



**REPORT
OF THE EXPERT PANEL
IN THE PROCEDURE OF INITIAL ACCREDITATION OF
PROFESSIONAL UNDERGRADUATE STUDY PROGRAMME IN
MECHATRONICS
BJELOVAR UNIVERSITY OF APPLIED SCIENCES**

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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 initial accreditation of study programmes, a procedure 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 Undergraduate Study Programme in Mechatronics at the Bjelovar University of Applied Sciences.

Members of the Expert Panel:

1. Assoc. Prof. Borut Werber, PhD, University of Maribor, Faculty of Organizational Sciences, Republic of Slovenia, Chair,
2. Prof. Ivica Botički, PhD, University of Zagreb, Faculty of Electrical Engineering and Computing, Republic of Croatia,
3. Assoc. Prof. Alen Jakupović, PhD, prof. prof. stud. with tenure, University of Applied Sciences of Rijeka, Republic of Croatia,
4. Assis. Prof. Mladen Bošnjaković, PhD, University of Slavonski Brod, Republic of Croatia,
5. Tena Šnajdar, student, Karlovac 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 who will participate in the delivery of the study programme,
- Students,
- External associates,
- Representatives of the business sector, potential employers.

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



The Expert Panel drafted this Report on the initial accreditation of the study programme Professional Undergraduate Study Programme in Mechatronics of Bjelovar University of Applied Sciences based on the Proposal of the Study Programme Professional Undergraduate Study Programme Mechatronics of Bjelovar University of Applied Sciences, other relevant documents and the site visit.

The Report contains the following elements:

- Basic information on the study programme;
- Detailed analysis of each quality standard, recommendations for improvement and quality grade for each standard,
- Final recommendation of Expert Panel members,
- 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 higher education institution Bjelovar University of Applied Sciences, and writing of the Report, the Expert Panel was supported by:

- Frano Pavić, coordinator, ASHE,
- Maja Šegvić, coordinator, ASHE.



BASIC INFORMATION ON THE STUDY PROGRAMME

Title, seat and OIB (Personal Identification Number) of higher education institution:
Bjelovar University of Applied Sciences, PIN: 16575582886

Title and type of study programme: Professional Undergraduate Study Programme
Mechatronics

CroQF/EQF/QF-EHEA level: 6.st/6/First Cycle

Scientific or artistic area and field of study programme: Area: Technical sciences, Field:
Electrical engineering

ISCED FoET classification: 0714

Programme duration: 3 years

Number of ECTS credits acquired on the completion of study programme: 180

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): prvostupnik/prvostupnica (baccalaureus/baccalaurea) inženjer/inženjerka
mehatronike

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): Bjelovar

Method of delivery of the study programme: In person

Admissions quota (for full-time and part-time students): 30 full-time students

Academic year in which the study programme delivery is to commence: 2024/2025

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

THE EXPERT PANEL'S RECOMMENDATION TO THE AGENCY'S ACCREDITATION
COUNCIL



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 Expert Panel confirms that clear justification for the introduction of new study programme has been provided. This decision is based on the analysis of the study programme proposal, documentation provided and the discussions with the HEI's management. The initial idea for a new study programme was a result of the processes of the Internal Quality Assurance System of Bjelovar University of Applied Sciences (BUAS). Internal Quality Assurance System is well established. Activities such as non-required audits are continuously performed, self-evaluation process is well-established, and several external stakeholders are actively taking part in various management bodies contributing with specific expertise.

The HEI's development and improvement is based on the BUAS Strategy for the period from 2023 to 2027. Introduction of the new (changed) study programme is justified regarding the mission and strategic goals. There are several activities mentioned in the Strategy that support the introduction of the proposed study programme. The First Strategic Goal refers to the modernization of study programmes, teaching process, and student support. A specific objective under this goal is: "Continuously modernize study programmes, equipment, and teaching aids", which was operationalized by measure 1.2.3. "Align the study programmes with the Croatian Qualifications Framework (CROQF) Register." The history and the development of the existing study programme Mechatronics is described in the Strategy.

The HEI's mission is published in its Strategy for 2023-2027 and is defined as: "BUAS strives to educate professionals in the field of technical and biomedical sciences, fostering competencies that enable a seamless integration of its students into the workforce. In collaboration with our students, employees, and partners, we are helping to build the conditions for sustainable development, taking into account individual and community needs." In this case it refers to technical sciences.

