Expert group joint opinion

Evaluation Procedure: Assessment of Study Field

Higher Education Institution: Ventspils University College

Study field: Information Technology, Computer Hardware, Electronics, Telecommunications, Computer Management, and Computer Science

Experts:

1. Tomas Krilavičius (Chair of the Experts Group)
2. Constantin Vertan (Secretary of the Experts Group)
3. Mihails Savrasovs
4. Mart Tamre
5. Jurijs Grigorjevs (Employers' Confederation of Latvia)
6. Lāsma Līga Reisa (Student Union of Latvia)

Summary of the Assessment of the Study Field and the Relevant Study Programmes

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The study field is mostly well-founded, management procedures are defined, and the management team is well-qualified and experienced. SWOT analysis is performed and the development plan incorporates its results, but some plans are incorrectly identified as opportunities. Admission and assessment are defined in detail, and well formalized, and all the stakeholders are well informed. A system for plagiarism detection as well as regulations allows to control of plagiarism risks.
The position of the professional bachelor study program “Smart Technologies and Mechatronics” (joint with the University of Liepāja) in the field as well as the faculty and university is not clear and should be considered by the administration.

Overall, the management of the study field is efficient, but in some cases is too informal.

VUAS has major expertise and experience in study program management including all necessary resources and teaching staff to provide good level education, high-level research, and contribute essentially to local development. VUAS runs a financially sustainable business through continuous improvements of competitiveness of the owned study programs. VUAS has equipped students and teaching staff with the necessary information systems, laboratories, special software, and hardware to achieve learning objectives within a study process.
The VUAS quality assurance system relies on both formal and informal communication. All of the formal procedures are well described and flow charts are available to students who have difficulties reading or understanding documents. Unfortunately, the documents mainly are available in Latvian, which complicates this process for international students. Overall students are very well informed about the quality assurance processes and how they can be a part of them, but students only receive feedback about individual or group complaints or suggestions but do not receive feedback about the bi-annual surveys. The bi-annual surveys are mandatory and if they are not completed, it is forbidden for the student to register for the next semester's courses. Such a mechanism can promote false answers in the surveys because some students might only fill them out in order to be able to register for the courses. It would be recommended for the student council to launch another survey, where those who are genuinely interested in the quality, could fill it out, and then it would be possible to compare the results in both surveys.

Overall the quality assurance system is running smoothly and the formal and informal practices are in balance, but the informal practice might only work in the future if the student count does not increase. All of the parties - students, graduates, and employers - are very well included in the development of the study programs and the insurance of their quality.
VUAS considers scientific and research development with attention, as scientific and research are mentioned in the HEI development strategy. VUAS development strategy includes specific activities targeted to improve this domain. But at the same time, in many cases used mechanisms and approaches are fragmented and do not form the system or framework of the scientific and research domain development, including students and teaching staff attraction, R2B and commercialization activities, continuous utilization of results gained in the frame of the already running or completed project. The primary scientific and research domain is clear and fits the profile of the VUAS - radio astronomy. There are a number of pieces of evidence gained from SAR and meeting that VUAS is collaborating with the local public and private sector in the domain of the research, but lack of commercialization activities targeted the establishment of long-running collaboration in the form of start-ups, spin-offs or any of our continuous form of collaboration with the industry. VUAS in their academic activity implements a number of innovative methods which could be considered as a good

undertaking, and they are unique for the Latvian academic system. There are international projects, in which there are involved, but we strongly believe that VUAS has enough experience not only to participate in projects as partners, but also initiate and take leading positions in the EU projects.

VUAS has rich collaboration with local private and public entities, but at the same time, international collaboration is limited. In many cases, collaboration is established based on personal contacts of the VUAS management, without formalizing collaboration aspects with agreements or MoU with specific activity plans. VUAS has a presence in all domain-related associations, while its presence in international bodies is limited. The teaching and student staff mobility could be improved, by moving from classical mobility programs to blended intensive programs (BIP).
The attraction of international students involves several mechanisms that correspond to the size and strategy of the VUAS. However, the policy regarding the involvement of international teaching staff is not presented as a formal document in the HEI, and is usually based on personal contacts. While the mentioned examples are good, they do not represent an official policy, but rather specific actions conducted during projects or regular activities.

Computer science programs include three levels: the first level (Programming Specialist), bachelor (Computer Science), and master (Computer Science). All the programs fully comply with formal regulations (except some minor issues, mentioned in the analysis). Teaching staff conforms to the requirements as well. Research is not the strongest part of the staff, but it conforms to the requirements. The programs are well-designed. Communication between the faculty and the students is good but mostly informal.

The electronics programs track consists of bachelor (Electronic Engineering) and master (Electronics) programs. Both programs comply with formal regulations and are well-designed. The teaching staff conforms to the requirements but is not overly active in research. Communication between the faculty and the students satisfies both sides as well.

The bachelor study program ‘’Smart Technologies and Mechatronics’’ joint with the University of Liepāja requires additional attention. While it satisfies formal requirements, it is not clear, how it benefits VUAS, because, in fact, it is mostly a program, run by the University of Liepāja, all students are from Liepāja as well, and VUAS provides just several courses. Hence, experts were not convinced about the necessity of such a program, except to fulfill a project, in which it was established, requirements.

I - Assessment of the Study Field

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1.1 Management of the Study Field

Analysis

1.1.1 The analysis is based on SAR (section 1 and section 2) and meetings during the assessment visit at Ventspils University College (VUAS) on April 12-13, 2023.

The main goal of the study field “Information Technology, Computer Hardware, Electronics, Telecommunications, Computer Management, and Computer Science" (study field) is to prepare highly skilled specialists in computer sciences and electronics with a profound knowledge that would enable them to adapt independently for professional activities in changing labor market conditions, as well as to prepare students for the further studies in higher-level programs, scientific activities, and further self-education.

The study field includes 6 study programs:
1. First-level study program ‘’Programming Specialist’’
2. academic bachelor study program ‘’Computer science’’
3. academic master study program ‘’Computer science’’.
4. professional bachelor study program ‘’Electronics engineering’’
5. professional bachelor study program “Smart Technologies and Mechatronics” (joint with University of Liepāja)
6. professional master study program ‘’Electronics’’

The study field covers all the relevant educational levels, except the doctoral programs. Computer science and electronics are two main study areas. The interconnection of the study programs is clear and logical, i.e. either it is three steps computer science studies or two-step electronics. However, the placement of the professional bachelor study program “Smart Technologies and Mechatronics” program seems to be an experiment on inter-country joint programs, and seems to be more supportive of Liepaja University, than the joint program, because the program is mostly run in Liepaja, and VUAS just provides selected courses. (see fully described in this report of experts in the analysis of professional bachelor study program “Smart technologies and Mechatronics”.

The aims of the study field are relevant and well-defined.

The study field and study programs comply with the development and horizontal objectives of the VUAS strategy, which is provided on the VUAS web page (https://irp.cdn-website.com/9945ff8b/files/uploaded/VENTSPILS%20UNIVERSITY%20OF%20APPLIED%20SCIENCE_STRATEGY_2021-2027.pdf). Study field well complies with a number of different level development policies, namely:
1. Sustainable Development Strategy of Latvia until 2030;
2. Latvian National Development Plan 2021-2027;
3. Education Development Guidelines 2021-2027 “Future Skills for the Society of the Future”;
4. Draft National Skills Strategy of the OECD;
5. Guidelines for Science, Technology Development, and Innovation 2021-2027;
6. National Industrial Policy Guidelines 2021-2027;
7. Summary of Knowledge Ecosystems: Smart Specialization Strategy;
8. Digital Transformation Guidelines 2021-2027;
9. Regional Policy Guidelines 2021-2027
10. Conceptual Report on the Change of the Internal Governance Model of Universities;
11. Sustainable Development Strategy for Kurzeme Planning Region 2015-2030;
12. Joint Sustainable Development Strategy of Ventspils State City Municipality and Ventspils
13. Municipality until 2030 - Action Plan;
14. Ventspils City Development Programme 2021-2027.

As a regional university, VUAS strives to support Ventspil's needs, however, the education of well-skilled computer science and electronics specialists contributes to the development of Latvia and Europe as well.

1.1.2 The analysis is based on SAR (section 1 and section 2) and meetings during the assessment visit at VUAS on April 12-13, 2023.

An in-depth SWOT analysis identifies the main strengths, weaknesses, opportunities, and threats of the study field. However, some opportunities sound more like plans, than opportunities, e.g. “12. to initiate, at the university level, development of new support mechanisms to ensure a competitive

remuneration policy and attractive working environment for bringing in highly qualified academic staff.” sounds more like a very good development plan than opportunity.

Plans (or at least ideas) on how to fight weaknesses and threats are provided. Plans on how to use listed opportunities are not provided, but as mentioned above, some opportunities sound more like plans than opportunities.

1.1.3 The analysis is based on SAR (section 1 and section 2) and meetings during the assessment visit at VUAS on April 12-13, 2023.

The study field management is shared between the study vice-rector (pro-rector), the dean of the faculty, the director of the study program, the study administration specialist, two Councils of Study programs for Electronics and Computer Science directions, respectively, and The Council of the FoIT (faculty).
1. Vice-rector coordinates general study-related issues and oversees the work of the Study unit.
2. The Dean of the faculty ensures operational management of the faculty, including studies and research.
3. The director of the study program is responsible for the implementation of the program and its content quality.
4. Study administration specialist supports the dean and other personnel in organizing the study process.
5. Councils consist of the teaching staff and the employers and approve strategies of the relevant programs, etc.
6. Faculty council consists of the teaching staff, administration, and students, and mainly decides on the faculty’s development and strategy.

Study field management structure reflects the good distribution of responsibilities between different stakeholders. It conforms to a more or less classical approach to the study field and study programs, i.e. from day-to-day decisions by the director of the study program to the whole study field management by the dean, to the supervisory council of the field of study.

Documentation and discussions in assessment visit show that the process is efficient but mostly informal, i.e. often it is based on the discussions with the study program or dean, instead of using the procedures. It is not a big problem for those who know the system well, and in small communities allows them to solve problems faster, but it can be complicated for new employees, early-stage researchers, and students. A more systematic approach would improve the process even more.

Documentation and discussions in the assessment visit show that the administrative and technical support is sufficient. Comments from assessment visits of the lecturers and students show that they get sufficient technical and administrative support, i.e. no issues very mentioned, and the procedures are clear.

1.1.4 The analysis is based on SAR (section 1 and section 2) and meetings during the assessment visit at VUAS on April 12-13, 2023.

The admission to VUAS is supervised by the Admissions Commission established by the order of the rector, consisting of the head of the Study Department, directors of the study programs, and other persons involved in the admissions process.

Enrolment into the basic study program is organized through the portal www.latvija.lv via Unified Enrollment. Study applications for the Master's and Doctoral (not relevant) programs are accepted in person or remotely by VUAS.

“DreamApply” application system is used to enroll foreign students.

“Admission Rules and Matriculation Procedure at Ventspils University of Applied Sciences for the Academic Year 2022/2023” is provided at https://irp.cdn-website.com/f6b5d556/files/uploaded/Uznemsanas%20_noteikumi_2023_2024.pdf

“Terms of admission and the matriculation process of Ventspils University of Applied Sciences for international candidates in the academic year 2022/2023” is provided at https://irp.cdn-website.com/9945ff8b/files/uploaded/23-04_Uznemsanas_noteikumi_arzemniekiem_ENG_2023-24.pdf .

Recognition of education and professional experience of students is regulated by “Regulation on recognition of study results achieved in previous education or professional experience” (https://irp.cdn-website.com/f6b5d556/files/uploaded/15_Par_profesionalas%20pieredzes%20atzisanu_nolikums.pdf) and “Regulation on the recognition of competences acquired outside formal education or professional experience and study outcomes achieved in previous education” (https://irp.cdn-website.com/f6b5d556/files/uploaded/14_Par_profesionalas%20pieredzes%20atzisanu_nolikums.pdf). However, the recognition of the study course costs 5 Euro, while recognition of competences acquired outside formal education costs 75 Euro. It does not pose any serious risks, but 75 euros could be quite expensive for socially insecure students and stop them from applying for such recognition.

Overall, procedures are logical and effective.

All information is available at the website of VUAS (www.venta.lv).

1.1.5 The analysis is based on SAR (section 1 and section 2) and meetings during the assessment visit at VUAS on April 12-13, 2023.

The criteria for evaluating the academic results are defined in VUAS Senate-approved regulations available in the Moodle environment and VUAS web
page (only in Latvian, https://www.venta.lv/augstskola/parskati-un-zinojumi).

1. Regulation on the procedures for organizing examinations and evaluation of the student's knowledge at VUAS;
2. Regulation on the study procedures at VUAS.

Study results are evaluated based on two criteria: qualitative 10 points system and quantitative (credit points).

Students are informed about the criteria for grading in the study courses/ Study results and conditions for obtaining a course evaluation are available in the course descriptions and in Moodle, where students receive evaluations of the submitted solutions, comments, and justification for the grade as feedback. Hence they can follow their progress, which learning outcomes, and to what extent they have achieved. It encourages students’ understanding and co-responsibility for their learning, and self-assessment and ensures understanding of the received assessment in accordance

with the principles of a student-centered approach. Moreover, the evaluation process takes place throughout the semester, stimulating regular study work.

The methods of the assessment of the achievements of students are similar to other higher education institutions worldwide. From the discussion with lecturers and students it seems that both parties understand them well, and allow them to assess students' results, give them timely feedback, and time to improve it if necessary.

1.1.6 The analysis is based on SAR (section 1 and section 2) and meetings during the assessment visit at VUAS on April 12-13, 2023.

VUAS has developed regulations and instructions to uphold academic integrity. These include the "Procedures for Organization of Examinations and Assessment of Students' Knowledge," "Academic Integrity in Ventspils University of Applied Sciences," and "Methodological Instructions for Development, Presentation and Defence of Master's Thesis, Bachelor's Thesis, and Graduation Paper."

The VUAS uses a computerized plagiarism control system (PLAG3) to detect plagiarism in student work, and any infringement is evaluated by a commission that decides on imposing sanctions on the student.

Stakeholders are informed about the academic integrity requirements.

There have been no plagiarism cases reported in the past year.

Conclusions on this set of criteria, by specifying strengths and weaknesses

Conclusions:
The study field is mostly well-founded, management procedures are defined, and the management team is well-qualified and experienced. SWOT analysis is performed and the development plan incorporates its results, but some plans are incorrectly identified as opportunities. Admission and assessment are defined in detail, and well formalized, and all the stakeholders are well informed. A system for plagiarism detection and regulations allows for controlling plagiarism risks.
The position of the professional bachelor study program “Smart Technologies and Mechatronics” (joint with the University of Liepāja) in the field as well as the faculty and university is unclear and should be considered by the administration.
Overall, the management of the study field is efficient, but in some cases is too informal.

Strengths
1. Weaknesses and threats are well identified in the SWOT, and plans to deal with them are provided.
2. Staff and students get good technical support, and issues are solved fast and efficiently.

Weaknesses
1. It is not clear how the professional bachelor study program “Smart Technologies and Mechatronics” (joint with the University of Liepāja) fits into the study field.
2. Opportunities section in SWOT primarily describes plans, not opportunities.
3. Most of the processes are informal.

1.2. Efficiency of the Internal Quality Assurance System

Analysis

1.2.1

According to the self-assessment reports part 1.3. the VUAS quality management system (QMS) focuses on improving the quality of education in regard to economic and societal development, as well as going hand in hand with the strategic specialization of the VUAS. The system itself is based on the European Quality Management Fund Excellence Model (EFQM Excellence Model). The quality management policy focuses on strategic leadership, staff involvement, process management and improvement, and data-driven decision-making thus guaranteeing continuous improvement.

VUAS has created a Strategy, Quality Management, and Risk monitoring commission to ensure continuous development of the study field as well as quality assurance, which is described in the self-assessment reports part 1.2. The commission includes the rector, the study pro-rector, the science and development pro-rector, the executive director, faculty deans, directors of scientific institutes, a student representative, and heads of units. This commission follows closely whether the aims of the strategy have been reached, analyzes the indicators, and also proposes changes to fulfill the indicators.

The QMS itself has 4 major steps, which are shown in the self-assessment report part 1.3. in Figure 1.2. – planning, in which the objectives and targets are set; implementation, where actions are implemented to reach the goals; checking or analyzing the outcomes and risks; acting where corrections are made to reach the goals.
In the self-assessment report in part 1.2. it is also described that regular comparison of the study programs is done to ensure that they are competitive with other similar study programs both nationally and in Europe. The QMS also relies on regular surveying amongst the students, employers, and graduates, which will be further explained in this report's part 1.2.4.

There are also a lot of informal quality assurance processes that were described in the interview process both by the teaching staff, faculty administration, students, and graduates. In the assessment visit interviews, it was mentioned that for 3 years now there have been informal meetings between the study program administration and the student representatives of each study group, where students discuss needed improvements in the study program. Meetings of students with the study program directors are described also in the self-assessment report part 2.2.1. There are also informal chats in the messaging platform “Telegram” so that students can immediately inform the staff about potential problems. Regarding the teaching staff, it was revealed in the interviews that there are also informal procedures taking place, such as coffee breaks each Wednesday where the teaching staff can discuss their problems with the administration, propose changes, etc.
The student council representative was very fund in the interview process on how the students are involved in each and every process of quality assurance management. In the interview process, it was revealed that the teaching staff has many opportunities for methodology seminars to increase their study subject quality as well.
The whole QMS is regulated by the VUAS Quality Management manual (https://irp.cdn-website.com/f6b5d556/files/uploaded/VeA_Kvalitates_vadibas_rokasgramata.pdf) and the quality management policy (https://www.venta.lv/augstskola/kvalit%C4%81tes-politika). Unfortunately, only the quality management policy is available in English, therefore it might be a problem for international students to get acquainted with the whole quality assurance process. Each of the processes have also a flowchart that explains them, therefore making the processes more friendly for those people, who are not reading the whole document or have difficulties doing so.

The evaluation of each program and the required changes are considered by the councils of study programs and the Faculty Council, therefore adding another layer of assurance.

Overall, the quality assurance system is running well, it depends both on formal and informal procedures and both are currently in balance, therefore the study field is improving. Informal communication might become a problem when more students will be attracted to VUAS.

1.2.2
According to the self-assessment report, the study field is closely related to the strategy of VUAS (https://irp.cdn-website.com/f6b5d556/files/uploaded/VeA_Strategija_2021_2027.gadam.pdf). To ensure continuous development of the study field and each study program individually, it is important to have a strong collaboration with students, employers, and graduates. To ensure the quality of the study programs, as mentioned in the self-assessment reports part 2.2.1. and in assessment visit meetings with management, the content of the study programs is analyzed in meetings with industry representatives, regularly compared to other universities, and discussed with secondary school representatives as well.

Each study program undergoes evaluation each year, where weaknesses, strengths, and possible developments and improvements are discussed. Students, graduates, and employers also play a significant part in the quality assurance processes in VUAS. To receive quantitative feedback, each of the parties receives a survey to fill in, as described in the self-assessment report part 2.2.1.

In an assessment visit in the interviews with the HEI management, it was said that VUAS also has a convent of counselors, where they have many stakeholders from the industry, from the region, and from different organizations which are important for local businesses as well (such as - A/S Latvenergo, SIA “Bucher Municipal”, Ventspils port, the head of Kuldīga municipality, The head of Talsi municipality, the deputy head of Ventspils municipality, The director of Ventspils 1 gymnasium, etc). With this convent, the VUAS can get suggestions on how they can improve the study process and where they need to aim strategy-wise.

The overall review process undergoes many institutions, starting from Strategy, Quality Management, and Risk monitoring commission, ending with the Faculties Council and Study programme council. The faculty's study programme council is responsible for reviewing the contents of each study program. In this council, there are representatives of students, graduates, and employers. Then, the changes are discussed also in the Faculties council, where students, teaching staff, and administrative staff are involved. As mentioned before in this report, Strategy, Quality Management, and Risk monitoring commission also can propose changes needed to the study direction in order to comply with the proposed indicators of the VUAS strategy.

In the self-assessment reports part 2.2.2. there are available specific examples of how this procedure works. It is described how the new first-level study program “Programming Specialist” was developed, which included communication with students, employer representatives, and career advisors from schools. The study program was developed in accordance with the development strategy
(https://irp.cdn-website.com/f6b5d556/files/uploaded/VeA_Strategija_2021_2027.gadam.pdf) of VUAS with the acceptance of VUAS Senate. The further process involved the Faculty council, analysis of the labor market, intensive consultations with the industry representatives, and in the end 9 experts from the industry were involved in the study programs development. 5 companies also signed a memorandum of intent to provide internships for the students of this study program. Also the bachelor study program “Electronics' ' underwent changes since the previous accreditation

period. The main changes were implemented because of student and graduate surveys that emphasized the need for more practical lessons and that they would be interested in getting a qualification. The improvement process included the faculties council and consultations with the industry, as well as the necessary procedures from the side of the Senate. It is also mentioned in the self-assessment reports part 2.2.2. that when creating and advancing educational programs, the Latvian Qualifications Framework (LQF) and the European Qualifications Framework (EQF) principles are taken into account.
The change implementation during the study semester in specific study courses is explained in this report's part 1.2.3.
Overall the procedures to implement changes in the study field are well working and currently include all parties - employers, graduates, and students. Students are mainly involved through the Study direction council, Faculties Council and the Senate.

1.2.3
According to the self-assessment reports part 2.2.3. students have the chance to submit complaints and suggestions both orally and in a written format. In the assessment visit interview with students, experts asked about oral complaints and it was explained that mainly oral complaints are resolved together with the teaching staff or in cases when the student does not know the procedure on how to submit the complaint or suggestion. In this case, the student is usually walked through the procedure and helped to submit the report. Regarding the written complaints, the complaints are collected and submitted in accordance with the “Procedure for submitting and reviewing proposals and complaints from students of Ventspils University of Applied Sciences” (https://irp.cdn-website.com/f6b5d556/files/uploaded/Nolikums%20par%20stud%C4%93jo%C5%A1o%20s%C5%ABdz%C4%ABbu%20un%20priek%C5%A1likumu%20izskat%C4%AB%C5%A1anas%20k%C4%81rt%C4%ABbu%20Ventspils%20Augstskol%C4%81.pdf). Although this document is available only in Latvian, therefore international students do not have the chance to get acquainted with it.

This procedure can be used to submit complaints or suggestions regarding the study contents, process, and its quality; material-technical equipment availability and quality; performance of the staff, and unethical or unfair conduct by the staff of VUAS. The procedure regulates that students can submit the suggestion or complaint alone or in a group, as well as explains the obligatory contents of the document (e.g. name, student ID, contact information, etc.) The students should address the document to the dean of the faculty or if the document includes the dean, it should be addressed to the vice-rector of academic affairs. The answer to the suggestion or complaint is sent back to the student in 7 days. In the interview process with the students, it was mentioned that students have used this mechanism to change the lecturer in certain study subjects. Almost all of the students and graduates were able to describe how the procedure takes place and what would be their actions in case they would want to submit a complaint or a suggestion. Some students also mentioned the informal methods that are described in this report's part 1.2.1.

Regarding the complaints and suggestions gathered by the bi-annual surveys, they are discussed amongst the teaching staff, administration of faculty, and the students involved either in the student council or faculties council. In the interview in the assessment visit process, it was mentioned that students themselves do not see any changes, because they have already completed the course, therefore some feedback could be provided to the students on how their suggestions are taken into account to improve the study quality.

1.2.4
The mechanism for obtaining and providing feedback, including from students, graduates, and employers, is effective and focused on the improvement of the study field.

Every year, VUAS evaluates each of its study programs to identify areas of weakness, strengths, and opportunities for development and improvement. This process involves input from various stakeholders, including students, graduates, and employers, to ensure the quality of education and training provided by VUAS. As part of this evaluation, VUAS distributes surveys to each of these parties to gather quantitative feedback. The self-assessment report, section 2.2.1, provides more information on this process. By regularly assessing its study programs and incorporating feedback from multiple sources, VUAS can maintain a high standard of education and training that meets the needs of its stakeholders. All of the included parties confirmed receiving and filling out the survey by VUAS.
In the self-assessment report, it is written that each student has an obligation to fill in a survey once a semester regarding the quality of each study course. In the interviews with the VUAS administration and the students, it was also confirmed. If the students do not fill in the survey they cannot register for the next semester's study subjects. In the expert commission's opinion, this might result in the fact that students randomly select their answers or do not qualitatively fill out the surveys. To get more precise data, it could be suggested that the student council of VUAS could run an independent survey that is not mandatory, therefore getting the data from students that are truly interested in raising the quality of study courses and study programs.
In the assessment visit interview process, it was also noticeable that both students and the teaching staff were able to name the latest changes that were implemented because of the surveys, which is a positive sign that the system is running.
In the future, as said in the self-assessment part 2.2.4. VUAS would like to implement a survey also for the teaching staff as well as it is mentioned that VUAS is looking for a systematic way how to introduce the next potential changes to all of the included parties.

1.2.5
The information in official registers corresponds with the information provided on the VUAS website https://www.venta.lv/. The information about study programs: first-level “Programming specialist”, professional bachelor “Electrical engineering”, “Ship navigation electronics” (will no longer be implemented), professional bachelor “Smart technologies and mechatronics” and academic master “Computer sciences” are provided in Latvian and information about academic bachelors study program “Computer sciences” is available in English. The description of each study program is provided, but the courses lack descriptions, therefore limiting the knowledge of potential applicants of the study programs.

The application process happens through the webpage apply.venta.lv, which can easily be accessed from the VUAS website. When clicking on the study program to which the applicant wants to apply, they are taken to a page with general information about the study program, which includes the duration, cost, application fee, and other useful information, yet still, there is no information about separate study courses or their description that can be easily accessed from this page. The availability of such information is essential because the contents and descriptions of each study course can help in attracting more students to VUAS.

Conclusions on this set of criteria, by specifying strengths and weaknesses

Conclusions

The VUAS quality assurance system relies on both formal and informal communication. All of the formal procedures are well described and flow charts are available to students who have difficulties reading or understanding documents. Unfortunately, the documents mainly are available in Latvian, which complicates this process for international students. Overall students are very well informed

about the quality assurance processes and how they can be a part of them, but students only receive feedback about individual or group complaints or suggestions but do not receive feedback about the bi-annual surveys. The bi-annual surveys are mandatory and if they are not completed, it is forbidden for the student to register for the next semester's courses. Such a mechanism can promote false answers in the surveys because some students might only fill them out in order to be able to register for the courses. It would be recommended for the student council to launch another survey, where those who are genuinely interested in the quality, could fill it out, and then it would be possible to compare the results in both surveys.
Overall the quality assurance system is running smoothly and the formal and informal practices are in balance, but the informal practice might only work in the future if the student count does not increase. All of the parties - students, graduates, and employers - are very well included in the development of the study programs and the insurance of their quality.

Strengths:
1. Strong student involvement in all of the steps of quality assurance
2. Each process also has a flowchart that makes the process easily understandable
3. Students and graduates are very well informed about how to submit complaints and suggestions

Weaknesses:
1. Some of the documents related to quality assurance are not available in English, therefore are difficult to access by international students
2. The bi-annual surveys might contain faulty data because they are obligatory
3. Students do not receive any feedback on what changes were implemented because of bi-annual surveys
4. Study course contents and descriptions are not available on the website

Assessment of the requirement [1]

1 R1 - Pursuant to Section 5, Paragraph 2.1 of the Law on Higher Education Institutions, the higher education institution/ college shall ensure continuous improvement, development, and efficient performance of the study field whilst implementing its internal quality assurance system:

Assessment of compliance: Fully compliant

VUAS has established a quality assurance policy and system that is taking place in VUAS. This system is based on the European Quality Management Fund Excellence Model. The system includes all responsible parties- the staff, students, graduates and employers, therefore bringing them all together to ensure continuous improvement of the study field. VUAS has also a clearly defined complaint and suggestion gathering mechanism that students are aware of.

2 1.1 - The higher education institution/ college has established a policy and procedures for assuring the quality of higher education.

Assessment of compliance: Fully compliant

VUAS has implemented a policy and system to ensure the quality of their education. This system follows the European Quality Management Fund Excellence Model and involves all stakeholders, including staff, students, graduates, and employers, in order to achieve continuous improvement in the study field.

3 1.2 - A mechanism for the development and internal approval of the study programmes of the higher education institution/ college, as well as the supervision of their performance and periodic inspection thereof has been developed.

Assessment of compliance: Fully compliant

VUAS has a clear mechanism on how new study programmes and changes in the existing ones are developed. Examples were provided in the self-assessment report and also described in this report.

4 1.3 - The criteria, conditions, and procedures for the evaluation of students' results, which enable reassurance of the achievement of the intended learning outcomes, have been developed and published.

Assessment of compliance: Fully compliant

The criteria, conditions and procedures for evaluating the outcomes of students' work is clear and ensures achievement of learning outcomes. Students are well informed of these criteria and they are regularly overlooked to improve them

5 1.4 - Internal procedures and mechanisms for assuring the qualifications of the academic staff and the work quality have been developed.

Assessment of compliance: Fully compliant

VUAS offers its academic staff various opportunities to rise their qualifications. The academic staff is not very keen on improving their qualifications in exchanges such as Erasmus, but often participate in international conferences, as well as participate in methodological and other seminars provided by VUAS.

6 1.5 - The higher education institution/ college ensures the collection and analysis of the information on the study achievements of the students, employment of the graduates, satisfaction of the students with the study programme, efficiency of the work of the academic staff, the study funds available and the disbursements thereof, as well as the key performance indicators of the higher education institution/ college.

Assessment of compliance: Fully compliant

VUAS collects information from students, graduates and employers both in a qualitative and quantitative manner. All of the included parties are asked about the satisfaction with the study programmes as well as the room for improvements.

7 1.6 - The higher education institution/ college ensures continuous improvement, development, and efficient performance of the study field whilst implementing its quality assurance systems.

Assessment of compliance: Fully compliant

The system in the self assessment report is described as working very well and the included parties are well informed about the procedures. But in the interview process it was mentioned that students lack feedback about their suggestions in the bi-anual surveys. Overall the study programmes are updated to suit the needs of students, graduates and the industry, as well as to teach the newest methods used in research and industry. The annual evaluations of each study programme of the branch ensures the best quality outcome.

1.3. Resources and Provision of the Study Field

Analysis

1.3.1. VUAS managed to differentiate revenue flows by attracting local and foreign students, developing new programs, developing and delivering specialized training for industry (https://en.venta.lv/lifelong-learning), running joint projects with industry partners and actively participating in research projects (https://en.venta.lv/zinatne/projekti). The main source of financing for the study field is a State Budget grant for the implementation of accredited and licensed study

programs and student scholarships.

On a regular basis, VUAS receives significant financial support from Ventspils State City Council. The budget is used for additional allowances for lecturers and researchers with Ph.D. degrees. Such support stimulates the attraction of experienced lecturers and researchers in their scientific work.

In addition to the State funding, a large part of revenue comes from students' tuition fees making this a key risk and at the same time an opportunity for further growth. Latvia continuously experiences a decrease in new students, and this has an impact also on VUAS. Besides the overall decrease in students, the global pandemic in recent years had another negative impact on attracting new students. VUAS has managed this challenge by optimizing the programs and making bachelor and master programs more attractive for potential students and introducing a joint professional bachelor study program Smart Technologies and Mechatronics in collaboration with Liepaja University.

The size of remuneration of the faculty’s general and administrative staff is precisely known and is divided among the study programs in proportion to the number of students in each study program at the time of the calculation of study program costs. Such investments support research in various aspects. VUAS has increased the number of specialized laboratories (Laboratory of electrical measurements, Digital Electronics Laboratory, Signal Processing Laboratory, Laboratory of optics and optoelectronics, Physics laboratory, Machine learning, and computer vision laboratory) and these laboratories ensure capabilities to get practical experience with fundamental principles (like physics, mechanics, and electronics) and more complex devices (like mobile and industrial robots and radiometry systems). Expenditures for the acquisition of fixed assets include costs related to the acquisition of the activities of the FoIT, including the fixed assets required for the provision of the study process. A significant amount of funding for the acquisition of fixed assets in 2018-2022 was provided in the form of ESF funding in the project “Modernization of Ventspils University of Applied Sciences’ STEM Teaching programs”. A system for funding scientific and applied research and or artistic creation is defined and implemented and it is effective.

1.3.2. VUAS has a significant volume of premises to host lectures and laboratories for their students including 6 computer classes with 25-31 computer workstations each, and three with 16-24 workstations, plus 3 labs with 10-13 computer workstations each, are available, two modern amphitheater auditoriums with 190 and 130 places respectively, equipped with multimedia audiovisual equipment and simultaneous translation equipment. Auditoriums were equipped with modern interactive boards and other technological equipment, ensuring access to technologies necessary for study programs. VUAS has established specialized laboratories of the Laboratory of electrical measurements, Digital Electronics Laboratory, Signal processing laboratory, Laboratory of Optics and Optoelectronics, Physics Laboratory, and Machine Learning and computer vision laboratory. For students of electronics, a permanent working space has been allocated and equipped with all necessary measuring instruments, and soldering stations, and it is available for student practical work. Laboratories are available for students 24/7, which is a great support for students' innovative activities and demonstrates the dedication of the staff able to organize their work according to the student's interests. IT infrastructure, hardware, and software equipment do cover the needs of remote and on-premise delivery of courses for electronics, computer science, and other study programs. Study program directors on an annual basis review existing and needed equipment and submit requests to the faculty dean, who combines and prioritizes requested items together with requesters and considers this for budgeting. VUAS is connected to the Latvian academic network with a 10 Gbps broadband connection. VUAS has introduced a student lounge where students can relax, study or meet other students. This room is also used to host events, meetings, or

simply as a meeting place. The room contains a pool table, table football and table tennis table, sofas, a small stage for presentations, and a large table at which you can easily learn, play games, or have tea therefore this is a great resource available to students and teaching staff.

VUAS provides hostel services for local and foreign students as well as for the teaching staff. In addition to short-term facilities, teaching staff can request long-term facilities from the city authorities.

1.3.3. VUAS has built a library for students and academic personnel. The library consists of two parts – physical (including printed materials and reading rooms with 32 600 volumes) and electronic (rooms and computers, access to the databases Databases: LETA; Letonika; Lursoft; EBSCO; Britannica Online Academic Edition; Scopus; Science Direct; Web of Science., etc. Both libraries are supported by an electronic catalog so students can find necessary articles or books. The library can be used 6 days a week (Mon-Sat). Students can use available materials in the library or take them home. VUAS maintains statistics on library usage. The library provides access to specialized IEEE sources but in a limited volume (only named items are available). On an annual basis, physical and electronic libraries are being extended with new books and materials. This is done by the bottom-up approach – by requesting needs from teachers and combining them on the study field and faculty level. The fundamental needs of the study field programs are fulfilled with the necessary libraries. An inter-library subscription is also available – both locally between the units of Ventspils Library and other academic libraries of the biggest universities, as well as the National Library of Latvia. Library resources and databases are available to students and meet the needs of the study field.

1.3.4. VUAS is using multiple channels and information systems to keep students informed about the latest news, provide necessary information about subjects (like time schedule), ensure communication between students and teaching staff, and receive requests or feedback back from students. These include a public web page (https://en.venta.lv/), an intranet for authorized users, and Moodle. These systems are being maintained on a high level considering the content and frequency of updates.

Moodle is the main VUAS system that supports the delivery of study programs. Same as other higher education institutions, VUAS is leveraging Moodle to: provide basic information about the study courses; ensure centralized access to tasks for independent work (incl. Examples); self-examination tests and questions for exam preparation; materials for the study course (incl. lecture materials, additional reading, and sources, etc.). During the demonstration of the Moodle system and other discussions in the assessment visit, it was observed that some of the courses do have good and complete descriptions and content, but some have basic information. VUAS is finalizing the implementation of the English content across the whole system to ensure that all information including study course materials, regulations, and official documents are equally available in Latvian and English.

