area.
- The institution is advised to revise the formalisation the CLO-to-PLO mapping as a mandatory and visible structural element within each syllabus template, and to supplement existing assessment tables with explicit performance criteria linking each assessment instrument to specific learning outcomes, ensuring that the constructive alignment framework is consistently applied, transparently documented, and verifiable across all courses and future programme iterations, in the future study programme revisions.
- The institution needs to revise the content descriptions of all affected course syllabi to ensure that section 1.4 describes the topics, methods, tools, and standards through which each CLO is achieved, rather than restating the CLO itself in nominalized form, in the future study programme revisions.
- In the future, the HEI is advised to supplement each assessment table entry with a concise performance criteria statement specifying what a student must demonstrate to satisfy each outcome.
- The institution needs to resolve residual content overlaps — particularly between User Interface Design and Mobile Application Development — by expanding course content descriptions to explicitly delimit the scope and progression of treatment in each course.

- The HEI is counselled to clarify the specific legislative and regulatory focus of the IT Law and Intellectual Property course, explicitly identifying the legal frameworks covered and distinguishing its scope from the regulatory content addressed in the Cybersecurity course.
- The HEI is suggested to expand the Applied Machine Learning course content description to specify the machine learning methods covered, including supervised and unsupervised learning approaches, feature engineering, and dimensionality reduction techniques.
- The institution needs to replace the current Data Warehouse literature with titles specifically addressing data warehouse architecture, dimensional modelling, ETL processes, and OLAP structures.
- The institution is advised to make generic competences — particularly industry collaboration, professional communication, and critical self-reflection — explicitly visible as independently assessable outcomes in the Thesis syllabus, and to specify minimum criteria for qualifying thesis topics and the role of industry co-mentorship.

Quality grade: **Partially fulfilled**

2.5. ECTS distribution is aligned with the anticipated actual student workload.

Analysis:

The HEI has allocated ECTS credits to every course within the proposed study programme in accordance with the rules and recommendations established in the European Higher Education Area (EHEA). The HEI defines 1 ECTS credit as corresponding to 25–30 hours of total student workload, resulting in an average of 1,500 to 1,800 hours per academic year for the 60 ECTS required. The allocation covers all forms of planned learning activities, including lectures, laboratory exercises, independent research, and preparation for examinations.

Mechanisms for monitoring and adjusting ECTS credits are integrated into the institution's Quality Assurance System (QAS), primarily through anonymous student surveys conducted twice per academic year. Documentation from previous re-accreditations confirms that the HEI has a history of correcting ECTS values when discrepancies between anticipated and actual workload are identified.

However, the Expert Panel noted that while the total ECTS for each course is defined, the current programme documentation **lacks a comprehensive breakdown of workload for individual courses**. Specifically, there is a need to detail the exact distribution of hours between contact time (lectures, seminars, exercises) and various independent activities (e.g., preparation for laboratory tasks, independent project work, and exam study) that contribute to each credit assignment. It is recommended that the programme documentation include a comprehensive breakdown of ECTS credit allocation for every element of the study programme, detailing the total student workload and all planned learning activities that contribute to each credit assignment.

Additionally, while students are generally satisfied with the credit distribution, they are often **unfamiliar with the results of workload surveys or the specific corrective actions taken by the management**. To ensure full transparency and student engagement, the HEI must move beyond data collection and formally communicate the results of workload monitoring to the student body. Finally, the HEI should pay particular attention to students required to take up to 25 ECTS of differential courses in their first year to ensure their total annual workload remains feasible and does not lead to burnout.

Recommendations:

- It is recommended that the programme documentation (syllabi) include a **comprehensive breakdown of ECTS credit allocation** for every element of the study programme, detailing the total student workload and all planned learning activities (contact hours vs. independent work) that contribute to each credit assignment.
- Establish a formal mechanism to inform students of the **results of ECTS/workload satisfaction surveys and clearly communicate any adjustments** made to the programme as a result of their feedback.
- Implement specific **monitoring for students enrolled in differential courses** (25 ECTS) during their first year to verify that their combined graduate and differential workload is manageable.
- Ensure that the weight of final examinations is consistently reflected in the ECTS breakdown across all course syllabi to maintain grading and workload objectivity.