The HEI provided an analysis of minimal institutional requirements for comparability of the proposed study programme with similar accredited study programmes in Croatia and Central and South East countries to ensure that the proposed study programme is specific



and not overlapping with existing ones. Accordingly, the HEI provided an analysis of three similar international study programmes in Mechatronic: one study programmes from Austria, Slovenia and from Hungary. The analysis confirms that most of the courses in the said programmes are similar as suggested in the new study programme.

The study programme was also compared with two similar professional study programmes of Mechatronic in Croatia: Zagreb University of Applied Sciences and Karlovac University of Applied Sciences. Both of those programmes are not in compliance with the CROQF Register, despite of that 21 courses were found to be similar with the proposed study programme.

A comparison of the proposed professional study programme in Mechatronics with the considered programmes (foreign and Croatian) leads to conclusion that there is a high level of correspondence of the proposed study programme with the courses of the considered programmes, which ensures exchange and mobility of students of mechatronics as well as teachers. Likewise, the competences that are gained on the considered study programmes, foreign and Croatian, are related and comparable to the competences gained on the proposed study programme.

The admission quotas were proposed by the Teaching and Student Affairs Committee based on the Quality Indicator Analysis and then adopted by the BUAS Council. The optimal number of students to be enrolled in the Professional Undergraduate Study Programme in Mechatronics amounts to 30 full-time students. The number is based on the number of students enrolled in the last five years.

The HEI requested an opinion on the compatibility of the proposed study programme with labour market needs from the Croatian Employment Service on 12 December 2023. The Croatian Employment Service gave a positive opinion on the employability after the completion of the proposed study programme and submitted the results of the analysis of employability of mechatronic graduates which in 2021/2022 amounted to 100%. During the site visit the Expert Panel asked the representatives of employers whether they plan to employ future graduates from this study programme. They confirm that they have had very good experience with Mechatronic graduates and that they also plan to employ more of them in coming years.

Based on the discussion with employers' representatives the Expert Panel assessed that the HEI's intention to propose this study programme was justified.

Recommendations: Encourage more active participation of external associates in BUAS Quality Assurance systems (e.g. Internal self-evaluation) since they have specific needs and can present best practice from their home institutions.

Encourage more active participation of employees in professional associations, as well as of a more active role in national and international committees for better involvement in education system in Croatia.

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 HEI has a well implemented quality assurance system and uses document system that ensures links among documents and data needed for processing documents. The HEI's website is providing availability by publishing all documents needed for internal quality assurance system. The procedure for adopting a new study programme and changing an existing study programme is defined by the *Regulations on Adopting and Improving Study Programmes and Educational Programmes of the BUAS*. The HEI started the procedure for major amendments to the study programme since more than one third of learning outcomes from the existing study programme in Mechatronic has been changed. On 22 November 2023, the BUAS Council adopted the Decision to initiate the procedure for major amendments to the Professional Undergraduate Study Programme in Mechatronics in order to align it with the CROQF Register. Working Group for the preparation of the Application was formed which included teachers who will participate in the implementation of the proposed programme, as well as the vice deans, administrative staff and a student representative. External stakeholders and alumni provided their opinions on the competencies that the mechatronics engineers should acquire to participate in the labour market. Members of the BUAS Advisory Council (employer representatives) working in the field of mechatronics field gave a positive opinion on the compatibility of the study programme with the needs of the labour market. The Working Group submitted, and the BUAS Council adopted the text of the Application with the relevant documentation at the session held on 22 February 2024. Upon the recommendation of the BUAS Council, the text of the Application was adopted by the BUAS Management Board at the session held on 27 February 2024.

The Expert Panel confirms that, based on the documentation and discussion with stakeholders, the new programme has undergone the internal quality assurance process which involved all internal and external stakeholders.

Recommendations: none

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: The HEI has already adopted appropriate procedures and policy documents supporting the monitoring and management of quality assurance (e.g. the Quality Indicator Analysis, Internal self-evaluation of the quality insurance system, etc.) at the current study programmes. The system consists of tools for collecting, analysing and using relevant data for continuous enhancement of active programmes. The HEI is relying



on indicators coming from the surveys completed by students, teachers, employees, employers and student practise mentors, which are considered as relevant or key indicators. Survey results reports are available in the BUAS Quality Indicators Analysis, Self-evaluation and Stakeholder Feedback section on the website of the higher education institution. The recommendations are included in the annual report of the Quality Assurance Unit and are operationally implemented by the BUAS committees. Based on surveys and collected data the study programme will be continuously enhanced and monitored.

