Expert group joint opinion

Evaluation Procedure: Assessment of Study Field

Higher Education Institution: Latvia University of Life Sciences and Technologies

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

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

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The site evaluation of LBTU was carried out in June 8-9, 2023. Based on the provided materials and the site visit, a summary of the assessment is the following.

The main goal of the study field “Information Technology, Computer Hardware, Electronics, Telecommunications, Computer Management, and Computer Science” is to prepare highly qualified internationally competitive specialists at all levels of ICT. The study field covers all educational levels, from the first to the doctoral programmes.

The study field includes four programmes:
1. Information technologies for sustainable development (42484), professional bachelor;
2. Computer management and computer science (43483), academic bachelor;
3. Information technologies (45483), academic master;
4. Information technologies (51483), doctoral studies.

The study field and the study programmes comply with LBTU strategy (LBTU Strategy 2023-2027). LBTU has a working and effective internal quality assurance mechanism in place. LBTU has established policies and procedures to ensure a high quality of education according to the ESG standards.

LBTU has involved 56 teaching staff members to implement the study field. 36 members have doctorate degrees, and 20 members have master’s degrees. Of the teaching staff, 36 members are elected to academic positions at LBTU (faculty members) and remaining are guest lecturers.

The research strategy of the university has domain specific focus that provides a clear vision and mission for the scientific endeavour. The focus on agriculture and life sciences is evident in the educational portfolio and concrete research activities as well as in the development of the infrastructure for education and research.

The connection of research and education is on a good level and there are further possibilities in developing the PhD education. The overall research activities have an applied nature providing excellent basis for collaborating the industries. The research portfolio would benefit from more foundational research elements and connecting them with the more applied activities. International cooperation has been developed in terms of EU projects and Erasmus agreements.

The university has seen a notable rise in international student enrolment, accompanied by an expansion in English-taught courses. However, this growth isn't uniform across all study programmes. The doctoral programme has not mirrored this growth trend, which is surprising considering expectations. This might indicate a need for further efforts to support and promote the PhD level education.

Further marketing initiatives could help enhance the visibility of the programmes, thereby drawing in more potential students. In light of this, I recommend continued development of international collaborations, both in terms of research and student/staff mobility. Expanding these efforts will foster a diverse educational environment, encouraging the exchange of knowledge, experiences, and cultural perspectives. This could involve providing more opportunities for students and staff to study or work abroad, as well as welcoming more international students and researchers to the

university.

The teachers have opportunities to be active in research and the scientific profile of the teachers is in-line with the expectations for the BSc, MSc and PhD level programmes. Overall, continuous emphasis should be placed on high quality top-tier publications.

The students are encouraged to participate in research activities and to apply research results at a student's conference. Mentoring of the PhD students is working well. There is focus on innovation activities and the university has established an incubator for student driven innovations. We recommend to continue to develop the innovation related instruments.

The industry collaboration is on a very good level with frequent interactions on multiple levels with concrete activities, such as guest lectures, theses topics and guidance, internship possibilities, and projects.

Overall, the assessment reveals that the four degree programmes are functioning effectively. They have established necessary quality assurance protocols and feedback mechanisms, ensuring that the education delivered is up-to-standard and responsive to student needs. The programmes are also in alignment with the university's overarching strategy, showing a clear integration of institutional goals into their operation. Furthermore, they demonstrate a record of meeting industry expectations, thus preparing students effectively for their future careers and contributing to the relevance of the educational offering.

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 1.1 and section 2.1) and meetings during the assessment visit at LBTU on June 8-9, 2023.
Latvia University of Life Sciences and Technologies (LBTU) is is one of the four universities of sciences in Latvia (established in 1936 as "Latvijas Lauksaimniecības universitāte" (Latvia Agricultural university); starting from September 1, 2022 its name in Latvian is "Latvijas Biozinātņu un tehnoloģiju universitāte").
LBTU vision - Latvia University of Life Sciences and Technologies is a modern, nationally and internationally recognized science university - a leader in the innovations of bioeconomy and related industries and the sustainability of natural resources.
LBTU long-term goals:
1. Excellence in research that promotes technology and innovation and is integrated into the study process.
2. High-quality studies that provide the development of internationally competitive specialists.
3. Effective university management that ensures the targeted and efficient use of resources for high-quality studies and excellence-focused research.