Quality grade: **Fulfilled**

2.6. Student/professional practice is an integral part of the study programme (if applicable).

Analysis:

Student/professional practice is an integral component of the study programme and is organized primarily through cooperation with industrial partners. Specifically, the HEI has planned to implement this practice in the form of a 30 ECTS Master's Thesis in the final semester, which is designed as an industry-oriented, applied project. This project aims to link theoretical knowledge with practical industrial needs, allowing students to engage with real-world problems under the guidance of mentors.

However, the Expert Panel identified **several areas requiring further formalization to ensure this model meets graduate-level standards**. While the HEI provides evidence of existing cooperation with the business sector, the Thesis requires more robust evidence of an applied, industry-oriented structured project with joint supervision provided by both an industrial and an academic supervisor. The Thesis (including the professional practice component) is allocated an appropriate number of ECTS credits, but it should be justified by demonstrating that this distribution is sufficient to achieve the full range of professional competencies and meet the requirements of professional qualification in the field.

The mechanisms for **ensuring systematic and high-quality thesis content** aligned with overall quality standards require further elaboration, particularly given that the thesis is largely dependent on the industrial partner's involvement. Therefore, a **formal co-mentorship structure is essential,** where an internal faculty member ensures the academic quality and standardization of work while an industrial mentor provides professional guidance. This approach will help guarantee the achievement of intended learning outcomes and maintain consistency across all student theses.

Furthermore, the **relationship** between the third-semester course "Project in Applied Industrial Computing" and the final "Thesis" must be more clearly defined to avoid content overlap and to ensure that the project work successfully prepares the student for the thesis.

Finally, the HEI must also ensure it moves beyond a reliance on students finding their own placements by establishing and documenting formal cooperation agreements with companies to guarantee the availability of high-quality project topics.

Recommendations:

- The Master's Thesis evaluation and grading criteria should be strengthened through the implementation of a **structured co-mentorship model** involving both industrial and internal faculty supervisors. This approach will help ensure that all these meet the high standards expected at the graduate level.
- The HEI should establish clear mechanisms to ensure **systematic oversight and maintain consistently high quality in thesis work**, aligned with overall institutional quality standards for graduate-level academic work.
- Explicitly update the programme documentation to clarify the **prerequisites for Master's Thesis enrolment**, specifically stating if all courses through the 3rd semester must be successfully completed.
- Provide a comprehensive explanation demonstrating how the proposed student practice component and its distribution throughout the programme are **sufficient to achieve the full range of intended student competencies** and satisfy the requirements for professional qualification in the field.
- It is advisable to establish a more formal procedure for signing **cooperation agreements with industrial partners** specifically for the Master's Thesis projects to ensure systematic oversight and institutional responsibility for placement quality.
- Clearly define the **differentiation between the "Project in Applied Industrial Computing"** (Semester 3) **and the "Master's Thesis"** (Semester 4) to ensure a logical progression of complexity and to prevent the simple repetition of tasks.

Quality grade: **Partially fulfilled**

2.7. If the completion of the study programme allows students access to a regulated profession, the programme is aligned with national and European regulations and the recommendations of national and international professional associations.

Analysis:

The proposed study programme in Applied Industrial Computing does not lead to a regulated profession in the Republic of Croatia. Therefore, it is not subject to the specific EU directives or national acts governing such professions. The HEI nonetheless ensures that the programme is designed to make graduates competitive in both national and international labour markets within the general engineering sector.

Recommendations:

- Maintain continuous dialogue with professional associations and industry leaders to ensure the programme's outcomes remain relevant to non-regulated engineering standards.

Quality grade: **Not applicable**

III. Teaching process and student support

3.1. Admission requirements and criteria as well as the admissions procedure are clearly defined and transparent, and guarantee that students will possess the necessary prior knowledge.

Analysis:

The HEI has established clear, comprehensive rules governing the admission process for the professional graduate study programme Applied Industrial Computing, detailed in the Study Regulations and aligned with the Act on Higher Education and Scientific Activity, the Statute, and other general acts of the UAS. Transparency is ensured through a public call for enrolment published on the University's website, which specifies available places, entry requirements, deadlines, and required documentation.