For study programs that require physical attendance in laboratories (i.e. electronics, mechatronics, or robotics), practical lessons are delivered in classrooms. VUAS has managed to mitigate the challenges of the pandemic period related to such class delivery by implementing demo sessions delivered by teachers so students can learn special equipment, and practical exercises, and repeat simple tasks on their premises.

BigBlueButton is an open-source online conference system hosted on VUAS servers and it was actively used during the period of COVID-19 pandemic restrictions and is used when it is necessary for teaching staff to connect remotely at any stage of the teaching process. In addition the following

systems are used too at VUAS: Google Workspace; Drive - for delivery of materials with a bigger file size; Meet - an alternative back-up solution for providing lectures in remote mode; Sites - for more interactive placement of individual subject materials; Classroom - solutions for submitting and testing work in individual subjects; VUAS Notice Board, LAIS, VeApp, VUAS server infrastructure, GitLab. It should be mentioned as an essential tool for the lesson planner and class list app called "University in Your Pocket". Students and teaching staff can view the class schedule on their smartphone, lecturers can make entries about changes. VUAS has established necessary practices for the study programs that are available for distance learning too if needed. In collaboration with the University of Latvia VUAS has implemented the LAIS information system to manage, keep track of student register, student payments, course enrollment, study plan, study grades, student contracts and management of other essential administrative documentation.
VUAS teaching staff keeps the priority on focusing on close collaboration with students, regularly interacting with them and informing about the actualities. Besides the official mandatory channels mentioned above, teaching staff established practices on usage of various communication platforms (i.e. WhatsApp and Telegram groups), what earned positive feedback from students.
During the onsite meetings with the students MS level students expressed an interest to have some options for distant studies or passing some courses in distant form because of problems with parallel studies and work and implementation of the Moodle system and other IT resources already used at VUAS the HEI has all the preconditions to develop this option.

1.3.5. VUAS promotes transparency in attracting new staff by publishing open vacancies on their homepage (https://en.venta.lv/university/vacancies). However, currently there are no vacancies (checked on April 25).
Close collaboration with local industry and Ventspils municipality supports collaboration and attraction of industry specialists in implementation of study programmes. It should be mentioned as a positive practice that several researchers from Ventspils International Radio Astronomy Centre are lecturing and supervising practical classes on all the programmes. This tightens the connections between high-tech research and teaching process and is also attractive for the students.
Industry specialists are being attracted for permanent positions and to deliver guest lectures or partially deliver particular subjects. Academic staff involved in study programme delivery has necessary experience and expertise to deliver related study courses (based on provided CVs and multiple positive feedback received from current and graduated students as well as representatives from industry). VUAS managed to keep top level experts of study fields and involve them in delivery of study courses, research activities, supervising graduate Theses and running joint projects with industry. Expertise of the academic staff has been highlighted during several meetings with current students (of bachelor and master programmes) and graduated industry specialists from all the study programmes.

1.3.6. Development of academic staff is one of the priorities of VUAS with-in 2021-2027 strategy https://irp.cdn-website.com/9945ff8b/files/uploaded/VENTSPILS%20UNIVERSITY%20OF%20APPLIED%20SCIENCE_STRATEGY_2021-2027.pdf. VUAS addresses this focus area by next activities: systematic annual planning of methodological development of academic staff; assessment of the potential for professional growth and individual plan preparation; analysis of student's feedback on study courses and aligned academic staff by running regular surveys. Methodological development plan for academic staff includes seminars, training and knowledge sharing sessions on various improvements for delivery of study courses, approaches for feedback collection and usage, critical thinking and other topics delivered by own and invited local and foreign experts.
VUAS participates in EU funded projects to get additional support in academic staff development and to attract foreign specialists.

As of February 2021, within the framework of the ESF project “Strengthening the Teaching Staff of Ventspils University of Applied Sciences in the fields of Strategic Specialization”, the teaching staff starts internships with businesses in Latvia. in order to improve the quality of the study process, to update the competences of teaching staff and strengthen collaboration with external partners.
VUAS has established regulations to evaluate teachers annually by examining the self assessment report of the study field and research activity at the meeting of the faculty council. The Ventspils Council pays an additional bonus to teaching staff with a doctoral degree for the contribution of staff with doctoral degrees to the city’s ICT processes.

1.3.7. Workload of academic staff and their involvement in delivery of study programmes overall is balanced and corresponds to expertise. Some people are responsible for multiple courses as they involve additional staff to deliver lectures and practical work. However there are people with a high number of study courses and some combine them with additional roles at VUAS or Ventspils International Radio Astronomy Centre.
VUAS has established regulation of expected workload of academic staff in teaching and other activities. This defines higher involvement (in %) of senior academic staff (like professors and associate professors) in research activities. Lecturers and assistants are more involved in teaching and delivery of study courses. Such approach balances new academic staff involvement in VUAS internal processes and continuous development of research directions. To balance the academic workload, if it exceeds 1.2 (teaching load), a separate decision by the Faculty Council and VUAS Senate is necessary for the approval of the workload.

1.3.8. Institution provides general and specific support for all students through: IT system support service for access management, hardware, IT infrastructure issues; student support guidelines (https://www.venta.lv/augstskola/parskati-un-zinojumi); providing individual consultations by academic staff (this has been recognized by several current students and graduates); searching for internship options in local and international companies. Contacts with employers' representatives are also facilitated by study programme directors, as well as visiting lecturers from companies and institutions, who inform students about job opportunities in the companies and institutions they represent.
VUAS provides necessary support for foreign students, and this includes assistance during the relocation, onboarding in the first months, English speaking administrative personnel and all needed documentation and process description.

Conclusions on this set of criteria, by specifying strengths and weaknesses

Conclusions:

VUAS has major expertise and experience in study program management including all necessary resources and teaching staff to provide good level education, high level research and contribute essentially to local development. VUAS runs a financially sustainable business through continuous improvements of competitiveness of the owned study programs. VUAS has equipped students and teaching staff with necessary information systems, laboratories, special software and hardware to achieve learning objectives with-in a study process.

Strengths:
1. VUAS has managed to keep and grow top expert level academic staff in corresponding study fields.
2. VUAS has built and continues investments in their specialized laboratories (i.e. electronics, radiolocation, machine vision and mobile robots) that make them one of the top higher education

institutions in engineering sciences and especially radio location related fields in the Baltic region.
3. Collaboration with Ventspils International Radio Astronomy Centre has strengthened the study field with modern and unique fields.
4. Strong collaboration with industry partners is ensured in the research area, delivery of study courses, internship options for students and academic staff development.
5. Good level and 24/7 accessible laboratories.

Weaknesses:
1. Not fully realized the potential of distant learning and industrial training courses.
2. Content in the Moodle system needs to be finalized and equally complete information to be available across study courses and in both Latvian and English languages.

1.4. Scientific Research and Artistic Creation

Analysis

1.4.1. As indicated in page 5 of the SAR the mission of the VUAS includes "...to provide modern, tailored to the changing requirements of the labor market, research-based, accessible education...". Vision states "...European-level university that is internationally recognized and makes a significant contribution to the development of the economy and science". Development goal A2 (page 6) clearly underlines the importance of the research for VUAS "A2. The excellence of science and the transfer of knowledge in the national economy, as well as the increase of the innovation capacity, the social and economic values of knowledge and research in cooperation with external ones, incl. international partners;". Development strategy identifies following directions of strategy development Z1: Promotion of scientific excellence; Z2: Strengthening cooperation; Z3: Promotion of commercialization; Z4: Strengthening the research capacity and quality. Page 18 of the SAR defines study fields objectives, which are inline with VUAS development strategy in terms of science and research. In addition page 58 states that in 2020 it has conducted VUAS evaluation as a research entity and experts have granted the status of quality local player, which supports all mentioned above. According to SAR, VUAS has been involved in 4 national research programmes (6 national research programme projects) and the most of them are related to the corresponding field - ICT. In addition, during the reporting period, VUAS implemented four projects under the European Space Agency's PECS programme. Page 67 of SAR also represents the involvement of VUAS to set up international projects under different programmes, including H2020. VUAS also puts significant efforts to organize annual scientific conferences, summer schools. Indicated in SAR (page 59) research directions fits well to the ICT domain. The list of public and private partners with whom VUAS is collaborating in the field of the research is also relevant to the study field (for example Institute of Engineering Ventspils International Centre for Radio Astronomy (VSRC), "Ventspils High Technology Park, Netherlands Institute of Radio Astronomy "Astron", Radio Astronomy Institute of the University of Manchester, Swedish Institute of Space Physics etc). Summarizing all mentioned above it shall be concluded that scientific research is considered as an important area of the development of VUAS , at the same time it should be stated that where are places for improvement related with commercialisation, publishing activity and joint research projects with international partnership. Considering that VUAS is university of the applied sciences it would be expected intensive activities targeted on collaboration with the industry and commercialisation activities, while SAR do not provide much details on commercialisation policy in VUAS (only page 70 has some notes about collaboration with LIAA, Business Incubators etc) and any "success stories" in commercialisation (for example start-ups, spin-offs, patents, intellectual property rights etc. Some of the projects (with industry) are mantioned in page 69 -70 of the SAR, but the majority of them are implemented via LIAA instruments or involving public money. Also 2-13_appendix_teaching-staff-scientific-resarch-experience.xlsx shows that there are no patents or any intellectual property items.

Also analysis of the 2-13_appendix_teaching-staff-scientific-resarch-experience.xlsx shows that some of the mantioned publications are in general out of the study field scope, as example the majority of the publication of Prof. Dr.phys. S. Hilkevics, Prof. Dr. sc. admin. Una Libkovska etc, but to note they are valuable and demonstrate the high performance of the mantioned staff. But the overall number of ICT-related publications could be improved. SAR reports a number of the projects completed within the frame of the international cooperation, but in the majority of the projects VUAS takes a role of the partner, while considering VUAS experience a leader position is recommented.

1.4.2. According to the information from SAR (page 60) and information presented during the meetings in assessment visit there are a significant number of the teaching staff, who are research staff at the same time and therefore able to deliver students not only fundamental knowledge, but also enrich students with the research issues they are dealing with. As a positive bullet point, could be mentioned the conference organized for the students, in which they are able to present their findings and ideas. The conference is organized once per year (April-May) and targeted to the students. Existence of the conference and ability to participate in the conference has been confirmed during the meeting with students. SAR do not provide much details about the conference, but during meeting with VUAS management and study programme directors, it has been confirmed that the primary goal of the conference is knowledge sharing, and popularization of the research among the students. Also it has been stated that best presentations receive some award. The conference is a VUAS level event, therefore students of all study programme directions take part. At the same time it has been reported that the conference is not obligatory and it is up to students to participate in it or not. But introducing the concept that master level students should participate is obligatory could enrich the conference and would give additional skills to master level students on presenting their results. Page 65 of the SAR provides good examples of how bachelor level and master level students are involved in research activities. For example bachelor level students mainly are involved in the projects as developers (implementing algorithms and solutions generated by VUAS researchers), also SAR reports that some of the bachelor thesis are prepared in the frame of the research activities. Master level study programmes students are involved in research more deeply, and many of them are working in VUAS IZI VSRC alongside their studies (SAR page 65) conducting the research. In addition all level students are capable of participating in research and projects conducted by VUAS. For example, during the period from 1 September 2019, the project “Kurzeme Innovation Grants for Students” was implemented by VUAS, financed from ESF (KInGS, Project No.1.1.1.3/18/A/004). At the same time it should be stated that learning outcomes identified for bachelor level study programmes in computer science do not reflect any at least basic research issues, while in master level it is clearly identified. The following is based not only on an overview of the courses, many of which deal with professional issues, but also on the feedback from students obtained during assessment visits.

1.4.3 The recognition of the VUAS on an international level is limited by the specific field, which is radio astronomy. SAR (page 61-62) provides examples of the international collaboration in this field utilizing different level research programmes. According to the SAR, key international partners, like the Radio Astronomy Institute of the University of Manchester, Swedish Institute of Space Physics (SISP), European Space Agency, University of Tartu Observatory, Torun Radio Astronomy Observatory in Poland etc. Unfortunately in most cases, HEI is not a leading institution in the project, but a partner. During the meetings in assessment visit it has been stated that in many cases/projects VUAS is involved as experts in signal processing, artificial intelligence etc. which corresponds to the ICT domain. Not looking at the fact that there are ongoing and completed projects, the research capacity of the VUAS is limited and improvement in this field could potentially raise the number of the projects and improve international collaboration, which would include not only joint projects, but also joint publications.

1.4.4. VUAS indicated in its strategy (2021-2027 strategy https://irp.cdn-website.com/9945ff8b/files/uploaded/VENTSPILS%20UNIVERSITY%20OF%20APPLIED%20SCIENCE_STRATEGY_2021-2027.pdf.) that scientific research would be one of the issues which should be considered and improved. There are several involvement mechanisms mentioned in the SAR (page 63-64), which by VUAS opinion forms the framework for the involvement of the teaching staff into scientific or applied research. As example following could be mantioned: In accordance with the regulation for the allocation of financing for professional trips to participate in conferences, VUAS teaching staff are paid to participate in international scientific conferences – transport and accommodation expenses and participation fees at the conference are covered; The teaching staff are also awarded funding for internal self-initiated research projects in accordance with the rules of the regulation "Development of Scientific Activity at Ventspils University of Applied Sciences"; In accordance with the Regulation on the procedures according to which academic staff of the Ventspils University of Applied Sciences (VUAS) are Granted Academic Leave for Scientific Research or for doing scientific work outside their workplace, lecturers who have served at least six years in elected academic positions at VUAS and who last took this type of leave at least six years ago are entitled to request paid academic leave of six calendar months; In accordance with the Regulation "Regarding Additional Remuneration for Employees of Ventspils University of Applied Sciences", additional remuneration is awarded to VUAS elected teaching staff with a doctoral degree, who have fulfilled one of the criteria referred to in Paragraph 3 of the regulation in the previous two academic years. In accordance with this regulation, teaching staff who have acquired the status of an Latvian Science Council (LSC) expert are awarded a one-off payment. The proposed mechanisms could be considered as supportive activities (must be), but they are not forming systematic motivation schemes, with clear vision from management perspective of the KPI, activities, and possible motivation actions, which would raise VUAS to the next level. Among listed mechanisms several could be noted, as positive examples of motivation - self-initiated projects, budget for conferences and publication. Considering the title of the VUAS ``university of applied" it would be useful and important also to stimulate R2B activities and propose the motivation scheme for teaching staff participation in such activities etc.

1.4.5. Page 64-65 of the SAR existing mechanisms of the students involvement into scientific research. Some of them are a part of the study process, like for example specific courses/topics which improve knowledge and skills regarding research "…research knowledge and skills of students, each bachelor's and master's study programme includes a study course on study methods, methodology." Final thesis in all levels utilize the topics promoted by public and private partners of the VUAS . One of the major players in this field is Ventspils International Radio Astronomy Centre. In addition VUAS tries to involve students into research projects of different levels, but effectiveness of this involvement still requires additional efforts and systematic approach. As a good example of clear policy it is additional bonuses for self-initiated projects if students are involved in the development, so it pushes academic/research staff to include students. The mentioned in SAR student conference also could be considered as a step forward into "promotion" of the research activities, but as it has been reported conference is not obligatory. The good undertaken, is also project "Kurzeme Innovation Grants for Students", which would allow students to realize themselves and get some budget for their ideas, but unfortunately SAR and meetings in assessment visit with VUAS representatives do not explain what VUAS is going to do after the end of the project (without ESF money). Demonstrated in page 65 of SAR thesis are in the frame of the study field and in many cases are industry related. Not looking at the fact that SAR provides specific cases of students involvement, there is no clear systematic approach which could promote more intensive involvement of the students, while already done efforts are respectable.

1.4.6. The SAR pages 68-69 reports specific cases of innovative solutions used in VUAS . Some

examples are very positive and could be considered as a step forward compared to the past, while some only pretend to be innovative. As positive examples should be mentioned a new video studio, which should speed up academic content digitalisation, continuous development of the Moodle environment, promotion among teaching staff knowledge and skills on courses development etc. At the same time, it seems that all described solutions are very fragmented and do not organize a systematic approach. Also during meetings in assessment visit with teaching staff the provided information about methodological seminars (conducted to the teaching staff) was limited. The usage of moodle, is intensive one, but in many cases it has been reported by students and teaching staff that there are no any rules or obligations for the teaching staff regarding material publishing and moodle course support. Some of the courses are well designed, while some have only basic information (like course description). Another good case from VUAS is C406 space which according to SAR was refurbished and turned into an interactive digital classroom. In addition, the 24/7 approach could be considered as some kind of innovation, as not so many Latvian HEI give such service to the students.

Conclusions on this set of criteria, by specifying strengths and weaknesses

Conclusions:
Overall it should be stated that VUAS considers scientific and research development with attention, as it scientific and research is mentioned in the HEI development strategy. VUAS development strategy includes specific activities targeted to improve this domain. But in the same time, it should be stated that now in many cases used mechanisms and approaches are fragmented one and do not form the system or framework of the scientific and research domain development, including students and teaching staff attraction, R2B and commercialisation activities, continuous utilization of results gained in the frame of the already running or completed project. The primary scientific and research domain is clear and fits the profile of the VUAS - radio astronomy. There are a number of pieces of evidence gained from SAR and meeting that VUAS is collaborating with the local public and private sector in the domain of the research, but lack of the commercialisation activities targeted on establishment long-running collaboration in form of start-ups, spin-off or any of our continuous form of collaboration with the industry. VUAS in their academic activity implements a number of innovative methods which could be considered as a good undertaking, and they are unique for Latvian academic system. There are international projects, in which here are involved, but we strongly believe that VUAS has enough experience not only to participate in projects as partners, but also initiate and take leading positions in the EU projects.

Strengths:
1) Inclusion of scientific and research development to the VUAS strategy and underlining its importance on all levels (mission, vision, specific activities etc)
2) Clear research application domain - radio astronomy.
3) Good level of general scientific and research collaboration with local private and public entities
4) Some unique services offered for teaching staff and students (video studio, 24/7 labs, etc)

Weaknesses:
1) Lack of the commercialisation strategy/policy (research R2B) for establishment of the long running collaboration with industry
2) Fragmented approach for students and teaching staff involvement to the scientific/research activity
3) No experience on taking the leading positions (project leader) in international projects (only partner role)
4) Lack of attention to the research-related issues in the bachelor level study programmes

5) Lack of the strategy of how to continue and support undertaken " project "Kurzeme Innovation Grants for Students" without ESF financing

Assessment of the requirement [2]

1 R2 - Compliance of scientific research and artistic creation with the level of development of scientific research and artistic creation (if applicable)

Assessment of compliance: Fully compliant

Not looking to the fact that approaches/methods/techniques used by VUAS related to the research are fragmented and do not form the systematic approach, VUAS for the last years did a lot to push forward the research domain. VUAS puts development of research and science as one of the element of the strategic development plan. VUAS has clear research domain radio - astronomy and this open a lot of opportunities to become a leader in this field not only in Latvian, but Baltic Sea countries. This opportunity should be utlised in more effective way - leading EU level projects, R2B activities, orientation toward commercialisation and establishment of the long-running projects/collaboration with industry.

1.5. Cooperation and Internationalisation

Analysis

1.5.1. SAR report reflects well the cooperation of the VUAS, also during the assessment visit it was an opportunity to discuss the cooperation activities between VUAS and private and public partners. The VUAS has established a rich cooperation network with local private and public sector, which supports the study field and included study programmers, by implementing different types of the activities: delivery of guest lectures, internship places, providing specific courses (as professionals from the industry). In addition, it should be noted that there are a significant number of the local SMEs, who support the VUAS . During the meeting in assessment visit all participants expressed support to the VUAS in general, to the study field and to specific study programmes. Among supporters Accenture Baltics etc could be mentioned as a global supporter of the IT domain and MIKROTIK, Hansa Matrix Group etc as a supporter of the electronics domain. In addition, should be mentioned long running and continuous collaboration with the local municipality, which supports, including financial support and promotes VUAS. During the meeting in assessment visit with students and alumni it has been confirmed by them that collaboration between private and public sector exists and in many cases is very intensive (internship places, guest lectures, visits, specific courses were mentioned as examples). During the meeting in assessment visit VUAS partners confirmed their involvement in development activities related with the study programs, by participating in different level meetings with VUAS representatives (official boards, round tables etc). In the area of collaboration activities in academic fields, several entities were mentioned as Liepāja University, Riga Technical University (RTU), University of Latvia (LU), Transport and Telecommunication Institute (TSI), Institute of Electronics and Computing science, etc. For example, running the joint program with Liepāja University, joint projects with RTU, LU etc. To conclude VUAS has created a rich partnership with the local private and public sector, which supports HEI in its activities. SAR reports about membership in domain associations, like LIKTA, LETERA, MASOC etc. A weak point could be mentioned in many cases: the collaboration is none-formal without having collaboration agreements and activity plans, as it was mentioned by industry representatives. So this is the area which needs to improve, to develop sustainable cooperation (only a few representatives during meetings in assessment visit reported that they have common collaboration agreements).

1.5.2. The international collaboration has been presented in SAR and the list of the partners included as annex (2-14_appendix_list-of -cooperation-agreements_ENG.pdf) to the SAR. Most of the international collaboration entities are indicated as ERASMUS+ program partners (more than 50 according to SAR). But as it has been reported during the meeting in assessment visit with VUAS management, study programs directors and students/alumni the mobility and the collaboration in the frame of ERASMUS+ is moderate (one indicated reason COVID19 impact). The mobility (students and teachers) is moderate and could be improved. The cooperation beside of the ERASMUS+ with international entities in many cases established in the framework of the different projects, as example Netherlands Institute of Radio Astronomy "Astron'' and the University of Manchester, Swedish Institute of Space Physics (SISP) and Swedish Space Corporation (SSC), Torun Radio Astronomy Observatory in Poland, etc. Provided examples are good, but here reference is done to sharing resources between academic partners, to provide some specific classes etc.
In many cases the projects are targeted on development of the collaboration study programme and teaching staff development. As a strong point here the policy on involvement of the students (bachelor & master level) to the projects could be mentioned. It shall be concluded that besides the ERASMUS+ mobility described in SAR collaboration activities with international players is rich and successful, in terms of the development of the study programmes, teaching staff and involvement of the students. SAR is not reporting a wide presence in the international association, which corresponds to the domain of computer science and electronics. So it would be useful to improve such a collaboration to raise international recognition of the VUAS. For example INFORMATICS EUROPE etc.

1.5.3. Page 74 of the SAR reports well mechanism used by the VUAS to attract international students and teaching staff. Regarding student VUAS implements the set of the activities to attract students, which includes education exhibitions, information publishing in educational platforms, use of social networks and agents. Constant based webinars for potential students and agents are organized to deliver the most vivid information. Also It has been reported in SAR and confirmed during the meeting that VUAS is Member of the Association for the Export of Higher Education. For potential students the requirements are presented. So, in this direction. Regarding teaching staff, several mechanisms were mentioned in SAR, but as it was communicated during the meeting in assessment visit in many cases a personal contact of VUAS is playing a great role in this process. Also establishing the collaboration in the frame of the project gives additional channels for teaching staff attraction. Very effective was implementation of the project “Strengthening the Academic Staff of Ventspils University of Applied Sciences in the Fields of Strategic Specialization” which gave an opportunity to attract new teaching staff, and some of them were later elected. Also one of the mechanism ERASMUS+ programme has been mentioned, but because of the COVID restriction it was not effective. To conclude the presented mechanisms are active and are used actively by the VUAS. At the same time it should be stated (and reported during visit), that in many cases personal contacts are playing a great role in this process. So formalization of this process (or strategy) could be a good support for the HEI for establish sustainable development and make it more efficient

Conclusions on this set of criteria, by specifying strengths and weaknesses

Conclusions:
It shall be concluded that VUAS has rich collaboration with local private and public entities, but at the same time international collaboration is limited. In many cases local private and public collaboration is established based on personal contacts of the VUAS management, without formalizing collaboration aspects with agreements or MoU with specific activity plans. VUAS has presence in all domain related associations, while presence on international bodies is limited. The teaching and students staff mobility could be improved, by moving from classical mobility

programmes to the blended intensive programmes (BIP). Attraction of the international students includes several mechanisms, which corresponds to the size and strategy of the VUAS , while the strategy (policy) on involvement of international teaching staff is not presented and usually based on personal contacts.

Strengths:
1. Rich cooperation with the local public and private entities, which supports study fields and includes study programmes by different activities (internships, guest lectures, specific courses etc).
2. Long-running and continuous cooperation with the local municipality, which provides different kind of support (including financial) to the VUAS
3. Fruitful collaboration in the frame of different level projects with impact on study programme (study programme development - new courses, teaching staff development, etc)
4) Use of EU funds and international projects to develop academic staff and attract new international teaching staff

Weaknesses:
1. In many cases of the collaboration there is no agreement or MoU between VUAS and the entity with some specific action plan, which potentially could impact the sustainability of the cooperation
2. Low level of the mobility of teaching staff and students, which could be improved, using as example BIP (blended intensive programmes)
3) Process of new international staff required formalization (or policy), which would support continuous development of the VUAS
4) Lack of resource sharing collaboration between VUAS and local, international academic partners
5) Lack of presence in international bodies/associations, related to computer science and electronics.

Assessment of the requirement [3]

1 R3 - The cooperation implemented within the study field with various Latvian and foreign organizations ensures the achievement of the aims of the study field.

Assessment of compliance: Partially compliant

Analysis of SAR and meeting demonstrates that VUAS has a strong collaboration with local private and public entities in both domains (computer science, electronics). Collaboration includes a different set of activities, which makes collaboration effective for both (VUAS and partner). Students and VUAS benefits from this collaboration. In many cases collaboration is based on personal contacts, which from one side is good and effective, and on the other side makes collaboration person-dependent (what would happen if a person will decide to move from VUAS). Therefore formalization in the form of MoU or common collaboration agreement) with an action plan is recommended. In the international level collaboration is limited and could be extended, beside of ERASMUS+ and projects. Primary point addresses presence international associations, like Informatics Europe etc. Which could be valuable for even regional university. Presence in the domain international association is limited, while VUAS could benefit a lot, and make it more visible in international level.

1.6. Implementation of the Recommendations Received During the Previous Assessment Procedures

Analysis

1.6.1. In the previous assessment procedures related to the study field and the corresponding study

programmes:
1.6.1.1. accreditation;
1.6.1.2. licensing of study programmes (if applicable);
As mentioned in SAR pp. 75-77, the previous accreditation of the study field was performed in 2017. According to the document 2-18_appendix_implementation_of_recommendations.docx, there was no particular recommendation for the entire study field, but the four study programs included in the accreditation (Bachelor program Computer Science, master program Computer Science, Bachelor program Electronics and master program Electronics) received each between 14 and 15 recommendations. Most of the recommendations are common and have been dealt with at the level of the study field. The SAR pp. 75 shows that "The majority - 73% of the recommendations - applied to all programs together or to the VUAS quality management system, formalization and institutionalization of processes: introduction of formalized quality assurance procedures and better communication of them to all stakeholders in accordance with European standards and guidelines (ESG) in order to obtain a traceable and reliable structure; introduce a common standard for course descriptions; to introduce formalized procedures for the development, updating and implementation of study course descriptions; develop a study program based entirely on a learning (study) outcome approach; introduce formalized procedures for the development, approval and updating of programs; implement formalized study program management processes and implement them throughout the development, description, monitoring, evaluation and change cycle; introduce formalized methods to involve external stakeholders in the process of developing and/or updating academic programs."
Document 2-18_appendix_implementation_of_recommendations.docx shows how the recommendations were dealt with and the timeline of the solution. As SAR pp. 76 describes, "Amended and newly developed regulations of individual processes have enabled the formal procedures of various processes to be implemented more accurately in the work of the FoIT, thus having a positive impact on the implementation of study programs. Mapping of study (learning) results has been developed for study programs, and the learning results of the study course are harmonized with it during the process of drafting the description of each study course, thus ensuring accomplishment of the learning results of the study program." Indeed, most of the recommendations have been implemented, with some exceptions that are discussed further.
The recommendation "Measure the workload of the students / the credit point volume of the program in ECTS, following the ESG." could not be implemented since the national Latvian legislation requires the measuring the student workloads in credits CP (1 CP = 1.5 ECTS).
The recommendation "Ensure the availability of all literature mentioned as mandatory in the course descriptions in the library." is estimated by implemented.

The recommendation "Consider re-naming the study program and the degree to accurately reflect the graduates' scientific area of knowledge." was declined by the university, without documenting the process leading to that decision. The experts recommend to the University College of Ventspils to ensure a process of thorough documentation of all the decisions related to the educational process, most notably the decisions stemming from the recommendations of an accreditation process.

1.6.1.3. in the evaluation of changes to the study programmes corresponding to the study field (if applicable);
As mentioned in SAR pp. 77, "Changes during the reporting period (2017-2022): […] substantial changes have been made to the bachelor program "Electronics", transforming it into a professional bachelor's program, substantial changes have been made to the academic bachelor program "Computer Sciences" and the first-level higher education professional program "Programming Specialist", complementing both programs with English as a second implementation language."

The accreditation for the mentioned changes was performed in 2018, and for each program there were 3-4 recommendations. According to the SAR pp. 78 and document 2-18_appendix_implementation_of_recommendations.docx, all the recommendations have been implemented.

1.6.1.4. the inclusion of the study programme on the accreditation form of a study field (if applicable).
As mentioned in SAR pp. 77, “Changes during the reporting period (2017-2022): a joint (with Liepaja University) professional bachelor program “Smart Technologies and Mechatronics” have been licensed”.
The new study program (joint with the University of Liepaja) was licensed in 2021. There were 5 recommendations, from which 2 are declared as implemented.
For one recommendation („The study program management should regularly meet manufacturing company managers and leading specialists, in order to understand their wishes regarding the knowledge and skills necessary for the engineer of mechatronic”) the response is evasive, mentioning the the presence in the University board of a representative of the industry is equivalent with holding „regularly meets with manufacturing company managers and leading specialists”.
For two recommendations concerning the content of the study program, the Ventspils University College considers the recommendations non applicable, since they point to courses held in the partner University of Liepaja. This represents a serious issue, since there is no apparent cooperation between the two universities in terms of the quality insurance system that must deal with curriculum-related recommendations.

Conclusions on this set of criteria, by specifying strengths and weaknesses

Conclusions:
The Faculty of Information Technology from the VUAS , as manager of the study field " "Information Technology, Computer Hardware, Electronics, Telecommunications, Computer Management, and Computer Science ", has proven that it considers seriously the quality insurance, by balanced analysis of the recommendations received on previous accreditations or licencing. Improvement is needed in the process of thoroughly and transparently documenting the analysis and solutions for previous recommendations, especially those that were declined. This statement pertains to the documentation and transparency of decisions. The process of cooperation with the partner University of Liepaja for the quality management needs improvements.

Strengths:
1.The VUAS has seriously considered the past recommendations and has taken concrete action towards implementing them.
2.Even if not all past recommendations have been implemented per se, the VUAS has laid out a track for doing so in a set time-horizon.

Weaknesses:
1.Some recommendations have been partially implemented and the chosen non-implementation of recommendation is not thoroughly documented.
2.The process of cooperation with the partner University of Liepaja for the quality management needs improvements, since there is no integrated way of dealing with curricula-based recommendations.

Assessment of the requirement [4]

1 R4 - Elimination of deficiencies and shortcomings identified in the previous assessment of the study field, if any, or implementation of the recommendations provided.

Assessment of compliance: Partially compliant

The Faculty of Information Technology from the VUAS , as manager of the study field " "Information Technology, Computer Hardware, Electronics, Telecommunications, Computer Management, and Computer Science ", has considered most of the previous recommendations. Still, there are remaining issues related to the mechanism of cooperation in term of quality management with the University of Liepaja and the documentation of the decisions taken as a response to previous recommendations.

1.7. Recommendations for the Study Field

Short-term recommendations

1. To ensure a process of thorough documentation of all decisions related to the educational process, most notably the decisions stemming from the recommendations of an accreditation process.
2. To ensure a real, effective and documented collaboration in term of education quality insurance with the partner University of Liepaja.
3. Publish study course descriptions for each study programme on the corresponding section of each study programme on VUAS website.
4. Consider the need and relevance of the joint study program “Smart Technologies and Mechatronics”
5. Review opportunities section in SWOT.
6. Finalize migration and translation of necessary information and documentation to the Moodle system to make it equally available and in full scope both in Latvian and in English.

Long-term recommendations

1. Translate the Quality assurance and other necessary documentation to English making it available to international students
2. Consider an alternative way to gather students quantitative feedback data outside of bi-aanual surveys in order to gather more truthful data
3. Implement a way how to inform students about the changes implemented because of their feedback
4. To select and become a member of at least 1 per domain (computer science, electronics) international association.
5. To raise number of the mobilities (students, teaching staff) adopting more flexible mobility schemes
6. To enter in collaboration with Latvian HEI, which would be targeted on sharing resources (at least one partner)
7. To formalize the collaboration process with local private and public process using collaboration agreements and MoU with activity plans

8. Development and utilisation commercialisation strategy/policy
9. Development motivation system of teaching staff and students involvement to the research activities, including more intensively research targeted approach in the bachelor level study programmes.
10. To take a leading position in at least one EU level project
11. To introduce a long-running strategy of students innovation grants as a logical continuation of the ESF funded project “Kurzeme Innovation Grants for Students”
12. Make a strategic plan to utilize more all the unique collaboration options in the programmes and in R&D with the Ventspils International Radioastronomy Centre, which is unique in all the Baltics

II - "Programming Specialist" ASSESSMENT

II - "Programming Specialist" ASSESSMENT

2.1. Indicators Describing the Study Programme

Analysis

2.1.1

The First level professional higher education study programme “Programming Specialist” (41484) (first level study programme) is in compliance with the study field "Information Technology, Computer Engineering, Electronics, Telecommunications, Computer Management, and Computer Science". The first level study programme belongs to the Engineering and Technology branch group Electrical Engineering, Electronics, Information and Communication Technologies, which is part of the study field. The first level study programme is designed to prepare programming specialists for professional activity. The first level study programme covers a wide range of topics related to software development main principles, software design and writing software code according to programming guidelines, analyzing the software errors, debugging and testing the software, cross-functional team working and communication.

The first level study programme is offered only in Latvian as 2 years full time 80 CP programme. The study courses include Java programming, web applications, Linux administration, Databases, Security issues and embedded systems and other programming related courses. No distant or part time study options are available.

2.1.2

The first level study programme is designed to prepare professionally educated specialists in ICT and especially programming specialists. The first level study programme aim and objectives, as well as the learning outcomes and admission requirements, are all aligned with the professional qualification to be obtained, which is a Programmer. The admission requirements are based on the Law on Higher Education Institutions. The study courses included in the first level study programme cover the basic guidelines, principles, algorithms and programming methodology on the base of Java language.

The educational classification code is 41484 which according to Latvian Education Classification (Latvian Cabinet of Ministers Regulations (Cab, Reg.) No. 322, https://likumi.lv/ta/id/291524-noteikumi-par-latvijas-izglitibas-klasifikaciju), corresponds to the following codification: meaning of the first two digits `41` notes for first level study and the last three digits `484` indicate that this first level study programme is related to the educational group

of “programming’’.
Overall, the programme's title, code, qualification to be obtained, aims, objectives, learning outcomes, and admission requirements are all interrelated and aligned with each other.
The first level study programme is offered in only one implementation option – full-time study. The duration of the programme implementation is reasonable and justified, as it is based on the normative acts, including the Law on Higher Education Institutions and the Cabinet of Ministers Regulation No. 846 of October 10, 2006 "On Requirements, Criteria and Procedures for Admission to Study Programmes". The programme's scope is also reasonable and justified, as it covers a wide range of topics related to programming and database management and web development tools, which are all part of the study field. The first level study programme is following the Programmer's professional standard (approved 08.06.2022.), corresponding to the fourth professional qualification level (PQL No.4) (corresponding to the fifth level of the Latvian Qualifications Framework (LQF No.5)) (https://registri.visc.gov.lv/profizglitiba/dokumenti/standarti/2017/PS-221.pdf). The implementation language of the programme is Latvian.
The duration and scope of the study programme implementation, as well as the implementation language, are reasonable and justified and correspond to regional needs.