The Quality Assurance Policy and Regulations on Study Programmes assure that determined ECTS credits and learning outcomes are continuously monitored. The Quality System defines teaching methods as well as student achievement assessments and examination controls. The HEI already uses a system for monitoring drop-out and completion rates and programme duration. Results of monitoring and action plans are publicly accessible online in the Quality Indicator Analysis.

Recommendations: To improve control of the quality assurance system use the existing computer information systems e.g. MS Teams to define action tasks, deadlines, activity status, the responsible persons, the controller and other information needed for the completion of tasks.

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. change made to existing ones.

Analysis: The Expert Panel confirms that the available information and data on HEI's publicly available website are well organised, navigation is user-friendly and information is up-to-date. There is sufficient information for students, employees and visitors available on monitors at the HEI. Information on admission requirements, intended learning outcomes, teaching and assessment methods and qualifications which may be gained, are published on the website and in brochures.

The plans to amend the existing professional undergraduate study programme in Mechatronics to align it with the CROQF Register were also published. Furthermore, the opportunities for students in the field of employment and continuing studies are available online and on site and are also communicated in person through different forms of meetings (student career week, fairs, conferences, etc.). The Alumni web page is up to date and contains information on their past activities (lectures, meetings, fairs, etc.).

For promoting the study programme the HEI uses integrated marketing channels such as social media, radio, billboards, word of mouth through students. The University tries to attract future students and organizes numerous events such as visits to secondary schools and presents their active study programmes to potential students.



Recommendations: In the hallway of the HEI, you can present the best student diploma/research work abstracts with a photo of the student and the main results of the paper.

Quality grade: fulfilled.

II. Study programme

2.1. The proposed study programme is compatible with the qualification standard in the Croatian Qualifications Framework Register.

Analysis:

The qualification standard (Croatian Qualifications Framework Register) defines as follows under the 'Conditions for obtaining qualification':

'At least 180 ECTS credits (of which at least 120 ECTS credits at the sixth or higher level of learning outcomes), all exams passed and the final thesis produced and defended. Of the acquired minimum 180 ECTS credits, 117 ECTS credits must be from obligatory units of learning outcomes, at least 51 ECTS credits must be from optional units of learning outcomes or units of learning outcomes related to electrical engineering or mechanical engineering or computer science, and a maximum of 12 ECTS credits can be from arbitrary units of learning outcomes.'

The Expert Panel has established that the proposed study programme meets the previously mentioned conditions i.e. that it is aligned with the qualification standard *stručni/a prvostupnik/prvostupnica (baccalaureus/baccalaurea) inženjer/inženjerka mehatronike*: <https://hko.srce.hr/registar/standard-kvalifikacije/detalji/126>

Recommendations: none

Quality grade: fulfilled.

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:

Units of learning outcomes of the courses are applied from CroQF database at the level 6st (i.e. 6) and at the level 6 according to EQF. Learning outcomes of the study programme in Mechatronics are defined in item 9 of the Study Programme Proposal. The intended learning outcomes of the study programme arise from the learning outcomes of courses. Therefore, we can say that they clearly reflect competences required at the labour market or the continuation of education in the Republic of Croatia or abroad.



The learning outcomes of the proposed Professional Undergraduate Study Programme in Mechatronics cover a broad range of competences relevant to mechatronics engineers in the EU and the Republic of Croatia (for example, mechatronics system design, production process management, integration of technical science and mathematics knowledge, etc.) The Croatian Employment Service gave a positive opinion on the alignment of the study programme Professional Undergraduate Study Programme in Mechatronics with the labour market needs.

The competences of the Professional Graduate Study Programme in Mechatronics were based on a needs survey where respondents rated each competence on a scale of 1–7. All competences of the study programme were rated 5.06 or above, indicating that the employers thought that all these competences were necessary for the involvement on the labour market. It was also confirmed by the employer representatives at the meeting with the Expert Panel.

There are no internationally defined learning outcomes for the considered profession. However, the HEI compared the Professional Undergraduate Study Programme in Mechatronics with the following international and Croatian study programmes:

- Bachelor Mechatronics/Robotics – University of Applied Sciences Technikum Wien,
- Professional Study Programme Mechatronics – Fakultet elektrotehnike, računalstva i informatike, Sveučilište u Mariboru,
- Mechatronics Engineering, BSc – University of Debrecen,
- Professional Undergraduate Study Programme Mechatronics - Polytechnic of Zagreb,
- Professional Undergraduate Study Programme Mechatronics - Polytechnic of Karlovac.