The admission criteria are designed to ensure that students have the necessary prior knowledge for the STEM field. Candidates who have completed a professional undergraduate programme in a technical field, specifically the professional undergraduate study programme in Computing degree, are eligible for enrolment without additional requirements. Candidates from other technical fields or information sciences (within the area of social sciences) are eligible, provided they pass four differential courses totalling 25 ECTS credits (Programming, Algorithms and Data Structures, Databases I, and Computer Networks) during their first year of study. Candidates from unrelated disciplines are required to complete an undergraduate programme in Computer Engineering prior to enrolment to ensure a proper academic foundation.

The HEI has also implemented a functional system for the recognition of prior learning, governed by the Study Regulations and the Decision on Conditions for Transfer and Enrolment of Students from Other Higher Education Institutions documents. Transfer students may be exempt from certain obligations if their previous coursework has at least 70% content overlap with the corresponding courses in the programme.

The planned enrolment quota of 20 full-time and 20 part-time students is part of a consistent strategic plan that considers both institutional capacity (facilities, equipment, and staff) and labour market demands.

The Expert Panel found that the criteria for admission are consistently applied and effectively ensure the selection of candidates with appropriate prior knowledge. All

information related to enrolment is and will be easily accessible via the HEI's Student Affairs Office and online.

Recommendations:

- Ensure that the differential course workload and time are managed carefully within the first year, particularly considering the study-work balance of part-time students, as 25 ECTS credits may be added to the standard 60 ECTS graduate workload.
- Clearly communicate the recognition of prior work experience in admission decisions, particularly for part-time students, as well as incentives related to competitions, and formalize the evaluation process for such experience.
- Maintain the high level of transparency by ensuring that all differential obligations are clearly communicated to applicants in advance, before the start of the academic year.

Quality grade: **Fulfilled**

3.2. The planned teaching methods guarantee student-centred teaching and the achievement of all intended learning outcomes.

Analysis:

The HEI has planned its teaching methods based on the fundamental principles of student-centeredness, interactivity, and the achievement of intended learning outcomes. The professional graduate study programme in Applied Industrial Computing is designed for on-site delivery using a variety of instructional modes, including lectures, projects, laboratory exercises, and mentored work. These methods are designed to encourage active learning, in which teachers facilitate discussions and problem-solving by applying knowledge to real-world examples.

Various teaching methods have been planned to foster interactive, research-based learning. A core component of the curriculum is problem-based learning, which requires students to solve challenges that promote critical thinking and deepen their understanding of STEM. Students engage in individual or team projects, such as the Project in Applied Industrial Computing, that must link theoretical knowledge to practical industrial needs. These activities are intended to build independence and responsibility, particularly through the final semesters, where students transition from broad field concepts to specialized depth. The Expert Panel notes that, for graduate-level study, it is critical to ensure that teaching methods and project tasks focus on higher-level

competencies such as architectural decision-making and strategic optimization, rather than on the implementation tasks typical of undergraduate programmes.

The planned teaching methods are adapted to a diverse student population. The HEI uses various techniques and materials to address different learning styles and provides adapted approaches for students with disabilities. This includes physical accommodation, such as access ramps and adapted sanitary facilities, as well as digital support for recording specific learning difficulties and providing individualized accommodations. Furthermore, the HEI sometimes organizes workshops and counselling to support vulnerable groups and non-traditional students.

To avoid overloading students, the student workload is distributed appropriately throughout the semester, in accordance with the EHEA standard, where 1 ECTS credit corresponds to 25–30 hours of work, totalling 60 ECTS per academic year. The Annual Implementation Plan defines the course schedule to ensure a balanced workload for both students and teachers, while also considering available laboratory and IT resources.

The use of advanced technologies should be a cornerstone of this programme. The HEI provides IT laboratories equipped with appropriate hardware (including VR and 3D printers) and uses the LMS Merlin platform and Microsoft tools to support collaborative learning. To ensure teaching staff can use these tools effectively, the HEI plans workshops on andragogical competencies and didactics, but there could be a need for more structured professional support to help teachers adapt their methodologies to the diverse needs of students, including those with disabilities and part-time learners.

Finally, mechanisms for assessment and adjustment are integrated into the quality assurance system. The HEI monitors teaching quality through anonymous student surveys twice per year and through the Vice-Dean for Education, who participates in classes to assess methodological approaches and student interaction. The HEI should focus more on continuous improvement, make students familiar with survey results, and inform them of the specific corrective actions management has taken in response to their feedback. Feedback from these surveys and peer reviews must be used to formally discuss and adjust teaching methods to ensure they remain effective and aligned with student needs.