2.1.3
The first level study programme was implemented only in Latvian without the second language – English by the decision of the IT Faculty Council No 22-15-07 of December 19, 2022. This is due to the fact that English was added as the second language for the bachelor's degree programme "Computer Science" in the same FoIT study field and there are not enough students for two study field "Information Technology, Computer Engineering, Electronics, Telecommunications, Computer Management and Computer Science" programmes.
No other changes have been made to the parameters of the first level study programme (in terms of its title, duration, scope, form, aim, objectives). While it is understandable during the COVID situation, it does not change the fact that foreign students have an interest in some other HEIs in the Baltic States for first-level programmes. Therefore, the problem is not only that 'foreign students are not attracted to the first level of professional education', but rather that the main problem is not the lack of interest of foreign applicants.

2.1.4
The first level study programme is aligned with the Latvian Smart Specialization Strategy (RIS3) and the development plans of the Republic of Latvia, which highlight the need for specialists in the field of ICT and with professional programming skills. The growing demand for specialists in this field is also reflected in the projected labor surplus/shortage and number of graduates in the STEM field, where there is a significant shortage of specialists. The first level study programme specialization is designed based on the demands of companies that develop or service ICT systems. The inclusion of the specialization ensures that the program meets the needs of the economy and provides students with the necessary competencies for successful professional activity in these areas.
The first level study programme structure includes group practical programming courses and two internships, which contribute to the development of students' practical professional competences and improve interdisciplinary communication in the program. While the first level study programme is offered in Latvian, efforts to attract and recruit international students may need to be increased in the future to foster a more diverse and multicultural learning environment. The statement suggests that in order to foster a more diverse and multicultural learning environment, the efforts to attract and recruit international students may need to be increased in the future. Although there may be many reasons why these efforts might not be successful, it is still worth trying, especially if the Latvian government policy supports the English language stream, and any potential failure should not be attributed to VUAS.

Attracting a more diverse student population can provide numerous benefits, including exposure to different perspectives, cultures, and experiences, which can enrich the learning experience for all students. While only some lecturers are involved in research projects and activities, there could be more opportunities for the teaching staff to engage in research and innovation and to bring their findings and expertise into the classroom. While first-level professional study programs should primarily focus on research and scientific activity, teaching staff with good professional skills, knowledge, and research experience have a better chance of sparking interest in young professionals and their future careers. The sentence “there could be more opportunities for the teaching staff to engage in research and innovation and to bring their findings and expertise into the classroom.” means exactly what is written - could be more opportunities, which does not mean they must be involved in some research.

2.1.5
N/A

Conclusions on this set of criteria, by specifying strengths and weaknesses

Conclusions:
Overall, the first level study programme offers a strong foundation in programming, with professional specialization that meets the needs of the labor market. The first level study programme practical approach and alignment with national and regional economic strategies make it relevant and practical.

Strengths
1. Specialization based on industry needs: The specialization of the first level study programme was developed in collaboration with specialists from companies in various industries, including embedded electronic systems, industrial production, telecommunications, and computer networks, ensuring that the first level study programme meets the current and future needs of the labor market.
2. Economic and societal relevance: The first level study programme is aligned with the RIS3 and the national economy, contributing to the development and modernization of industry in Latvia and the entire Baltic Sea region.

Weaknesses
1. No distant or part time study options are available.

2.2. The Content of Studies and Implementation Thereof

Analysis

2.2.1. The content of the study courses is developed in compliance with the Cabinet of Ministers Regulation No 141 Regulations regarding the State Standard for First Level Professional Higher Education (https://likumi.lv/ta/en/en/id/6397-regulations-regarding-the-state-standard-for-first-level-professional-higher-education), proven in annex 7-3_appendix_complience-to-state-educational-standard.pdf) , and annex 7-4_appendix_complience-with-professional-standard.pdf for the compliance of the professional standard for Programmers (08.06.2022) : https://registri.visc.gov.lv/profizglitiba/dokumenti/standarti/2017/PS-221.pdf. SAR page 198 represents details about the requirements and how first level study programme fulfill the requirements. The total length of the first level study programme is 80 credit points. The total amount of study courses is 56 credit points. The content of the courses consists of General study

courses and Sectoral study courses. More than 30 % of the study courses are practical. General education study courses. The first level study programme comprises general education courses with a total of 20 credit points. The study course "Entrepreneurship and Economics" (2 CP) helps to develop competences in the organisation and establishment of enterprises, management methods, record-keeping and financial accounting systems. The study course "IT Project Management'' (2 CP) helps to build the core competencies of project development and management. The study course "Aspects of Communication and Professional Ethics" (1 CP) helps to build competences in social dialogue in society. Whereas the study course "Basics of IT Industry Rules & Regulations & Standards" (2 CP) helps to build competences in the laws and regulations governing employment relations. Sectoral study courses. The first level study programme comprises sectoral study courses equivalent to 36 credit points. The sectoral study courses include compulsory study courses, study courses for a particular profession and optional study courses and provide specific knowledge and skills in programming. The internship is organized for 16 credit points in companies (for example SIA TestDevLab, SIA Sapiens Software Solutions, SIA “HW & SW Services” etc) in the sector or in companies where software development and testing activities are carried out, in accordance with the internship regulations (7-8_appendix_internship_regulations.pdf). At the final stage of the first level study programme, students develop a qualification work. The elaboration of the qualification work in the amount of 8 CP strengthens the knowledge, skills and competences acquired in the study courses, applying them in the development of the practical work and in the preparation of the theoretical description of the development process. Considering the goal of the first level study programme “The study programme goal is to prepare programming specialists for professional activity in accordance with the level standards of higher professional education and profession, providing the necessary knowledge, skills, and competences required for the programming profession and enabling successful integration into the labour market and independent adaptation to the changing labour market requirements, as well as to motivate students for professional development and further education in higher education study programmes or through non-formal education.” and declared learning-outcomes “- Awareness, knowledge and ability to evaluate first level study programme requirements - Able to prepare a software design - Able to write software code according to programming guidelines, analyze the sources of software errors, debug the software - Able to perform software testing - Able to cooperate during software development and delivery processes in cross-functional teams - Able to organize and plan the work alone and in a team, to communicate in the professional environment; able to individually work in the profession, improve knowledge and competencies” it should be stated that the content of the first level study programme (set of courses and content of the courses) supports reaching of the declared learning outcomes (also Annex 7-5_appendix_mapping_LV-EN.xlsx provides a mapping of study courses for achieving the study results of the first level study programme.). Declared learning outcomes and set of courses are inline with the requirements of the industry and labor market. While presented study plan in my opinion is overloaded with small (1-2CP) courses, which complicated management of them (from administrative point of the view) and overloads students with the assignments. As example tow courses dedicated to JAVA: Fundamentals of JAVA programming (4KP), and JAVA programming (2KP), U believe they could be merged. 1CP courses: Spanish Language Fundamentals for Programmers, Saskarsme un profesionālā ētika, etc. Hard to imagine what could be studied during 1CP (40h).

2.2.2. N/A

2.2.3. The form of education of the first level study programme is full-time studies. But during meeting with students and study programme directors it has been reported, that in many cases students are already working (want to change the domain), therefore the decision to have only full-time study (not also part-time study) seems irrational. In order to provide students with a

transparent framework for the implementation of the study course, for each study course the aim of the study course is defined (annex 7-7_Appendix_course_descriptions.pdf), along with the content of the study course, the calendar plan, the achievable results within the framework of the study course, the evaluation of the results of the study course and the criteria, as well as the organization of the individual independent work of the student (this information is available in Moodle system of VUAS). Study implementation methods are classical ones, but still contribute to the learning outcomes of each course and programme overall. They are lectures & seminars, individual and group practical works etc. Independent work, which includes: regular study of the course material using lecture materials, study literature, internet resources, etc.; development of independent practical work; development of homework; preparation for tests, etc. To bring students closer to the industry and to learn about current industry trends, several courses are run by representatives of companies in the sector. Students have the opportunity to attend guest lectures by experts in the field or in their professional field. Various methods of assessing knowledge, skills, attitudes and competences are used both during the study course and at the end of it: test work, homework, test, project, study work, presentation demonstration, study test, examination. The assessment system at Ventspils University of Applied Sciences is regulated by the "Regulations on the Procedure for Organising Examinations and Assessing Students' Knowledge at Ventspils University of Applied Sciences" (approved at the meeting of the VUAS Senate on 15 January 2020, Decision No 20-02. Decision No. 21-29 of the Senate of 31.05.2021). All mentioned above fits the study programme learning outcomes and aim of the study programme. SAR (page 201-202 and meeting with students and alumni confirmed the statements done above. Also during the meeting in assessment visit, students and alumni reported about high availability of the teaching staff for consulting and assistance, which formed by the opinion of the VUAS student-centered approach of the VUAS. Also 24/7 availability here could be mentioned to point out the student-centered approach adopted by VUAS.
(In case of a joint study programme, or in case the study programme is implemented in a foreign language or in the form of distance-learning, analyze in detail the methods used for the implementation of such a study programme).
n/a

2.2.4. The first level study programme provides for an internship of 16 CP in accordance with the Cabinet of Ministers Regulation No 141 "Regulations on the State Standard for First Level Professional Higher Education" (20 March 2001), which provides for a minimum internship of 16 credit points. The internship is divided into two parts: 4 credits in semester 3 and 12 credits in semester 4. First level study programme description indicated the following aims: to verify the student's professional and personal suitability to work in the field of programming; to give the student the opportunity to independently continue the professional development of the acquired skills and competences in a real working environment of a company/organisation. The student's tasks during the internship are: independently carry out a software development task or participate in a software development project; develop professional skills and competences by carrying out tasks in the framework of a software development project; become familiar with software development methods used in the enterprise; familiarize themselves with the software development environments used in the enterprise; document regularly the progress of the traineeship; develop documentation of the internship. Expected results of the internship in terms of knowledge: Knowledge of technologies and methods for practice tasks and problem solving; Knowledge of documentation and technical standards required for the completion of the practice task. Skills: Is able to apply the technologies learned in practice; Is able to identify the functional and non-functional requirements of a programme and their validity; Is able to analyze different technical solutions and select the most appropriate one; Is able to understand requirements specification and system design, participate in software implementation and testing; Is able to select and analyse

theoretical and practical solutions described in literature sources, specifications and documentation. Competences: Is able to present, discuss and explain results in a reasoned manner; Is able to take responsibility for the quality of the results of the work placement; Is able integrate into the company working environment. All mentioned above is feasible, while some of the expected results are too ambitious for the first level professional higher education study programme. Students have internships according to the acquired qualification in companies of the industry or in companies where activities related to software development are carried out, such as Ltd. TestDevLab, Accenture Latvia, Ltd. Dartfish, Ventspils University of Applied Sciences Engineering Institute "Ventspils International Radio Astronomy Centre" (VUAS EI VIRAC), Ltd.Tieto Latvia, JSC “Development Finance Institution Altum”, Ltd. ITP Baltic, Ltd.eazyBI. Also SAR reported that 14 out of 19 graduates continue their working career in the same company or daughter company where they had their internship during their studies. This we believe is the most important result of the internships. Also during meetings with alumni and students it has been reported that internships are running smoothly and are effectively implemented. The university supports the student in finding an internship if this is necessary.
If the study programme is implemented in a foreign language, provide an assessment of the provision of internship in a foreign language, including for foreign students.
N/A

2.2.5. N/A

2.2.6. At the final stage of the first level study programme, students develop a qualification work. The elaboration of the qualification work in the amount of eight credits strengthens the knowledge, skills and competences acquired in the study courses, applying them in the development of the practical work and in the preparation of the theoretical description of the development process. SAR page 204 represents the qualification work topics, all of them fit well to the domain of the study programme, as they are related with the development of the specific software. SAR also reports that there are some final works which are based on research projects conducted by VUAS. During the visit several final works were demonstrated as samples, the quality of the work is sufficient and corresponds to the expectations.

Conclusions on this set of criteria, by specifying strengths and weaknesses

Conclusion:
Considering SAR and evidence collected during the meeting it shall be concluded that the presented study programme fulfills formal requirements, is inline with the requirements of the industry and labor market. At the same time, representatives of the industry pointed out that they would be happy to see more “soft” skills by the graduates of the VUAS. The content of the study programme supports reaching the aim and learning outcomes of the study programme. Internship is an obligatory part of the study programme and according to provided evidence is running smoothly and effectively, while at the same time it has been stated that sometimes students are having problems finding internship places, but in this case university assists students. Expected outcomes of the internships are inline with the programme and requirements of the industry. Some of the learning outcomes are too ambitious for the such level study programme, but considering the feedback from employees they are satisfied with the level of skills, knowledge and competences. The topics of the final work and demonstrated samples are inline with study programme learning outcomes.

Strengths:
1. The first level study program is balanced between the necessary knowledge, skills and competencies required to perform the duties after graduation.

2. The content of the first level study program is relevant to the field of the relevant industry.
3) Rich collaboration with the local public and private entities.

Weaknesses:
1. The first level study program is provided only in a form of full-time study, which limits the opportunity to some potential learners to join the study programme
2) Too many small courses in the programme (1- 2 CP), which decreases manageability of the first level study program (from VUAS side) and in the same time overloads students with the assessments.

Assessment of the requirement [5] (applicable only to master's or doctoral study programmes)

1 R5 - The study programme for obtaining a master's or doctoral degree is based on the achievements and findings of the respective field of science or field of artistic creation.

Assessment of compliance: Not relevant

NA

2.3. Resources and Provision of the Study Programme

Analysis

2.3.1. VUAS has a significant and sufficient volume of auditoriums (130 and 190 seats), 9 computer classes (10-30 computers in each) and laboratories for specific study courses to equip students with necessary equipment and software. Laboratories are accessible for students on 24/7 basis. The key asset required for students in the first level study programme is the computer equipped with compilers, program development and supporting environments and the internet connection supported by 10Gb broadband. VUAS leverages and has equipped students with next development tools and environments: Anaconda, CLion, PyCharm, WebStorm, Android Studio, Java(TM) SE Development Kit, Microsoft Visual Studio Code, Spring Tool Suite, Eclipse and others.
Students do have access to the VUAS library that provides access to physical and electronic materials used in study program delivery. Majority of the referenced materials in the descriptions of the study courses can be found and are accessible in the VUAS library (even few copies of each can be enough to source all students).
VUAS has implemented a Moodle system to provide required information to students. This includes general information about the VUAS, description and clarification of internal processes, necessary information of the study courses including practical exercises and additional materials. Mentioned information is available both in Latvian and English. Each VUAS student has assigned an email address to secure formal and informal collaboration with VUAS and teaching staff. On top of email as a collaboration channel, teachers set up study courses dedicated groups in WhatsApp, Telegram and other collaboration platforms to speed up communication and bring collaboration between them and students to the next level.
Review of the necessary equipment and literature is being done on the annual basis by teaching staff and the list of necessary items is submitted to the director of the study field. Based on the feedback collected during the assessment visit (meeting with teaching staff), the ultimate majority of such requests is supported and approved.
First level study programme includes an internship part. VUAS has established a number of strong collaborations with local and country level companies to provide internship options for their students (i.e. Accenture, TestDevLab, HansaMatrix Ventspils, Elektroniskie sakari, ATEA). IT specialists are heavily demanded on the market, and this increases an interest of the industry in the skilled

students. Such collaboration supports achievement of the learning objectives of the first level study programme, but also introduces challenges, when students get full-time work and continue studies in VUAS in parallel.

2.3.2. N/A

2.3.3. Financial provisioning and sustainability of the first level study programme is directly impacted by the number of students in this first level study programme. VUAS has managed to grow the number of students in the first level study programme from 13-15 in academic years 2017.-2019. to 37 in the year 2022.-2023. Such an increase is supported by a significant number of allocated budget seats. Meanwhile, during the COVID period there is an increased number of dropouts (42 during the last 2 years) and low number of graduated students (11 in 2 years), what introduces the risk of the sustainability of the study program. Nevertheless, the current number of students (51) is significantly higher than the minimal number (30) needed to keep the study program financially sustainable. This leads to positive financial results (+40,3%) in the year 2022.-2023. and possibility to invest over-recovery into further study program development and cover less profitable first level study programme.
Additionally, VUAS managed to leverage ESF funds and complete several projects during 2018-2022 and attract additional funds to finance new laboratory equipment, new computer classes, improvements of premises and development of the academic staff.

Conclusions on this set of criteria, by specifying strengths and weaknesses

Conclusions:
students and teaching staff are fully equipped to achieve learning objectives and graduate the first level study programme. First level study programme has achieved good financial results and shows strong financial sustainability to ensure current implementation of the first level study programme and make investment in program development.

Strengths:
1. VUAS managed to significantly increase the number of students.
2. Students have 24/7 access to fully equipped laboratories.
3. First level study programme shows strong financial results.

Weaknesses:
1. High dropouts and low number of graduations can raise challenges in overall first level study programme sustainability as learning objectives are not fully achieved in such cases.

Assessment of the requirement [6]

1 R6 - Compliance of the study provision, science provision (if applicable), informative provision (including library), material and technical provision and financial provision with the conditions for the implementation of the study programme and ensuring the achievement of learning outcomes

Assessment of compliance: Fully compliant

students and teaching staff are fully equipped to achieve learning objectives and graduate the first level study programme. First level study programme has strong financial sustainability through an increased number of students.

2.4. Teaching Staff

Analysis

2.4.1. As presented in the SAR and in the Annexes to SAR submitted for evaluation, the teaching staff of the first level study programme (SAR pp. 213-214) consists of 20 persons, out of which 4 Professors, 2 Assoc. Professors, 5 guest Professors, 6 guest lecturer, 2 docents and 1 guest lecturer. 6 persons of the teaching staff hold a doctoral/ Ph.D. degree (4 of which in computer science/ engineering). The remaining 14 teaching staff have master's degrees. 60% of the teaching staff has a guest status.
However, in the Latvian version of the SAR a different composition is presented: 20 persons, out of which 2 Assoc. Professor, 2 docents, 1 guest docent, 4 lecturers, 11 guest lecturers, 6 persons of the teaching staff hold a doctoral/ Ph.D. degree (3 of which in computer science/ engineering).

The knowledge, skills and competences of the teaching staff are declared as being sufficient for a good teaching process; the SAR pp. 214-216 provides significant description of the expertise of 8 of the guest lecturers/ professors.
The first level study programme is implemented for less than 250 students. As described in SAR pp. 214, "The language skills of the teaching staff of the first-level professional higher education study programme "Programming Specialist" comply with the Cabinet of Ministers Regulation of 2009 No. 733 "Regulations on the Scope of Knowledge of the State Language and the Procedure for Testing Proficiency in the State Language for Professional and Official Duties". Information on the foreign language skills of the lecturers is summarized in the lecturers' curricula vitae (CV) is attached as Annex 2.9.". The VUAS has also provided certified letters of declaration for the language skills of teaching staff for both Latvian (2-10_appendix_teaching-staff-latvian-language_ENG, Declaration 1-10.1/69 of 22.12.2022) and English (2-11_appendix_teaching-staff-English-language_ENG, Declaration 1-10.1/70 of 22.12.2022).
The teaching staff provisions are evaluated as being conform to the requirements of the Higher Education Law of Latvia.

2.4.2. The SAR pp. 214-216 presents the changes in the composition of teaching staff. The changes are related to two main causes: 1) the heavy workload of some teachers that gave up some of the courses they teach at the first level study programme ''Programming Specialist'' or have terminated their employment with the University College of Ventspils (7 courses teached by 5 persons) or 2) the inclusion of new courses in the curricula, courses that required new teaching staff or the rotation of teaching staff from the industry-provided courses (as is the case for the "Software Testing and Automation" course, which is taught by TestDevLab Ltd). The SAR explains in detail the qualifications of the new teaching staff.
This shows that the teaching staff composition change was managed successfully by the responsible structure; still, there is no available documentation regarding any specific provision on staff change at the VUAS/ Faculty level, especially under the consideration of the significant number of guest teaching staff.

2.4.3. The criterion is not applicable, the study program is a first-level study program.

2.4.4. The SAR of the first level study programme (pp. 219, points 3.4.3 and 3.4.4) does not specifically mentions any information about publications of the teaching staff (although these publications exist, as shown in document 2-12_appendix_quantitative-data-on-academic-staff-research-activitiy-ENG).
The annexes to the 2.4. Scientific Research and Artistic Creation chapter of the SAR (pp. 57-70) (2-13_appendix_teaching-staff-scientific-resarch-experience) list all the publications, patents and creations of the teaching staff involved in all the programs from the evaluated study field. In the last

6 years, as shown in document 2-12_appendix_quantitative-data-on-academic-staff-research-activitiy-ENG, there are 705 scientific publications of various types (including publications numbered multiple times, as they have several authors from the university); the average yearly production of the 58-teaching staff of the field is then around 2 publications.
The identification of the publications of the teaching staff from the first level study programme ''Programming Specialist'' in document 2-13_appendix_teaching-staff-scientific-resarch-experience shows that 11 (most coming from the industry) out of 20 persons do not have any publication declared.

2.4.5. The SAR lists (pp. 219-220) several ways of teaching staff cooperation:
- Interdisciplinary cooperation of academic staff, with topical issues discussed at organised meetings of the Council of Study Programmes, Faculty Council meetings, seminars, meetings with employer;
- Cooperation of teaching staff in the development of the study programme content;
- Cooperation between teaching staff in the implementation of specific study courses;
- Informal cooperation between teaching staff („the weekly coffee break").
All this shows that cooperation between teaching staff does exist, it is functional, but it works in mostly non-documented and informal ways, without a unitary mechanism.
The SAR pp. 220 mentions that "At the time of submission of the Self-assessment Report, the first level professional education study programme "Programming Specialist" is implemented by 20 faculty members and it has 40 students in the 1st year and 15 students in the 2nd year, thus the ratio of students to faculty members is 2.75 students to one faculty member. The calculations do not take into account that students from several study programmes of Ventspils University of Applied Sciences participate in the study courses implemented in the "Programming Specialist" programme." This provides a baseline of 2.25 students/ teaching staff ratio.
For reference, for the entire study field there are 58 teaching staff, as described for instance in Annex 2-9_appendix_Teaching_Staff_CV_ENG.pdf; the total number of enrolled students in the study field is 254 (45+147+15+6+30+11), which provides a student to teaching staff ratio of 4.38.

Conclusions on this set of criteria, by indicating strengths and weaknesses

Conclusions:
The teaching staff provisions are evaluated as being conform to the requirements of the Higher Education Law of Latvia. There are 20 people in the academic staff allocated to the first level study programme and the student/teaching staff ratio is quite low (2.25). The teaching staff is not very active in research (as 50% of the teaching staff has declared zero publications) and cooperates (in various, mostly non-documented and informal ways) towards the successful implementation of the first level study programme.

Strengths:
1. A low student to teaching staff ratio, which enables close cooperation and student-centered guidance.

Weaknesses:
1. The relatively low ratio of tenured (elected) teaching staff (40%) as compared to guest teaching staff (60%).
2. The small number of publications of the teaching staff.
3. There are no documented provisions regarding the management of the changes in teaching staff.
4. Lack of documentation of the cooperation between the teaching staff and their specific interactions towards program changes.

Assessment of the requirement [7]

1 R7 - Compliance of the qualification of the academic staff and visiting professors, visiting associate professors, visiting docents, visiting lecturers and visiting assistants with the conditions for the implementation of the study programme and the requirements set out in the respective regulatory enactments.

Assessment of compliance: Fully compliant

The teaching staff provisions are evaluated as being conform to the requirements of the Higher Education Law of Latvia.

2.5. Assessment of the Compliance

Requirements

1 1 - The study programme complies with the State Academic Education Standard or the Professional Higher Education Standard

Assessment of compliance: Fully compliant

According to annex 7-3 (7-3_appendix_complience-to-state-educational-standard.pdf), the first level study programme complies with the "Regulations on the State Standard for First-Level Professional Higher Education" by the Cabinet of Ministers.

2 2 - The study programme complies with a valid professional standard or the requirements for the professional qualification (if there is no professional standard required for the relevant occupation) provided if the completion of the study programme leads to a professional qualification (if applicable)

Assessment of compliance: Fully compliant

According to annex 7-4 (7-4_appendix_complience-with-professional-standard.pdf), the first level study programme is designed based on the Programmer's Professional Standard. The professional standard with registration number PS-221 was approved during the meeting of the Tripartite Sub-Council for Vocational Education and Employment on June 8, 2022. Available at: https://registri.visc.gov.lv/profizglitiba/dokumenti/standarti/2017/PS-221.pdf (Latvian)

3 3 - The descriptions of the study courses and the study materials have been prepared in all languages in which the study programme is implemented, and they comply with the requirements set forth in Section 561 , Paragraph two and Section 562 , Paragraph two of the Law on Higher Education Institutions.

Assessment of compliance: Fully compliant

The course descriptions are available in both Latvian and English languages, although the programme is realized only in Latvian. All course descriptions contain the requirements set forth in the corresponding sections of the Law on Higher Education Institutions. Study course descriptions are available in annex 7-7 (7-7_Appendix_course_descriptions.pdf).

4 4 - The sample of the diploma to be issued for the acquisition of the study programme complies with the procedure according to which state recognised documents of higher education are issued.

Assessment of compliance: Fully compliant

The diploma example available in annex 1_PS_Diploms_paraugs is compliant with the Cabinet of Ministers regulation no 202 “Procedures by which documents certifying higher education recognised by the State shall be issued”

5 5 - The academic staff of the academic study programme complies with the requirements set forth in Section 55, Paragraph one, Clause 3 of the Law on Higher Education Institutions.

Assessment of compliance: Not relevant

6 6 - Academic study programmes provided for less than 250 full-time students may be implemented and less than five professors and associated professors of the higher education institution may be involved in the implementation of the mandatory and limited elective part of these study programmes provided that the relevant opinion of the Council for Higher Education has been received in accordance with Section 55, Paragraph two of the Law on Higher Education Institutions.

Assessment of compliance: Not relevant

7 7 - At least five teaching staff members with a doctoral degree are among the academic staff of an academic doctoral study programme, at least three of which are experts approved by the Latvian Science Council in the respective field of science. At least five teaching staff members with a doctoral degree are among the academic staff of a professional doctoral study programme in arts (if applicable).

Assessment of compliance: Not relevant

8 8 - The teaching staff members involved in the implementation of the study programme are proficient in the official language in accordance with the regulations on the level of the official language knowledge and the procedures for testing official language proficiency for performing professional duties and office duties.

Assessment of compliance: Fully compliant

According to annex 2-10 (2-10_appendix_teaching-staff-latvian-language_ENG.pdf) the proficiency level of all teaching staff involved in the implementation of the first level study programme complies with the requirements of Official Language Law.

9 9 - The teaching staff members to be involved in the implementation of the study programme have at least B2-level knowledge of a related foreign language, if the study programme or any part thereof is to be implemented in a foreign language (if applicable).

Assessment of compliance: Not relevant

10 10 - The sample of the study agreement complies with the mandatory provisions to be included in the study agreement.

Assessment of compliance: Fully compliant

The study agreement example available in annex 2-5 (2-5_appendix_study-contract-example.pdf) fully complies with the Cabinet of Ministers regulation “Rules to be included in the study agreement”.

11 11 - The higher education institution / college has provided confirmation that students will be provided with opportunities to continue their education in another study programme or another higher education institution or college (agreement with another accredited higher education institution or college) if the implementation of the study programme is terminated.

Assessment of compliance: Fully compliant

The attached document (No. 5.5/68) in Annex 2-3 (2-3_appendix_study-continuence-in-other-programmes.docx.pdf) confirms that an agreement with Rezekne academy of technologies (Rēzeknes tehnoloģiju akadēmija- RTA) is in place and students are provided with opportunities to continue their education in RTA first level study programme “Programming and computer

network administration".

12 12 - The higher education institution / college has provided confirmation that students are guaranteed compensation for losses if the study programme is not accredited or the study programme's license is revoked due to the actions (actions or omissions) of the higher education institution or college and the student does not wish to continue studies in another study programme.

Assessment of compliance: Fully compliant

The attached document in Annex 2-4 (2-4_appendix_Declaration_on_loss_compensation_for_students.docx.pdf) confirms that students are guaranteed compensation for losses if the study programme is not accredited or the study programs license is revoked due to the actions (actions or omissions) of the VUAS, and the student does not wish to continue studies in another study program.

13 13 - The joint study programmes comply with the requirements prescribed in Section 55.(1), Paragraphs one, two, and seven of the Law on Higher Education Institutions (if applicable)

Assessment of compliance: Not relevant

14 14 - Compliance with the requirements specified in other regulatory enactments that apply to the study programme being assessed (if applicable)

Assessment of compliance: Not relevant

Assessment of the requirement [8]

1 R8 - Compliance of the study programme with the requirements set forth in the Law on Higher Education Institutions and other regulatory enactments.

Assessment of compliance: Fully compliant

The study programme complies with the requirements set in national regulatory enactments.

General conclusions about the study programme, indicating the most important strengths and weaknesses of the study programme

Conclusions:

The teaching staff provisions (20 people in the academic staff) are evaluated as being conform to the requirements of the Higher Education Law of Latvia. The student/teaching staff ratio is quite low (2.25). The teaching staff is not very active in research (as 50% of the teaching staff has declared zero publications) and cooperates (in various, mostly non-documented and informal ways) towards the successful implementation of the study program.
The provided documentation of the study programme fully complies with the forthset regulations and requirements of the law.

Strengths:
1. A low student-to-teaching staff ratio, which enables close cooperation and student-centered guidance.

Weaknesses :
1. The relatively low ratio of tenured (elected) teaching staff (40%) as compared to guest teaching staff (60%).

Evaluation of the study programme "Programming Specialist"

Evaluation of the study programme:

Good

2.6. Recommendations for the Study Programme "Programming Specialist"

Short-term recommendations

1. Consider implementing a consistent plan for the insurance of a teaching staff corps more resilient to changes and less dependent on guest teaching staff.
2. Consider provisions regarding the management of the changes in teaching staff.
3. Consider options for distant or part-time study

Long-term recommendations

1. Consider implementing a consistent plan for the increase of the number and impact of publications of the teaching staff.
2. Consider the documentation of the cooperation between the teaching staff and their specific interactions towards program changes.
3. Consider creating stronger links between the programme and R&D projects
4. Consider to have more bigger courses (in terms CP), or organaising modules
5. Explore a possibility and demand for opening a part-time study in the frame of this programme.

II - "Electronics Engineering" ASSESSMENT

II - "Electronics Engineering" ASSESSMENT

2.1. Indicators Describing the Study Programme

Analysis

2.1.1

The Professional bachelor study programme Electronics Engineering (42523) (BA Electronics Engineering study programme) is in compliance with the study field "Information Technology, Computer Engineering, Electronics, Telecommunications, Computer Management, and Computer Science". The BA Electronics Engineering study programme belongs to the Engineering and Technology branch group Electrical Engineering, Electronics, Information and Communication Technologies, which is part of the study field. The BA Electronics Engineering study programme is designed to prepare academically and professionally educated specialists in electronics. The BA Electronics Engineering study programme covers a wide range of topics related to electronics and automation.

The BA Electronics Engineering study programme offers wide range of knowledge to practice solving real technical problems by involving them in the work of electronics companies during their future career, to develop electronic equipment and systems; to define a manufacturing process and to manufacture electronic equipment and systems; to perform and manage the installation and understanding the state-of-the-art of the electronics engineering. The study courses (Annex: 5-7_Pielikums_Kursu apraksti.pdf) included in the BA Electronics Engineering study programme

cover the guidelines, principles, structure, and methodology of the field of computer engineering and electronics, as well as the interdisciplinary aspects of electronics characteristics and problems. The programme is implemented only in Latvian without the English passing options and therefore lacks international students.

2.1.2

The BA Electronics Engineering study programme is designed to prepare academically and professionally educated specialists in electronics. The BA Electronics Engineering study programme aim and objectives, as well as the learning outcomes and admission requirements, are all aligned with the degree and professional qualification to be obtained, which is a Professional Bachelor's degree in Electronics and qualification : Electronics Engineer. The admission requirements are based on the Law on Higher Education Institutions. The BA Electronics Engineering study programme offers courses in programming for microcontrollers; programmable integrated circuits; industrial automation; programming of ARM architecture microcontrollers; embedded operating systems; automatic control systems and programmable logic controller programming, which are all relevant to the study field. These study courses included in the BA Electronics Engineering study programme cover the guidelines, principles, structure, and methodology of the field of electronics, as well as the interdisciplinary aspects of electronical engineering characteristics and problems.

The educational classification code is 42523 which according to Latvian Education Classification (Latvian Cabinet of Ministers Regulations (Cab, Reg.) No. 322, https://likumi.lv/ta/id/291524-noteikumi-par-latvijas-izglitibas-klasifikaciju), corresponds to the following codification: meaning of the first two digits `42` notes for professional bachelor and the last three digits `523` indicate that this professional bachelor study programme is related to the educational group of “Electronics and automation’’.

Overall, the BA Electronics Engineering study programme title, code, degree to be obtained, professional qualification or degree and professional qualification, aims, objectives, learning outcomes, and admission requirements are all interrelated and aligned with each other.

The BA Electronics Engineering study programme is offered as full-time study only. The duration of the BA Electronics Engineering study programme implementation (4 years) is reasonable and justified, as it is based on the normative acts, including the Law on Higher Education Institutions and the Cabinet of Ministers Regulation No. 846 of October 10, 2006 "On Requirements, Criteria and Procedures for Admission to Study Programmes". The BA Electronics Engineering study programme scope is also reasonable and justified, as it covers a wide range of topics related to electronics engineering and covers many aspects of automation.

The implementation language of the BA Electronics Engineering study programme is Latvian, which is reasonable and justified according to local industry needs. Overall, the duration and scope of the BA Electronics Engineering study programme implementation is reasonable and justified.