The long-term goal of the LBTU “to implement high-quality studies that ensure the preparation of internationally competitive specialists” is implemented in the study field “Information Technology, Computer Hardware, Electronics, Telecommunications, Computer Management, and Computer Science” as the main goal "to prepare highly qualified specialists at all levels of information technology" (SAR p.16).

The study field includes four programmes:
1. Information technologies for sustainable development (42484), professional bachelor;
2. Computer management and computer science (43483), academic bachelor;
3. Information technologies (45483), academic master;
4. Information technologies (51483), doctoral studies.
The study field covers all educational levels, from the first to the doctoral programmes. The primary study area is information technologies.
The aims of the study field and programmes are defined in accordance with international recommendations - Euro-Inf Framework Standards and Accreditation Criteria for Informatics Programmes, 2011, EQANIE Framework, 2017 (SAR section 2.1.1). Therefore, the aims of the study field and programmes are helping to create a single European educational space to develop internationally competitive specialists.
The study field and the study programmes comply with LBTU strategy (LBTU Strategy 2023-2027: https://www.llu.lv/lv/llu-pamatdokumenti). The need for ITC experts and reliance on ITC technologies for development in countries with comparatively low natural resources are widely discussed topics. According to LIKTA, the ITC sector is the third exporting sector, and the need for ITC specialists in Latvia is still unfulfilled (the same, as Worldwide). LBTU strategy includes a contribution to society and study development, and maintaining and improving ITC programmes has a direct impact on these priorities. See SAR (section 1.1, 2.1.1).

1.1.2. The analysis is based on SAR (section 1.1 and section 2.1) and meetings during the onsite visit at LBTU on June 8-9, 2023.
SWOT analysis was performed. The main strength, weaknesses, opportunities, and threats were identified. As the main strengths are identified: a strong teaching staff core with PhDs in industry; study programmes with unique in Latvia ICT study courses in the interdisciplinary field. As the main weaknesses are identified: difficulties to attract new qualified teaching staff, mainly due to the disproportion between the salaries of the companies in the industry and the educational institution; low motivation for ICT students to continue their studies in master's and doctoral studies. 10 opportunities are identified, among them - increase the number of successful students in the study field, increase the number of foreign students with the help of cooperation agreements, participate in various industry organisations to identify new trends in ICT education in a timely manner. As the main threats are identified: decrease or invariance of the number of students due to the demographic situation of Latvia, restrictions on attracting students, introducing changes to the co-financing requirement of state-funded study places from students' personal funds in Latvia, the geopolitical situation in Latvia's neighbouring countries.
Development plans (SAR p.72 itf_pilnveides_plans_en.pdf) reflect SWOT results, but plan covers only period 2020-2023.
During the onsite visit it was found that to eliminate some weaknesses academic motivation systems make academic personnel more competitive and promote good practices. It was found that IT in the context of agriculture provides great opportunities for interdisciplinary approach, which gives LBTU a unique advantage.

1.1.3. The analysis is based on SAR (section 1 and section 2.1) and meetings during the assessment visit at LBTU on June 8-9, 2023.
The study field is implemented at the Faculty of Information Technologies(ITF).
The study field management (SAR p. 72 itf_studiju_virziena_parvaldiba_en.png) is shared between the ITF Council, ITF Student`s self-government, ITF Dean, Head of study field (direction), Directors of study programmes. Study work is organised by the responsible departments, but supervised by the Faculty Council, Study Centre, LBTU Council and Senate.
The director of the study programme prepares information about the study programme for the

annual self-assessment report of the study field, which is developed together with the head of the study field. The director of each study programme is approved by the LBTU Senate based on the decision of the LBTU Study Council.

The dean's office of the faculty supervises student affairs, manages record-keeping, prepares diploma supplements, etc., binding record-keeping documents.
Documentation and discussions during onsite visit show that the study management process is efficient but sometimes informal. It is not a big problem for those who know the system well, but it can be complicated for new employees, early-stage researchers, and students. A more systematic approach would improve the process.

Documentation and discussions during onsite visit show that the administrative and technical support is sufficient. Comments from the staff and programme directors during onsite visit show that they get sufficient technical and administrative support.