Recommendations:

- Ensure that project-based learning at the graduate level is explicitly designed for CroQF Level 7.1 complexity and clearly differentiated from undergraduate by

focusing more on advanced competencies such as architectural decision-making, optimization, and strategic responsibility.

- Implement a formal policy on the use of generative artificial intelligence (Gen AI) within the teaching and learning process to ensure its ethical and effective integration into student assignments and research.
- Provide structured professional support to teachers to further improve their competencies in adjusting teaching methods and materials, beyond technical tool training, particularly to address the specific needs of students with disabilities.
- Establish a formal mechanism to inform students of the results of satisfaction surveys and the specific actions and improvements taken in response to their suggestions.

Quality grade: **Fulfilled**

3.3. The higher education institution has provided evidence that adequate support will be ensured for future students.

Analysis:

The HEI has established a support system to ensure that future students receive guidance on academic progress and career opportunities, including a tutor system and a Career Development Centre. Teaching staff are assigned to specific study programmes to advise students on resolving issues and fulfilling obligations. Tutors meet with students at the start of the academic year to assist in planning and early problem detection. Furthermore, all teachers post consultation schedules online for individual guidance.

Career guidance is available through the Career Development Centre, which serves as an intermediary between students, alumni, and employers. The Centre is tasked with educating students on market trends, career planning, and the development of management skills, often in cooperation with the Croatian Employment Service, but its service must be fully functional in practice. Student interests are further protected by the Student Union, whose representatives participate in institutional decision-making.

The HEI has procedures for psychological and health support through a partnership with the Public Health Institute of Međimurje County, including medical check-ups, mental health workshops, and psychosocial treatment, which students can access individually and often without a referral. There is a noted lack of awareness among the student body regarding available psychological and health support, suggesting that these services

must be more actively promoted. Legal support and information on rights are provided through specialized brochures, and students should also be better informed about disciplinary processes and appeal procedures.

For students with disabilities, physical accessibility is supported via ramps and elevators, adapted dormitory rooms, and specialized equipment. A dedicated Support Officer for Students with Disabilities coordinates individualized accommodation and informs teaching staff of necessary adjustments. Regarding international mobility, the HEI holds the Erasmus+ Charter (2021–2027) and provides support via an Erasmus Coordinator and the Student Buddies programme, which helps foreign students adapt to life in Čakovec. Professional service units offer extended hours only one day per week to accommodate students with work obligations, and the library's working hours could be adjusted to better accommodate part-time students, who may require access outside of standard working hours.

The HEI ensures an adequate number of staff, currently employing 15 professional, administrative, and technical staff members across its functional units. These offices are well-equipped and appropriately sized for institutional operations. Additionally, the Student Dormitory Čakovec provides 39 beds and a student restaurant, ensuring high standards for student living. Since the programme is primarily delivered in Croatian, international mobility requires additional English-language support to effectively assist incoming students.

Recommendations:

- Implement more effective communication and information channels to ensure all students are fully aware of the full range of available support services, including disciplinary processes and appeal procedures.
- Clearly and publicly communicate the formal procedures for student career guidance, as well as the specific pathways for obtaining psychological and legal counselling and support for students with disabilities.
- Strengthen support for both incoming and outgoing mobility by increasing the availability of information (online) and administrative assistance in English.
- The Career Development Centre should develop a more active presence on the website to present its services, providing more up-to-date career resources and success stories to better engage students.
- Adjust all administrative services and library working hours to ensure better access for all part-time students.

Quality grade: **Fulfilled**

3.4. Objective and consistent evaluation and assessment of student achievements are planned so as to ensure the achievement of all intended learning outcomes.

Analysis:

The HEI has planned a transparent assessment system in which the criteria and methods for evaluation are defined in course syllabi and published on the website before the academic year begins. Transparency is further reinforced during introductory lectures, where teachers should inform students about expected learning outcomes, assessment tasks, deadlines, and the weight of each component in the final grade. The evaluation methods, including active learning, seminar papers, colloquia, and final exams, are aligned with each course's characteristics.