2.1.3

The several corrections made to the BA Electronics Engineering study programme parameters within the assessment of the study field are analyzed, justified, and would be supported. E.g., the changes made to the name and structure of the the BA Electronics Engineering study programme is transformed from an academic bachelor's programme to a professional bachelor's programme; the title of the BA Electronics Engineering study programme was changed from "Electronics" to "Electronics Engineering”; the duration of the BA Electronics Engineering study programme was changed from 3 years to 4 years and and the study programme volume was changed only from 120 CP (180 ECTS) to 160 CP (240 ECTS). The degree and qualification to be obtained in the study programme were changed from "Bachelor of Engineering degree in Electronics" to "Professional Bachelor of Engineering degree in Electronics and qualification of Electronics Engineer (Professional qualification level 5, European Qualifications Framework (EQF) and Latvian Qualifications Framework (LQF) level 6)". All the above changes were introduced according to recommendations of the previous accreditation. Following the recommendations of the previous accreditation commission, a

compulsory internship of 20 CP (30 ECTS) has been introduced and a series of project-oriented, practical training courses were introduced: Electronics Engineering Project I 2 CP (3 ECTS); Electronics Engineering Project II 2 CP (3 ECTS); Electronics Engineering Project III 2 CP (3 ECTS); Electronics Engineering Group Project I 2 CP (3 ECTS); Electronics Engineering Group Project II 2 CP (3 ECTS); Electronics Engineering Research Project 2 CP (3 ECTS). Also some new courses were introduced, taking into account employers' needs and students' suggestions: Programming Basics for Microcontrollers I (2CP, 3 ECTS); Fundamentals of Programmable Integrated Circuits (2 CP, 3 ECTS); Introduction to Industrial Automation (2 CP, 3 ECTS); Programming of ARM Architecture Microcontrollers (3 CP, 4.5 ECTS); Embedded Operating Systems (4CP, 6 ECTS); Automatic Control System Design (3 CP, 4.5 ECTS); Programmable Logic Controller Programming (4 CP, 6 ECTS); Systematization Principles of Industrial Engineering(4 CP, 6 ECTS); Manipulators and Control Systems of Industrial Robots (4 CP, 6 ECTS); Object Oriented Programming II (4CP, 6 ECTS). Besides that modifications were introduced to the content and organization of the following study courses: "Mathematical Analysis II", the number of credit points has been reduced from 4 (6 ECTS) to 2 (3 ECTS) in order to balance the number of mathematical knowledge and professional skills-based study courses in the 1st year of study; the course "Introduction to Electrodynamics and Antenna Theory" (4 CP, 6 ECTS) was introduced, combining two existing courses "Electromagnetic Fields and Waves" (2 CP, 3 ECTS) and "Antenna Theory" (2 CP, 3 ECTS). A new course "Digital Electronics" (4 CP, 6 ECTS) was introduced, combining two existing courses "Fundamentals of Digital Circuitry" (2 CP, 3 ECTS) and "Digital Electronics and Computer Architecture" (2 CP, 3 ECTS). The title of the course "Programming" has been modified to "Programming in C", in order to better reflect the content of the course. The title of the course "Microcontrollers and Embedded Systems" has been modified to "Programming Basics for Microcontrollers I" in order to better reflect the content of the course. The title of the course "Computer Aided Design" has been changed to "PCB Design" in order to make the title of the course more indicative of its content. A new course "Data Transmission Technology and Devices" (4 CP, 6 ECTS) was introduced, combining two existing courses "Wireless Technologies" (2 CP, 3 ECTS) and "Sound and Image Transmission Technologies" (2 CP, 3 ECTS). The course "Optics and Optoelectronics" has been reduced from 3 (4.5 ECTS) to 2 CP (3 ECTS) to balance the physics-based and professional skills-based courses in the 2nd year of study. The number of CPs allocated for the development of the Bachelor's thesis has been increased from 10 (16 ECTS) to 12 (18 ECTS), taking into account students' feedback that too limited time is allocated for the development of a high-quality Bachelor' Thesis.

As a result of all these modifications the fragmentation of the courses and all the BA Electronics Engineering study programme was reduced. Overall, these changes contribute to the improvement of the BA Electronics Engineering study programme and the formation of students' practical professional competencies. The changes made to the BA Electronics Engineering study programme are well-justified and supported by economic and social factors.

2.1.4

The BA Electronics Engineering study programme is aligned with the Latvian Smart Specialization Strategy (RIS3) and the development plans of the Republic of Latvia, which highlight the need for specialists in the field of electronic engineering. The growing demand for specialists in this field is also reflected in the projected labor surplus/shortage and number of graduates in the STEM field, where there is a significant shortage of specialists. The program's specialization is designed based on the demands of companies that develop embedded electronic systems, automated control systems for industrial production. The inclusion of the specialization ensures that the program meets the needs of the economy and provides students with the necessary competencies for successful professional activity in these areas. Moreover, the BA Electronics Engineering study programme integration of electronic engineering, as well as the inclusion of applied electronics knowledge, sets

it apart from similar bachelor's programs in Latvia and other Baltic countries. The BA Electronics Engineering study programme structure includes group projects and individual courses, which contribute to the development of students' practical professional competences and improve interdisciplinary communication in the program. While the BA Electronics Engineering study programme is offered only in Latvian, efforts to attract and recruit international students may need to be increased to foster a more diverse and multicultural learning environment. Attracting a more diverse student population can provide numerous benefits, including exposure to different perspectives, cultures, and experiences, which can enrich the learning experience for all students.

2.1.5
N/A

Conclusions on this set of criteria, by specifying strengths and weaknesses

Conclusions:
Overall, the BA Electronics Engineering study programme offers a strong foundation in electronic engineering, covering a wide area of the subfields that meet the needs of the labor market. The BA Electronics Engineering study programme project-based approach and alignment with national and regional economic strategies make it relevant and practical and future oriented.

Strengths
1. The BA Electronics Engineering study programme is designed to integrate a broad scope of electronic engineering, which is essential in modern technology, particularly in the development of embedded electronic systems, industrial automation devices, and telecommunication systems and gives students flexibility in their future career.
2. Specialization based on industry needs: the specialization of the program was developed in collaboration with specialists from companies in various industries, including embedded electronic systems, industrial production, telecommunications, ensuring that the program meets the current and future needs of the labor market.
3. Project-based approach: The BA Electronics Engineering study programme includes individual and group projects, allowing students to develop practical professional competencies, project management skills, and interdisciplinary communication, which are essential for successful professional activity in the field.
4. Economic and societal relevance: The program is aligned with the RIS3 and the national economy, contributing to the development and modernization of industry in Latvia and the entire Baltic Sea region.

Weaknesses
1. Limited internationalization: the students in the programme are Latvian as the teaching language is Latvian. The programme may benefit from more efforts to attract and recruit international students introducing some courses in English too and foster a more diverse and multicultural learning environment.

2.2. The Content of Studies and Implementation Thereof

Analysis

2.2.1. The goal of the BA Electronics Engineering study programme as declared in the SAR is “The aim of the study programme is to prepare specialists in engineering sciences with a professional

bachelor's degree and qualification of electronics engineer, whose theoretical knowledge and research skills allow to continue studies in engineering master's level study programmes and higher level professional study programmes in electronics for obtaining level 5 professional qualification, as well as to independently and systematically improve their knowledge and skills to adapt to professional activities in changing labour market conditions. To develop and defend a 12 credit point bachelor's thesis in electronics". The results are the following "- ability to develop electronic equipment and systems; - ability to participate in research and development projects; - ability to define a manufacturing process and to manufacture electronic equipment and systems; - ability to perform and manage the installation, maintenance and repair of electronic equipment and systems; - ability to carry out the general tasks of pursuing a professional activity; - understanding and knowledge of electronics engineering at the state-of-the-art of the field". The skills, knowledge and competencies expected in the frame of the study programme are reflected in SAR (page 228 -229), presented in detail. The majority of skills, knowledge and competencies fit the study programme well, while it shall be noted, that they could be presented in more aggregated form and some are confusing, as example "able to speak and write in at least two languages in familiar and unfamiliar contexts;" (Here point is regarding the number of the learning outcomes per module). SAR pages 23 - 237 reports how programme fulfills the requirements of the Cabinet Regulation No. 512 "Regulations on the national standard for the 2nd level professional higher education" (26 August 2014) (Annex 5-3_pielikums_Atbilstiba-valsts-standartam_EIB.pdf) establish the mandatory content of professional undergraduate studies. General education study courses of the professional undergraduate program include courses to teach professional business competences and management (innovation, business organization and establishment, management methods, business economics, basic project development and management, financial accounting system), as well as environmental protection competences. The block has 20 CP. Field (professional field) theoretical core courses and information technology courses (39 CP) provide knowledge required in any subject of engineering sciences: mathematics, physics, programming, as well as basic theory required for electronics engineering. Professional specialization courses in the field (area of professional activity) consist of 62 CP (in page 237 of SAR different information is provided 62 CP and 61CP, but considering total volume 160, 62CP is a correct one). Optional part courses (7 CP). Internship (20 CP) and finally 12CP for diploma project. The content of the BA Electronics Engineering study programme corresponds to the declared aim and learning outcomes of the study programme and it takes place according to the for professional standard ''Electronics Engineer'' according to the fifth level of professional qualification (5.PKL), which corresponds to the sixth level of the Latvian Qualifications Framework (6.LKI). Registration number of the occupational standard PS-141. Standard was accepted at the Tripartite Sub-Council for Vocational Education and Employment meeting on 12 August 2020, Minutes No 6. Available at: https://registri.visc.gov.lv/profizglitiba/dokumenti/standarti/2017/PS-141.pdf, compliance in annex: 5-4_pielikums_Atbilstiba-profesijas-standartam.pdf. Representatives of sectoral companies are: active in the council of the study programme (five representatives of employers are approved for participation in the council of FoIT Engineering Sciences study program); participates in the commission for defense of undergraduate student papers; involved in the teaching process as teaching staff (for example "Basic industrial automation (2 CP)", "Standards and technical norms (2 CP)", and "Programming programmable logic controllers (4 CP)"). As example of the ssectoral companies following could be mantioned: SIA SAF Tehnika, SIA Mikrotik, SIA EUROLCDsm SIA LMT, Hansa Matrix Group etc. In addition should be states that analysis of the study plan demonstrates that there are a lot of 1-3CP study courses, which potentially could be merged and this would simplify management of the programme and in the same time will decrease overload of the students with assignments as example Mathematical Analysis I, Mathematical Analysis II, Linear Algebra and Analytic Geometry I, Linear Algebra and Analytic Geometry II, Civil Protection, Sustainable Society and Green Thinking, Programming in C I, Programming in C II, Programming Basics for

Microcontrollers I, Programming Basics for Microcontrollers II etc.

2.2.2. N/A

2.2.3 Beside the classical approaches, lectures, practical classes, seminars etc., the core of the curriculum is based on a project-oriented learning approach, while the other courses contribute to the implementation of this project-oriented approach, providing the necessary knowledge, skills and competences (Annex: 5-7_Pielikums_Kursu apraksti.pdf). The BA Electronics Engineering study programme has following project-based learning courses Electronics engineering project I (3 KP), Electronics engineering project II (3 KP), Electronics engineering project III (3 KP); Electronics engineering group project I (3 KP), Electronics engineering group project II (3 KP); Electronics engineering research project (3 KP). Significant role in the study process takes independent studies. During independent studies, the student studies the subject independently. Independent work can take place in laboratories, in the library (where there are also free-access computers with internet access). Students of the electronics programme (both bachelor and master) have 24-hour access to a student independent work room, where students organise their own work. The used approach in the frame of the study programme contribute to the achievement of the aims and learning outcomes of the study courses and the study programme. Student-centred learning is supported by a variety of the methods and organizational approaches, like 24/7 open labs, availability of the teaching staff for consulting etc.
(In case of a joint study programme, or in case the study programme is implemented in a foreign language or in the form of distance-learning, analyze in detail the methods used for the implementation of such a study programme).
N/A

2.2.4. The aim of the internship is to use the theoretical knowledge and practical skills acquired in the study process to solve specific tasks in a practical environment in order to promote the development and improvement of students' professional knowledge, skills and competences in accordance with the qualification of electronics engineer. In the 7th semester of the BA Electronics Engineering study programme an internship of 20 CP is foreseen in accordance with the study plan (annex: 5-6_pielikums_Studiju-programmas-plans_EIB.docx.pdf) and the Regulation of the Cabinet of Ministers of the Republic of Latvia No.512 "Regulations on the State Standard of Second Level Professional Higher Education" (Annex:5-3_pielikums_Atbilstiba-valsts-standartam_EIB.pdf), which stipulates a minimum internship of 20 CP. The Director of the BA Electronics Engineering study programme is responsible for the organisation and control of student internships. The aim and objectives of the internship are defined in the Internship Regulations (annex: 5-8_pielikums_Prakses_nolikums_2022_EIB.pdf) in accordance with: 1) the duties and tasks of an electronics engineer as defined in the professional standard "Electronics Engineer"; 2) the study programme study outcomes. The following internship tasks are defined in the internship regulations: to encourage students to understand the core tasks and responsibilities of the electronics engineer's career; to develop the professional knowledge, skills and competences necessary for the performance of the main tasks and duties of the professional activity; to improve the general knowledge and competences necessary for the performance of the main tasks and duties of their professional activity, including interpersonal, communication, leadership, etc. skills and competences. There are 3 internship opportunities mentioned in SAR: Internships in companies and organisations in Latvia; Internship at the Ventspils University of Applied Sciences Research Institute Ventspils International Radio Astronomy Centre; Internships in companies and organisations through Erasmus+. SAR report and meeting states that there are not any problems of the finding internship places for the students, but in any cases the support from the HEI side is provided. Also SAR and meeting provided information about ERASMUS + mobility for the internship.It shall be concluded

that the opportunities and provision of internship offered to students, as well as the organization of work are effective. The tasks of the internship are related to the learning outcomes achievable. The internship complies with the requirements of regulatory enactments.
If the study programme is implemented in a foreign language, provide an assessment of the provision of internship in a foreign language, including for foreign students.
N/A

2.2.5. N/A

2.2.6. Students choose their final thesis topics independently, in consultation with their supervisors. These topics are usually related to research projects that students have been involved in during their studies, or for those students who have started their career, they relate their topic to current developments in their workplace. The SAR (page 244) presents bachelor thesis topics and during the visit it was possible to see samples. The topics of the bachelor thesis are in the frame of the study programme and requirements, as usually related with the development of the some solution in the field.

Conclusions on this set of criteria, by specifying strengths and weaknesses

Conclusions:
Considering SAR and evidence collected during the meeting in assessment visit it shall be concluded that the presented study programme fulfills formal requirements, is inline with the requirements of the industry and labor market. At the same time, representatives of the industry pointed out that they would be happy to see more “soft” skills by the graduates of the VUAS. The content of the BA Electronics Engineering study programme supports reaching the aim and learning outcomes of the study programme. Internship is an obligatory part of the BA Electronics Engineering study programme and according to provided evidence is running smoothly and effectively. Expected outcomes of the internships are inline with the BA Electronics Engineering study programme and requirements of the industry. Some of the learning outcomes are confusing and could be more generic (as now it is too many of them).

Strengths:
1. The BA Electronics Engineering study programme is balanced between the necessary knowledge, skills and competencies required to perform the duties after graduation.
2. The content of the BA Electronics Engineering study programme is relevant to the field of the relevant industry.
3) Rich collaboration with the local public and private entities.

Weaknesses:
1. The BA Electronics Engineering study programme is provided only in a form of full-time study, which limits the opportunity to some potential learners to join the study programme
2) Too many small courses in the programme (1- 3 CP), which decreases manageability of the study programme (from VUAS side) and in the same time overloads students with the assessments.

Assessment of the requirement [5] (applicable only to master's or doctoral study programmes)

1 R5 - The study programme for obtaining a master's or doctoral degree is based on the achievements and findings of the respective field of science or field of artistic creation.

Assessment of compliance: Not relevant

NA

2.3. Resources and Provision of the Study Programme

Analysis

2.3.1. VUAS has a significant and sufficient volume of auditoriums (130 and 190 seats), 9 computer classes (10-30 computers in each) and laboratories for specific study courses to equip students with necessary equipment and software. Laboratories are accessible for students on 24/7 basis. Students of the BA Electronics Engineering study programme require a significant amount of practical exercises especially focusing on laboratory work. VUAS has established and maintains next specialized laboratories necessary to achieve learning objectives of the study program: Laboratory for electrical measurements (E1), Laboratory for digital electronics (E2), Laboratory for Signal Processing (E3), Laboratory of Optics and Optoelectronics (E6), laboratory of Physics (E8), Laboratory for Mechatronic Systems (D208), Prototyping laboratory (D04), Laboratory for Robotics and Sensors (D207), Amateur Radio Station (E801) and Practical workspace (B3) for practical projects outside class time.
Students do have access to the VUAS library that provides access to physical and electronic materials used in study program delivery. Majority of the referenced materials in the descriptions of the study courses can be found and are accessible in the VUAS library (even few copies of each can be enough to source all students).
VUAS has implemented a Moodle system to provide required information to students. This includes general information about the VUAS, description and clarification of internal processes, necessary information of the study courses including practical exercises and additional materials. Mentioned information is available both in Latvian and English. Each VUAS student has assigned an email address to secure formal and informal collaboration with VUAS and teaching staff. On top of email as a collaboration channel, teachers set up study courses dedicated groups in WhatsApp, Telegram and other collaboration platforms to speed up communication and bring collaboration between them and students to the next level.
Review of the necessary equipment and literature is being done on the annual basis by teaching staff and the list of necessary items is submitted to the head of FoIT Engineering department. On average 7000 EUR annually are allocated on renewal of technical teaching aids and materials.
BA Electronics Engineering study programme includes an internship part. VUAS has established a number of strong collaborations with local companies to provide internship options for their students (i.e. Accenture, TestDevLab, HansaMatrix Ventspils, Elektroniskie sakari, ATEA). VUAS students do get real practical experience in laboratories, and this increases an interest of the industry in the skilled students. Such collaboration supports achievement of the learning objectives of the BA Electronics Engineering study programme, but also introduces challenges, when students get full-time work and continue studies in VUAS in parallel.

2.3.2. N/A

2.3.3. Financial sustainability of the BA Electronics Engineering study programme is directly dependent on the number of the students. There are 25 students in the year 2022.-2023., what is insufficient to make this program financially sustainable. Specifics of the BA Electronics Engineering study programme require significant investments in specialized laboratories and maintenance staff. VUAS calculations show that 29 is the minimal number of students required in this BA Electronics Engineering study programme to make it financially sustainable. Insufficient number of students leads to negative results in 2022.-2023. year and shows -17% negative result.
On average 10-12 new students join the BA Electronics Engineering study programme, but in the year 2021.-2022. only 4 have joined, followed by 10 new students in the year 2022.-2023. In the

related Master degree Electronics program, the number of new students also continues to decrease. This makes the key concern in regard to program future sustainability.
Additionally, VUAS managed to leverage ESF funds and complete several projects during 2018-2022 and attract additional funds to finance new laboratory equipment, new computer classes, improvements of premises and development of the academic staff.

Conclusions on this set of criteria, by specifying strengths and weaknesses

Conclusions: students and teaching staff are fully equipped to achieve learning objectives and graduate the program. Due to the decreased number of students, the BA Electronics Engineering study programme has not achieved positive financial results (-17%) in the year 2022.-2023. and total number of students has decreased, however there is a positive trend in getting new students.

Strengths:
1. VUAS has established and maintains a number of specialized laboratories that are available for students 24/7.
2. In the year 2022.-2023. the number of new students is back to pre-COVID period.

Weaknesses:
1. Low number of students leads to negative financial results in the year 2022.-2023. and overall financial sustainability of the BA Electronics Engineering study programme.

Assessment of the requirement [6]

1 R6 - Compliance of the study provision, science provision (if applicable), informative provision (including library), material and technical provision and financial provision with the conditions for the implementation of the study programme and ensuring the achievement of learning outcomes

Assessment of compliance: Fully compliant

students and teaching staff are fully equipped to achieve learning objectives and graduate the BA Electronics Engineering study programme. Negative financial results of the BA Electronics Engineering study programme can be accepted and managed by VUAS to continue development of the study program.

2.4. Teaching Staff

Analysis

2.4.1. As presented in the SAR and in the Annexes to SAR submitted for evaluation, the teaching staff of the BA Electronics Engineering study programme (SAR pp. 252-256) consists of 25 persons, out of which 2 Assoc. Professors, 5 lecturers, 6 docents, and 12 guest lecturers. 10 persons of the teaching staff hold a doctoral/ Ph.D. degree (6 of which in computer science/ engineering/ physics). The remaining 15 teaching staff have master’s degrees (14 persons) or significant professional activity in the narrow domain of the discipline (1 person, SAR pp. 257). 52% of the teaching staff has a guest status.
The knowledge, skills and competences of the teaching staff are declared as being sufficient for a good teaching process; the SAR pp. 257-258 provides significant description of the expertise of the teaching staff towards the obtention of the outcomes of the BA Electronics Engineering study programme.
The BA Electronics Engineering study programme is implemented for less than 250 students. As described in SAR pp. 256, “The language skills of the teaching staff of the bachelor study

programme "Electronics Engineering" comply with the Cabinet of Ministers Regulation of 2009 No. 733 "Regulations on the Scope of Knowledge of the State Language and the Procedure for Testing Proficiency in the State Language for Professional and Official Duties". Information on the foreign language skills of the lecturers is summarized in the lecturers' curricula vitae (CV) is attached as Annex 2.9.". The University has also provided certified letters of declaration for the language skills of teaching staff for both Latvian (2-10_appendix_teaching-staff-latvian-language_ENG, Declaration 1-10.1/69 of 22.12.2022) and English (2-11_appendix_teaching-staff-English-language_ENG, Declaration 1-10.1/70 of 22.12.2022).
The teaching staff provisions are evaluated as conform to the requirements of the Higher Education Law of Latvia.

2.4.2. The SAR pp. 259 presents the changes in the composition of teaching staff. The changes are related to attracting 3 new persons (2 docents and 1 guest lecturer) who are entrusted with the teaching of 16 courses and projects (out of the total 48 courses and projects included in the study program curricula - 5-6_appendix_Study_programme_plan_EIB.docx). The new recruited staff (which represents 15% of the teaching staff) covers 33% of the disciplines, which represents a very unequal work balance.

Attracting new teaching staff shows that the teaching staff composition change was managed successfully by the responsible structure; still, there is no available documentation regarding any specific provision on staff change at the VUAS/ Faculty level, especially under the consideration of the significant number of guest teaching staff.

2.4.3. The criterion is not applicable, the study program is a bachelor study program.

2.4.4. The SAR of the BA Electronics Engineering study programme(pp. 259, points 3.4.3 and 3.4.4) does not specifically mentions any information about publications of the teaching staff (although these publications exist, as shown in document 2-12_appendix_quantitative-data-on-academic-staff-research-activitiy-ENG).
The annexes to the 2.4. Scientific Research and Artistic Creation chapter of the SAR (pp. 57-70) (2-13_appendix_teaching-staff-scientific-resarch-experience) list all the publications, patents and creations of the teaching staff involved in all the programs from the evaluated study field. In the last 6 years, as shown in document 2-12_appendix_quantitative-data-on-academic-staff-research-activitiy-ENG, there are 705 scientific publications of various types (including publications numbered multiple times, as they have several authors from the university); the average yearly production of the 58-teaching staff of the field is then around 2 publications.
The identification of the publications of the teaching staff from the BA Electronics Engineering study programme in document 2-13_appendix_teaching-staff-scientific-resarch-experience shows that 8 (most coming from the industry) out of 25 persons do not have any publication declared.

2.4.5. The SAR lists (pp. 260) several ways of teaching staff cooperation:
- Interdisciplinary cooperation of academic staff, with topical issues discussed at organised meetings of the Council of Study Programmes, Faculty Council meetings, seminars, meetings with employer;
- Cooperation of teaching staff in the development of the study programme content;
- Cooperation between teaching staff in the implementation of specific study courses;
- Informal cooperation between teaching staff („the weekly coffee break").
All this shows that cooperation between teaching staff does exist, it is functional, but it works in mostly non-documented and informal ways, without a unitary mechanism.
The SAR pp. 220 mentions that at the time of submission of the Self-assessment Report, the

bachelor study programme "Electronics Engineering" is implemented by 25 faculty members and it has 30 students, thus the ratio of students to faculty members is 1.25 students to one faculty member.
For reference, for the entire study field there are 58 teaching staff, as described for instance in Annex 2-9_appendix_Teaching_Staff_CV_ENG.pdf; the total number of enrolled students in the study field is 254 (45+147+15+6+30+11), which provides a student to teaching staff ratio of 4.38.

Conclusions on this set of criteria, by indicating strengths and weaknesses

Conclusions:
The teaching staff provisions are evaluated as being conform to the requirements of the Higher Education Law of Latvia. There are 25 people in the academic staff allocated to the program and the student/teaching staff ratio is quite low (1.25). The teaching staff is not very active in research (as 32% of the teaching staff has declared zero publications and others have a single publication during the reporting period) and cooperates (in various, mostly non-documented and informal ways) towards the successful implementation of theBA Electronics Engineering study programme.

Strengths:
1. A low student to teaching staff ratio, which enables close cooperation and student-centered guidance.

Weaknesses:
1. The relatively low ratio of tenured (elected) teaching staff (48%) as compared to guest teaching staff (52%).
2. The small number of publications of the teaching staff.
3. There are no documented provisions regarding the management of the changes in teaching staff.
4. Lack of documentation of the cooperation between the teaching staff and their specific interactions towards program changes.

Assessment of the requirement [7]

1 R7 - Compliance of the qualification of the academic staff and visiting professors, visiting associate professors, visiting docents, visiting lecturers and visiting assistants with the conditions for the implementation of the study programme and the requirements set out in the respective regulatory enactments.

Assessment of compliance: Fully compliant

The teaching staff provisions are evaluated as being conform to the requirements of the Higher Education Law of Latvia.

2.5. Assessment of the Compliance

Requirements

1 1 - The study programme complies with the State Academic Education Standard or the Professional Higher Education Standard

Assessment of compliance: Fully compliant

According to annex 5-3 (5-3_pielikums_Atbilstiba-valsts-standartam_EIB.pdf), the BA Electronics Engineering study programme complies with the "Regulations Regarding the State Standard of Vocational HigherEducation of the Second Level" by the Cabinet of Ministers.

2 2 - The study programme complies with a valid professional standard or the requirements for the professional qualification (if there is no professional standard required for the relevant occupation) provided if the completion of the study programme leads to a professional qualification (if applicable)

Assessment of compliance: Fully compliant

According to annex 5-4 (5-4_pielikums_Atbilstiba-profesijas-standartam.pdf), the BA Electronics Engineering study programme is designed based on the Professional Standard for Electronics Engineer. The professional standard with registration number PS-141 was approved during the meeting of the Tripartite Sub-Council for Vocational Education and Employment on August 12, 2020. https://registri.visc.gov.lv/profizglitiba/dokumenti/standarti/2017/PS-141.pdf

3 3 - The descriptions of the study courses and the study materials have been prepared in all languages in which the study programme is implemented, and they comply with the requirements set forth in Section 561 , Paragraph two and Section 562 , Paragraph two of the Law on Higher Education Institutions.

Assessment of compliance: Fully compliant

The course descriptions are available in both Latvian and English languages, although the programme is realized only in Latvian. All course descriptions contain the requirements set forth in the corresponding sections of the Law on Higher Education Institutions. Study course descriptions are available in annex 5-7 (5-7_Pielikums_Kursu apraksti.pdf).

4 4 - The sample of the diploma to be issued for the acquisition of the study programme complies with the procedure according to which state recognised documents of higher education are issued.

Assessment of compliance: Fully compliant

The diploma example available in annex 3-1_EIB_pielikums_DP_LV is compliant with the Cabinet of Ministers regulation No 202 “Procedures by which documents certifying higher education recognised by the State shall be issued”.

5 5 - The academic staff of the academic study programme complies with the requirements set forth in Section 55, Paragraph one, Clause 3 of the Law on Higher Education Institutions.

Assessment of compliance: Not relevant

6 6 - Academic study programmes provided for less than 250 full-time students may be implemented and less than five professors and associated professors of the higher education institution may be involved in the implementation of the mandatory and limited elective part of these study programmes provided that the relevant opinion of the Council for Higher Education has been received in accordance with Section 55, Paragraph two of the Law on Higher Education Institutions.

Assessment of compliance: Not relevant

7 7 - At least five teaching staff members with a doctoral degree are among the academic staff of an academic doctoral study programme, at least three of which are experts approved by the Latvian Science Council in the respective field of science. At least five teaching staff members with a doctoral degree are among the academic staff of a professional doctoral study programme in arts (if applicable).

Assessment of compliance: Not relevant

8 8 - The teaching staff members involved in the implementation of the study programme are proficient in the official language in accordance with the regulations on the level of the official language knowledge and the procedures for testing official language proficiency for performing professional duties and office duties.

Assessment of compliance: Fully compliant

According to annex 2-10 (2-10_appendix_teaching-staff-latvian-language_ENG.pdf) the proficiency level of all teaching staff involved in the implementation of the BA Electronics Engineering study programme complies with the requirements of Official Language Law.

9 9 - The teaching staff members to be involved in the implementation of the study programme have at least B2-level knowledge of a related foreign language, if the study programme or any part thereof is to be implemented in a foreign language (if applicable).

Assessment of compliance: Not relevant

10 10 - The sample of the study agreement complies with the mandatory provisions to be included in the study agreement.

Assessment of compliance: Fully compliant

The study agreement example available in annex 2-5 (2-5_appendix_study-contract-example.pdf) fully complies with the Cabinet of Ministers regulation “Rules to be included in the study agreement”.

11 11 - The higher education institution / college has provided confirmation that students will be provided with opportunities to continue their education in another study programme or another higher education institution or college (agreement with another accredited higher education institution or college) if the implementation of the study programme is terminated.

Assessment of compliance: Fully compliant

The provided contract in the annex states the study programme name “Bachelor of Engineering in Electronics” (Licence No. 04038-8) that would be received in TSI, but TSI is undergoing accreditation process in which the study programme names may change, therefore it should be revisited. Although the contract allowing students to transfer to another study programme in the event of termination of the VUAS Electronics engineering study programme should be signed for a professional programme, in order for students to continue their studies with a practical focus rather than an academic one.

12 12 - The higher education institution / college has provided confirmation that students are guaranteed compensation for losses if the study programme is not accredited or the study programme’s license is revoked due to the actions (actions or omissions) of the higher education institution or college and the student does not wish to continue studies in another study programme.

Assessment of compliance: Fully compliant

The attached document in Annex 2-4 (2-4_appendix_Declaration_on_loss_compensation_for_students.docx.pdf) confirms that students are guaranteed compensation for losses if the study programme is not accredited or the study programs license is revoked due to the actions (actions or omissions) of the VUAS, and the student does not wish to continue studies in another study program.

13 13 - The joint study programmes comply with the requirements prescribed in Section 55.(1), Paragraphs one, two, and seven of the Law on Higher Education Institutions (if applicable)

Assessment of compliance: Not relevant

14 14 - Compliance with the requirements specified in other regulatory enactments that apply to the study programme being assessed (if applicable)

Assessment of compliance: Not relevant

Assessment of the requirement [8]

1 R8 - Compliance of the study programme with the requirements set forth in the Law on Higher Education Institutions and other regulatory enactments.

Assessment of compliance: Fully compliant

The BA Electronics Engineering study programme partially complies with the requirements set in national regulatory enactments, although the contract that allows the students to continue their studies in another study programme in case VUAS study programme Electronic engineering would be terminated should be signed for a different study programme, in order for students to continue their studies in a professional study programme rather than an academic

General conclusions about the study programme, indicating the most important strengths and weaknesses of the study programme

Conclusions:
The teaching staff provisions (25 people in the academic staff) are evaluated as being conform to the requirements of the Higher Education Law of Latvia. The student/teaching staff ratio is quite low (1.25). The teaching staff is not very active in research (as 32% of the teaching staff has declared zero publications and others have a single publication during the reporting period) and cooperates (in various, mostly non-documented and informal ways) towards the successful implementation of the study program.
The provided documentation of the study programme fully complies with the forthset regulations and requirements of the law,.

Strengths:
1. A low student to teaching staff ratio, which enables close cooperation and student-centered guidance.

Weaknesses:
1. The relatively low ratio of tenured (elected) teaching staff (48%) as compared to guest teaching staff (52%).
2. In case the VUAS study programme Electronics engineering would be terminated, the students are offered to continue their studies in an academic study programme not a professional study programme.
3. Revisit the agreement with TSI, which allows the students to continue their studies in TSI if the VUAS study programme Electronic engineering is terminated, after TSI undergoes the accreditation process, because the study programme names may change.

Evaluation of the study programme "Electronics Engineering"

Evaluation of the study programme:

Good

2.6. Recommendations for the Study Programme "Electronics Engineering"

Short-term recommendations

1. Consider implementing a consistent plan for the insurance of a teaching staff corps more resilient to changes and less dependent on guest teaching staff.
2. Consider provisions regarding the management of the changes in teaching staff.
3. Revisit the agreement with TSI, which allows the students to continue their studies in TSI if the VUAS study programme Electronic engineering is terminated, after TSI undergoes the accreditation process, because the study programme names may change.

Long-term recommendations

1. Consider implementing a consistent plan for the increase of the number and impact of publications of the teaching staff.
2. Consider the documentation of the cooperation between the teaching staff and their specific interactions towards program changes.
3. Consider to have more bigger courses (in terms of CP), or organaising modules
4. Explore a possibility and demand for opening a part-time study in the frame of this programme.
5. Consider signing an agreement allowing students to continue their studies in another study programme if the VUAS study programme Electronic engineering is terminated, with another study programme in which a professional degree can be obtained.
6. Consider adding an option to pass the programme for international students

II - "Smart Technologies and Mechatronics" ASSESSMENT

II - "Smart Technologies and Mechatronics" ASSESSMENT

2.1. Indicators Describing the Study Programme

Analysis

2.1.1

The joint professional bachelor study programme "Smart Technologies and Mechatronics” (42523) (joint study programme) is designed in accordance with the study field "Information Technology, Computer Engineering, Electronics, Telecommunications, Computer Management, and Computer Science" and its related areas, such as mechatronics, automation, smart technologies and is related directly to ICT and electronics and technology. The joint study programme includes a broad range of topics that are relevant to the field of smart technologies and automation. The content of the joint study programme is based on the thorough analysis of the future technology trends and implementation of various smart technologies and situation in the world and current tendencies in the Baltic region focusing on supporting the regional industry progress. The current trends and regional needs proven by the good collaboration with the local companies and between the VUAS and Liepaja University are the strong foundations of the joint study programme.

The joint study programme covers both theoretical and practical aspects of various smart technologies and mechatronics and electronics and computer engineering, including the design, development, and operation of smart systems in today's industry. The curriculum includes courses such as "Production Organisation and Management"; "Total Quality Management"; "Basics of Electronics"; "Metrology, Measurement Technology and Sensors"; "Algorithms and Data Structures"; "Operating Systems and Computer Architecture"; "Electronics"; "Computer Aided Design";

"Production Technologies"; "Electrical Engineering and Electric Drives"; "Sensors"; "Databases"; "Robot Control"; "Artificial Intelligence" and "Internet of Things". These courses cover the fundamental concepts and skills needed for students to succeed in the field of smart technologies. The practical work allows students to apply their theoretical knowledge to real-world problems and to develop practical skills, which are highly valued by employers. In addition, the joint study programme also emphasizes the importance of communication skills, teamwork, and ethical considerations, which are essential for success in the field of new and smart technologies and mechatronics. These skills are developed through various activities, such as group projects, presentations, and discussions. It could be noted that a joint study programme introducing in the EU prioritized smart technologies issues such as optimization of the use of sustainable technologies, ICT, mechatronics and electronics and AI etc. is complicated and challenging to realize in an implicit way.

Overall, the joint study programme is relatively well-aligned with the study field and provides students with the knowledge, skills, and practical experience needed to succeed in the field of future technologies.

2.1.2

The degree to be obtained - Professional bachelor's degree in mechatronics and professional qualification - Mechatronics Engineer is appropriate for the knowledge, skills, and competencies that the joint study programme aims to provide. One of the joint study programme goals is: “to give bachelors of the study program “Smart Technologies and Mechatronics” the opportunity to obtain further master's degree in engineering, mechatronics, adaptronics, transport, etc.”. The joint study programme does not contain basic courses in transport engineering and does not give respective basic knowledge and therefore this goal is not achievable - to prepare the students for acquiring further education in the transport. The rest of aims and objectives of the joint study programme are clearly defined and aligned with the learning outcomes that students are expected to achieve upon completion of the joint study programme.