The Expert Panel concluded that the intended learning outcomes of the Professional Undergraduate Study Programme in Mechatronics were comparable to the intended learning outcomes of similar study programmes in the Republic of Croatia and EU Member States.

There are 5 learning outcomes that ensure the acquisition of generic competencies, while the remaining 8 learning outcomes instil profession-specific competencies in the field of mechatronics. The Expert Panel's analysis has established that the learning outcomes of the proposed Professional Undergraduate Study Programme in Mechatronics were aligned with the descriptors of level 6 of CroQF/EQF.

Recommendations: none

Quality grade: fulfilled



2.3. The intended course outcomes are aligned with the intended learning outcomes at the level of the study programme.

Analysis:

The intended course outcomes are aligned with the intended learning outcomes at the level of the study programme, which is visible in Table 2. of the Initial accreditation procedure application form. According to Table 2, obligatory courses help students achieve all anticipated learning outcomes of the study programme.

As previously said, the intended learning outcomes at course level include the development of generic and profession-specific competences.

The method of assessment of the learning outcomes is defined in the programme of each course. During the introductory lecture at the start of the course, the course instructor introduces students to the course content, learning outcomes, teaching methods, and course outcome assessment strategies. The Merlin e-learning system provides students with access to course materials, results, and achievements by learning outcomes. Students can acquire the anticipated programme learning outcomes by successfully acquiring the learning outcomes of all individual courses. According to the Student Assessment Regulations, students should achieve at least 50% of points for each course outcome to pass a course.

Although the course programme lists all the necessary conditions for passing the learning outcomes, in the tables for Continuous Assessment and Exam Term it would be clearer if the types of assessment were listed in an extra column (For example: theoretical questions, numerical exercises, etc.).

Recommendations:

The Expert Panel recommended to the HEI to describe in more detail the method of assessment (for example: theoretical questions, numerical exercises, graphic exercises, project defense, etc.) in the syllabuses, in the section "Assessment and evaluation of student work during classes and on the final exam". This can be done by adding an extra column in the "Continuous Check" table.

Quality grade: fulfilled

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

Analysis:

Table 2 Learning outcomes of the study programme from the Application shows that out of 13 proposed learning outcomes of the study programme, 5 ensure the acquisition of generic competencies, while the remaining 8 learning outcomes instil profession-specific competencies in mechatronics.



At the meeting with industry representatives the Expert Panel was informed that some companies have good equipment which could be used in the practicals and that they are willing to support it. This could also ensure even better achievement of certain learning outcomes. Head of the study programmes' responsibility is to consider this option and to take it as needed.

BUAS enables horizontal student mobility via the Erasmus+ programme. Cooperation agreement was signed with more than 20 international partnership institutions. In the last three years an adequate number of students participated in mobility programmes in the undergraduate studies (48 outgoing and 32 incoming). Before going to mobility programmes, ECTS coordinator advises the students about the courses to be elected at the host institution and in cooperation with the head of the study programme and course leaders, they draft a decision in which the recognition of the acquired ECTS credits is also defined.

Vertical student mobility in Croatia is possible pursuant to the Act on Higher Education and Scientific Activity. In accordance with the Act, students who have completed a professional undergraduate study programme in mechatronics can enrol in a professional or university graduate study programme by taking equivalence examinations set by the higher education institution. In the EU Member States it is necessary to fulfil the requirements for admissions to a higher level of studies of each country.

Alignment of the content of each course and the defined course learning outcomes has been ensured by having stated the number of learning outcomes for each part of course content.

The development of the Professional Undergraduate Study Programme in Mechatronics is grounded in a careful analysis and ensuring a logical sequence of courses, and the wish to ensure that the study programme is attractive. Requirements for enrolment in the course are defined by the requirements for accessing the group of learning outcomes as defined in the CroQF Register (Qualification Standard).

The study programme is designed to have one elective course in the fifth semester and two elective courses in the sixth semester. A higher number of elective courses ensures greater flexibility of the study programme to meet the community's needs over a period of time. The HEI should consider increasing the number of elective courses in year 3.

The core disciplines for the acquisition of professional competences in the field of mechatronic are well covered by the courses at the study programme and cover a broad range of skills and knowledge (linear algebra, mathematical analysis, etc.), electrical engineering (electrostatics, electromagnetism, electric circuits, electronics, etc.), mechanical engineering (statics, hardness, kinematics, dynamics, materials, etc.) and computer science (digital logic and assemblies, programming, computer architecture, etc.)