The HEI's assessment model requires students to achieve at least 50% of the available points for each learning outcome to pass a course, ensuring that the acquisition of specific competencies is not bypassed by high performance in unrelated areas. Continuous monitoring is facilitated through the Merlin system, and written exam results are supposed to be published within five working days, while oral results are communicated immediately.

The planned procedures effectively account for the special circumstances of students with disabilities. The Support Officer for Students with Disabilities informs teaching staff of specific needs, enabling modifications to examination procedures (e.g., extended time or adapted formats) while ensuring that the intended learning outcomes are met.

To guarantee impartiality and objectivity, exams are typically conducted publicly in the presence of multiple students. The HEI also monitors assessment of quality through the Vice-Dean for Education, who participates in classes to evaluate the teacher's methodological approach. A formal appeals procedure allows students to request reassessment before a committee. It must also be ensured that students are not required to retake learning outcomes they have already passed if they have failed other parts of the course.

The revised programme demonstrates clear progress on thesis evaluation and grading criteria. The thesis learning outcomes (O1–O5) are formulated, the five-component assessment framework covers the expected dimensions of graduate-level thesis work, and the quality assurance mechanism provides a structured description of mentoring, co-mentorship, and topic approval procedures.

Finally, while some mapping exists, the **link between specific assignments and individual learning outcomes should be more explicitly documented** in all syllabi to assist in constructive alignment as elaborated in standard 2 (2.3. and 2.4).

Recommendations:

- In accordance with the requirements for constructive alignment, update all syllabi to include an explicit mapping of specific examinations and assignments to demonstration of course-level learning outcomes.
- Ensure that students are not required to re-examine learning outcomes they have already successfully passed.
- Consider implementing assessment rubrics and sharing them with students for all assignments, and particularly project-based assignments, to further enhance grading consistency across different teachers.
- Ensure that the student evaluations are used in combination with pass-rate analyses to formally adjust assessment practices for courses with consistently low success rates.
- Implement more effective communication to ensure that all students are fully aware of the disciplinary process, appeal procedures, and available support services through multiple institutional channels.

Quality grade: **Partially fulfilled**

IV. Teaching resources and infrastructure

4.1. The higher education institution has ensured adequate teaching capacities to deliver the study programme and achieve the intended learning outcomes. - (Table 3, Table 4, Table 5)

Analysis:

The higher education institution maintains an adequate number of full-time teaching staff employed on indefinite-term contracts. The institution currently employs 20.5 full-time teaching personnel, of whom 9 will be directly engaged in delivering the professional graduate study programme in Applied Industrial Computing. More specifically, 9 of the 16 teachers assigned to this programme hold full-time positions at the institution.

The cumulative teaching load undertaken by employed staff amounts to 780 contact hours, representing approximately 59% of the programme's total direct instructional workload. An additional 8 external associates will deliver 540 contact hours. Consequently, employed teachers cover 59% of the total teaching commitment (789 of 1,329 contact hours).

The ratio between the total number of enrolled students and the total number of full-time teachers and those with nominal teaching titles does not exceed the ratio 30:1- 9:1 ratio is reported in Table 3. Notably, the annual teaching load for individual teachers remains well within acceptable limits, not exceeding 20% of the standard annual teaching obligation.

While the quantitative staffing indicators are satisfactory, there is room for improvement in the qualifications profile of the teaching staff. As indicated in Table 5, there is notably limited research and professional publication activity, both in terms of the number of publications over the past five years and citation metrics. Furthermore, the majority of teachers currently hold the titles of lecturer or senior lecturer. For effective delivery of a graduate-level programme, it would be advisable for the institution to enhance this profile, either by supporting current staff in pursuing additional academic qualifications or by recruiting highly qualified personnel with specialized expertise in applied industrial computing.

Recommendations:

- It is recommended that teaching staff significantly enhance their research and professional activity, primarily through increased publication output in relevant academic and professional venues. This will ensure that instructors remain

current with emerging trends and advancements in both professional practice and scientific research within the field.

- The institution is encouraged to develop a strategic staffing plan that includes the recruitment of new faculty members with advanced qualifications and specialized expertise in industrial computing. Concurrently, the institution should establish supportive measures and incentives to encourage current teaching staff to pursue further academic education and professional development, thereby strengthening the overall qualifications profile of the programme team.