1.1.4. The analysis is based on SAR (section 1 and section 2.1) and meetings during the assessment visit at LBTU on June 8-9, 2023.
Admission regulations for all LBTU study programmes are approved by the Senate every year in October and published on the LBTU website. Regulations in Latvian are available at https://www.llu.lv/lv/uznemsana, for studies in English – https://www.llu.lv/en/degree-programmes. The description of the procedure is clear.

In both bachelor's programmes realised at LBTU ITF, admission requirements are previous secondary education. New students are admitted on a competitive basis, based on the results of their centralised exams in Latvian, foreign languages, and mathematics. Students receive additional points for the centralised exam in physics. From the next study year (2023/2024) also for the newly introduced Programming and Design and Technology centralised exams in Latvia. Applicants for the study programme can apply using the e-service (at the portal latvija.lv) and the unified admission system, in which applications are simultaneously processed for 12 Latvia universities.

Foreign students use the application system https://apply.llu.lv/, which is based on the purchased Dream apply system (https://dreamapply.com/). Foreign students are tested for secondary education, language knowledge, which is confirmed by an internationally recognised certificate, and when enrolling in LBTU's ITF bachelor's and master's programmes, students take the entrance examination remotely, using a special course of the LBTU e-study system.

The admission requirements for the master's programme “Information Technology” firstly include the general LBTU admission requirements. New master’s students are admitted on a competitive basis on the basis of a weighted average mark obtained in bachelor's studies (or higher professional education studies). LBTU graduates can apply for master's studies electronically, using the LBTU Information System; graduates of other universities – in person at LBTU.
Taking into account the demand observed in recent years and in consultation with employers in order to expand the possible range of master's students, studies in this programme are also offered to graduates in other fields (not related to ICT studies). Consequently, the admission rules have been slightly supplemented - bachelor's degree or first-cycle (second-level) professional higher education in engineering, computer science, mathematics or physics. If the education was obtained in another field of study, an entrance exam must be taken. If language of implementation is English, English language skills at least at B2 level are required.
During the current activity of the study field, there has been no equalisation of non-formal or other types of education.

In undergraduate level studies, there are practical examples where students join a group as listeners while acquiring individual study courses. This process is managed by the Lifelong Learning Centre of LBTU.

In recent years, students relatively often transfer from other Latvian higher education institutions to study at later stages, for example, a 2nd-year bachelor's student in the field of ICT from Riga Technical University can start studies in the 2nd year of the LBTU ITF corresponding programme, following the "Transfer from another higher education institution" procedure (https://www.llu.lv/lv/pariesana-no-citas-augstskolas – only in Latvian).
During the onsite visit it was found that information about study programme acquired from older friends/students helped student to choose this programme.

1.1.5. The analysis is based on SAR (section 1 and section 2.1) and meetings during the assessment visit at LBTU on June 8-9, 2023.
The evaluation criteria, conditions and binding procedures for LBTU students are described in the Study Regulations, that are available in Latvian https://www.llu.lv/lv/studijas and in English https://www.llu.lv/en/study-guide-documents
In evaluating the study results of LBTU students, the basic principles defined in the Cabinet of Ministers Regulations are applied:
- The principle of openness of assessment – in accordance with the set objectives and tasks of the study programmes, as well as the goals and tasks of the study courses, the higher education institution has determined a set of requirements for the assessment of study results. The LBTU Study Regulations stipulate that the study results are evaluated according to two indicators: qualitative (examinations are evaluated on a 10-point scale or pass/fail) and quantitative (amount of the study course in credit points (CP), including both the attendance and the amount of independent work – the amount of credit points is presented in the study plan).
- The principle of obligatory assessment – it is necessary to obtain a successful assessment of the acquisition of the entire content of the study programme.
- The principle of assessment revision possibilities – the LBTU Study Regulations specify the appeal procedure.
- The principle of diversity of the types of tests used in the assessment – different types of tests are used in in the assessment of the study programme acquisition, which are specified in the study plan.