Recommendations:

Consider introducing more elective courses.



Quality grade: fulfilled

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

Analysis:

The number of ECTS credits per learning outcome unit has been taken from the CroQF Register. The course workload is defined based on a sum of ECTS credits of all units of learning outcomes included in the course.

In the conversation with students the Expert Panel established that students are informed about the relationship between the number of ECTS credits assigned to a course and the time required to achieve its learning outcomes through introductory lectures and the Study Regulations. Students write their opinion about whether allocated ECTS credits align with the actual workload in an answer to a question in the student survey 'The student workload is consistent with the number of ECTS credits' and the students rate this statement from 1 to 5 (question 7, source for verification: 2.5.1).

In the conversation with the head of the study programme it is evident that student surveys are analysed and amendments to course programmes are initiated in case of discrepancies between the workload and ECTS credits in accordance with the Regulations on Adopting and Improving Study Programmes and Educational Programmes.

Recommendations: none

Quality grade: fulfilled

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

Analysis:

The students of the Professional Undergraduate Study Programme in Mechatronics undergo their student practice within the Student Practice course framework.

The Student Practice course carries 6 ECTS credits and includes 170 hours of practical teaching in a legal entity, and it can be assessed that the number of hours of student practice is satisfactory.

Student Practice Regulations regulate the student practice organization, student obligations, student practice contents, mentorship, leadership, coordination and other issues pertaining to the student practice of BUAS students.

The planning, organization and other activities pertaining to the student practice for the Professional Undergraduate Study Programme in Mechatronics are performed by the head of the student practice appointed by the dean.

At the meeting with industry representatives the Expert Panel got the impression that BUAS' cooperation with industry is at a high level, which also includes the matter of student practice.



During student practice, students are required to keep a student practice journal that will be graded by their mentor in the legal entity and the head of the student practice. Student practice journal defines the learning outcomes to be acquired by the student following the successfully completed student practice. However, the Expert Panel was told that the mentors in a legal entity do not undergo any training pertaining to mentorship. The Expert Panel is of the opinion that the HEI should draft a manual for mentors so they would know what is expected of them regarding student practice.

Students also acquire practical skills in the BUAS laboratories where they have 597 hours of laboratory exercises. During the laboratory practicals, students work on practical tasks using didactic aids in order to better prepare them for the labour market.

Recommendations:

In order to additionally strengthen the achievement of the intended learning outcomes the Expert Panel recommends that the HEI draft a manual for mentors in the companies so they would know what is expected of them in order for the practice-related outcomes to be achieved.

Quality grade: 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: not applicable

Recommendations: -

Quality grade: -

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 conducts admissions for each academic year based on the call for admissions to study programmes adopted by BUAS Council and published on BUAS' website no later than May 1st of the current year. The public call specifies the number of available slots, admission requirements, application deadlines, as well as the admission process and required documents. It also includes tuition fees determined by the BUAS Council and other relevant information. When determining the admission requirements, criteria, and



procedures it is important to ensure equal opportunities for all applicants. In accordance with the Act on Higher Education and Scientific Activity (OG 119/22) and the BUAS Study Regulations admissions of full-time and foreign students is carried out by publishing a call. Information regarding admissions, admission decisions, and other relevant details are published on BUAS' website. It is stated that persons who can enrol in the Professional Undergraduate Study Programme in Mechatronics include those who graduated from a four-year high school programme and passed the national matriculation exam after 2010, while for persons who completed a qualifying four-year high school education programme in the Republic of Croatia before 2010 different rules apply, and conditions for foreign citizens are also stated. Allegations are explained clearly and transparently with the links provided to websites of state institutions and instructions.

In order to ensure the necessary prior knowledge, the minimum prerequisites that the future student must meet are listed. The stated conditions ensure prior knowledge necessary for attending the studies and achieving the intended learning outcomes. The materials are easily accessible and appropriately designed with the aim of providing clear instructions and information that ensure facilitation and better accessibility of enrolment data.

Recommendations: none

Quality grade: fulfilled

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

Analysis:

Teaching methods and modes are adjusted to the mastering of different teaching contents of the courses for which the BUAS Council adopts the syllabus. It is adopted prior to the beginning of the academic year and it defines the method of study programme delivery according to the planned schedule. The programme curriculum specifies the intended learning outcomes for each course as well as the teaching methods to be used to cover the course content and achieve those outcomes. Classes are organized in the form of lectures, laboratory and auditory exercises, seminars, workshops, fieldwork, flipped classrooms, solving independent tasks, and working with a mentor.