Quality grade: **Partially Fulfilled**

4.2. The qualifications and professional experience of external associates are appropriate for the delivery of the study programme and the achievement of the intended learning outcomes. (Table 5)

Analysis:

The external associates engaged in this study programme bring valuable professional experience in industrial computing. Specifically, 5 are currently employed in industry, while 3 hold positions at other educational institutions. However, Table 5 indicates that no publications or citations have been reported for external associates over the 5 years period, which suggests limited engagement in research or professional publishing activities. While the external associates from industry effectively integrate current professional expertise from the labour market into the teaching process, there appears to be a gap in engagement with the latest research developments. Notably, Table 5 reports no professional or scientific publications within the past five years, and the proposed literature for certain courses appears to be outdated.

Written statements have been provided by each external associate confirming their commitment to teaching responsibilities, accompanied by supporting statements from the institutional heads of the two educational institutions where external teachers are employed.

The institution's Regulations on Final and Graduate Theses (Pravilnik o završnom i diplomskom radu) permit external associates to participate in the supervision of final and graduation theses. However, to ensure consistent quality standards across student work, it would be advisable to implement a co-mentoring model whereby external associates collaborate with internal faculty members in thesis supervision, rather than supervising independently.

The institution commendably encourages the organization of student professional practice placements at external partner companies and institutions. Furthermore, portions of the teaching curriculum may be delivered at companies that collaborate in the implementation of professional practice activities.

According to Table 5, external associates have not participated in internal or external training programmes focused on pedagogical competencies (0 reported instances). Moving forward, it would be beneficial for the institution to encourage and facilitate opportunities for external associates to develop their teaching competencies through formal training.

Recommendations:

- It is recommended that external associates strengthen their professional and research capacity through increased engagement in publishing activities, including both scientific and professional publications, to ensure their contributions reflect current developments in the field.
- The institution should provide opportunities for external associates to participate in formal training programmes focused on developing pedagogical competencies, thereby enhancing the quality of instruction and supporting effective teaching practices.
- The institution is encouraged to establish a formalized co-mentoring (by both internal faculty members and industrial associates) framework and clear procedural guidelines for thesis supervision.

Quality grade: **Partially fulfilled**

4.3. The premises, equipment and entire infrastructure (classrooms, laboratories, library, etc.) are appropriate for the delivery of the study programme and ensure the achievement of the intended learning outcomes. – (Table 6)

Analysis:

The higher education institution exceeds the minimum requirement of 1 m^2 of space per student. Specifically, the institution maintains a total of 2,442 m^2 of space, of which 1,303 m^2 are dedicated to classrooms, laboratories/practical rooms, and IT lecture rooms. When divided by the total projected student enrolment (510 students), this yields a ratio of 4.78 m^2 per student (or 2.55 m^2 per student when considering only instructional spaces), significantly surpassing the regulatory minimum.

The institutional premises, equipment, and infrastructure are well-equipped to support the programme's needs, including 190 PC computers, specialized software and hardware for a virtual reality laboratory, and access to state-of-the-art 3D printing and additive manufacturing equipment available through the Metal Centre Čakovec.

The facilities and infrastructure are well-suited for the realization of professional and scientific research activities. The premises have been recently renovated, and the institution retains capacity for further expansion should future needs arise. The strategic co-location on campus with the Metal Centre Čakovec and the Technology and Innovation Center of Međimurje facilitates close collaboration and creates valuable opportunities for institutional advancement.

The institution has ensured adequate provision of computing resources for students, including comprehensive wireless internet access throughout all student-accessible areas. Additionally, students benefit from access to dedicated learning space in the library, which operates on a 24-hour basis.

Recommendations: None

Quality grade: **Fulfilled**

4.4. The library premises and resources, as well as access to additional services ensure the availability of literature and library services for the delivery of the study programme. – (Table 7)

Analysis:

The library maintains a collection of 7,228 books and 2,854 textbooks, along with several electronic and print journals. However, a portion of the literature supporting the study programme would benefit from updating to reflect current developments in the field. It is recommended that the institution prioritize the acquisition of recent textbooks and consider expanding access to digital study materials, particularly resources available in English, to enhance the relevance of available learning materials.