The scope of the joint study programme is also reasonable, as it includes a combination of compulsory, restricted elective, and free elective courses, which cover various aspects of mechatronics and smart technologies basics, including mechanics, electronics, control systems, and robot control. The programme also includes a final thesis, which allows students to demonstrate their ability to apply their knowledge and skills to a real-world problem in the field of mechatronics. The implementation language of the joint study programme is justified, as the programme is offered in Latvian and English, which are the two official languages of the European Union. This allows the joint study programme to attract both local and international students and ensures that graduates are proficient in at least one of these languages, which is important in the global job market. The duration of the joint study programme is 4 years (160 CP) both in Latvian and in English. The interdisciplinary approach of the joint study programme allows students to acquire knowledge and skills in multiple fields related to mechatronics and technology, preparing them to handle real-world problems and work on complex projects that require a multidisciplinary approach.

The admission requirements for the English language programme are a secondary education and a level of English of at least B2 or respective certificate (SAR p.265). On the other hand on the p.271 SAR declares that: the admittance process is regulated by the annual admission rules for full-time and part-time studies approved by the Liepaja University Senate (in 2019 - "LiepU admission requirements and criteria for higher level study programs in the 2019/2020 academic year", LiepU order of the LiepU Senate of October 29, 2018 at the meeting, protocol No. 4). The number of budget and paid student places to be admitted is approved by the Senate of LiepU every year. The admission criteria are: successful grades of the secondary education certificate year in all subjects with an average grade not lower than 6 points (if the average grade is lower than 6 points, there is a possibility to take a test – discussions); CE in Latvian language, mathematics, English language; entrance exam. So – the pages 265 and 271 of the SAR define differently the admission criteria,

which is confusing. The students starting on the joint programme at both the Universities (Liepaja University and VUAS) should be dealt equally at admission and later and this admission discrepancy should be corrected.
The duration of the joint study programme implementation is based on the normative acts, including the Law on Higher Education Institutions and the Cabinet of Ministers Regulation No. 846 of October 10, 2006 "On Requirements, Criteria and Procedures for Admission to Study Programmes".
The duration and scope of the joint study programme implementation, as well as the implementation language, are reasonable and justified.
The educational classification code is 42523 which according to Latvian Education Classification (Latvian Cabinet of Ministers Regulations (Cab, Reg.) No. 322, https://likumi.lv/ta/id/291524-noteikumi-par-latvijas-izglitibas-klasifikaciju), corresponds to the following codification: meaning of the first two digits `42` notes for professional bachelor and the last three digits `523` indicate that this professional bachelor degree study programme is related to the educational group of "Electronics and automation''.
The title, code, degree and qualification to be obtained, aims, objectives, learning outcomes, and admission requirements of a joint study programme are interrelated and are aligned with each other. The title and code of the joint study programme reflect the content and focus of the programme.
Therefore, it is important to note that all these elements of a joint study programme are carefully considered and interrelated to ensure that the joint study programme is relevant, coherent, and effective in achieving its intended outcomes.
2.1.3
This is the first accreditation of the joint study programme. After the licensing process in 2021, the number of credits were increased for the study course "Manufacturing technologies" to 6 CP, introduced the study course "Hydraulics and pneumatics" in the amount of 2 CP and removed the Latvian language from the planning for the English language group and it is planned too supplement material support with 2 CNC machine tools within 5 years. In conclusion, the corrections made to the study programme's parameters within last years were well-analyzed, justified, and would be supported.
2.1.4
The joint study programme has a clear economic and social justification, as the demand for smart technologies professionals in general has been steadily increasing in recent years due to the growth of the automation, robotics and digitalisation in industry in various sectors. Unfortunately there has not been students matriculated on this joint study programme at VUAS and admission has taken place only at the Liepaja University (11 students in the year 2022) and therefore it could not be discussed about the dynamics of the number of students in the joint study programme or about the experiences at VUAS. This indicates that the joint study programme is running only at the University of Liepaja with some small amount (10%, i.e. 16 CP) of courses offered by VUAS (electronics and electromagnetism) and Liepaja University covering the rest of 144 CP. Therefore it might raise the question whether the implementation of the joint study programme is "joint programme" or collaboration between the universities where VUAS is offering some additional courses in the form of collaboration to Liepaja University as extra to Liepaja University study programme. SAR gives main arguments for creating the programme (SAR p.274) as LiepU collaboration with companies in Liepaja (Trelleborg Wheel Systems Liepaja Ltd., Silkeborg Spaantagning Baltic Ltd., AE Partner, INPASS Ltd. etc.). Therefore it is unclear how the programme is contributing to balanced regional social and economic development. As for now there are no students from VUAS on this programme it is also unclear the choice of the form of the programme - "joint programme" because delivering only small amounts of courses in some other HEI could be organized on the basis of cooperation agreements if it could be economically more effective. From the discussions with the LiepU students in assessment visit, from the same programme and from on-site comments of VUAS teaching staff the experts

noticed problems connected with travel of Liepaja University students to Ventspils for this kind of short study courses that do not cover even one semester study load. Therefore a question might raise why the programme does not allow to complete one full semester or even one year in VUAS and another year or semester in Liepaja. Division of the study load by semesters could be more logical. On the other hand it was recognized that VUAS has very good electronics labs and related competencies that Liepaja University does not have. Therefore the implementation of the joint study programme could be analyzed more deeply taking into consideration the existing competencies and lab equipment and problems with students and teachers travel and from the point of optimizing the economics of the joint study programme implementation.
2.1.5 The development and implementation of the joint study programme is justified and ensures a quality study process (if applicable).
Professional Bachelor's study programme "Smart Technologies and Mechatronics" is a joint programme of LiepU and VUAS). The joint study programme has been developed in the framework of the SAM project "Reduction of fragmentation of study programmes at LiepU" (No. 8.2.1.0/18/I/002). This choice was determined due to changes in the production organizations - mainly in Liepaja (LSEZ companies "Trelleborg Wheel Systems Liepaja Ltd. (SIA)", "Silkeborg Spaantagning Baltics Ltd. (SIA)", etc.). The choice of the partner (LiepU) seems reasonable as the partner has sufficient resources (Prototyping Laboratory and the Mechatronics and Physics Laboratory and production engineering equipment like CNC and robots) available and running collaboration with the Liepaja companies. From the other hand there is no staff mobility or exchange running between the partner institutions and no R&D collaboration. There is no data in SAR how the programme could contribute to Ventspils industry development or improve the teaching quality in VUAS. It is essential to note that only LiepU students are participating in the programme during some last years (12 students in total over all the years). No data in SAR, not during the meetings with VUAS staff about common communication channels and other important processes and therefore it seems the integration between the institutions is very weak. LiepU's contribution at the programme is implementation of the core courses in amount of 144 CP, while the VUAS is offering in an
amount of 16 CP related to electronics and electromagnetism (16 out of 160 CP), which is a very small amount of courses. Due to the fact that there are no enrolled students at VUAS on this programme and the teaching load at VUAS is very small on this programme and there are no evidence how the Ventspils companies contribute to development of the programme the programme management and content needs an urgent analysis and common quality assurance plan.

Conclusions on this set of criteria, by specifying strengths and weaknesses

Conclusions:
The joint study programme shows promise in preparing students for the demands of the smart systems and mechatronics industry, but there is room for improvement and optimization of the programme implementation.

Strengths
1. Interdisciplinary approach: The joint study programme maintains an interdisciplinary approach, which allows students to gain knowledge and skills in a variety of fields related to mechatronics in a broad sense. This prepares them to work on complex projects and handle real-world problems that require a multidisciplinary approach.

2. Research opportunities at VUAS: The joint study programme might provide opportunities for students to engage in research activities, which can help them develop their research skills and prepare them for graduate studies or a career in research.

3. VUAS has strong competency in electronics and a very good electronics laboratories.

4. Future oriented, prioritizing future technologies.

Weaknesses
1. Very uneven distribution of teaching courses (teaching load) between VUAS and LiepU.

2. No students enrolled at VUAS on this joint study programme.

3. Problems with organizing the studies related to travel.

4. The roles and responsibilities of the partner universities are not very clear in improving the joint study programme.
5. The students starting on the joint programme at both the Universities (Liepaja University and VUAS) should be dealt equally at admission and later and this admission discrepancy should be corrected (SAR p. 265 and 271 define differently the admission criteria.

2.2. The Content of Studies and Implementation Thereof

Analysis

2.2.1. The joint study programme is delivered as a joint with Liepaja University. The following study results are declared in SAR: Is able to demonstrate a comprehensive and specialised knowledge and understanding of the facts, theories, patterns and technologies elevant to the professional field of mechatronics; Is able to perform practical tasks in the mechatronics profession in an analytical manner, to demonstrate skills that enable creative solutions to professional problems, to discuss and to reasonably debate practical issues and solutions in the profession with colleagues, clients and management, and to learn further with an appropriate degree of independence, developing their competences. Is able to evaluate and to improve own and others' performance, to work collaboratively with others, to plan and to organise work in order to carry out specific tasks in the profession, and to carry out or supervise work activities that are subject to unpredictable change; Is able to formulate, to describe and to analyse practical problems in the mechatronics profession, to select the necessary information and to use it to solve clearly defined problems; Is able to participate in the development of the mechatronics profession, to demonstrate an understanding of the place of the mechatronics profession in the wider social context. The joint study programme is implemented in 4 years (160CP) in latvian and english. The content of the joint study programme is developed in accordance with the requirements of the regulatory enactments Izglītības likums, Augstskolu likums, LR MK 2017. gada 13. jūnija noteikumi Nr. 322 “Noteikumi par Latvijas izglītības klasifikāciju”, LR MK 2014. gada 26. augusta noteikumi Nr. 512 “Noteikumi par otrā līmeņa profesionālās augstākās izglītības valsts standartu”,). The goal, objectives and learning outcomes of the joint study programme in terms of knowledge, skills and competences have been developed in accordance with the European Qualifications Framework[1] (EQF) and the Latvian Qualifications Framework[2] (LCI) Level 5 and in accordance with the professional standard "Mechatronics Engineer" (2002) . Study programs at VUAS have been created with the active participation of employers, and all FOIT graduates have the opportunity to find a job in their specialty. According to the "Dynamic University" research, the survey of local industry companies shows that in the next 7 years, the demand for information technology specialists (including electronics) in Ventspils will increase by more than 500%, which makes up more than 700 specialists in total. The joint study programme of study comprises 160 CP (240 ECTS) and their distribution is in accordance with the regulatory enactments: General study courses (20 CP), Theoretical courses (38 CP), Professional specialization study courses (58 CP), Elective study courses (6 CP), Internship (26 CP), State

examination (12 CP). The provided content of the study programme in overall relevant to the study programme specialization and development of the domain. SAR (page 278 - 280) represents detailed description of how study programme could be represented by the modules: General courses with an Entrepreneurship module (20CP), Mathematics (10CP), Information technology (18CP), Innovation and Smart Technologies module (6CP) etc. But according to the description it seems that the joint study programme could be improved by more deep skills and competences in the field of mechanics and engineering. The study course descriptions that come from Liepaja University use a different template for the descriptions rather than a joint one. In this template from Liepāja University it is said that a creditpoint is 40 hours, although the law of higher education currently states that it is 25 to 30 hours, the law also suggests since the term credit point has recently changed (from 40 hours to 25-30 hours), the correct version should be introduced until 31st December, 2024.Very confusing that the joint study programme is organised as joint programme, as according to the provided information only minor part is implemented by the VUAS, around 10% from the total amount of the credit points. Such disproportion between partners is not clear and is unbalanced. Actually the possibility to get any students in Venspils for this joint study programme is almost close to zero, as the majority of the programme is implemented in Liepaja. With such distribution it is not possible to see any value of the joint study programme for the VUAS. In addition it is not clear the title of the programme in English language, as course description (provided) states a different title, instead of Smart used word Intelligent (8-7_appendix_Study_course_descriptions_VTM.pdf)

2.2.2.N/A

2.2.3. The delivery mechanism of the joint study programme ensures the achievement of learning outcomes, incorporating the principles of student-centred learning. The student workload is equivalent to 40 academic hours of work per credit point. 1 CP includes contact hours (16) and students' independent work (24). Therefore, two forms of study are integrated in the process of learning the course content: classroom work and independent work. SAR reports following study implementation methods: lectures, seminars, discussion, individual, pair and group work, practical work, laboratory work, projects, independent work. In addition multimedia technologies for developing the study materials are used.This is organized using e-learning multimedia technologies. Student-centric approach is implemented using close collaboration between course teaching staff and students, self-assessments tasks. Study implementation methods are valid for this type of the joint study programme.
(In case of a joint study programme, or in case the study programme is implemented in a foreign language or in the form of distance-learning, analyze in detail the methods used for the implementation of such a study programme).
According to SAR information and clarification received during the meetings in assessment visit, both HEIs (VUAS and Liepaja University) are coordinating visits of the students to VUAS. The schedule is known before and delivered to the students. The transport is provided to the students. If students are missing classes, he or she is able to contact the teaching staff of VUAS and agree on possible solutions. The methods used during students' visit to VUAS are the same as described above: lectures, seminars, discussion, individual, pair and group work, practical work, laboratory work, projects, independent work. While more advanced and innovative approaches could be realized here, for example flipped-classes.

2.2.4. SAR pages 284-286 reports about internship organisation, tasks and students obligations regarding internship. According to SAR, study programme "Smart Technologies and Mechatronics' internships are planned in accordance with the Liepaja University regulations on internships. The content of the study courses (annex: 8-7_pielikums_Studiju_kursu_apraksti_VTM.pdf) offered in the

joint study programme is oriented towards the continuous and mutually integrated acquisition of knowledge and skills in order to develop students' professional competence in various fields of engineering. The implementation of internship tasks promotes students' independence, responsibility and demonstrates their ability to apply previously acquired knowledge in a professional environment. The strategy of internship planning includes attraction of practitioners - entrepreneurs are involved in providing internships, especially employees of companies operating in the Liepaja Special Economic Zone. Before and after the placement, the suitability of the placement site for the placement is assessed. The internship is carried out in the amount of 26 CP (three internships) - Internship I (4th Semester), Internship II (6th Semester), Internship III (7th Semester), by the end of which the student has already mastered most of the theoretical study courses. In a positive way also could be evaluated existence of the final internship conference, with public defence of the internship results. Shall be concluded that the opportunities and provision of internship offered to students, as well as the organization of work are effective.
If the study programme is implemented in a foreign language, provide an assessment of the provision of internship in a foreign language, including for foreign students.
SAR reports that there will be no problems for foreign students to do internships. During the meeting with industry representatives in assessment visit, this was confirmed. But at the same time SAR has a reference to the regulation for internship (annex: 8-8_pielikums_Noteikumi_par_praksi_LiepU.docx.pdf) and it is available only in latvian. Considering the fact that joint study programme also delivered in english the document shall be translated to english and available for english-speaking students.

2.2.5. N/A

2.2.6. The final theses of the VUAS students in the joint study programme have not yet been defended.

Conclusions on this set of criteria, by specifying strengths and weaknesses

Conclusion:
The content of the joint study programme in general fits the declared title of the programme, at the same the content should be improved in terms of adding more courses (or inclusion of topics to the existing courses) regarding mechanics and engineering. The format of the joint study programme is under question, as the distribution of the courses between HEIs is dramatically unbalanced. VUAS delivers only around 10% (credit points) from the joint study programme. This limits the ability of VUAS to get any students for this joint study programme. Looks like that here resource sharing activity is the best option (not join programme). The joint study programme is going to be implemented also in english, while the regulation document for the internship is available only in latvian. Used joint study programme delivery methods are adequate, but more modern approaches could be tested and implemented (flipped classes, learning-by-doing) etc.

Strengths:
1. Attractive study programme, considering fast development of the robotics and automatisation.
2. VUAS courses are well supported by the resources (labs and equipment).
3. Strong partnership with local companies.

Weaknesses:
1. Delivery format - joint programme seems to be not suitable here as courses between HEIs are unbalanced (Liepaja University -90%, VUAS - 10%).

2) Current structure of the joint study programme do not provide enough competences and skills in the domain of mechanics and engineering
3) Course descriptions are provided in different forms compared to the rest of the programmes.
4) Significant number of the small courses (even if they are organized as modules).
5) Different templates for the study course descriptions are used in VUAS and LiepU, which could cause confusion. In the LiepU course descriptions a credit point is considered 40 hours, which needs to be updated until December 31st, 2024 (according to the Law of Higher education)
6) Internship document is only in Latvian, while it is planned to realize the programme also in English

Assessment of the requirement [5] (applicable only to master's or doctoral study programmes)

1 R5 - The study programme for obtaining a master's or doctoral degree is based on the achievements and findings of the respective field of science or field of artistic creation.

Assessment of compliance: Not relevant

NA

2.3. Resources and Provision of the Study Programme

Analysis

2.3.1. This is a joint study programme between VUAS and University of Liepaja (LiepU), where 10% of the study courses to be delivered from VUAS and the rest 90% from LiepU. VUAS will focus on study courses related to electronics due to their experienced teaching staff and advanced laboratories in the field of electronics.
VUAS has a significant and sufficient volume of auditoriums (130 and 190 seats), 9 computer classes (10-30 computers in each) and laboratories for specific study courses to equip students with necessary equipment and software. Laboratories are accessible for students on 24/7 basis. VUAS has established and maintains next specialized laboratories: Laboratory for electrical measurements (E1), Laboratory for digital electronics (E2), Laboratory for Signal Processing (E3), Laboratory of Optics and Optoelectronics (E6), laboratory of Physics (E8), Laboratory for Mechatronic Systems (D208), Prototyping laboratory (D04), Laboratory for Robotics and Sensors (D207), Amateur Radio Station (E801) and Practical workspace (B3) for practical projects outside class time.
LiepU has auditoriums and computer classes with 320 computers, 23 video projectors, 7 interactive boards, cameras and copiers. For study courses LiepU has ensured and maintains Raspberry Pi microcomputer classroom, Arduino microcontroller and sensor kits, a WAGO professional PLC controller and sensor kit, RPi cameras, data transmission modules, displays, mock-up boards, self-driving robots and other equipment for Internet of Things (IoT).
Institute of Natural Sciences and Innovative Technologies (part of LiepU) provides equipment for the study process: foaming equipment, three different steamers, chemical vapor deposition, pulsed laser, electron microscope, solar collector, solar photovoltaic generator and bioreactors.
Students do have access to the VUAS library that provides access to physical and electronic materials used in study program delivery. Majority of the referenced materials in the descriptions of the study courses can be found and are accessible in the VUAS library (even few copies of each can be enough to source all students). For joint study program access is granted also to LiepU library.
VUAS has implemented a Moodle system to provide required information to students. This includes general information about the VUAS, description and clarification of internal processes, necessary information of the study courses including practical exercises and additional materials. Mentioned information is available both in Latvian and English. Each VUAS student has assigned an email

address to secure formal and informal collaboration with VUAS and teaching staff. Similar Moodle system (not connected in-between) is established by LiepU.
Review of the necessary equipment and literature is being done on the annual basis by teaching staff and the list of necessary items is submitted to the head of FoIT Engineering department. On average 7000 EUR annually are allocated on renewal of technical teaching aids and materials.
Joint study programme includes an internship part. VUAS has established a number of strong collaborations with local companies to provide internship options for their students (i.e. Accenture, TestDevLab, HansaMatrix Ventspils, Elektroniskie sakari, ATEA), but these companies do focus on existing study programs like Computer Science and Electronics. For Smart Technologies and Mechatronics study program students would require an internship in the field related to the study program.
The distance between VUAS and LiepU is 120km. LiepU provides the possibility for students to visit VUAS study courses by traveling in groups without overnight stays. It is not clear how VUAS will ensure transfer (or permanent allocation) of students in two locations.

2.3.2 N/A

2.3.3. Till the year 2022.-2023. there are no VUAS students in this program. 10 students from LiepU take part in the joint study program, where 10% (16CP) is delivered from VUAS. Based on the collaboration agreement between LiepU and VUAS, 10 students from LiepU were trained in 2022 in the courses covering 6CP. Such collaboration had positive financial results for VUAS (5530 eur income vs 2438 eur costs) and had minor improvement of negative financial results in Electronics study programs of VUAS.
As currently there are no students in VUAS in this program, then VUAS has determined the minimum number of students (12) needed from VUAS side to have this joint program financially sustainable. Considering decreasing number of students in Bachelor and Master programs of Electronics and relation between these programs, then there is a significant risk in achieving calculated minimal needed number of students in a short-term.

Conclusions on this set of criteria, by specifying strengths and weaknesses

Conclusions:
Both universities have the necessary facilities to deliver the study program.

Strengths:
1. VUAS has established and equipped laboratories necessary for the joint study program (VUAS part).
2. Students would benefit from facilities provided by both universities VUAS and LiepU (libraries, laboratories, etc).
3. VUAS already started to teach LiepU students in related study courses and financially benefited from this collaboration.

Weaknesses:
1. Permanent location and transfer facilities for VUAS students are not clear.
2. Financial sustainability of the planned joint study program raises major risks to VUAS as achievement of the minimal number of students (12) can take several years.
3. The study course descriptions coming from LiepU use a different template and do not state the correct hourly count of a creditpoint.

Assessment of the requirement [6]

1 R6 - Compliance of the study provision, science provision (if applicable), informative provision (including library), material and technical provision and financial provision with the conditions for the implementation of the study programme and ensuring the achievement of learning outcomes

Assessment of compliance: Partially compliant

VUAS and LiepU do have necessary facilities to deliver the study program, but financial sustainability of the joint program is weak for VUAS.

2.4. Teaching Staff

Analysis

2.4.1. The joint study programme is a joint program with the LiepU; the information in SAR and its annexes covers with sufficient and verifiable evidence only the teaching staff from VUAS.
As presented in the SAR and in the Annexes to SAR submitted for evaluation, the teaching staff of the joint study programme (SAR pp. 296) consists of 24 persons, of which 15 are elected faculty members and 9 are guest faculty members; thus 37% of the teaching staff has a guest status. In the teaching staff there are 4 Professors and 5 Associate Professors.
The teaching staff at VUAS that delivers courses in this program consists of 5 people, 2 guest lecturers, 1 guest docent and 2 docents (according to data in document 2-8_Appendix_Faculty members involved_ENG, where staff involved in the joint program is identified with “VMT” course identification). This is different than the reported staff composition SAR pp 296 which states: “There are 4 faculty members involved in the implementation of the study programme at VUAS - 1 with a PhD degree (25%) and 3 with a Master's degree (75%), of whom 2 are lecturers (50%) and 2 assistant professors (50%), 2 elected (50%) and 2 non-elected (50%)”
The knowledge, skills and competences of the teaching staff from VUAS are declared as being sufficient for a good teaching process and contribution to the outcomes of the joint study programme, as they are involved in the same courses held for the bachelor “Electronic Engineering” program at VUAS.
There is no evidence regarding the knowledge, skills and competences of the teaching staff from the partner LiepU.
VUAS contributes with 17% of the teaching staff and covers some 10% of the courses in the program (according to the curricula in document 8-6_Study_programe_plan_VTM).
The joint study programme is implemented for less than 250 students. As described in SAR pp. 296, “The language skills of the teaching staff of the bachelor study programme "’Smart Technologies and Mechatronics " comply with the Cabinet of Ministers Regulation of 2009 No. 733 "Regulations on the Scope of Knowledge of the State Language and the Procedure for Testing Proficiency in the State Language for Professional and Official Duties". Information on the foreign language skills of the lecturers is summarised in the lecturers' curricula vitae (CV) is attached as Annex 2.9.”. The University has also provided certified letters of declaration for the language skills of teaching staff for both Latvian (2-10_appendix_teaching-staff-latvian-language_ENG, Declaration 1-10.1/69 of 22.12.2022) and English (2-11_appendix_teaching-staff-English-language_ENG, Declaration 1-10.1/70 of 22.12.2022).
The teaching staff provisions from the VUAS are evaluated as conform to the requirements of the Higher Education Law of Latvia.

2.4.2 The SAR pp. 297 presents the changes in the composition of teaching staff. It mentions that “Due to the short duration of the programme, there have been no major changes in the composition of the teaching staff. The only adjustment was the vaccination requirement during the Covid-19 pandemic, when some teachers had to be replaced by others with equivalent training and

experience. Mg.sc.ing. P. Bitāns (Electronics Engineering Project I - III) did leave the VUAS, he was replaced by Mg.sc.ing. A. Orbidans; two lecturers left the LiepU, I. Mockus (Construction I, II, Materials, structures), replaced by Mg.sc.ing. U. Žaimis and V. Kalniņš (Introduction to studies, research, and technology and Environmental and civil defense), replaced by Mg.sc.ing. U. Žaimis and Mg.sc.comp. Dz. Tomsons. Two lecturers passed away - A. Mežinska (Human Resources Management) and A. Jākabsons (Industry legislation and Production organization and management), replaced by Mg.soc. I. Skrīvers. The replacing lecturers have similar qualifications (Mg.sc) and higher experience (U. Žaimis, A. Orbidans), thus the quality of study courses has increased."
Attracting new teaching staff shows that the teaching staff composition change was managed successfully by the responsible structure; still, there is no available documentation regarding any specific provision on staff change at the VUAS/ Faculty level, especially under the consideration of the significant number of guest teaching staff and the fact that teaching staff comes from two separate universitys.

2.4.3. The criterion is not applicable, the study program is a bachelor study program.

2.4.4. The SAR of the joint study programme (pp. 297, points 3.4.3 and 3.4.4) does not specifically mentions any information about publications of the teaching staff (although these publications exist, as shown in document 2-12_appendix_quantitative-data-on-academic-staff-research-activitiy-ENG).
The annexes to the 2.4. Scientific Research and Artistic Creation chapter of the SAR (pp. 57-70) (2-13_appendix_teaching-staff-scientific-resarch-experience) list all the publications, patents and creations of the teaching staff involved in all the programs from the evaluated study field. In the last 6 years, as shown in document 2-12_appendix_quantitative-data-on-academic-staff-research-activitiy-ENG, there are 705 scientific publications of various types (including publications numbered multiple times, as they have several authors from the university); the average yearly production of the 58-teaching staff of the field is then around 2 publications.
The identification of the publications of the teaching staff from the bachelor study programme 'Electronics Engineering'' in document 2-13_appendix_teaching-staff-scientific-resarch-experience shows that all the 5 teaching staff from Ventspils University Colege have publications in the last accreditation period.
There is no information about the research activity of the teaching staff at LiepU.

2.4.5. The SAR lists (pp. 298) several general ways in which teaching staff at the LiepU cooperate: European structural fund programmes, research programmes, mobility programmes.
The SAR lists (pp. 299) several ways of teaching staff cooperation for the VUAS:
- Interdisciplinary cooperation of academic staff, with topical issues discussed at organised meetings of the Council of Study Programmes, Faculty Council meetings, seminars, meetings with employer;
- Cooperation of teaching staff in the development of the study programme content;
- Cooperation between teaching staff in the implementation of specific study courses;
- Informal cooperation between teaching staff („the weekly coffee break").
All this shows that cooperation between teaching staff do exist within the Ventspils University of Applied Sciences (VUAS), it is functional, but it works in mostly non-documented and informal ways, without a unitary mechanism.
The SAR pp. 299 mentions that at the time of submission of the Self-assessment Report, the bachelor study programme "Smart Technologies and Mechatronics " is implemented by 28 faculty members and it has 11 students, thus the ratio of students to faculty members is 2.55 students to one faculty member. It should be mentioned that the SAR contradicts itself, as at page 299 are declared 28 teaching staff and at page 296 are declared 15+9 =24 teaching staff.
For reference, for the entire study field at the Ventspils University of Applied Sciences (VUAS) there are 58 teaching staff, as described for instance in Annex 2-9_appendix_Teaching_Staff_CV_ENG.pdf;

the total number of enrolled students in the study field is 254 (45+147+15+6+30+11), which provides a student to teaching staff ratio of 4.38.

Conclusions on this set of criteria, by indicating strengths and weaknesses

Conclusions:
The teaching staff provisions at VUAS are evaluated as being conform to the requirements of the Higher Education Law of Latvia. There are 24 people in the academic staff (Ventspils + Liepāja) allocated to the joint study programme and the student/teaching staff ratio is quite low (2.55). The teaching staff in VUAS cooperates (in various, mostly non-documented and informal ways) towards the successful implementation of the joint study programme. There is no specifically documented/ described cooperation between the teaching staff in Ventspils and Liepāja.

Strengths:
1. A low student to teaching staff ratio, which enables close cooperation and student-centered guidance.

Weaknesses:
1. The relatively low ratio of permanent teaching staff (63%) as compared to guest teaching staff (37%).
2. The cooperation between the partner universities is not described/ documented.
3. There are no documented provisions regarding the management of the changes in teaching staff.
4. Lack of documentation of the cooperation between the teaching staff and their specific interactions towards program changes.

Assessment of the requirement [7]

1 R7 - Compliance of the qualification of the academic staff and visiting professors, visiting associate professors, visiting docents, visiting lecturers and visiting assistants with the conditions for the implementation of the study programme and the requirements set out in the respective regulatory enactments.

Assessment of compliance: Fully compliant

The teaching staff provisions are evaluated as being conform to the requirements of the Higher Education Law of Latvia.

2.5. Assessment of the Compliance

Requirements

1 1 - The study programme complies with the State Academic Education Standard or the Professional Higher Education Standard

Assessment of compliance: Fully compliant

According to annex 8-3 (8-3_pielikums_VTM_atbilstiba_valsts_standartam.docx.pdf), the joint study programme complies with the "Regulations Regarding the State Standard of Vocational HigherEducation of the Second Level" by the Cabinet of Ministers.

2 2 - The study programme complies with a valid professional standard or the requirements for the professional qualification (if there is no professional standard required for the relevant occupation) provided if the completion of the study programme leads to a professional qualification (if applicable)

Assessment of compliance: Fully compliant

According to annex 8-4 (8-4_pielikums_VMT_atbilstiba_prof_standartam.docx.pdf), the joint study programme is designed based on the Professional Standard for Mechatronics Engineer. The professional standard with registration number PS-210 was approved during the meeting of the Tripartite Sub-Council for Vocational Education and Employment on February 9, 2022. https://registri.visc.gov.lv/profizglitiba/dokumenti/standarti/2017/PS-210.pdf

3 3 - The descriptions of the study courses and the study materials have been prepared in all languages in which the study programme is implemented, and they comply with the requirements set forth in Section 561 , Paragraph two and Section 562 , Paragraph two of the Law on Higher Education Institutions.

Assessment of compliance: Fully compliant

The course descriptions are available in both Latvian and English languages. All course descriptions contain the requirements set forth in the corresponding sections of the Law on Higher Education Institutions. Study course descriptions are available in annex 8-7 (8-7_pielikums_Studiju_kursu_apraksti_VTM.pdf). The study course descriptions form LiepU use a different template and state that a creditpoint corresponds to 40 hours, but the law of higher education suggests that a creditpoint is 25 to 30 hours and ir needs to be updated until December 31st, 2024, according to the Law of higher education.

4 4 - The sample of the diploma to be issued for the acquisition of the study programme complies with the procedure according to which state recognised documents of higher education are issued.

Assessment of compliance: Fully compliant

The diploma sample is available in annex 8-1 (8-1_pielikums_D-DP_LV.pdf). The Cabinet of Ministers regulation no 202 “Procedures by which documents certifying higher education recognised by the State shall be issued” clause 9 suggests that “The joint diploma shall be signed by the leaders of all the HEI involved in the implementation of the relevant joint study programme or by officials authorized by them, if the written agreement concluded by the partner institutions involved in the implementation of the joint study programme does not provide for other procedures.”, but the agreement (additional annex SAD 20-14) between LiepU and VUAS clause 8.1.3. states “Each HEI individually awards a diploma of his or her institution of higher education, awards a degree and professional qualifications only after the acquisition of the full study programme”. Therefore the diplomas are signed only by the institution, where the diploma is issued.

5 5 - The academic staff of the academic study programme complies with the requirements set forth in Section 55, Paragraph one, Clause 3 of the Law on Higher Education Institutions.

Assessment of compliance: Not relevant

6 6 - Academic study programmes provided for less than 250 full-time students may be implemented and less than five professors and associated professors of the higher education institution may be involved in the implementation of the mandatory and limited elective part of these study programmes provided that the relevant opinion of the Council for Higher Education has been received in accordance with Section 55, Paragraph two of the Law on Higher Education Institutions.

Assessment of compliance: Not relevant

7 7 - At least five teaching staff members with a doctoral degree are among the academic staff of an academic doctoral study programme, at least three of which are experts approved by the Latvian Science Council in the respective field of science. At least five teaching staff members with a doctoral degree are among the academic staff of a professional doctoral study programme in arts (if applicable).

Assessment of compliance: Not relevant

8 8 - The teaching staff members involved in the implementation of the study programme are proficient in the official language in accordance with the regulations on the level of the official language knowledge and the procedures for testing official language proficiency for performing professional duties and office duties.

Assessment of compliance: Fully compliant

According to annex 2-10 (2-10_appendix_teaching-staff-latvian-language_ENG.pdf) the proficiency level of all teaching staff involved in the implementation of the joint study programme complies with the requirements of Official Language Law.

9 9 - The teaching staff members to be involved in the implementation of the study programme have at least B2-level knowledge of a related foreign language, if the study programme or any part thereof is to be implemented in a foreign language (if applicable).

Assessment of compliance: Fully compliant

According to annex 2-11(2-11_pielikums_apliecinajums par anglu valodu_LV.pdf) the English language proficiency level of all teaching staff involved in the implementation of the joint study programme is at least level B2.

10 10 - The sample of the study agreement complies with the mandatory provisions to be included in the study agreement.

Assessment of compliance: Fully compliant

The study agreement example available in annex 2-5 (2-5_appendix_study-contract-example.pdf) fully complies with the Cabinet of Ministers regulation “Rules to be included in the study agreement”.

11 11 - The higher education institution / college has provided confirmation that students will be provided with opportunities to continue their education in another study programme or another higher education institution or college (agreement with another accredited higher education institution or college) if the implementation of the study programme is terminated.

Assessment of compliance: Fully compliant

The attached document (No. 5.5/70) in Annex 2-3 (2-3_appendix_study-continuence-in-other-programmes.docx.pdf) confirms that an agreement with Rezekne academy of technologies (Rēzeknes tehnoloģiju akadēmija) is in place and students are provided with opportunities to continue their education in RTA profesional bachelor study programme “Mechatronics”.

12 12 - The higher education institution / college has provided confirmation that students are guaranteed compensation for losses if the study programme is not accredited or the study programme’s license is revoked due to the actions (actions or omissions) of the higher education institution or college and the student does not wish to continue studies in another study programme.

Assessment of compliance: Fully compliant

The attached document in Annex 2-4 (2-4_appendix_Declaration_on_loss_compensation_for_students.docx.pdf) confirms that students are guaranteed compensation for losses if the study programme is not accredited or the study programs license is revoked due to the actions (actions or omissions) of the VUAS, and the student does not wish to continue studies in another study program.

13 13 - The joint study programmes comply with the requirements prescribed in Section 55.(1), Paragraphs one, two, and seven of the Law on Higher Education Institutions (if applicable)

Assessment of compliance: Fully compliant

The joint study programme complies with the requirements prescribed in Section 55.(1), Paragraphs one, two, and seven of the Law on Higher Education Institutions. Annex: 8-2_pielikums_Kopigas_stud_prog_atb_AL_prasibam.docx.pdf

14 14 - Compliance with the requirements specified in other regulatory enactments that apply to the study programme being assessed (if applicable)

Assessment of compliance: Not relevant

Assessment of the requirement [8]

1 R8 - Compliance of the study programme with the requirements set forth in the Law on Higher Education Institutions and other regulatory enactments.

Assessment of compliance: Fully compliant

The study programme complies with the requirements set in national regulatory enactments.