BUAS teachers are continuously furthering their education regarding the application of new teaching methods. BUAS teachers implement teaching methods that include problem-based teaching, collaborative learning, work in groups, individual and group projects, fieldwork and guest lectures. This leads to a better achievement of the intended learning outcomes, and depending on the generations of students, it is chosen which types of teaching will be used to acquire content of the course and achieve the expected learning outcomes.

Moreover, additional support is provided to students by heads of study programmes and teacher-mentors, and the teaching staff is at their disposal during consultations. The HEI



adapts their teaching methods to older students, students who have children, working students, and students commuters.

Moreover, ongoing investment in laboratories, teachers' offices, practicums and classrooms contributes to the achievement of good student results and the achievement of learning outcomes.

Recommendations: none

Quality grade: fulfilled

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

Analysis:

BUAS holds introductory lectures for all first-year students, to acquaint them with essential information about their academic journey. These students are evenly distributed into mentorship groups led by a mentor to facilitate their adjustment to university life and enhance their academic performance. They also inform students about important matters, and students are instructed to turn to appropriate services or provided with appropriate links.

To make the start of the studies easier there are documents in place such as: Student Guide, Information about Student Benefits, BUAS Study Regulations, BUAS Grading Regulations. Students can find a lot of useful information about the studies in these documents. There are also administrative services available to students such as BUAS Student Services, Secretary's Office, IT Service and the Library.

The Office for Students with Disabilities takes care about the students with disabilities. The HEI also takes care about student athletes. All this information and detailed and clear instructions are available on the BUAS website.

Recommendations: none

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 programme curriculum which is adopted by the Council before the start of every academic year defines assessment and grading criteria and methods for each course. This defines at the very beginning of the academic year what is expected of a student for a particular course. Each course has different learning outcomes, and consequently evaluation methods and criteria.

Also, the methods, ways and values sufficient for passing the assessment for each course are defined at the introductory lectures. The BUAS Grading Regulations regulate in detail



the rules of assessment and grading of student achievements. The criteria and methods of evaluation and grading of student achievements are aligned with the intended teaching methods. Throughout the academic year, the previously defined evaluation methods are implemented, which enable verification of the achievement of individual learning outcomes of the course. BUAS Grading Regulations ensure impartiality and objectivity in assessing and grading student accomplishments.

This also applies to students with disabilities to which assessment methods are adjusted, as well as top athletes.

Recommendations: none

Quality grade: fulfilled.

IV. Teaching capacities and infrastructure

4.1. The higher education institution has ensured adequate teaching capacities to deliver the study programme and achieve the intended learning outcomes.

Analysis:

According to the employment contracts and information provided by the HEI when submitting the application for accreditation of the Mechatronics study programme, the HEI employs 25 teachers, 10 of whom are employed full-time. The HEI is planning to engage 9 full-time teachers for the proposed study programme, of which 6 are from the area of technical sciences, the field of computing, electrical engineering and basic technical sciences, and 1 from the area of natural sciences, 1 from social sciences and 1 from humanities. The HEI's own staff hold 47% of classes at the Professional Undergraduate Study Programme of Mechatronics. The HEI employs teachers who perform 66.50% of all forms of direct teaching in the entire Professional Undergraduate Study Programme of Mechatronics (the first year of study is covered by 76% of all forms of direct teaching by its own employees; the second year of study is covered by 57.86% of all forms of direct teaching by own employees, and the third year of study is covered by 64.71% of all forms of direct teaching by own employees). This satisfies the criterion that teachers employed at the HEI will perform at least 35% of all forms of direct teaching in the first year of professional studies.

The HEI continuously increases the number of employed teachers and improves the qualification structure. Five (5) PhD teachers are currently employed at the HEI. In addition to the aforementioned five PhDs, there are currently six (6) teachers at the HEI attending doctoral studies in the scientific area and the field in which they teach.



According to table 4, the total annual teaching load of an individual teacher does not exceed 20% of the total annual standard teaching load. Total annual teaching load of an individual teacher does not exceed 20% of the total annual standard teaching load.

Considering the mentioned teaching load, it follows that teachers have available time for professional and scientific work. In the conversation with the Panel, the teachers themselves confirmed that their progress is taken care of, that they are encouraged to enrol in doctoral studies, and that the HEI pays for registration fees for participation in professional and scientific conferences.