Students and teaching staff engaged in the proposed study programme have comprehensive access to ICT resources, including wireless network connectivity and library materials. Users benefit from online access to national databases provided through national licensing agreements. Additionally, students can access the eduroam wireless network using their AAI@EduHr credentials, facilitating seamless connectivity across participating institutions.

The library premises and resources, including additional resources, meet the conditions for a high quality of study in accordance with, among other things, the conditions stipulated by the Standard for Higher Education, University and Scientific Libraries (Official Gazette, 81/22).

Recommendations:

- The library should develop a systematic acquisition plan to ensure that the required literature specified in course syllabi is available and up-to-date.
- The institution is encouraged to secure subscriptions to digital library platforms and databases that provide access to current literature and resources, including English-language materials.
- It is recommended that the institution review and adjust the operating hours of administrative services and the library to better accommodate the needs of part-time students, ensuring equitable access to essential support services and learning resources for all student populations.

Quality grade: **Fulfilled**

4.5. The higher education institution ensures the availability of the necessary financial resources to organise the activities and quality delivery of the proposed study programme. – (Table 8)

Analysis:

The institution has secured adequate financial resources to support the delivery of the study programme. As a public higher education institution, financial projections have been prepared that account for tuition income from multiple sources: expected revenue from the Ministry's subsidy allocation per year of study has been calculated, and for the proposed quota of 20 part-time students, projected annual tuition revenue has been estimated accordingly.

Recommendations: None

Quality grade: **Fulfilled**

☐ **AMEND THE STUDY PROGRAMME**

OPINION OF THE EXPERT PANEL AFTER PROGRAMME AMENDMENTS

Following submission of the amended documentation of the professional graduate study programme Applied Industrial Computing, the Expert Panel reviewed the revised programme and documentation and reached its final recommendation. The Panel had initially identified 16 specific requests for amendment across Standards 1.1 (1), 1.3 (1), 2.2 (3), 2.3 (4), 2.4 (6), and 3.4 (1).

The amended submission successfully addresses the majority of the requested improvements, demonstrating the institution's genuine commitment to programme quality and its constructive responsiveness to expert evaluation. The Panel has nonetheless identified a number of further points for improvement, extensively elaborated in the analysis of each standard and summarised below as recommendations for future action. The scope, sequencing, and pace of implementing these recommendations remain at the institution's discretion, in accordance with its own feasibility assessments, institutional timelines, and strategic priorities for the ongoing development of this programme.

FINAL RECOMMENDATION OF THE EXPERT PANEL MEMBERS:

a. [X] **ISSUE A LICENSE, rationale:**

The Expert Panel **recommends issuing a license** for the Applied Industrial Computing programme as it fulfils all critical accreditation requirements. The programme addresses a strategic STEM shortage in northwestern Croatia through a unique focus on applied industrial computing, filling a specific gap in the labour market. Substantive amendments have elevated learning outcomes to CroQF Level 7.1, implemented constructive alignment across all syllabi, modernized course content and inclusion of contemporary literature. The programme is anchored by a 30 ECTS Thesis, which utilizes a formalized academic-industrial co-mentorship model. While the Panel has identified a number of issues for future improvement, the amended submission demonstrates a genuine and commendable commitment to study programme quality and satisfies the requirements for the commencement of the programme. The Expert Panel asses that the institution is prepared to deliver the study programme.

b. ☐ **DENY THE REQUEST FOR ISSUING A LICENSE, rationale:**

ANNEXES

1. Quality grade summary - tables

Quality grade by assessment area			
Assessment area	Not fulfilled	Partially fulfilled	Fulfilled
I. Internal quality assurance			X
II. Study programme		X	
III. Teaching process and student support			X
IV. Teaching resources and infrastructure			X

Quality grade by standard			
I. Internal quality assurance	Not fulfilled	Partially fulfilled	Fulfilled
1.1. Clear justification for the introduction of the new study programme has been provided with regard to the mission and strategic goals of the higher education institution, as well as economic and societal needs.			X
1.2. The study programme has undergone an appropriate internal quality assurance process and has been formally approved by the higher education institution.			X
1.3. The higher education institution will collect, analyse and use relevant data for the effective management and continuous enhancement of the study programme in accordance with the published quality assurance policy.			X
1.4. The higher education institution informs the public about the study programmes it offers, as well as plans to offer new programmes, i.e. changes made to existing ones.		X	