General conclusions about the study programme, indicating the most important strengths and weaknesses of the study programme

Conclusions:
The teaching staff provisions at Ventspils University of Applied Sciences (VUAS) (24 people in the academic staff (Ventspils + Liepāja)) are evaluated as being conform to the requirements of the Higher Education Law of Latvia. The student/teaching staff ratio is quite low (2.55). The teaching staff in Ventspils University of Applied Sciences (VUAS) cooperates (in various, mostly non-documented and informal ways) towards the successful implementation of the study program. There is no specifically documented/ described cooperation between the teaching staff in Ventspils and Liepāja.
The documentation submitted for the study programme is in complete adherence to the prevailing regulations and legal stipulations governing its implementation. All aspects of the documentation, including the curriculum, course structure, assessment criteria, and other pertinent details, have been meticulously prepared in accordance with the established guidelines and mandates specified by the relevant regulatory bodies and the law itself.

Strengths:
1. A low student-to-teaching staff ratio, which enables close cooperation and student-centered guidance.

Weaknesses:
1 The relatively low ratio of permanent teaching staff (63%) as compared to guest teaching staff (37%).
2. The cooperation between the partner universities is not described/ documented.

Evaluation of the study programme "Smart Technologies and Mechatronics"

Evaluation of the study programme:

Average

2.6. Recommendations for the Study Programme "Smart Technologies and Mechatronics"

Short-term recommendations

1. Consider implementing a consistent plan for the insurance of a teaching staff corps more resilient to changes and less dependent on guest teaching staff.
2. Consider provisions regarding the management of the changes in teaching staff.
3. Consider the documentation of the cooperation between the teaching staff from both universities (VUAS and LiepU) and their specific interactions towards program changes.
4. Consider revision of the joint study programme to distribute the teaching load more evenly between the partner universities to use better resources available or change the programme into one university programme with some simple collaboration in delivering the courses.
5. Involve local companies and employers in optimizing the programme future delivery decision process
6. Revise the description of the courses. Check the title in course description, Intelligence is used instead of Smart. Also different format is used compare with the rest study programmes.
Revise structure of the programme to consider skills and competences regarding mechanics and engineering
8. Translate regulation regarding internships to English.
9. Consider to change the title in course description documents, as now in english version it is stated “Intelligent technologies and mechatronics”, instead of official title “Smart technology and mechatronics”
10. Work on detailed calculation of the financial sustainability of the study program considering time needed to achieve the minimal number of students (12) incl travel and teaching at both HEI´s
11. Fix the discrepancies in admission criteria and other study regulations in both the HEI´s

Long-term recommendations

1. Consider implementing a consistent plan for the increase of the number and impact of publications of the teaching staff.
2. Consider to increase a volume of the courses, the are too much of small courses, this increases administrative loading (to supervise the programme) and increases number of the assignment (for students)
3. Consider to use more advanced and innovative study methods, as example flipped classes
4. Explore and define transfer options or relocation facilities for VUAS students in regards to the joint study program.
5. Until December 31st, 2024 update the study course descriptions form LiepU side in order to match the credit point description provided in the Law of higher education

6. Consider implementing a joint template for study course descriptions from VUAS and LiepU sides

II - "Computer Science" ASSESSMENT

II - "Computer Science" ASSESSMENT

2.1. Indicators Describing the Study Programme

Analysis

2.1.1

The academic bachelor study programme “Computer Science” (43484) (BA Computer Science study programme) is compliant with the study field "Information Technology, computer hardware, electronics, Telecommunications, computer management, and computer science." The name of the BA Computer Science study programme indicates that the program belongs to the field of Information and Communication Technologies, which is a part of the study field. Additionally, the BA Computer Science study programme aims to prepare professionals with professional knowledge and skills in computer science, software engineering, and artificial intelligence, which are all areas within the study field. The BA Computer Science study programme spans theoretical disciplines (such as algorithms, information and computation theory, and automation) to practical disciplines (design and implementation of hardware and software) on the Bachelor level and prepares the students for the Master level programme in Computer Science. The BA Computer Science study programme also prepares graduates for leadership roles in the IT industry, which is relevant to the study field of programming. Overall, the BA Computer Science study programme objectives, content, and outcomes align with the study field of Information Technology, computer hardware, electronics, Telecommunications, computer management, and computer science.

2.1.2

The title and code of the BA Computer Science study programme indicate its subject area and level, while the degree indicates the level of education it will receive upon completion of the BA Computer Science study programme.

The educational classification code is 43484 which according to Latvian Education Classification (Latvian Cabinet of Ministers Regulations (Cab, Reg.) No. 322, https://likumi.lv/ta/id/291524-noteikumi-par-latvijas-izglitibas-klasifikaciju), corresponds to the following codification: meaning of the first two digits `43` notes for academic bachelor and the last three digits `484` indicate that this academic bachelor study programme is related to the educational group of “programming’’

The aims and objectives of the BA Computer Science study programme are designed to achieve the learning outcomes, which are the knowledge, skills, and competencies that students are expected to acquire during their studies. The admission requirements are designed to ensure that students have the necessary background and qualifications to succeed in the BA Computer Science study programme and achieve the intended learning outcomes. All of these elements are interconnected and work together to ensure that the BA Computer Science study programme is effective in achieving its goals and preparing students for their future careers.

The BA Computer Science study programme is designed to be completed in 3 years of full-time study (120 CP), which is in line with the standard duration of Bachelor's programs in Latvia (Cabinet of ministers regulation no 240’’ Regulations on the national standard of academic education’’ https://likumi.lv/ta/id/266187-noteikumi-par-valsts-akademiskas-izglitibas-standartu (only in Latvian)). The BA Computer Science study programme is taught in Latvian or in English language.

This allows students to choose the option that best suits their needs and circumstances. The SAR also notes that the content and implementation of the BA Computer Science study programme are focused on students' skills in applying the latest IT technologies and developing their competencies in line with the demands of the global labor market. The BA Computer Science study programme provides knowledge in programming, software engineering in general and computer hardware basics and therefore it is quite comprehensive curriculum. The programme covers a wide range of topics related to computer science, software engineering, and artificial intelligence aspects, application software, website development, information security, and automation solutions. Overall, the duration and scope of the BA Computer Science study programme implementation appear to be reasonable and justified, as the programme is designed to provide students with the knowledge and skills needed to succeed in the IT industry according to individual possibilities and the situation. The BA Computer Science study programme is well-aligned with the study field and its related areas and the study programme learning outcomes are reasonable and well aligned with the courses and industry needs. Additionally, the BA Computer Science study programme preparation of graduates for leadership roles in the IT industry and teamwork aligns with the study field of computer science. The BA Computer Science study programme compliance with professional ethics and IT standards also aligns with the study field's focus on responsible and ethical professionals. The graduates obtain the Bachelor's degree of Natural Sciences in Computer Science and admission requirement is Secondary education and level of English knowledge at least B2 level for English language programme and Secondary education for Latvian language programme. Knowledge, skills and competencies defined in the BA Computer Science study programme match the descriptions of knowledge, skills and competencies outlined in the “Regulations regarding Classification of Education in Latvia” at the 6th level of the Latvian Qualifications Framework (LQF). The duration and scope of the study programme implementation, as well as the implementation languages, are reasonable and justified.

2.1.3

In 2018, the English language programme option was introduced to increase the number of full-time foreign students at VUAS. The first students in English flow were matriculated in the 2019/2020 academic year. The Education Qualification Code of the Republic of Latvia (from 43481 to 43484) is being changed, in accordance with the changes in the Regulations regarding the classification of education of Latvia. No other changes have been made to the parameters of the BA Computer Science study programme.

2.1.4

The BA Computer Science study programme plays a significant role in promoting the transformation of the national economy in order to facilitate the growth of high technologies in Latvia and it corresponds to the field of smart specialization in Information and Communication Technologies, which is an area with a direct horizontal investment in the development of other areas of smart specialization, such as Bioeconomy, Biomedicine, Smart Materials and Technologies, and Smart Energy. The BA Computer Science study programme is also aligned with the projected labor market demand for professionals with higher education in the STEM fields, including computer science. This is an academic bachelor study programme that prepares professionals with academic and professional knowledge and skills in computer science and software engineering, as well as its preparation of graduates for leadership roles in the IT industry, aligns with the demands of the global labor market. The BA Computer Science study programme prepares graduates for a variety of roles in the IT industry, including analysts, computer systems engineers, application software development engineers, software engineers, website developers, information security specialists, testing engineers, QA engineers, automation solutions architects, and automation solutions developers. The structure of the specialization has been discussed with representatives of industry

partners (for example, "Accenture", "Routed In", “Emergn", "TestDevLab", "Asya" and "DevLead", etc.) and recognized as appropriate for current and future market requirements. This suggests that the programme is aligned with the needs of the regional industry and can prepare graduates for successful careers in the field of computer science.
The impact of work on study results is an important factor to consider for many students, as they often work alongside their studies to secure funding for their education, which can have an impact on their academic performance. On the other hand, meetings with the students and teachers indicated a strong student-centered and personal approach characteristic to smaller HEI´s.. This approach ensures that students are well-prepared for their future careers.
Working long hours, juggling multiple responsibilities, and experiencing burnout can lead to decreased motivation, difficulty concentrating, and lower academic performance. Students who work may also have less time to attend lectures, complete assignments, and engage in other academic activities, which can further affect their grades and academic progress. Low student participation in the ERASMUS mobility programme may indicate a lack of awareness of the benefits of international experience, or barriers such as financial constraints or concerns about the impact on academic progress. Similarly, low incoming lecturer activity may indicate a lack of interest in collaborating with VeA or a lack of awareness of the benefits of participating in the ERASMUS mobility programme.
The Ministry of Economics of the Republic of Latvia states that in the medium term (2020-2030) 3000 specialists will be required in the information and communication services sector, but in the long term (2031-2040) that figure might amount to 7000 specialists. The demand for VeA STEM programmes from the part of foreign students is growing every year. The Bachelor Degree programme in Computer Science plays an important role in the future industrial development and in the coming INDUSTRY 5.0 programme in the EU.

In general, it should be concluded that the BA Computer Science study programme meets the needs of both Latvia’s smart specialization and the national economy.

2.1.5
N/A

Conclusions on this set of criteria, by specifying strengths and weaknesses

Conclusions:
Overall, the BA Computer Science study programme at VUAS meets the needs of both Latvia's smart specialization and the national economy, and prepares students for a promising future in the IT industry.

Strengths
1. Alignment with the needs of the labor market: The BA Computer Science study programme is designed to prepare professionals with professional knowledge and skills in computer science at an international level, software engineering, and artificial intelligence, as well as the ability to participate in computer system development projects in a variety of roles (including management) and to comply with professional ethics and IT standards.

2. Comprehensive curriculum: The BA Computer Science study programme offers a comprehensive curriculum that covers a wide range of topics related to computer science, software engineering, and artificial intelligence aspects. The programme's study courses are designed to provide students with the necessary knowledge and skills to succeed in their future careers as computer systems engineers, application software development engineers, software engineers, website developers, information security specialists, testing engineers, QA engineers, automation solutions architects,

and automation solutions developers.

3. Student-centered approach: The achievable study outcomes of the study programme are formulated using a student-centered approach, defining in a structured and detailed manner the knowledge, skills, and competences that the student possesses and which the student is able to use and implement after graduation. This approach ensures that students are well-prepared for their future careers and can apply their knowledge and skills in real-world situations.

Weaknesses
1. Impact of work on study results: Many students work alongside their studies to secure funding for their studies, which can impact their study results.

2. Low activity in ERASMUS mobility programme: VUAS has relative low activity of students within the ERASMUS mobility programme, as well as the activity of incoming lecturers.

2.2. The Content of Studies and Implementation Thereof

Analysis

2.1.1. As in indicated in SAR (page 84), the goal of the BA Computer Science study programme is to prepare highly skilled computer science specialists with profound knowledge in computer science, higher mathematics, and engineering fundamentals that would enable them to adapt independently to professional activities in the changing labour market conditions, as well as to prepare students for further studies in higher level professional programs and Master's courses, scientific activities, and further self-education. Results of the BA Computer Science study programme are presented as knowledge: Able to demonstrate comprehensive knowledge of facts, theories, and relationships required for personal development and growth, civic engagement, social integration and continuation of education; Able to understand in detail and demonstrate complex knowledge of specific facts, principles, processes and concepts in computer science in standard and nonstandard situations; Knows technologies and methods used to perform study or work tasks in the profession; Skills: Able to plan and organise work, use various methods, technologies, software development tools and environments to perform tasks and solve problems; Able to find, evaluate and creatively use information to perform academic or professional tasks and to solve problems; Able to work, learn and develop independently to adapt to the professional environment in varying labour market conditions; Competencies: Motivated to develop his/her career, continue education and life-lond learning in knowledge-based, democratic, multilingual, and multicultural societies in Europe and in the world; Able to plan and perform academic or professional tasks alone, by working in a team or managing the team, describe, present, and explain the results of the work in a well-reasoned manner; Able to take responsibility for the quality and quantity of academic and professional performance. The demonstrated results of the study are inline with the study programme and the study field, but in the same time there are some issues, which are discussible, as example learning outcome “Able to understand in detail and demonstrate complex knowledge of specific facts, principles, processes and concepts in computer science in standard and nonstandard situations;” refer to the ability to solve nonstandart situation, which required higher level of skills, knowledge and competences, usually in bachelor level solving of the standart situation is declared. Also as the BA Computer Science study programme is academic one in the results should be included some learning outcomes related with the scientific and research activity. It is planned to deliver the BA Computer Science study programme as a full-time studies and in two languages (Latvian and English). This corresponds to the demand of the market (specially in IT domain), but it is recommended to explore the possibility to deliver a pogramme as a part-time study. The key reason

is a note, that many students of this programme have their position in industry very early (end of the 2nd year) and for them it is hard to study and work. The BA Computer Science study programme could be split on several blocks: Courses of the mandatory part (A) - 78CP (industry's guidelines courses, industry's current problems courses, cross-sectoral aspects courses); Limited choice (B) - 26CP, Optional courses (10CP) and Bachelor's paper (10CP). The study programme implementation is supported by several industrial companies, like TestDevLab, Accenture Baltics etc. The content of the study programme is topical, the content of the study courses / modules is interconnected and complementary, corresponds to the objectives of the programme and ensures the achievement of learning outcomes. But it should be stated that BA Computer Science study programme has a significant number of "small" courses, which makes the study programme hard to manage (from VUAS side) and overloads students with assessments. Analysis of the 3-3_appendix_Compliance_national_education_standard.pdf shows that study programme corresponds to the national education standards, including delivery of Latvian language (4CP) in English version of the study programme (see 3-5_appendix_ITB_Study_plan.docx.pdf). But, not clear how VUAS is going to manage the situation, if someone local will decide to join the English version of the study programme.

2.2.2. N/A

2.2.3 In the frame of the BA Computer Science study programme mostly classical implementation methods are used as mentioned in the SAR (98 - 99 pages). These methods include lectures and seminars, discussions, workshops, laboratory work, literary analysis, learning projects. . Various learning projects, which are developed in separate study courses, play an important role in the implementation of the learning process. In most courses training materials (lecture slides, practice assignments, tests, a.o.) are available electronically, as has been stated in SAR and confirmed during the visit. Not looking to the fact that mentioned implementation methods correspond and contribute to the study programme, it would be recommended to put attention to learning-by-doing approach, flipped classes etc. SAR reports about availability of the teaching staff for consultancy and help in the frame of the consulting hours. The students are offered consultations, individual interviews, both face-to-face and remotely, thus creating preconditions for the students that reduce the difference in the level of previously acquired knowledge, respect the interests of students, cultural differences, experience as well as language skills (especially for students studying in English)
The principles for the implementation of the BA Computer Science study programme and the methods used are identical in implementing the programme in Latvian and English. In overall the study implementation methods contribute to the achievement of the aims and learning outcomes of the study courses (3-6_Pielikums_ITB_kursu apraksti_LV _precizets.pdf) and the BA Computer Science study programme.
(In case of a joint study programme, or in case the study programme is implemented in a foreign language or in the form of distance-learning, analyze in detail the methods used for the implementation of such a study programme).
N/A

2.2.4. In the BA Computer Science study programme, the internship is not mandatory, but it is offered to the students under the limited choice part of the BA Computer Science study programme amounting to 8 CP. The internship is organised in accordance with the internship by-law approved at the Council meeting of FoIT of Ventspils University of Applied Sciences on 9th December, 2014 (Decision No 14-10-02), as amended on 10th February, 2021, (Decision No 21-02-03). Annex No 3.7 3-7_pielikums_Prakses_nolikums_ITB.docx.pdf. The purpose of the practice is: make sure of the student's professional and personal suitability for work in the field of computer science; to give the

student the opportunity to independently continue improving the acquired skills in real working conditions of the company or organization. Despite the internship being optional, some students choose the internship. This enables them to become acquainted with a potential workplace during their studies, acquire professional skills and integrate more easily into the labour market in the future. SAR reports about the number of students taking internship. As an example for the last year (21/22) 14 students used this opportunity. Internship is supported by Accenture's Latvian branch and SIA TestDevLab etc. A student during the internship, in addition to performing internship tasks, documents the progress of the internship, and prepares a report on the progress of the internship and the work done. The evaluation of the internship is carried out during defence of the internship, and the internship is evaluated in a 10-point system. In overall opportunities and provision of internship offered to students, as well as the organization of work are effective.
If the study programme is implemented in a foreign language, provide an assessment of the provision of internship in a foreign language, including for foreign students.
The internship is optional, and SAR does not describe much how the internship will happen if international students express their interest to join the internship, but during the meeting with employers several of them stated that they are accepting international students for internships. Therefore it should not be the issue. In overall the international students are following the same process as for local students.

2.2.5. N/A

2.2.6. The presented in SAR topics of the bachelor thesis are corresponding to the BA Computer Science study programme. It has been reported that some of the topics are industry targeted and initiated by the industry representatives. Also nice to see that some of the bachelor topics are contributions to the developments of the IT resources of the HEI. At the same time, it should be considered that this is an academic study programme, so it would be recommended to pay more attention to the research topics, rather development topics or differentiate bachelor thesis by the complexity during assessment. During assessment visit samples of the bachelor thesis were demonstrated, they are inline with the BA Computer Science study programme.

Conclusions on this set of criteria, by specifying strengths and weaknesses

Conclusions
Considering SAR and evidence collected during the meeting it shall be concluded that the presented study programme fulfills formal requirements, is inline with the requirements of the industry and labor market. At the same time, representatives of the industry pointed out that they would be happy to see more “soft” skills by the graduates of the VUAS. The content of the BA Computer Science study programme supports reaching the aim and learning outcomes of the study programme. In the same among learning outcomes the research component is not very well indicated. Internship is not an obligatory part of the programme, but according to data, it is utilized by the students. Also VUAS provides support in terms of finding internship places, if student has some problem with it. During the meeting employers confirmed their ability to take international students for internships. bachelor thesis are inline with the study programme, while it is recommended to put more attention into the research part of the bachelor thesis to differentiate their content from the first level programme.

Strengths:
1. The BA Computer Science study programme is balanced between the necessary knowledge, skills and competencies required to perform the duties after graduation.

2. The content of the program is relevant to the field of the relevant industry.
3) Rich collaboration with the local public and private entities.
4) The internship is provided as an option, which underlines student-centric approach

Weaknesses:
1. The BA Computer Science study programme is provided only in a form of full-time study, which limits the opportunity to some potential learners to join the study programme
2) Too many small courses in the programme (1- 2 CP), which decreases manageability of the study programme (from HEI side) and in the same time overloads students with the assessments.
3) Very classical teaching approaches are reported in the frame of the BA Computer Science study programme

Assessment of the requirement [5] (applicable only to master's or doctoral study programmes)

1 R5 - The study programme for obtaining a master's or doctoral degree is based on the achievements and findings of the respective field of science or field of artistic creation.

Assessment of compliance: Not relevant

NA

2.3. Resources and Provision of the Study Programme

Analysis

2.3.1. VUAS has a significant and sufficient volume of auditoriums (130 and 190 seats), 9 computer classes (10-30 computers in each) and laboratories for specific study courses to equip students with necessary equipment and software. Laboratories are accessible for students on 24/7 basis. The key asset required for students in BA Computer Science study programme is the computer equipped with compilers, program development and supporting environments and the internet connection supported by 10Gb broadband. VUAS leverages and has equipped students with next development tools and environments: Anaconda, CLion, PyCharm, WebStorm, Android Studio, Java(TM) SE Development Kit, Microsoft Visual Studio Code, Spring Tool Suite, Eclipse and others.
Students do have access to the VUAS library that provides access to physical and electronic materials used in BA Computer Science study programme delivery. Majority of the referenced materials in the descriptions of the study courses can be found and are accessible in the VUAS library (even few copies of each can be enough to source all students).
VUAS has implemented a Moodle system to provide required information to students. This includes general information about the VUAS, description and clarification of internal processes, necessary information of the study courses including practical exercises and additional materials. Mentioned information is available both in Latvian and English. Each VUAS student has assigned an email address to secure formal and informal collaboration with VUAS and teaching staff. On top of email as a collaboration channel, teachers set up study courses dedicated groups in WhatsApp, Telegram and other collaboration platforms to speed up communication and bring collaboration between them and students to the next level.
Review of the necessary equipment and literature is being done on the annual basis by teaching staff and the list of necessary items is submitted to the director of the study field. Based on the feedback collected during the visit, the ultimate majority of such requests is supported and approved.
BA Computer Science study programme includes an internship part. VUAS has established a number

of strong collaborations with local and country level companies to provide internship options for their students (i.e. Accenture, TestDevLab, HansaMatrix Ventspils, Elektroniskie sakari, ATEA). IT specialists are heavily demanded on the market, and this increases an interest of the industry in the skilled students. Such collaboration supports achievement of the learning objectives of the BA Computer Science study programme, but also introduces challenges, when students get full-time work and continue studies in VUAS in parallel.

2.3.2. N/A

2.3.3. Financial provisioning and sustainability of the BA Computer Science study programme is directly impacted by the number of students in this program. VUAS differentiates Latvian and English streams of the study program to calculate costs, income and determine minimal number of students in each stream needed to achieve profitability.
Additionally, VUAS managed to leverage ESF funds and complete several projects during 2018-2022 and attract additional funds to finance new laboratory equipment, new computer classes, improvements of premises and development of the academic staff.
Despite the pandemic period and general decrease of students in Latvia, VUAS managed to keep on the same level of new students in both programs. Decrease in Latvian stream is compensated with the increase in English stream, which was record high in the year 2022.-2023. (19 new students in English stream). Meanwhile, the current number of students in Latvian stream (128) is the lowest number in the last 6 years. In the English stream there are 19 students (based on appendix 3-2_appendix_statistics_on_students, however in SAR 3.3.3 section of study program self-evaluation 15 students are mentioned, as per 01.10.2022). Combination of both streams keeps the study program on the same stable level of actual students.
Despite the decrease of students in Latvian stream, it is significantly higher than the minimal number (71) needed to keep the study program (Latvian stream) financially sustainable and profitable. This leads to positive financial results (+29%) in the year 2022.-2023. and possibility to invest over-recovery into development of English stream, which remains non-profitable (20 students are needed in English stream to reach profitability level).
Considering the above, the number of students in both streams remains stable (147) and is significantly higher than the total minimal needed number (91).

Conclusions on this set of criteria, by specifying strengths and weaknesses

Conclusions:
students and teaching staff are fully equipped to achieve learning objectives and graduate the program. Study program has achieved good financial results and shows strong financial sustainability to ensure current implementation of the study program and make investment in program development. Number of students in the English stream is growing and helps to attract foreign students.

Strengths:
1. VUAS managed to keep a high number of students by developing and growing the English stream.
2. Students have 24/7 access to fully equipped laboratories.
3. Study program shows strong financial results.

Weaknesses:
1. The English stream of the BA Computer Science study programme has insufficient number of students to become profitable.

Assessment of the requirement [6]

1 R6 - Compliance of the study provision, science provision (if applicable), informative provision (including library), material and technical provision and financial provision with the conditions for the implementation of the study programme and ensuring the achievement of learning outcomes

Assessment of compliance: Fully compliant

students and teaching staff are fully equipped to achieve learning objectives and graduate the BA Computer Science study programme. BA Computer Science study programme has strong financial sustainability through a stable high cumulative number of students in both Latvian and English streams.

2.4. Teaching Staff

Analysis

2.4.1. As presented in the SAR and in the Annexes to SAR submitted for evaluation, the teaching staff of the BA Computer Science study programme (SAR pp. 111-115) consists of 34 persons, out of which 1 Professor, 1 Guest Professor, 4 Assoc. Professors, 1 Guest Assoc. Professor, 5 lecturers, 3 docents, 3 guest docents, 1 guest teaching staff and 15 guest lecturers. 14 persons of the teaching staff hold a doctoral/ Ph.D. degree (11 of which in computer science/ engineering/ physics). The remaining 20 teaching staff have all master's degree. 62% of the teaching staff has guest status.
The knowledge, skills and competences of the teaching staff are declared as being sufficient for a good teaching process; the SAR pp. 115-116 provides significant description of the expertise of the teaching staff towards the obtention of the outcomes of theBA Computer Science study programme.
The BA Computer Science study programme is implemented for less than 250 students. As described in SAR pp. 115, "The language skills of the teaching staff of the BA Computer Science study programme complies with the Cabinet Regulation No 733 of 2009 regarding Knowledge of the State Language and Procedure for Testing Fluency of the State Language for Performance of Professional and Official Duties. Information on the foreign language skills of the teaching staff is summarised in the "Basic Information on the Teaching Staff Involved in Implementation of the Study Field" (Annex No 2.8) and in the curricula vitae (CVs) of the teaching staff appended in Annex No 2.9". The VUAS has also provided certified letters of declaration for the language skills of teaching staff for both Latvian (2-10_appendix_teaching-staff-latvian-language_ENG, Declaration 1-10.1/69 of 22.12.2022) and English (2-11_appendix_teaching-staff-English-language_ENG, Declaration 1-10.1/70 of 22.12.2022).
The teaching staff provisions are evaluated as conform to the requirements of the Higher Education Law of Latvia.

2.4.2 The SAR pp. 117 presents the changes in the composition of teaching staff. The changes are related to two main causes: the heavy workload of some teachers that gave up some of the courses they teach at the BA Computer Science study programme or have terminated their employment with the VUAS (6 courses delivered now by 6 persons).

Attracting new teaching staff shows that the teaching staff composition change was managed successfully by the responsible structure; still, there is no available documentation regarding any specific provision on staff change at the University/ Faculty level, especially under the consideration of the significant number of guest teaching staff.

2.4.3. The criterion is not applicable, the BA Computer Science study programme is a bachelor study

program.

2.4.4. The SAR of the BA Computer Science study programme(pp. 117-118, points 3.4.3 and 3.4.4) does not specifically mentions any information about publications of the teaching staff (although these publications exist, as shown in document 2-12_appendix_quantitative-data-on-academic-staff-research-activitiy-ENG).
The annexes to the 2.4. Scientific Research and Artistic Creation chapter of the SAR (pp. 57-70) (2-13_appendix_teaching-staff-scientific-resarch-experience) list all the publications, patents and creations of the teaching staff involved in all the programs from the evaluated study field. In the last 6 years, as shown in document 2-12_appendix_quantitative-data-on-academic-staff-research-activitiy-ENG, there are 705 scientific publications of various types (including publications numbered multiple times, as they have several authors from the university); the average yearly production of the 58-teaching staff of the field is then around 2 publications.
The identification of the publications of the teaching staff from the BA Computer Science study programme in document 2-13_appendix_teaching-staff-scientific-resarch-experience shows that 11 (most coming from the industry) out of 34 persons do not have any publication declared.

2.4.5. The SAR lists (pp. 118) several ways of teaching staff cooperation, both formal and informal. Participation of the teaching staff in professional improvement and methodological seminars, courses and discussions organized by the Study Unit in cooperation with Lifelong Learning Centre, participation of the teaching staff in national/international programs are exemplified as such ways.
All this shows that cooperation between teaching staff does exist, it is functional, but it works in mostly non-documented and informal ways, without a unitary mechanism.
The SAR pp. 118 mentions that „128 students study in the Latvian language flow in the Bachelor's study programme “Computer Science”, 19 students study in the English (147 students in total). During the study year the study process is ensured by 31 teaching staff members. Ratio of students and lecturers: 147/34 = 4,32. The students have been provided with quality studies and personal approach during the study process.”
For reference, for the entire study field there are 58 teaching staff, as described for instance in Annex 2-9_appendix_Teaching_Staff_CV_ENG.pdf; the total number of enrolled students in the study field is 254 (45+147+15+6+30+11), which provides a student to teaching staff ratio of 4.38.

Conclusions on this set of criteria, by indicating strengths and weaknesses

Conclusions:
The teaching staff provisions are evaluated as being conform to the requirements of the Higher Education Law of Latvia. There are 34 people in the academic staff allocated to the program and the student/teaching staff ratio is favorable (4.32). The teaching staff is not very active in research (as 32% of the teaching staff has declared zero publications and others have a single publication during the reporting period) and cooperates (in various, mostly non-documented and informal ways) towards the successful implementation of the BA Computer Science study programme.
Strengths:
1. A low student to teaching staff ratio, which enables close cooperation and student-centered guidance.
Weaknesses:
1. The relatively low ratio of tenured (elected) teaching staff (38%) as compared to guest teaching staff (62%).
2. The small number of publications of the teaching staff.
3. There are no documented provisions regarding the management of the changes in teaching staff.
4. Lack of documentation of the cooperation between the teaching staff and their specific

interactions towards BA Computer Science study programme changes.

Assessment of the requirement [7]

1 R7 - Compliance of the qualification of the academic staff and visiting professors, visiting associate professors, visiting docents, visiting lecturers and visiting assistants with the conditions for the implementation of the study programme and the requirements set out in the respective regulatory enactments.

Assessment of compliance: Fully compliant

The teaching staff provisions are evaluated as being conform to the requirements of the Higher Education Law of Latvia.

2.5. Assessment of the Compliance

Requirements

1 1 - The study programme complies with the State Academic Education Standard or the Professional Higher Education Standard

Assessment of compliance: Fully compliant

According to annex 3-3 3-3_pielikums_ITB_Atbilstiba-valsts-izglitibas-standartam.pdf, the BA Computer Science study programme complies with the "Rules on the National Standard for Academic Education" by the Cabinet of Ministers.

2 2 - The study programme complies with a valid professional standard or the requirements for the professional qualification (if there is no professional standard required for the relevant occupation) provided if the completion of the study programme leads to a professional qualification (if applicable)

Assessment of compliance: Not relevant

3 3 - The descriptions of the study courses and the study materials have been prepared in all languages in which the study programme is implemented, and they comply with the requirements set forth in Section 561 , Paragraph two and Section 562 , Paragraph two of the Law on Higher Education Institutions.

Assessment of compliance: Fully compliant

The course descriptions are available in both Latvian and English language. All course descriptions contain the requirements set forth in the corresponding sections of the Law on Higher Education Institutions. Study course descriptions are available in annex 3-6 (3-6_Pielikums_ITB_kursu apraksti_LV _precizets.pdf).

4 4 - The sample of the diploma to be issued for the acquisition of the study programme complies with the procedure according to which state recognised documents of higher education are issued.

Assessment of compliance: Fully compliant

The diploma example available in annexes 5-1_ITB_appendix_DS_ENG-eng-prog, 5-2_ITB_appendix_DS_ENG-latv-prog, 5-3_ITB_pielikums_DP_LV_ang-prog, 5-4_ITB_pielikums_DP_LV_latv-prog. are compliant with the Cabinet of Ministers regulation no 202 "Procedures by which documents certifying higher education recognised by the State shall be issued", yet a minor mistake is spotted in the diploma annex

5 5 - The academic staff of the academic study programme complies with the requirements set forth in Section 55, Paragraph one, Clause 3 of the Law on Higher Education Institutions.

Assessment of compliance: Fully compliant

According to annex 3-8 (3-8_pielikums_aplicinajums_atbilstiba-AL-55p-prasibam.pdf), the academic staff of the BA Computer Science study programme complies with the requirements set forth in the Law on Higher Education Institutions.

6 6 - Academic study programmes provided for less than 250 full-time students may be implemented and less than five professors and associated professors of the higher education institution may be involved in the implementation of the mandatory and limited elective part of these study programmes provided that the relevant opinion of the Council for Higher Education has been received in accordance with Section 55, Paragraph two of the Law on Higher Education Institutions.

Assessment of compliance: Fully compliant

According to annex "AIP_atzinums.pdf" the BA Computer Science study programme has received the approval of Higher education council (Nr 32. on February 21, 2005).

7 7 - At least five teaching staff members with a doctoral degree are among the academic staff of an academic doctoral study programme, at least three of which are experts approved by the Latvian Science Council in the respective field of science. At least five teaching staff members with a doctoral degree are among the academic staff of a professional doctoral study programme in arts (if applicable).

Assessment of compliance: Not relevant

8 8 - The teaching staff members involved in the implementation of the study programme are proficient in the official language in accordance with the regulations on the level of the official language knowledge and the procedures for testing official language proficiency for performing professional duties and office duties.

Assessment of compliance: Fully compliant

According to annex 2-10 (2-10_pielikums_apliecinajums par valsts valodu_LV.pdf) the proficiency level of all teaching staff involved in the implementation of the BA Computer Science study programme complies with the requirements of Official Language Law.

9 9 - The teaching staff members to be involved in the implementation of the study programme have at least B2-level knowledge of a related foreign language, if the study programme or any part thereof is to be implemented in a foreign language (if applicable).

Assessment of compliance: Fully compliant

According to annex 2-11 (2-11_pielikums_apliecinajums par anglu valodu_LV.pdf) the English language proficiency level of all teaching staff involved in the implementation of the BA Computer Science study programme is at least level B2

10 10 - The sample of the study agreement complies with the mandatory provisions to be included in the study agreement.

Assessment of compliance: Fully compliant

The study agreement example available in annex 2-5 (2-5_appendix_study-contract-example.pdf) fully complies with the Cabinet of Ministers regulation "Rules to be included in the study agreement".

11 11 - The higher education institution / college has provided confirmation that students will be provided with opportunities to continue their education in another study programme or another higher education institution or college (agreement with another accredited higher education institution or college) if the implementation of the study programme is terminated.

Assessment of compliance: Fully compliant

The provided contract in the annex states the study programme name “Bachelor of natural sciences in computer sciences” (Licence No. 04038-6) that would be received in TSI, but TSI is undergoing accreditation process in which the study programme names may change, therefore it should be revisited.

12 12 - The higher education institution / college has provided confirmation that students are guaranteed compensation for losses if the study programme is not accredited or the study programme’s license is revoked due to the actions (actions or omissions) of the higher education institution or college and the student does not wish to continue studies in another study programme.

Assessment of compliance: Fully compliant

The attached document in Annex 2-4 (2-4_appendix_Declaration_on_loss_compensation_for_students.docx.pdf) confirms that students are guaranteed compensation for losses if the study programme is not accredited or the study programs license is revoked due to the actions (actions or omissions) of the VUAS, and the student does not wish to continue studies in another study program.

13 13 - The joint study programmes comply with the requirements prescribed in Section 55.(1), Paragraphs one, two, and seven of the Law on Higher Education Institutions (if applicable)

Assessment of compliance: Not relevant

14 14 - Compliance with the requirements specified in other regulatory enactments that apply to the study programme being assessed (if applicable)

Assessment of compliance: Not relevant

Assessment of the requirement [8]

1 R8 - Compliance of the study programme with the requirements set forth in the Law on Higher Education Institutions and other regulatory enactments.

Assessment of compliance: Fully compliant

The study programme complies with the requirements set in national regulatory enactments.

General conclusions about the study programme, indicating the most important strengths and weaknesses of the study programme

Conclusions :

The teaching staff provisions (34 people in the academic staff) are evaluated as being conform to the requirements of the Higher Education Law of Latvia. The teaching staff is not very active in research (as 32% of the teaching staff has declared zero publications and others have a single publication during the reporting period) and cooperates (in various, mostly non-documented and informal ways) towards the successful implementation of the study program.
The documentation for the study program is in complete accordance with the existing regulations and legal requirements.