According to Table 3, the ratio of the total number of enrolled students to full-time teachers and nominal teachers in the academic year 2023/2024 is 10.36:1. Therefore, the ratio between the total number of enrolled students and the total number of full-time teachers and those with nominal teaching titles should not exceed 30 : 1, pursuant to the Act on Quality Assurance in Higher Education and Science.

Recommendations:

BUAS is encouraged to introduce workshops to strengthen the pedagogical competences of teachers.

BUAS is encouraged to further stimulate teachers to publish more papers, primarily due to the current modest number of publications listed in Table 5. The above can be done by publishing more papers with students and by publishing more teaching and professional publications.

BUAS is encouraged to increase motivational mechanisms for the stimulation of young employees, such as the 'overhead costs', i.e. its own project card with funds that can be spent in accordance with the rules of the institution for its own development.

Quality grade: 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.

Seven external associates with relevant work experience are involved in teaching in the Professional Undergraduate Study Programme in Mechatronics. They are appointed in the associate positions, nominal positions/teaching positions or nominal scientific-teaching positions, they are productive in professional and scientific work and they supervise student thesis development.

In the conversation with external associates we got the information that they are familiar with the regulations and practices in higher education in relation to the preparation and delivery of teaching and ECTS credits and learning outcomes.



BUAS also encourages teachers to engage in students' final projects as co-supervisors, which was explained in detail in the BUAS Final Paper Regulations. BUAS has successfully concluded 31 cooperation agreements with various companies, providing students with an exceptional opportunity to gain professional experience through internship in most of these institutions, and cooperation with the technology park is especially noteworthy. This cooperation proved to be extremely fruitful, as a large percentage of students who completed an internship in the companies with which BUAS cooperates find employment within these same organizations. This confirms the success of the cooperation programme, providing a concrete example of how studying at the BUAS directly contributes to the employment of students in the economic sector.

Recommendations:

The HEI is encouraged to include external teachers more in the processes and implementation of the quality assurance system.

Quality grade: 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.

Analysis:

Classes in the Professional Undergraduate Study Programme in Mechatronics will be held in two BUAS buildings in Bjelovar: Building 1 (Trg E. Kvaternika 4) with a total area of 435 m² and Building 2 (A. B. Šimića 1b) with a total area of 2,052.69 m², located 50 meters apart. The combined area of both buildings is 2,487.69 m². Building 1 was remodelled and furnished in 2009, while Building 2 was fully remodelled, adapted, and furnished in early October 2014.

All BUAS classrooms have the necessary equipment for lectures, including computers and free access to high-speed wireless internet. The space and equipment are appropriate for the delivery of the study programme and ensure achievement of the intended learning outcomes. BUAS systematically invests in improving its IT equipment.

BUAS has 2.85 m² of space per student.

Recommendations:

The Panel recommends BUAS to expand the laboratories for the teaching activities in mechatronics.

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.

Analysis:

The BUAS Library covers an area of 65.47 m². It provides services aimed at supporting the research and learning of its patrons (BUAS students, staff, and external associates). The library features a reading room with 8 seats and 4 computers for users, along with a photocopier, printer, and scanner. Additionally, students have the option to purchase textbooks published by BUAS.

The library also operates a Seminar and Final Paper Support Center, providing assistance to students in writing seminars and theses and literature searches. The library permanently stores and preserves all final and graduation theses of BUAS students in Dabar repository.

Recommendations:

The HEI is advised to introduce a systematic practice of using reference management tools when writing final, graduate and professional theses. The library can serve as a central point of distribution of instructions for using such tools.

Quality grade: fulfilled

4.5. The higher education institution ensures the availability of the necessary financial resources to organise the activities and provide a high quality of delivery of the proposed study programme.

Analysis:

A comparison of revenues and expenditures reflects BUAS' financial sustainability and effective management of financial resources. Enrolling the projected number of first-year students will generate €36,000.00 in revenues from tuition fees, as well as an additional €1650 from enrolment fees. Expenditures in the first academic year would amount to approximately €41,430.00 (total expenditures for all three years of the Professional Undergraduate Study Programme in Mechatronics amount to €124,292.47), consisting of expenditures for employees and external associates, equipment costs, and other material costs.

In 2023, slightly increased expenditures compared to operating income were recorded (Table 8), but this is considered a technical deficit that will be covered by previously retained earnings.