Quality grade by standard			
II. Study programme	Not fulfilled	Partially fulfilled	Fulfilled
2.1. The proposed study programme is compatible with the qualification standard in the Croatian Qualifications Framework Register.			Not applicable
2.2. The intended learning outcomes at the level of the study programme are aligned with the competences a student should gain by completing the study programme, as well as with the CroQF and EQF level.		X	
2.3. The intended course outcomes are aligned with the intended learning outcomes at the level of the study programme.		X	
2.4. The study programme content allows students to achieve all the intended learning outcomes.		X	
2.5. ECTS distribution is aligned with the anticipated actual student workload.			X
2.6. Student/professional practice is an integral part of the study programme (if applicable).		X	
2.7. If the completion of the study programme allows students access to a regulated profession, the programme is aligned with national and European regulations and the recommendations of national and international professional associations.			Not applicable

Quality grade by standard			
III. Teaching process and student support	Not fulfilled	Partially fulfilled	Fulfilled
3.1. Admission requirements and criteria as well as the admissions procedure are clearly defined and transparent, and guarantee that students will possess the necessary prior knowledge.			X
3.2. The planned teaching methods guarantee student-centred teaching and the achievement of all intended learning outcomes.			X
3.3. The higher education institution has provided evidence that adequate support will be ensured for future students.			X
3.4. Objective and consistent evaluation and assessment of student achievements are planned so as to ensure the achievement of all intended learning outcomes.		X	

Quality grade by standard			
IV. Teaching resources and infrastructure	Not fulfilled	Partially fulfilled	Fulfilled
4.1. The higher education institution has ensured adequate teaching capacities to deliver the study programme and achieve the intended learning outcomes.		X	
4.2. The qualifications and professional experience of external associates are appropriate for the delivery of the study programme and the achievement of the intended learning outcomes.		X	
4.3. The premises, equipment and entire infrastructure (classrooms, laboratories, library, etc.) are appropriate for the delivery of the study programme and ensure the achievement of the intended learning outcomes.			X
4.4. The library premises and resources, as well as access to additional services ensure the availability of literature and library services for the delivery of the study programme.			X
4.5. The higher education institution ensures the availability of the necessary financial resources to organise the activities and quality delivery of the proposed study programme.			X

2. Site-visit Protocol

	Srijeda, 21. siječnja 2026.	Wednesday, 21 January 2026
10:00 - 10:45	Sastanak s Upravom Veleučilišta *(bez prezentacije)*	Meeting with the Management of HEI *(no presentation)*
10:45 - 10:50	Pauza	Break
10:50 - 11:50	Sastanak s voditeljem studijskog programa	Meeting with the Head of the study programme
11:50 - 12:00	Pauza	Break
12:00 - 12:45	Sastanak sa studentima stručnog prijediplomskog studija Računarstvo	Meeting with students of the professional undergraduate study Computer Science
12:45 – 13:00	Pauza	Break
13:00 – 14:00	Sastanak s nastavnicima koji će biti angažirani na studijskom programu *(u stalnom radnom odnosu - nisu na rukovodećim mjestima)* i vanjskim suradnicima	Meeting with teachers *(full time employed - except those in managerial positions*) and external associates
14:00 - 15:30	Radni ručak	Working lunch
15:30 - 16:30	Obilazak Veleučilišta *(knjižnica, učionice, informatičke učionice, laboratoriji/praktikumi, ured za studente)*	Tour of the HEI *(library, classrooms, computer classrooms, laboratories/practicums, Office for students)*
16:30 - 17:15	Sastanak s vanjskim dionicima - predstavnicima strukovnih i profesionalnih udruženja, poslovna zajednica, poslodavci, stručnjaci iz prakse, organizacijama civilnog društva	Meeting with external stakeholders - representatives of professional organisations, business sector/industry sector, professional experts, non-governmental organisations
17:15 - 17:30	Organizacija dodatnog sastanka o otvorenim pitanjima, prema potrebi	Organisation of additional meeting on open questions, if needed
17:30 - 17:50	Interni sastanak članova stručnog povjerenstva – priprema za završni sastanak	Internal meeting of the panel members – preparation for the exit meeting

17:50 - 18:00	Završni sastanak s Upravom Veleučilišta	Exit meeting with the Management of HEI