Strengths:
1. A low student to teaching staff ratio, which enables close cooperation and student-centered guidance.

Weaknesses:
1 The relatively low ratio of tenured (elected) teaching staff (38%) as compared to guest teaching staff (62%).

Evaluation of the study programme "Computer Science"

Evaluation of the study programme:

Good

2.6. Recommendations for the Study Programme "Computer Science"

Short-term recommendations

1. Consider implementing a consistent plan for the insurance of a teaching staff corps more resilient to changes and less dependent on guest teaching staff.
2. Consider provisions regarding the management of the changes in teaching staff.
3. Take means to activate ERASMUS mobility.
4. To explore the situation, if local students ar joining an English version of the study programme in terms of Latvian languages courses (in total 4CP and only fundamental are provided). And present the specific study path for such students.

Long-term recommendations

1. Consider implementing a consistent plan for the increase of the number and impact of publications of the teaching staff.
2. Consider the documentation of the cooperation between the teaching staff and their specific interactions towards program changes.
3. Consider to have more bigger courses (in terms of CP), or organaising modules
4. Explore a possibility and demand for opening a part-time study in the frame of this programme
5. Consider to utilise in the frame of the programme more innovative delivery approaches (learning-by-doing, flipped-classses etc)
6. Focus on attraction of foreign and local students to the English stream of the study program.
7. Consider providing more work possibilities to students at VUAS on the projects and as lab assistants.
8. Revisit the agreement with TSI, which allows the students to continue their studies in TSI if the VUAS study programme Electronic engineering is terminated, after TSI undergoes the accreditation process, because the study programme names may change.

II - "Computer Science" ASSESSMENT

II - "Computer Science" ASSESSMENT

2.1. Indicators Describing the Study Programme

Analysis

2.1.1

The academic master study programme Computer Science (45484) (MA Computer Science study programme) is designed to provide students with a comprehensive education in the field of computer science, covering contemporary topics such as programming, algorithms, software engineering, databases, machine learning, and artificial intelligence. The MA Computer Science study programme aims to develop students' competencies in problem-solving, critical thinking, and creativity, as well as to equip them with practical skills that are highly valued in the job market. The MA Computer Science study programme is aligned with the requirements and standards of the European Higher Education Area and the education system of Latvia, as well as with the industry's needs and trends. The MA Computer Science study programme spans theoretical disciplines (such as algorithms, information and computation theory, and automation) to practical disciplines (design and implementation of hardware and software) on the Master level on the basis of Bachelor level knowledge in Computer Science.

The curriculum is regularly reviewed and updated to ensure that it remains relevant and up-to-date with the latest developments in the field. The MA Computer Science study programme compliance with the study field is further demonstrated by the qualifications and experience of the teaching staff, all of whom hold doctoral degrees in engineering and have relevant academic and industry work experience. The involvement of industry specialists as guest lecturers also ensures that the programme is up-to-date with the latest industry practices and trends. In summary, the MA Computer Science study programme is well-aligned with the study field, providing students with a comprehensive education in computer science and equipping them with the necessary skills and competencies to succeed in the job market.

2.1.2

The title, code, degree to be obtained, aims, objectives, learning outcomes, and admission requirements of a MA Computer Science study programme are all interconnected and designed to work together to achieve the intended outcome of the programme. The title and code of the MA Computer Science study programme provide a brief description and identification of the programme. The educational classification code is 45484 which according to Latvian Education Classification (Latvian Cabinet of Ministers Regulations (Cab, Reg.) No. 322, https://likumi.lv/ta/id/291524-noteikumi-par-latvijas-izglitibas-klasifikaciju), corresponds to the following codification: meaning of the first two digits `45` notes for academic master studies and the last three digits `484` indicate that this first level study programme is related to the educational group of “programming’’

The degree to be obtained (Master's degree of Natural Sciences in Computer Science) specifies the academic qualification that students will receive upon completion of the programme. The academic degree is related to the specific profession that the MA Computer Science study programme is designed to prepare students for. The aims and objectives of the MA Computer Science study programme describe what the programme is intended to achieve and are as follows: to prepare specialists in computer science with a broad knowledge in higher mathematics, science and engineering, with particular emphasis on digital signal and image processing, development of software and IT systems, computer vision and machine learning, and to prepare students for independent scientific research work. The learning outcomes specify the knowledge, skills, and competencies that students are expected to acquire during the programme, which are directly related to the aims and objectives and they are as follows: knows computer science guidelines, machine learning fundamentals and project development cycles; Is able to apply their knowledge to

formulate and solve problems in academic, scientific and professional environment; is able to independently plan and organize own work; is able to use documentation and technical standards; is able to communicate and cooperate with specialists from other sectors in the development, implementation and management of projects. The admission requirements ensure that students who enter the programme have the necessary qualifications, skills, and knowledge to successfully complete the programme and achieve the intended learning outcomes. The admission requirements are defined as follows: Bachelor of Science or Engineering in computer science, mathematics, information technology, physics, astronomy, electronics or telecommunications. For the English language programme in addition - English language level of at least B2 level.
Overall, all these elements of a MA Computer Science study programme are interconnected and designed to work together to ensure that students receive the necessary education and training to achieve their academic and professional goals. The programme offers a well balanced combination of theoretical knowledge and practical skills, allowing students to acquire a broad range of competencies in different areas of computer science.
According to the information provided in the SAR, the MA Computer Science study programme is introduced in two forms: full time studies in Latvian and full time studies in English with duration of the study programme 2 years (4 semesters and 80 CP). This is in line with the standard duration for a master's programme in Latvia (Cabinet of ministers regulation no 240'' Regulations on the national standard of academic education'' https://likumi.lv/ta/id/266187-noteikumi-par-valsts-akademiskas-izglitibas-standartu (only in Latvian)). The scope of the main form of the MA Computer Science study programme is 80 CP credits, which is also in line with the requirements set by the Bologna process. Overall, the duration, scope, implementation options, and language of the study programme appear to be reasonable and justified for the needs of the job market. The duration and scope of the MA Computer Science study programme implementation, as well as the implementation language, are reasonable and justified.
2.1.3
The MA Computer Science study programme is intended to be accredited for implementation in English because of high demand from international students and suggestions from the employer companies. The Education Qualification Code of the Republic of Latvia (from 45481 to 45484) is also changed, in accordance with the changes in the Regulations regarding the classification of education of Latvia.
No other changes have been made to the parameters of the MA Computer Science study programme (meaning title, duration, volume, form, objectives and tasks).
2.1.4
The MA Computer Science study programme has strong economic and social justification as it prepares graduates for a rapidly growing and innovative industry - the ICT sector. The MA Computer Science study programme curriculum is designed to provide students with in-depth knowledge and practical skills in computer systems, software engineering, data analytics and artificial intelligence. These areas are in high demand in today's job market and are expected to remain in demand in the future. It is essential to note that the MA Computer Science study programme has strong scientific support and teachers expertise in conjunction with the tight collaboration with the Ventspils International Radio Astronomy Centre. Many teachers work in this Centre delivering their high-tech expertise directly to students.
The dynamics of the number of students in the programme shows a relatively stable trend. In the academic year 2020/2021, there were 10 students enrolled in the programme, while in the academic year 2021/2022, the number was 8 students. This indicates a stable interest in the programme among students and a recognition of its relevance in the job market. Employment indicators of the graduates of the study programme are positive. According to the data provided by the university all the graduates of the programme find employment already before graduation. The graduates of the MA Computer Science study programme are employed in various industrial sectors, including IT,

finance, consulting, and others. In conclusion, the Master's study programme in Computer Systems has a strong economic and social justification, as demonstrated by the growing request from companies and the positive employment indicators of the graduates. The study programme may benefit from placing more emphasis on soft skills such as communication, teamwork, and leadership and entrepreneurship, which are becoming increasingly important in the world and are valued by employers alongside technical skills.
The Ministry of Economics of the Republic of Latvia states that in the medium term (2020-2030) 3000 specialists will be required in the information and communication services sector, but in the long term (2031-2040) that figure might amount to 7000 specialists. The demand for VeA STEM programmes from the part of foreign students is growing every year.
The Master Degree programme in Computer Science plays the key role in the future industrial development and in the coming INDUSTRY 5.0 programme in the EU.

In general, it should be concluded that the MA Computer Science study programme meets the needs of both Latvia’s smart specialization and the national economy.
2.1.5
N/A

Conclusions on this set of criteria, by specifying strengths and weaknesses

Conclusions:
The MA Computer Science study programme is a comprehensive and interdisciplinary programme that aims to prepare students for successful careers in the ICT industry.
Strengths
1. Industry-oriented: The MA Computer Science study programme is designed to meet the needs of the ICT industry and is continuously updated to keep up with the latest trends and technologies.

2. Interdisciplinary: The MA Computer Science study programme offers a combination of theoretical knowledge and practical skills, allowing students to acquire a broad range of competencies in different areas of computer science.

3. Strong research support/background from the Ventspils International Radio Astronomy Centre side. Many teachers work in this centre delivering their high-tech expertise directly to students.

4. High employment rate: all the graduates of the programme find employment in their field of study shortly after graduation, indicating the relevance and marketability of the programme.

5. Good options for international collaboration as the programme is offered both in Latvian and in English.

Weaknesses
1. Relatively limited focus on soft skills: limited emphasis on soft skills such as communication, teamwork, leadership and entrepreneurship.

2. Limited number of quest lecturers from other countries.

2.2. The Content of Studies and Implementation Thereof

Analysis

2.2.1. The aim of the MA Computer Science study programme i declared as " is to prepare specialists in computer science with a broad knowledge in higher mathematics, science and engineering, with particular emphasis on digital signal and image processing, development of software and IT systems, computer vision and machine learning, and to prepare students for independent scientific research work that would enable them to independently perform professionally in promising sectors of the computer science labor market. " Results of the study presented as follows: Knowledge: Knows computer science guidelines, machine learning fundamentals and project development cycles. Skills: Is able to apply their knowledge to formulate and solve problems in academic, scientific and professional environment; Is able to independently plan and organize their work and further learning; Is able to use documentation and technical standards of other sectors; Is able to communicate and cooperate with specialists from other sectors in the development, implementation and management of projects. Competences: Can discuss complex and systemic aspects of computer science in a reasoned manner with both experts and non-experts; Can work effectively both individually and in a group; Can perform their work and duties to a high standard while continually looking for and implementing innovations to improve their scientific or professional activities; Can demonstrate their knowledge and ethical responsibility for the impact of scientific results or professional activities on the environment and society. Declared aim and learning outcomes are in the frame of the study field and the content of the study programme contributes to the learning outcome of the study programme. MA Computer Science study programme is provided as 80CP study programme in 2 languages (Latvian and English). Obligatory courses (A block) represented by two subblocks Theoretical courses in the sector (14CP), Courses on current issues (16CP), Part of compulsory option 28CP, C, optional courses, 2CP, master thesis 20CP. Shall be stated that MA Computer Science study programme is compalient to the national education standard 4-3_pielikums_Atbilstiba-valsts-izglitibas-standartam-ITM.docx.pdf., including the course International Aspects of the Latvian Language for international students (2CP)

2.2.2. SAR reports (page 133 - 134) topics of the master thesis for the last years. It should be concluded that presented topics contribute to the development of the computer science fields as mainly they are related to the topics of machine learning, computer vision, remote sensing,data processing and analysis. Also it is stated and confirmed during the visit that significant master thesis are done in the frame of collaboration with research and scientific entities. The title of the topics and samples (provided during the visit) shows that presented master thesis are based on analysis of the field and insights on potential improvements, which corresponds to the master thesis. The obligatory part of the master thesis is state-of-the-art, which sets the context of the research and is based on novel achievements in the specific field. Therefore it shall be concluded that awarding of a degree is based on the achievements and findings of the relevant field of science. While it is recommended to define some specific requirements for awarding 10 for a master thesis defense. The data about defenses, shows significant number of 10 for final thesis. It is 15%, from really small cohort of the students. 10 in words means outstanding, therefore it is recommended clearly describe, what is included in outstanding (to have formal criteria), as example publication in research journal(participation conference with publication), winning competition etc

2.2.3. The MA Computer Science study programme is implemented as a full-time face-to-face programme, 30% of the study programme consist of contact hours. The implementation of study courses of the study programme is realised in face-to-face classes and remotely, in accordance with the regulation that the proportion of remote studies does not exceed 50% of the total number of contact hours in the programme. The organisation and implementation of the study programme is carried out using various teaching and learning methods and forms, which include lectures, seminars, discussions, workshops, individual work of students, presentations, preparation and presentation of posters to a commission, etc. The methods used by the teaching staff of the study

programme are different, but interactive learning methods prevail, which promote active and informed participation of students in the study process. Practical experience of teaching staff in companies and projects of the ICT sector ensures synergy of theoretical knowledge and practical experience, which fully ensures the achievement of study results and study objectives by using diverse teaching methodologies. Also SAR reports usage of the flipped-classroom. The variety of methods were reported and all of them contributed to the achievement of the study programme learning outcomes, and some of them are reported as innovative. But during meetings with the students only more or less traditional approaches were mentioned by the students. In VUAS student-centric method is utilized as a core collaboration paradigm, which is also supported by the statements of the students (open labs, consulting with teaching staff, availability of the MA Computer Science study programme director).

2.2.4

N/A

2.2.5.
N/A

2.2.6. The list of the presented topics is in the frame of the MA Computer Science study programme reported in SAR (page 133 -134). The presented topics are relevant to the field and correspond to the MA Computer Science study programme. Most of them are related to machine learning, computer vision, remote sensing, data processing. In addition SAR states that master thesis topics are done as a direct assignment of an enterprise or scientific institution.

Conclusions on this set of criteria, by specifying strengths and weaknesses

Conclusions
Considering SAR and evidence collected during the meeting it shall be concluded that the presented MA Computer Science study programme fulfills formal requirements, is inline with the requirements of the industry and labor market. At the same time, representatives of the industry pointed out that they would be happy to see more “soft” skills by the graduates of the VUAS. The content of the study programme supports reaching the aim and learning outcomes of the MA Computer Science study programme.
Strengths:
1. The MA Computer Science study programme is balanced between the necessary knowledge, skills and competencies required to perform the duties after graduation.
2. The content of the program is relevant to the field of the relevant industry.
3) Rich collaboration with the local public and private entities.
Weaknesses:
1. The MA Computer Science study programme is provided only in a form of full-time study, which limits the opportunity to some potential learners to join the study programme
2) Too many small courses in the programme (1- 2 CP), which decreases manageability of the study programme (from HEI side) and in the same time overloads students with the assessments.
3) Not clear statements about grade 10 for the master thesis. This one needs additional clarification and regulation.

Assessment of the requirement [5] (applicable only to master's or doctoral study

programmes)

1 R5 - The study programme for obtaining a master's or doctoral degree is based on the achievements and findings of the respective field of science or field of artistic creation.

Assessment of compliance: Fully compliant

Analysis of the research topics and samples of the master thesis is relevant to the field of study and mainly based on utilizing the following approaches machine learning, computer vision, remote sensing, data processing and analysis solutions (courses provided in the frame of study programme are contributing to the mantioned domains). It is reported that in many cases master thesis are done as a direct assignment of an enterprise or scientific institution.

2.3. Resources and Provision of the Study Programme

Analysis

2.3.1. VUAS has a significant and sufficient volume of auditoriums (130 and 190 seats), 9 computer classes (10-30 computers in each) and laboratories for specific study courses to equip students with necessary equipment and software. For MA Computer Science study programme implementation, VUAS has recently established a Machine Learning and Computer Vision Laboratory, which is equipped with powerful computers able to handle large image/data processing. Laboratories are accessible for students on 24/7 basis. The key asset required for students in MA Computer Science study programme is the computer equipped with compilers, program development and supporting environments and the internet connection supported by 10Gb broadband. VUAS leverages and has equipped students with next development tools and environments: Anaconda, CLion, PyCharm, WebStorm, Android Studio, Java(TM) SE Development Kit, Microsoft Visual Studio Code, Spring Tool Suite, Eclipse and others.
Students do have access to the VUAS library that provides access to physical and electronic materials used in study program delivery. Majority of the referenced materials in the descriptions of the study courses can be found and are accessible in the VUAS library (even few copies of each can be enough to source all students).
VUAS has implemented a Moodle system to provide required information to students. This includes general information about the VUAS, description and clarification of internal processes, necessary information of the study courses including practical exercises and additional materials. Mentioned information is available both in Latvian and English. Each VUAS student has assigned an email address to secure formal and informal collaboration with VUAS and teaching staff. On top of email as a collaboration channel, teachers set up study courses dedicated groups in WhatsApp, Telegram and other collaboration platforms to speed up communication and bring collaboration between them and students to the next level.
Review of the necessary equipment and literature is being done on the annual basis by teaching staff and the list of necessary items is submitted to the director of the study field. Based on the feedback collected during the visit, the ultimate majority of such requests is supported and approved.

2.3.2. N/A

2.3.3. Financial provisioning and sustainability of the MA Computer Science study programme is directly impacted by the number of students in this program. However, VUAS is leveraging resources from other profitable study programs to support this one.
Additionally, VUAS managed to leverage ESF funds and complete several projects during 2018-2022 and attract additional funds to finance new laboratory equipment, new computer classes,

improvements of premises and development of the academic staff.
Current number of students in the study program remains low. Based on SAR 3.3.3 section of MA Computer Science study programme evaluation it is 7 students (on 01.10.2022), but based on 4-2_appendix_statistics-on-students 15 students are mentioned. As per SAR 7 is insufficient number to make this study program profitable. VUAS has determined that the study program requires at least 12-13 students to reach break-even point. In the year 2022.-2023. There is only one new student enrolled.
To make the program attractive and enable it for foreign students, VUAS is to run this MA Computer Science study programme in Latvian and English following the “Computer Science” Bachelor program. It is expected that such a change will positively impact the number of new students.
VUAS delivers this MA Computer Science study programme full-time. Since the ultimate majority of potential candidates and students of the Master study program has a full-time job, then this creates a risk for high drop-out of students and low number of new students.

Conclusions on this set of criteria, by specifying strengths and weaknesses

Conclusions: students and teaching staff are fully equipped to achieve learning objectives and graduate the program. MA Computer Science study programme was not able to achieve positive financial results due to insufficient number of students, however VUAS is on the way to implement an English stream to make the study program attractive for foreign students.
Strengths:
1. VUAS recently established a Machine Learning and Computer Vision Laboratory that supports implementation of related study courses.
2. Students have 24/7 access to fully equipped laboratories.
Weaknesses:
1. Low number of students raises the risk of future sustainability of the MA Computer Science study programme.

Assessment of the requirement [6]

1 R6 - Compliance of the study provision, science provision (if applicable), informative provision (including library), material and technical provision and financial provision with the conditions for the implementation of the study programme and ensuring the achievement of learning outcomes

Assessment of compliance: Fully compliant

students and teaching staff are fully equipped to achieve learning objectives and graduate the program. MA Computer Science study programme has an insufficient number of students, however VUAS introduces an English stream to grow the number of students.

2.4. Teaching Staff

Analysis

2.4.1. As presented in the SAR and in the Annexes to SAR submitted for evaluation, the teaching staff of the master MA Computer Science study programme (SAR pp. 139-140) consists of 15 persons, out of which 2 Professors, 1 Guest Professor, 3 Assoc. Professors, 1 Guest Assoc. Professor, 4 docents, 2 guest docents, and 2 guest lecturers. 13 persons of the teaching staff hold a doctoral/ Ph.D. degree (12 of which in computer science/ engineering/ physics). The remaining 2 teaching staff have all master’s degree. 40% of the teaching staff has guest status.
The knowledge, skills and competences of the teaching staff are declared as being sufficient for a good teaching process; the SAR pp. 140 provides significant description of the expertise of the

teaching staff towards the obtention of the outcomes of the MA Computer Science study programme.
The MA Computer Science study programme is implemented for less than 250 students. As described in SAR pp. 140-141, “The language skills of the teaching staff of the MA Computer Science study programme complies with the Cabinet Regulation No 733 of 2009 regarding Knowledge of the State Language and Procedure for Testing Fluency of the State Language for Performance of Professional and Official Duties. Information on the foreign language skills of the teaching staff is summarised in the “Basic Information on the Teaching Staff Involved in Implementation of the Study Field” (Annex No 2.8) and in the curricula vitae (CVs) of the teaching staff appended in Annex No 2.9”. The University has also provided certified letters of declaration for the language skills of teaching staff for both Latvian (2-10_appendix_teaching-staff-latvian-language_ENG, Declaration 1-10.1/69 of 22.12.2022) and English (2-11_appendix_teaching-staff-English-language_ENG, Declaration 1-10.1/70 of 22.12.2022).
The teaching staff provisions are evaluated as being conform to the requirements of the Higher Education Law of Latvia.

2.4.2. The SAR pp. 141-142 presents the changes in the composition of teaching staff. The changes are related to 9 study courses: 4 courses are new (and are delivered by new teaching staff, some of it having strong industrial expertise) and 5 study courses changed their teacher due to the reduction of workload for 2 former teaching staff.
Attracting new teaching staff shows that the teaching staff composition change was managed successfully by the responsible structure; still, there is no available documentation regarding any specific provision on staff change at the University/ Faculty level, especially under the consideration of the significant number of guest teaching staff.

2.4.3. The criterion is not applicable, the study program is a master study program.

2.4.4. The SAR of the MA Computer Science study programme(pp. 142, points 3.4.3 and 3.4.4) does not specifically mentions any information about publications of the teaching staff (although these publications exist, as shown in document 2-12_appendix_quantitative-data-on-academic-staff-research-activitiy-ENG).
The annexes to the 2.4. Scientific Research and Artistic Creation chapter of the SAR (pp. 57-70) (2-13_appendix_teaching-staff-scientific-resarch-experience) list all the publications, patents and creations of the teaching staff involved in all the programs from the evaluated study field. In the last 6 years, as shown in document 2-12_appendix_quantitative-data-on-academic-staff-research-activitiy-ENG, there are 705 scientific publications of various types (including publications numbered multiple times, as they have several authors from the university); the average yearly production of the 58-teaching staff of the field is then around 2 publications.
The identification of the publications of the teaching staff from the MA Computer Science study programme in document 2-13_appendix_teaching-staff-scientific-resarch-experience shows that 1 (coming from the industry) out of 15 persons do not have any publication declared.

2.4.5. The SAR lists (pp. 142-143) several ways of teaching staff cooperation, both formal and informal. Some of the declared means of cooperations are:
- Interdisciplinary cooperation of academic staff, with topical issues discussed at organised meetings of the Council of Study Programmes, Faculty Council meetings, seminars, meetings with employer;
- Cooperation of teaching staff in the development of the study programme content;
- Cooperation between teaching staff in the implementation of specific study courses;
- Research activities (including students);
- Informal cooperation between teaching staff („the weekly coffee break”).

All this shows that cooperation between teaching staff does exist, it is functional, but it works in mostly non-documented and informal ways, without a unitary mechanism.
The SAR pp. 118 mentions that „There are currently 15 students in the programme. A total of 15 teaching staff are involved in teaching the study programme. Therefore, the ratio of students to teaching staff within the study programme (at the time of submission of the self-assessment report) is calculated formally as 1:1. However, it should be noted that since the first year student is currently studying on an individual plan and the amount of credit points for optional study courses exceeds the total number of credit points to be earned (accordingly, all teaching staff will never participate in the entire student training process), it would be more illustrative to look at the ratio of the lecturers currently teaching to the number of students. This ratio is currently 1.667:1, or there is one teacher per 1.67 students..”
For reference, for the entire study field there are 58 teaching staff, as described for instance in Annex 2-9_appendix_Teaching_Staff_CV_ENG.pdf; the total number of enrolled students in the study field is 254 (45+147+15+6+30+11), which provides a student to teaching staff ratio of 4.38.

Conclusions on this set of criteria, by indicating strengths and weaknesses

Conclusions:
The teaching staff provisions are evaluated as being conform to the requirements of the Higher Education Law of Latvia. There are 15 people in the academic staff allocated to the program and the student/teaching staff ratio is very good from a student perspective (1.67). The teaching staff is active in research and cooperates (in various, mostly non-documented and informal ways) towards the successful implementation of the MA Computer Science study programme.

Strengths:
1. A low student to teaching staff ratio, which enables close cooperation and student-centered guidance.

Weaknesses:
1. The relatively low ratio of tenured (elected) teaching staff (60%) as compared to guest teaching staff (40%).
2. There are no documented provisions regarding the management of the changes in teaching staff.
3. Lack of documentation of the cooperation between the teaching staff and their specific interactions towards MA Computer Science study programme changes.

Assessment of the requirement [7]

1 R7 - Compliance of the qualification of the academic staff and visiting professors, visiting associate professors, visiting docents, visiting lecturers and visiting assistants with the conditions for the implementation of the study programme and the requirements set out in the respective regulatory enactments.

Assessment of compliance: Fully compliant

The teaching staff provisions are evaluated as being conform to the requirements of the Higher Education Law of Latvia.

2.5. Assessment of the Compliance

Requirements

1 1 - The study programme complies with the State Academic Education Standard or the Professional Higher Education Standard

Assessment of compliance: Fully compliant

According to annex 4-3 (4-3_pielikums_Atbilstiba-valsts-izglitibas-standartam-ITM.docx.pdf), the MA Computer Science study programme complies with the "Rules on the National Standard for Academic Education" by the Cabinet of Ministers.

2 2 - The study programme complies with a valid professional standard or the requirements for the professional qualification (if there is no professional standard required for the relevant occupation) provided if the completion of the study programme leads to a professional qualification (if applicable)

Assessment of compliance: Not relevant

3 3 - The descriptions of the study courses and the study materials have been prepared in all languages in which the study programme is implemented, and they comply with the requirements set forth in Section 561 , Paragraph two and Section 562 , Paragraph two of the Law on Higher Education Institutions.

Assessment of compliance: Fully compliant

The course descriptions are available in both Latvian and English language. All course descriptions contain the requirements set forth in the corresponding sections of the Law on Higher Education Institutions. Study course descriptions are available in annex 4-6- 4-6_pielikums_Kursu apraksti_LV.pdf.

4 4 - The sample of the diploma to be issued for the acquisition of the study programme complies with the procedure according to which state recognised documents of higher education are issued.

Assessment of compliance: Fully compliant

The diploma example available in annex 4-1- 4-1_pielikums_D-DP_LV.pdf is compliant with the Cabinet of Ministers regulation "Procedures by which documents certifying higher education recognised by the State shall be issued".

5 5 - The academic staff of the academic study programme complies with the requirements set forth in Section 55, Paragraph one, Clause 3 of the Law on Higher Education Institutions.

Assessment of compliance: Fully compliant

According to annex 4-7- 4-7_pielikums_aplicinajums_atbilstiba-AL-55p-prasibam.pdf, the academic staff of the MA Computer Science study programme complies with the requirements set forth in the Law on Higher Education Institutions.

6 6 - Academic study programmes provided for less than 250 full-time students may be implemented and less than five professors and associated professors of the higher education institution may be involved in the implementation of the mandatory and limited elective part of these study programmes provided that the relevant opinion of the Council for Higher Education has been received in accordance with Section 55, Paragraph two of the Law on Higher Education Institutions.

Assessment of compliance: Fully compliant

According to annex "AIP_atzinums" the MA Computer Science study programme has received the approval of Higher education council (Nr. 1.10./11 on April 20, 2017).

7 7 - At least five teaching staff members with a doctoral degree are among the academic staff of an academic doctoral study programme, at least three of which are experts approved by the Latvian Science Council in the respective field of science. At least five teaching staff members with a doctoral degree are among the academic staff of a professional doctoral study programme in arts (if applicable).

Assessment of compliance: Not relevant

8 8 - The teaching staff members involved in the implementation of the study programme are proficient in the official language in accordance with the regulations on the level of the official language knowledge and the procedures for testing official language proficiency for performing professional duties and office duties.

Assessment of compliance: Fully compliant

According to annex 2-10 - 2-10_pielikums_apliecinajums par valsts valodu_LV.pdf the proficiency level of all teaching staff involved in the implementation of the MA Computer Science study programme complies with the requirements of Official Language Law.

9 9 - The teaching staff members to be involved in the implementation of the study programme have at least B2-level knowledge of a related foreign language, if the study programme or any part thereof is to be implemented in a foreign language (if applicable).

Assessment of compliance: Fully compliant

According to annex 2-11 - 2-11_pielikums_apliecinajums par anglu valodu_LV.pdf the English language proficiency level of all teaching staff involved in the implementation of the MA Computer Science study programme is at least level B2.

10 10 - The sample of the study agreement complies with the mandatory provisions to be included in the study agreement.

Assessment of compliance: Fully compliant

The study agreement example available in annex 2-5 (2-5_appendix_study-contract-example.pdf) fully complies with the Cabinet of Ministers regulation “Rules to be included in the study agreement”.

11 11 - The higher education institution / college has provided confirmation that students will be provided with opportunities to continue their education in another study programme or another higher education institution or college (agreement with another accredited higher education institution or college) if the implementation of the study programme is terminated.

Assessment of compliance: Fully compliant

The attached document (No. SAD 23.7) in Annex 2-3 (2-3_appendix_study-continuence-in-other-programmes.docx.pdf) confirms that an agreement with Transport and communications institute (Transporta un sakaru institūts- TSI) is in place and students are provided with opportunities to continue their education in TSI academic study programmes “Computer sciences” or “Information system management”.

12 12 - The higher education institution / college has provided confirmation that students are guaranteed compensation for losses if the study programme is not accredited or the study programme’s license is revoked due to the actions (actions or omissions) of the higher education institution or college and the student does not wish to continue studies in another study programme.

Assessment of compliance: Fully compliant

The attached document in Annex 2-4 (2-4_appendix_Declaration_on_loss_compensation_for_students.docx.pdf) confirms that students are guaranteed compensation for losses if the study programme is not accredited or the study programs license is revoked due to the actions (actions or omissions) of the VUAS, and the student does not wish to continue studies in another study program.

13 13 - The joint study programmes comply with the requirements prescribed in Section 55.(1), Paragraphs one, two, and seven of the Law on Higher Education Institutions (if applicable)

Assessment of compliance: Not relevant

14 14 - Compliance with the requirements specified in other regulatory enactments that apply to the study programme being assessed (if applicable)

Assessment of compliance: Not relevant

Assessment of the requirement [8]

1 R8 - Compliance of the study programme with the requirements set forth in the Law on Higher Education Institutions and other regulatory enactments.

Assessment of compliance: Fully compliant

The study programme complies with the requirements set in national regulatory enactments.

General conclusions about the study programme, indicating the most important strengths and weaknesses of the study programme

Conclusions :
The teaching staff provisions (15 people in the academic staff) are evaluated as conforming to the requirements of the Higher Education Law of Latvia. The student/teaching staff ratio is very good from a student perspective (1.67). The teaching staff is active in research and cooperates (in various, mostly non-documented and informal ways) towards the successful implementation of the study program.
The provided documentation of the study programme fully complies with the forthset regulations and requirements of the law.

Strengths:
1. A low student to teaching staff ratio, which enables close cooperation and student-centered guidance.
Weaknesses:

1 The relatively low ratio of tenured (elected) teaching staff (60%) as compared to guest teaching staff (40%).

Evaluation of the study programme "Computer Science"

Evaluation of the study programme:

Good

2.6. Recommendations for the Study Programme "Computer Science"

Short-term recommendations

1. Consider implementing a consistent plan for the insurance of a teaching staff corps more resilient to changes and less dependent on guest teaching staff.
2. Consider provisions regarding the management of the changes in teaching staff.
3. Consider the increasing number of guest lecturers from other countries.

Long-term recommendations

1. Consider implementing a consistent plan for the increase of the number and impact of publications of the teaching staff.
2. Consider the documentation of the cooperation between the teaching staff and their specific interactions towards program changes.
3. Consider to have more bigger courses (in terms of CP), or organaising modules
4. Explore a possibility and demand for opening a part-time study in the frame of this programme
5. The specific requirements for obtaining 10 during the defence should be formulated.
6. Consider increasing focus on soft skills such as communication, teamwork, leadership and entrepreneurship.
7. Revisit the agreement with TSI, which allows the students to continue their studies in TSI if the VUAS study programme Electronic engineering is terminated, after TSI undergoes the accreditation process, because the study programme names may change.

II - "Electronics" ASSESSMENT

II - "Electronics" ASSESSMENT

2.1. Indicators Describing the Study Programme

Analysis

2.1.1

The professional master study programme “Electronics” (47523) (MA Electronics study programme) is a Master's level programme in the field of "Information Technologies, Computer Engineering, Electronics, Telecommunications, Computer Management, and Computer Science". The SAR explains that the MA Electronics study programme is designed to provide students with advanced knowledge and skills in the field of electronics and automation, as well as to prepare students for development work in the field. The MA Electronics study programme curriculum is aligned with the study field and covers a wide range of topics related to electronics, including automatic control systems; programming of ARM architecture microcontrollers; embedded operating systems; programmable integrated circuits; electronics engineering project management; satellite communication systems; heterogeneous computing systems and RF & Microwave devices. The MA Electronics study programme also contains Electronics Engineering Research Project; Internship and Professional Internship, which makes the programme very practice oriented. The SAR also explains that the MA Electronics study programme learning outcomes are aligned with the study field and are designed to prepare students for a wide range of career opportunities in the field of today's electronics. The MA Electronics study programme learning outcomes include the ability to design and develop complex electronic systems, the ability to analyze and optimize electronic systems, and the ability to manage and lead electronic system development projects or ability working in teams. The achievable study outcomes of the study programme are formulated using a student-centered approach, defining in a structured and detailed manner in accordance with the regional as well as global development trends. Overall, MA Electronics study programme is compliant with the study field "Information Technologies, Computer Engineering, Electronics, Telecommunications, Computer Management, and Computer Science". The MA Electronics study programme curriculum, specializations, and learning outcomes are all aligned with the study field and are designed to prepare students for successful careers in the field of computer engineering and electronics.