Recommendations: none

Quality grade: fulfilled

☐ **AMEND THE STUDY PROGRAMME**

Rationale:

OPINION OF THE EXPERT PANEL AFTER AMENDMENTS

Following the amendments to the Study Programme Proposal the course 'Technical Materials and Production Processes' is delivered in the second year of the study programme (4th semester) while the course 'Automatic Management' was moved to the third year (6th semester). With this change, a more logical sequence of the courses in the study programme was introduced. It was stated in accordance with the given recommendation of the Expert Panel, which means that the objection of the Expert Panel has been removed in its entirety.

FINAL RECOMMENDATION OF THE EXPERT PANEL MEMBERS:

a. ☒ **ISSUE A LICENSE, rationale**

We believe that by all standards the University of Applied Sciences in Bjelovar showed a high level of quality in terms of the readiness to carry out the study programme Mechatronics. Therefore, we propose to issue a license for the mentioned study programme. BUAS is also instructed to further improve the quality of the study programme in accordance with the recommendations given by the Expert Panel, which can be implemented gradually during the execution of the study programme.

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



ANNEXES

1. Quality grade summary - tables

<i>Quality grade by assessment area</i>			
<i>Assessment area</i>	Not fulfilled	Partially fulfilled	Fulfilled
<i>I. Internal quality assurance</i>			Fulfilled
<i>II. Study programme</i>			Fulfilled
<i>III. Teaching process and student support</i>			Fulfilled
<i>IV. Teaching capacities and infrastructure</i>			Fulfilled



<i>Quality grade by standard</i>			
<i>I. Internal quality assurance</i>	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.			Fulfilled
1.2. The study programme has undergone an appropriate internal quality assurance process and has been formally approved by the higher education institution.			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.			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. change made to existing ones.			Fulfilled



<i>Quality grade by standard</i>			
<i>II. Study programme</i>	Not fulfilled	Partially fulfilled	Fulfilled
2.1. The proposed study programme is compatible with the qualification standard in the Croatian Qualifications Framework Register.			Fulfilled
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.			Fulfilled
2.3. The intended course outcomes are aligned with the intended learning outcomes at the level of the study programme.			Fulfilled
2.4. The study programme content allows students to achieve all the intended learning outcomes.			Fulfilled
2.5. ECTS distribution is aligned with the anticipated actual student workload.			Fulfilled
2.6. Student/professional practice is an integral part of the study programme (if applicable).			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.			Not applicable.



<i>Quality grade by standard</i>			
<i>III. Teaching process and student support</i>	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.			Fulfilled
3.2. The intended teaching methods ensure student-centred learning and the achievement of all intended learning outcomes.			Fulfilled
3.3. The higher education institution has provided evidence that adequate support will be ensured for future students.			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.			Fulfilled



<i>Quality grade by standard</i>			
<i>IV. Teaching capacities and infrastructure</i>	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.			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.			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.			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.			Fulfilled
4.5. The higher education institution ensures the availability of the necessary financial resources to organise the activities and provide a high quality of delivery of the proposed study programme.			Fulfilled



2. Protokol posjeta

	Utorak 21. svibnja 2024.
10:00 – 10:30	Sastanak s Upravom visokog učilišta
10:30 – 11:30	Sastanak s voditeljima studijskih programa i prodekanom za nastavu i studente
11:30 – 11:40	<i>Pauza</i>
11:40 – 12:40	Sastanak s nastavnicima koji će biti angažirani na studijskim programima <i>(u stalnom radnom odnosu – bez prisustva uprave)</i>
12:40 – 12:50	<i>Pauza</i>
12:50 – 13:20	Sastanak sa studentima prijediplomskog studija Računarstvo i Mehatronika
13:20 – 14:50	Radni ručak
14:50 – 15:50	Obilazak visokog učilišta <i>(knjižnica, laboratoriji, informatičke učionice, ured za studente, predavaonice)</i>
15:50 – 16:30	Sastanak s vanjskim suradnicima koji će biti angažirani na studijskim programima
16:30 – 16:35	<i>Pauza</i>
16:35 – 17:15	Sastanak s vanjskim dionicima <i>(predstavnicima strukovnih i profesionalnih udruženja, poslovna zajednica, poslodavci, stručnjaci iz prakse, organizacijama civilnog društva)</i>
17:15 – 17:30	<i>Organizacija dodatnog sastanka o otvorenim pitanjima, prema potrebi</i>
17:30 – 17:45	Interni sastanak članova Stručnog povjerenstva <i>(priprema za završni sastanak)</i>
17:45 – 18:00	Završni sastanak s upravom