2.1.2
The title, code, degree to be obtained (Professional Master's degree in Electronics) , professional qualification (Lead Electronics Engineer) of the MA Electronics study programme are all interrelated and are designed to prepare students for successful careers in the field of computer engineering and electronics.
The educational classification code is 47523 which according to Latvian Education Classification (Latvian Cabinet of Ministers Regulations (Cab, Reg.) No. 322, https://likumi.lv/ta/id/291524-noteikumi-par-latvijas-izglitibas-klasifikaciju), corresponds to the following codification: meaning of the first two digits `47` notes for professional master studies and the last three digits `523` indicate that this professional master study programme is related to the educational group of “Electronics and automation”.
The MA Electronics study programme aims, objectives, and learning outcomes are also interrelated and are designed to provide students with advanced knowledge and skills in the field of electronics, as well as to prepare them for professional and development work in the field. The tasks, knowledge, skills and competencies of lead electronics engineers are determined by the professional standard PS-143 “Lead Electronics Engineer” and the MA Electronics study programme complies fully with the standard (annex: 6-4_pielikums_Atbilstiba-profesijas-standartam_EIM.pdf). The admission requirements for the MA Electronics study programme are also related to the programme's aims and objectives, as they are designed to ensure that students have the necessary background knowledge and skills to succeed in the programme. Overall, the MA Electronics study programme is designed to provide students with a comprehensive education in the field of electronics, and all aspects of the programme are interrelated and designed to prepare students for successful careers in the field. The programme covers a wide range of topics related to electronics, embedded systems, programming aspects, different applications, testing and automation solutions.
The strategic objective of the MA Electronics study programme - to achieve the study outcomes specified in the study programme in accordance with the description of knowledge, skills and competences at level 7 of the European Qualifications Framework (EQF) as defined in the Latvian Classification of Education is set taking into account EU perspectives and requirements.
The duration and scope of the MA Electronics study programme implementation, including two study programme implementation options, as well as the implementation language (only Latvian), are reasonable and justified for the regional needs. The MA Electronics study programme duration and scope are designed to provide students with advanced knowledge and skills in the field of electronics, as well as to prepare them for research and development work in the field. The MA Electronics study programme offers two different implementation options, including full-time 1 or 2 years studies, which are designed to accommodate the needs of different background students. The implementation language of the programme is Latvian, which is reasonable and justified given the location of the institution and the needs of the local labor market. 2 years programme option in amount of 80 CP is designed for the students who have already Academic Bachelor of Engineering in electronics, telecommunications or related engineering specialty degree with previous studies in amount of 120 CP. 1 year programme option in amount of 40 CP is designed is designed for the students who have already Professional Bachelor of Engineering in electronics, telecommunications or related engineering specialty degree with previous studies in amount of 160 CP.. Therefore the duration and scope of the MA Electronics study programme implementation, as well as the implementation language, are reasonable and justified for the MA Electronics study programme. The MA Electronics study programme is designed to provide students with a comprehensive education in the field of electronics, and the implementation options are designed to accommodate the needs of different students and the local labor market. It might be beneficial to consider for instance introducing into the Electronics programme some elements of the Smart Technologies and Mechatronics programme to create a more comprehensive and wider coverage and more flexible VUAS programme, providing students with a wider range of knowledge and skills, and better

preparing them for various needs of the job market and getting more students on the programme.
2.1.3
According to the SAR, the corrections made to the MA Electronics study programme parameters have been analyzed, justified, and would be supported. The changes include the following: an additional programme option of 1 year 40 CP (full-time) has been introduced for the implementation and respective admission requirements for the MA Electronics study programme have been updated to take account of the addition of the option - admission to the 80 CP programme requires aa academic Bachelor's degree in electronics, telecommunications or a related electrical engineering specialisation and the admission to the 40 CP programme requires a professional bachelor's degree in electronics, telecommunications or a related electrical engineering specialisation; the qualification to be awarded has changed from "Electronics Engineer" to "Lead Electronics Engineer"; the content and title of the study course "Devices for transmitting and receiving of radio signals" (4 CP) has been changed to the study course "Satellite communication systems" (4 CP); the study course "Antenna Engineering" (4 CP) is replaced by the study course "Heterogeneous Computing Systems" (4 CP); course "Data Conversion Methods and Circuits" and the course "Signal Transmission in Optical Systems" (4 CP) have been withdrawn from the study programme; the content, title and scope of the study course "Project and Innovation Management" (2 CP) have been updated and changed to the study course "Project management for electronics engineering" (4 CP); the course "Teaching methods" (2 CP), replaced by study course "Communication skills" (3 CP); the course "Programming of ARM architecture microcontrollers" (3 CP) has been added to the study programme to give students the possibility to choose between this course and the course "Introduction to LabVIEW and its applications in electronics" (3 CP); The study courses "Embedded Operating Systems" (3 CP), "Programmable Integrated Circuits" (4 CP) and "Electronics Engineering Research Project" (3 CP) have been added to the study programme. The internship included in the study programme, which is carried out in the amount of 6 CP, has changed its name from "Internship" to "Professional Internship".
Overall it should be noted that the changes made the MA Electronics study programme more practical and more oriented to the regional needs. This contributes to the formation of students' practical professional competences and improves the interdisciplinary connection in the programme. The changes align with the national regulations, meet the demands of the labor market, and provide students with the necessary skills and competencies for successful professional activity in the field of electronics and automation.
2.1.4
The MA Electronics study programme is economically and socially justified, as it falls under the thematic field of "Engineering and Technology" and smart specialization area of "Information and Communication Technologies" (STEM). This field has a direct horizontal contribution to the development of other smart specialization areas in Latvia, promoting economic transformation and growth of high and medium-high technologies in the export of Latvian goods and services. In terms of labor market demand, by 2040, the demand for labor is expected to shift in favor of specialists with higher education, with a possible shortage of 37 thousand professionals by 2027.
The MA Electronics study programme is fully in line with contemporary world trends in the field of ICT and engineering, as well as the most important development directions of the Latvian economy in accordance with smart specialization. The MA Electronics study programme is designed to prepare professionals with professional knowledge and skills in electronics at an international level, as well as the ability to participate in electronics system development projects in a variety of roles (including management) and to comply with professional ethics and IT standards. The quality level of the competences acquired by the graduates of VeA provides them with opportunities to find jobs not only in Latvia but also in foreign countries. Therefore, the program is economically and socially justified, meets the needs of Latvia's smart specialization, and the national economy. The analysis of development plans, economic and societal needs of Latvia in the era of digitalization clearly

indicates the need to continue and expand the training of specialists in this field. The "Electronics" programme may be considered too narrow in today's technological landscape and not fully utilizing good competencies the region has at Engineering Research Institute Ventspils International Radio Astronomy Centre. Developing international partnerships and collaborations is a valuable opportunity for the programme to promote itself and attract international students and lecturers and the Ventspils region has a good potential for this. This can enhance the diversity and global reach of the programme, as well as provide opportunities for collaboration and exchange of knowledge and expertise. Collaboration and sharing of expertise among lecturers can contribute to the enhancement of the quality and coherence of the MA Electronics study programme.
2.1.5
N/A

Conclusions on this set of criteria, by specifying strengths and weaknesses

Conclusions:
The Strengths and Weaknesses of the professional MA Electronics study programme in Electronics at VUAS are analyzed in the SAR. This MA Electronics study programme aims to prepare professionals with the knowledge and skills necessary to work in the field of electronics that are needed locally and elsewhere.
Strengths
1. Alignment with the needs of the labor market: The MA Electronics study programme is designed to prepare professionals with professional knowledge and skills in electronics at an international level, as well as the ability to participate in electronics system development projects in a variety of roles (including management) and to comply with professional ethics and IT standards.

2. Comprehensive curriculum: The MA Electronics study programme offers a comprehensive curriculum that covers a wide range of topics related to electronics, embedded systems and programming aspects. The programme's study courses are designed to provide students with the necessary knowledge and skills to succeed in their future careers as electronics engineers, application engineers, testing engineers and automation solutions developers.

3. Student-centered approach: The achievable study outcomes of the study programme are formulated using a student-centered approach, defining in a structured and detailed manner the knowledge, skills, and competences that the student possesses and which the student is able to use and implement after graduation. This approach ensures that students are well-prepared for their future careers and can apply their knowledge and skills in real-world situations.

Weaknesses
1. Impact of work on study results: Many students work alongside their studies to secure funding for their studies, which can impact their study results.

2. Low activity in ERASMUS mobility programme: VUAS has relatively low activity of students within the ERASMUS mobility programme, as well as the activity of incoming lecturers.

2.2. The Content of Studies and Implementation Thereof

Analysis

2.2.1. SAR declares the following aim of the MA Electronics study programme “To train highly qualified leading electronic engineers who are capable not only of developing complex electronic equipment and systems, but also of planning, organising and supervising the development process

of such equipment and systems, and of formulating and researching complex scientific and professional problems independently.”, while results of the MA Electronics study programme are formulated as: - able to design electronic equipment and systems of high complexity; - able to manage research and development projects; - able to monitor, manage and optimize the production of electronic equipment and systems; - able to carry out scientific research; - able to carry out the general tasks of pursuing a professional activity; - understanding and knowledge in electronics engineering in line with the theoretical orientations of this field and the latest findings. Study programme is delivered in two variants 1y and 2y long, respectively 40CP and 80CP, in Latvian language. The programme includes the following groups of courses for both variants of the study programme (40 CP and 80 CP): Theoretical and professional courses of the field (at least 5 CP) - both variants corresponds to the requirements, Courses in research, creative work, design work and management studies (at least 3 CP) - both variants corresponds to the requirements; Internship (at least 6 CP or at least 26 CP) - both variants corresponds to the requirements; Diploma project (at least 20 CP) - both variants corresponds to the requirements. The theoretical and professional courses in the field make up 8 CP for the 40 CP study programme and 22 CP for the 80 CP study programme. The content of the professional courses corresponds to the two main areas of electronics: embedded systems programming and telecommunications, microwave and radio-frequency devices. The core of this group of courses is formed by the courses "Satellite Communication Systems" (4 CP), "Heterogeneous Computing Systems" (4 CP) and "Radio Frequency and Microwave Devices" (4 CP). Students can choose between the courses "Heterogeneous Computing Systems" (4 CP) and "Radio Frequency and Microwave Devices" (4 CP), one of which is dedicated to high-density embedded systems, while the other is dedicated to advanced radio frequency and microwave electronics. This provides the opportunity to specialise in one of these sub-areas of electronic engineering. The course "Satellite Communication Systems" is devoted to the study of telecommunication systems with a strong emphasis on their application to satellite communications. The content of this course is being developed with funding from project. In the 80 CP study option, the following additional study courses are provided: 'Automatic Control Systems' (4 CP), 'ARM Architecture Microcontroller Programming' (4 CP), 'Introduction to LabVIEW and its Applications in Electronics' (3 CP) and 'Embedded Operating Systems' (3 CP), the content of which is based on the professional standards 'Electronics Engineer' and 'Lead Electronics Engineer'. The main focus of courses in research, creative work, design work and management studies is on the competences, knowledge and skills mentioned in the professional standard for a lead electronics engineer, which related to the management of research and development projects ("Electronic engineering project management" (4 CP)), as well as scientific research work ("Scientific research methodology" (2 CP) and "Electronic engineering research project" (3 CP)). As the study programme is a professional master's programme, its content is defined and implemented in accordance with the Standard for the Profession of Lead Electronics Engineer (approved on 12 August 2020, Protocol No 6) (see 6-4_appendix_compliance-with-profession-standard.pdf) and national academic standard (see 6-3_appendix_Compliance_national_education_standart.pdf). The content of the MA Electronics study programme is thus designed and implemented in line with current industry trends and labour market needs.

2.2.2. SAR (166 - 167 pages) represents examples of the master thesis, also during visit it was the opportunity to see samples. According to the titles and provided description of the master thesis the awarding of a degree is based on the achievements and findings of the relevant field of science. The study programme clearly corresponds to the scientific field "Electrical Engineering, Electronics, Information and Communication Technologies" of the "Engineering and Technology" group of the Latvian science. Also SAR reports that the majority of the master thesis are implemented in the frame of the projects. The data about defenses, shows significant number of 10 for final thesis. For such small cohort of students, still too much. But the key point - is requirements, not the numbers.

10 in words means outstanding, therefore it is recommended clearly describe, what is included in outstanding (to have formal criteria), as example publication in research journal(participation conference with publication), winning competition etc

2.2.3. Beside the classical MA Electronics study programme implementation methods (lectures, practical classes, labs, independent studies) SAR reports following methods, like project-oriented teaching methods. Project-based learning is at the core of the study programme and is implemented through a series of electronic engineering project-based learning courses:Electronics Engineering Project Management (4 CP); Electronic Engineering Research Project (3 CP). In the study courses "Electronics Engineering Project Management" and "Electronics Engineering Research Project", the course lecturer mainly plays the role of mentor (providing support) and customer (defining technical requirements). In addition SAR reports that for some courses flipped classroom elements were used, while during meeting with students such an approach was not mentioned.

N/A

2.2.4. The tasks of the internship are related to the learning outcomes achievable. The internship complies with the requirements of regulatory enactments.
The aim of the internship (6-8_pielikums_Prakses_nolikums_2022_IZM.pdf) is to use the theoretical knowledge and practical skills acquired in the study process to solve specific tasks in a practical environment in order to promote the development and improvement of students' professional knowledge, skills and competences in accordance with the qualification of leading electronics engineer. The Director of the MA Electronics study programme is responsible for the organisation and control of student internships. The organization of the internship work is determined in accordance with the Regulations "Regulations of the Internship of the Professional Master's Degree Programme "Electronics"". In order to achieve the results planned in the study programme and to ensure the professional competence required for a leading electronics engineer, the programme content includes an internship, which is : internship of 20 CP and 6 CP in a study programme of 80 CP; internship of 6 CP in a study programme of 40 CP. The aim and tasks of the internship are defined in the Internship Regulations in accordance with: 1) the duties and tasks of a senior electronics engineer as defined in the professional standard " Lead electronics engineer"; 2) the study programme study outcomes. The internships used by students so far fall into three categories: Internships in companies and organisations in Latvia; Internship at the Ventspils University of Applied Sciences Research Institute Ventspils International Radio Astronomy Centre; Internship in companies and organisations through Erasmus+. Regarding last option SAR reports only 4 students for the last 3y. During meeting alumni confirmed, that there are no problems with the internships organisation. Tasks of the internship are related to the learning outcomes achievable.

N/A

2.2.5. N/A

2.2.6. The list of the presented topics is in the frame of the MA Electronics study programme reported in SAR (page 165-167). The presented topics are relevant to the field and correspond to the MA Electronics study programme. Most of them are related to development of specific equipment or systems, implementation of signal processing algorithms in embedded systems; development of experimental measurement benches. In addition SAR states that master thesis topics are done as a direct assignment of an enterprise or scientific institution.

Conclusions on this set of criteria, by specifying strengths and weaknesses

Conclusion:
Considering SAR and evidence collected during the meeting it shall be concluded that the presented MA Electronics study programme fulfills formal requirements, is inline with the requirements of the industry and labor market. At the same time, representatives of the industry pointed out that they would be happy to see more “soft” skills by the graduates of the VUAS. The content of the study programme supports reaching the aim and learning outcomes of the MA Electronics study programme.
Strengths:
1. The MA Electronics study programme is balanced between the necessary knowledge, skills and competencies required to perform the duties after graduation.
2. The content of the program is relevant to the field of the relevant industry.
3) Rich collaboration with the local public and private entities.
Weaknesses:
1. The MA Electronics study programme is provided only in a form of full-time study, which limits the opportunity to some potential learners to join the study programme
2) Too many small courses in the programme (1- 2 CP), which decreases manageability of the study programme (from VUAS side) and in the same time overloads students with the assessments.
3) No clear statements about grade 10 for the master thesis. This one needs additional clarification and regulation.

Assessment of the requirement [5] (applicable only to master's or doctoral study programmes)

1 R5 - The study programme for obtaining a master's or doctoral degree is based on the achievements and findings of the respective field of science or field of artistic creation.

Assessment of compliance: Fully compliant

Analysis of the research topics and samples of the master thesis is relevant to the field of study and mainly based on utilizing the following development of specific equipment or systems; implementation of signal processing algorithms in embedded systems; development of experimental measurement benches (courses provided in the frame of study programme are contributing to the mentioned domains). It is reported that in many cases master thesis are done as a direct assignment of an enterprise or scientific institution.

2.3. Resources and Provision of the Study Programme

Analysis

2.3.1. VUAS has a significant and sufficient volume of auditoriums (130 and 190 seats), 9 computer classes (10-30 computers in each) and laboratories for specific study courses to equip students with necessary equipment and software. Laboratories are accessible for students on 24/7 basis. Students of the MA Electronics study programme require a significant amount of practical exercises, especially focusing on laboratory work. VUAS has established and maintains next specialized laboratories necessary to achieve learning objectives of the MA Electronics study programme: Laboratory for electrical measurements (E1), Laboratory for digital electronics (E2), Laboratory for Signal Processing (E3), Laboratory of Optics and Optoelectronics (E6), laboratory of Physics (E8), Laboratory for Mechatronic Systems (D208), Prototyping laboratory (D04), Laboratory for Robotics and Sensors (D207), Amateur Radio Station (E801) and Practical workspace (B3) for practical projects outside class time.
Students do have access to the VUAS library that provides access to physical and electronic

materials used in study program delivery. Majority of the referenced materials in the descriptions of the study courses can be found and are accessible in the VUAS library (even few copies of each can be enough to source all students).
VUAS has implemented a Moodle system to provide required information to students. This includes general information about the VUAS, description and clarification of internal processes, necessary information of the study courses including practical exercises and additional materials. Mentioned information is available both in Latvian and English. Each VUAS student has assigned an email address to secure formal and informal collaboration with VUAS and teaching staff. On top of email as a collaboration channel, teachers set up study courses dedicated groups in WhatsApp, Telegram and other collaboration platforms to speed up communication and bring collaboration between them and students to the next level.
Review of the necessary equipment and literature is being done on the annual basis by teaching staff and the list of necessary items is submitted to the head of FoIT Engineering department. On average 7000 EUR annually are allocated on renewal of technical teaching aids and materials.
Study program includes an internship part. VUAS has established a number of strong collaborations with local companies to provide internship options for their students (i.e. Accenture, TestDevLab, HansaMatrix Ventspils, Elektroniskie sakari, ATEA). VUAS students do get real practical experience in laboratories, and this increases an interest of the industry in the skilled students. Such collaboration supports achievement of the learning objectives of the study program, but also introduces challenges, when students get full-time work and continue studies in VUAS in parallel.
VUAS delivers this study program full-time. Since the ultimate majority of potential candidates and students of Master study program have a full-time job, then this creates a risk for high drop-out of students and low number of new students.

2.3.2. N/A

2.3.3. Financial sustainability of the study program is directly dependent on the number of the students. There are only 3 students in the year 2022.-2023., what is insufficient to make this program financially sustainable. Specifics of the program require significant investments in specialized laboratories and maintenance staff. VUAS calculations show that 7 is the minimal number of students required in this program to make it financially sustainable. Insufficient number of students leads to negative results in 2022.-2023. year and shows -58% negative result.
Additionally, VUAS managed to leverage ESF funds and complete several projects during 2018-2022 and attract additional funds to finance new laboratory equipment, new computer classes, improvements of premises and development of the academic staff.
VUAS forecasts decrease of the needed costs due to the decrease of the study program duration – from 2 years to 1 year.
On average 4-6 new students joined the program before the COVID, but in the year 2021.-2022. zero have joined followed by 2 new students in the year 2022.-2023. Also, there is a significant decrease of new and current students in Bachelor degree program. This makes the key concern regarding program future sustainability.

Conclusions on this set of criteria, by specifying strengths and weaknesses

Conclusions:
students and teaching staff are fully equipped to achieve learning objectives and graduate the program. Negative financial results of the study program can be accepted and managed by VUAS to continue development of the MA Electronics study programme.
Strengths:
1. VUAS has established and maintains a number of specialized laboratories that are available for

students 24/7.
2. There is a shortened 1 year Master degree program available for students to attract more of them.
Weaknesses:
1. Currently there are only 3 students in this MA Electronics study programme, what introduces the risk of this program sustainability.

Assessment of the requirement [6]

1 R6 - Compliance of the study provision, science provision (if applicable), informative provision (including library), material and technical provision and financial provision with the conditions for the implementation of the study programme and ensuring the achievement of learning outcomes

Assessment of compliance: Fully compliant

students and teaching staff are fully equipped to achieve learning objectives and graduate the MA Electronics study programme. Negative financial results of the MA Electronics study programme can be accepted and managed by VUAS to continue development of the study program.

2.4. Teaching Staff

Analysis

2.4.1. As presented in the SAR and in the Annexes to SAR submitted for evaluation, the teaching staff of the MA Electronics study programme (SAR pp. 175-176) consists of 8 persons, out of which 1 Assoc. Professor, 1 lecturer, 2 docents, and 4 guest lecturers. 3 persons of the teaching staff hold a doctoral/ Ph.D. degree (2 of which in computer science/ engineering). The remaining 5 teaching staff have all master's degree. 50% of the teaching staff has guest status.
The knowledge, skills and competences of the teaching staff are declared as being sufficient for a good teaching process; the SAR pp. 176-178 provides significant description of the expertise of the teaching staff towards the obtention of the outcomes of the MA Electronics study programme.
The MA Electronics study programme is implemented for less than 250 students. As described in SAR pp. 176, "The language skills of the teaching staff of the professional masters study programme "Electronics" complies with the Cabinet Regulation No 733 of 2009 regarding Knowledge of the State Language and Procedure for Testing Fluency of the State Language for Performance of Professional and Official Duties. Information on the foreign language skills of the teaching staff is summarised in the "Basic Information on the Teaching Staff Involved in Implementation of the Study Field" (Annex No 2.8) and in the curricula vitae (CVs) of the teaching staff appended in Annex No 2.9". The University has also provided certified letters of declaration for the language skills of teaching staff for both Latvian (2-10_appendix_teaching-staff-latvian-language_ENG, Declaration 1-10.1/69 of 22.12.2022) and English (2-11_appendix_teaching-staff-English-language_ENG, Declaration 1-10.1/70 of 22.12.2022).
The teaching staff provisions are evaluated as being conform to the requirements of the Higher Education Law of Latvia.

2.4.2. The SAR pp. 141-142 presents the changes in the composition of teaching staff. The changes are related to 9 study courses: 4 courses are new (and are delivered by new teaching staff, some of it having strong industrial expertise) and 5 study courses changed their teacher due to the reduction of workload for 2 former teaching staff.
Attracting new teaching staff shows that the teaching staff composition change was managed

successfully by the responsible structure; still, there is no available documentation regarding any specific provision on staff change at the VUAS/ Faculty level, especially under the consideration of the significant number of guest teaching staff.

2.4.3. The criterion is not applicable, the study program is a professional master study program.

2.4.4. The SAR of the MA Electronics study programme(pp. 178-179, points 3.4.3 and 3.4.4) does not specifically mentions any information about publications of the teaching staff (although these publications exist, as shown in document 2-12_appendix_quantitative-data-on-academic-staff-research-activitiy-ENG).
The annexes to the 2.4. Scientific Research and Artistic Creation chapter of the SAR (pp. 57-70) (2-13_appendix_teaching-staff-scientific-resarch-experience) list all the publications, patents and creations of the teaching staff involved in all the programs from the evaluated study field. In the last 6 years, as shown in document 2-12_appendix_quantitative-data-on-academic-staff-research-activitiy-ENG, there are 705 scientific publications of various types (including publications numbered multiple times, as they have several authors from the university); the average yearly production of the 58-teaching staff of the field is then around 2 publications.
The identification of the publications of the teaching staff from the MA Electronics study programme in document 2-13_appendix_teaching-staff-scientific-resarch-experience shows that all 8 persons from the teaching staff have publications declared.

2.4.5. The SAR lists (pp. 179-180) several ways of teaching staff cooperation, both formal and informal. Some of the declared means of cooperations are:
- Interdisciplinary cooperation of academic staff, with topical issues discussed at organised meetings of the Council of Study Programmes, Faculty Council meetings, seminars, meetings with employer;
- Cooperation of teaching staff in the development of the study programme content;
- Cooperation between teaching staff in the implementation of specific study courses;
- Research activities (including students);
- Informal cooperation between teaching staff („the weekly coffee break”).
All this shows that cooperation between teaching staff does exist, it is functional, but it works in mostly non-documented and informal ways, without a unitary mechanism.
The SAR pp. 180 mentions that „Currently, 8 lecturers with different workloads are involved in the implementation of the study programme, while 6 students are currently enrolled in the study programme. So the ratio of students to lecturers: 6/8=0,75. Students are provided with quality studies and the possibility of individual approach during the study process.”
For reference, for the entire study field there are 58 teaching staff, as described for instance in Annex 2-9_appendix_Teaching_Staff_CV_ENG.pdf; the total number of enrolled students in the study field is 254 (45+147+15+6+30+11), which provides a student to teaching staff ratio of 4.38.

Conclusions on this set of criteria, by indicating strengths and weaknesses

Conclusions:
The teaching staff provisions are evaluated as being conform to the requirements of the Higher Education Law of Latvia. There are 8 people in the academic staff allocated to the program and the student/teaching staff ratio is very good from a student perspective (0.75). The teaching staff is active in research and cooperates (in various, mostly non-documented and informal ways) towards the successful implementation of the MA Electronics study programme.
Strengths:
1. A very low student to teaching staff ratio, which enables close cooperation and student-centered

guidance.
Weaknesses:
1. The low ratio of tenured (elected) teaching staff (50%) as compared to guest teaching staff (50%).
2. There are no documented provisions regarding the management of the changes in teaching staff.
3. Lack of documentation of the cooperation between the teaching staff and their specific interactions towards MA Electronics study programme changes.

Assessment of the requirement [7]

1 R7 - Compliance of the qualification of the academic staff and visiting professors, visiting associate professors, visiting docents, visiting lecturers and visiting assistants with the conditions for the implementation of the study programme and the requirements set out in the respective regulatory enactments.

Assessment of compliance: Fully compliant

The teaching staff provisions are evaluated as being conform to the requirements of the Higher Education Law of Latvia.

2.5. Assessment of the Compliance

Requirements

1 1 - The study programme complies with the State Academic Education Standard or the Professional Higher Education Standard

Assessment of compliance: Fully compliant

According to annex 6-3 (6-3_pielikums_Atbilstiba-valsts-standartam.pdf), the MA Electronics study programme complies with the "Regulations Regarding the National Standard for Vocational Higher Education" by the Cabinet of Ministers.

2 2 - The study programme complies with a valid professional standard or the requirements for the professional qualification (if there is no professional standard required for the relevant occupation) provided if the completion of the study programme leads to a professional qualification (if applicable)

Assessment of compliance: Fully compliant

According to annex 6-4- 6-4_pielikums_Atbilstiba-profesijas-standartam_EIM.pdf, the MA Electronics study programme is designed based on the Lead Electronics Engineer standard. The professional standard with registration number PS-143 was approved during the meeting of the Tripartite Sub-Council for Vocational Education and Employment on August 12, 2022. : https://registri.visc.gov.lv/profizglitiba/dokumenti/standarti/2017/PS-141.pdf

3 3 - The descriptions of the study courses and the study materials have been prepared in all languages in which the study programme is implemented, and they comply with the requirements set forth in Section 561 , Paragraph two and Section 562 , Paragraph two of the Law on Higher Education Institutions.

Assessment of compliance: Fully compliant

The course descriptions are available in both Latvian and English languages, although the programme is realized only in Latvian. All course descriptions contain the requirements set forth in the corresponding sections of the Law on Higher Education Institutions. Study course descriptions are available in annex 6-7-6-7_Pielikums_kursu apraksti.pdf

4 4 - The sample of the diploma to be issued for the acquisition of the study programme complies with the procedure according to which state recognised documents of higher education are issued.

Assessment of compliance: Fully compliant

The diploma example available in annex 7-1_EIM_appendix_DS_ENG_1g, 7-2_EIM_appendix_DS_ENG_2g, 7-3_EIM_pielikums_DP_LV_1gand 7-4_EIM_pielikums_DP_LV_2g. is compliant with the Cabinet of Ministers regulation no 202 “Procedures by which documents certifying higher education recognised by the State shall be issued”.

5 5 - The academic staff of the academic study programme complies with the requirements set forth in Section 55, Paragraph one, Clause 3 of the Law on Higher Education Institutions.

Assessment of compliance: Not relevant

6 6 - Academic study programmes provided for less than 250 full-time students may be implemented and less than five professors and associated professors of the higher education institution may be involved in the implementation of the mandatory and limited elective part of these study programmes provided that the relevant opinion of the Council for Higher Education has been received in accordance with Section 55, Paragraph two of the Law on Higher Education Institutions.

Assessment of compliance: Not relevant

7 7 - At least five teaching staff members with a doctoral degree are among the academic staff of an academic doctoral study programme, at least three of which are experts approved by the Latvian Science Council in the respective field of science. At least five teaching staff members with a doctoral degree are among the academic staff of a professional doctoral study programme in arts (if applicable).

Assessment of compliance: Not relevant

8 8 - The teaching staff members involved in the implementation of the study programme are proficient in the official language in accordance with the regulations on the level of the official language knowledge and the procedures for testing official language proficiency for performing professional duties and office duties.

Assessment of compliance: Fully compliant

According to annex 2-10 - 2-10_pielikums_apliecinajums par valsts valodu_LV.pdf the proficiency level of all teaching staff involved in the implementation of the MA Electronics study programme complies with the requirements of Official Language Law.

9 9 - The teaching staff members to be involved in the implementation of the study programme have at least B2-level knowledge of a related foreign language, if the study programme or any part thereof is to be implemented in a foreign language (if applicable).

Assessment of compliance: Fully compliant

According to annex 2-11 - 2-11_pielikums_apliecinajums par anglu valodu_LV.pdf the English language proficiency level of all teaching staff involved in the implementation of the MA Electronics study programme is at least level B2.

10 10 - The sample of the study agreement complies with the mandatory provisions to be included in the study agreement.

Assessment of compliance: Fully compliant

The study agreement example available in annex 2-5 - 2-5_pielikums_studiju-liguma-paraugs.pdf fully complies with the Cabinet of Ministers regulation no 70 “Rules to be included in the study agreement”.

11 11 - The higher education institution / college has provided confirmation that students will be provided with opportunities to continue their education in another study programme or another higher education institution or college (agreement with another accredited higher education institution or college) if the implementation of the study programme is terminated.

Assessment of compliance: Fully compliant

The provided contract in the annex states the study programme name “Master of Engineering in Electronics” (Licence No. 04038-9) that would be received in TSI, but TSI is undergoing an accreditation process in which the study programme names may change, therefore it should be revisited.

12 12 - The higher education institution / college has provided confirmation that students are guaranteed compensation for losses if the study programme is not accredited or the study programme’s license is revoked due to the actions (actions or omissions) of the higher education institution or college and the student does not wish to continue studies in another study programme.

Assessment of compliance: Fully compliant

The attached document in Annex 2-4 (2-4_appendix_Declaration_on_loss_compensation_for_students.docx.pdf) confirms that students are guaranteed compensation for losses if the study programme is not accredited or the study programs license is revoked due to the actions (actions or omissions) of the VUAS, and the student does not wish to continue studies in another study program.

13 13 - The joint study programmes comply with the requirements prescribed in Section 55.(1), Paragraphs one, two, and seven of the Law on Higher Education Institutions (if applicable)

Assessment of compliance: Not relevant

14 14 - Compliance with the requirements specified in other regulatory enactments that apply to the study programme being assessed (if applicable)

Assessment of compliance: Not relevant

Assessment of the requirement [8]

1 R8 - Compliance of the study programme with the requirements set forth in the Law on Higher Education Institutions and other regulatory enactments.

Assessment of compliance: Fully compliant

The documentation related to the study programme complies with the current regulations and legal requirements

General conclusions about the study programme, indicating the most important strengths and weaknesses of the study programme

Conclusions:

The teaching staff provisions (8 people in the academic staff) are evaluated as being conform to the requirements of the Higher Education Law of Latvia. The student/teaching staff ratio is very good from a student perspective (0.75). The teaching staff is active in research and cooperates (in various, mostly non-documented and informal ways) towards the successful implementation of the study program.
The documentation pertaining to the study programme is in compliance with the existing regulations

and legal requirements.

Strengths:
1. A very low student to teaching staff ratio, which enables close cooperation and student-centered guidance.

Weaknesses:
1 The low ratio of tenured (elected) teaching staff (50%) as compared to guest teaching staff (50%).

Evaluation of the study programme "Electronics"

Evaluation of the study programme:

Good

2.6. Recommendations for the Study Programme "Electronics"

Short-term recommendations

1. Consider implementing a consistent plan for the insurance of a teaching staff corps more resilient to changes and less dependent on guest teaching staff.
2. Consider provisions regarding the management of the changes in teaching staff.
3. Revisit the agreement with TSI, which allows the students to continue their studies in TSI if the VUAS study programme Electronic engineering is terminated, after TSI undergoes the accreditation process, because the study programme names may change.
4. Consider activating ERASMUS mobility.

Long-term recommendations

1. Consider implementing a consistent plan for the increase of the number and impact of publications of the teaching staff.
2. Consider the documentation of the cooperation between the teaching staff and their specific interactions towards program changes.
3. Consider to have more bigger courses (in terms of CP), or organaising modules
4. Explore a possibility and demand for opening a part-time study in the frame of this programme
5. The specific requirements for obtaining 10 during the defence should be formulated.
6. Consider signing an agreement allowing students to continue their studies in another study programme if the VUAS MA study programme Electronic engineering is terminated, with another study programme in which a professional degree can be obtained.
7. Consider making available more research positions at projects to the students.

III - Assessment of the Requirements for the Study Field and the

Relevant Study Programmes

III - Assessment of the Requirements for the Study Field and the Relevant Study Programmes

Assessment of the Requirements for the Study Field

Requirements	Requirement Evaluation			Comment
R1 - Pursuant to Section 5, Paragraph 2.1 of the Law on Higher Education Institutions, the higher education institution/ college shall ensure continuous improvement, development, and efficient performance of the study field whilst implementing its internal quality assurance system:	Fully compliant			VUAS has established a quality assurance policy and system that is taking place in VUAS. This system is based on the European Quality Management Fund Excellence Model. The system includes all responsible parties- the staff, students, graduates and employers, therefore bringing them all together to ensure continuous improvement of the study field. VUAS has also a clearly defined complaint and suggestion gathering mechanism that students are aware of.
R2 - Compliance of scientific research and artistic creation with the level of development of scientific research and artistic creation (if applicable)	Fully compliant			Not looking to the fact that approaches/methods/techniques used by VUAS related to the research are fragmented and do not form the systematic approach, VUAS for the last years did a lot to push forward the research domain. VUAS puts development of research and science as one of the element of the strategic development plan. VUAS has clear research domain radio - astronomy and this open a lot of opportunities to become a leader in this field not only in Latvian, but Baltic Sea countries. This opportunity should be utlised in more effective way - leading EU level projects, R2B activities, orientation toward commercialisation and establishment of the long-running projects/collaboration with industry.

Requirements	Requirement Evaluation		Comment
R3 - The cooperation implemented within the study field with various Latvian and foreign organizations ensures the achievement of the aims of the study field.		Partially compliant	Analysis of SAR and meeting demonstrates that VUAS has a strong collaboration with local private and public entities in both domains (computer science, electronics). Collaboration includes a different set of activities, which makes collaboration effective for both (VUAS and partner). Students and VUAS benefits from this collaboration. In many cases collaboration is based on personal contacts, which from one side is good and effective, and on the other side makes collaboration person-dependent (what would happen if a person will decide to move from VUAS). Therefore formalization in the form of MoU or common collaboration agreement) with an action plan is recommended. In the international level collaboration is limited and could be extended, beside of ERASMUS+ and projects. Primary point addresses presence international associations, like Informatics Europe etc. Which could be valuable for even regional university. Presence in the domain international association is limited, while VUAS could benefit a lot, and make it more visible in international level.
R4 - Elimination of deficiencies and shortcomings identified in the previous assessment of the study field, if any, or implementation of the recommendations provided.		Partially compliant	The Faculty of Information Technology from the VUAS , as manager of the study field " "Information Technology, Computer Hardware, Electronics, Telecommunications, Computer Management, and Computer Science ", has considered most of the previous recommendations. Still, there are remaining issues related to the mechanism of cooperation in term of quality management with the University of Liepaja and the documentation of the decisions taken as a response to previous recommendations.

Assessment of the Requirements for the Relevant Study Programmes of the Study Field

No.	Study programme	R5	R6	R7	R8	Evaluation of the study programme (excellent, good, average, poor)
1	Programming Specialist (41484)	Not relevant	Fully compliant	Fully compliant	Fully compliant	Good
2	Electronics Engineering (42523)	Not relevant	Fully compliant	Fully compliant	Fully compliant	Good
3	Smart Technologies and Mechatronics (42523)	Not relevant	Partially compliant	Fully compliant	Fully compliant	Average
4	Computer Science (43484)	Not relevant	Fully compliant	Fully compliant	Fully compliant	Good
5	Computer Science (45484)	Fully compliant	Fully compliant	Fully compliant	Fully compliant	Good
6	Electronics (47523)	Fully compliant	Fully compliant	Fully compliant	Fully compliant	Good

The Dissenting Opinions of the Experts

1. Programming specialist, the first level program: Good - 5, Excellent - 1, overall - Good
2. Smart Technologies and Mechatronics: Poor - 3, Average - 3, overall - Average