During the semester, the teaching staff in their study course regularly check the knowledge and skills of the students using the types of tests specified in the study course programme (tests, homework, calculations, graphic works, reports, colloquiums, laboratory works, etc.).
The programme of each study course defines the knowledge, skills and competence to be acquired as a result of studying the course, as well as describes the evaluation criteria and methods (itia_kursu_programmas_en, dvdz_kursu_programmas_en, IT_kursu_programmas_ENG, phd_kursu_programmas_en). The programmes are placed in the LBTU IS Study Course Register, as well as in the e-study environment.

The procedure and criteria for the evaluation of doctoral theses and the granting of the scientific doctoral degree are determined by the Cabinet Regulations No. 1001 "On the Procedure and Criteria for Granting (Promotion) of the Scientific Doctoral Degree", LBTU Regulations "On the Promotion Councils and the Promotion." According to these regulatory documents, the evaluation of doctoral theses and the granting of a scientific degree are carried out by the ITF Information Technology Industry Promotion Council.
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 evaluate 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 2.1) and meetings during the onsite visit at LBTU on June 8-9, 2023.
Students and LBTU academic, general, scientific, and administrative staff are equally responsible for the compliance of the principles of academic integrity and for the consequences of violation.
The LBTU Code of Ethics (https://www.llu.lv/lv/llu-pamatdokumenti, in English – https://www.llu.lv/index.php/en/study-guide-documents) and the Rector's Regulation On Academic Integrity Violations in Students' Theses/Doctoral Theses are available on the LBTU website. (https://www.llu.lv/lv/llu-pamatdokumenti, in English, https://www.llu.lv/en/study-guide-documents).
LBTU has joined the Unified Computerised Plagiarism Control System in 2014, which checks all final theses developed during studies at LBTU.

The procedure provides that if in the final thesis the System detects a 10% coincidence of the text with another thesis, then the final thesis will be reviewed by the Faculty's Methodological Commission/Industry Promotion Council, and a decision will be made on the presence or absence of plagiarism, before receiving explanations from the author and supervisor of the final thesis in person. Since the implementation of the unified computerised plagiarism control system, only one thesis has been discovered among ITF final year students in a bachelor's study programme, where the author of the thesis was invited to the ITF Methodological Commission to discuss the result identified by the system. As a result, the author admitted that a large part of the thesis was plagiarised and decided to interrupt their studies. The author resumed their studies the following year and developed a new final thesis, which the author successfully defended.

The LBTU e-learning system uses the plagiarism control tool "Original by Turnitin". On the basis of these results, each member of the teaching staff can follow the performance of practical works and, according to the requirements of their course, take this information into account in the assessment of work. Initially, the greatest attention is paid to developing students' understanding of plagiarism and eliminating its use in course works.

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

The study field is well-founded, taking into account the need for experts in country with comparatively low natural resources. SWOT analysis is performed. The main strengths, weaknesses, opportunities, and threats were identified. The Development plan reflects SWOT results. The study management process is efficient. Admission and assessment are defined in detail, and well formalized, and all the stakeholders are well informed. The LBTU Code of Ethics, the Rector's Regulation On Academic Integrity Violations and the Unified Computerised Plagiarism Control System regulate the compliance of academic integrity and consequences of violation.
LBTU has sufficiently developed an internal quality assurance system and it is effective. LBTU has established policies and procedures to ensure a high quality of education according to the ESG standards.
State-owned HEI LBTU has established proven processes to manage revenue and expenses as well as keep control and tracking of the execution. LBTU has managed to secure well balanced teaching staff, involve industry partners in study program delivery and internship and introduce the system to grow the research activities.
The research strategy of the university has agriculture and life sciences specific focus that provides a clear vision and mission for the scientific endeavour. The connection of research and education is on a good level.

LBTU has proven that it considers seriously quality assurance, by transparent analysis of the recommendations received on previous accreditation.
Overall the findings are positive, the study programmes are balanced.

Strengths
1. ICT in the context of agriculture and life sciences provide great opportunities for interdisciplinary approach, which gives LBTU a unique advantage.
2. Internal quality assurance system provides strong cooperation with governmental and non-governmental organisations, employers, academic staff and students.
3. LBTU is the HEI with history and well established and managed processes to plan and execute financial processes that support development of study programs.

Weaknesses
1. Difficulties to attract new qualified teaching staff, that not impacts the current evaluation, mainly due to the disproportion between the salaries of the companies in the industry and the educational institution.
2. Some information for study programmes differ in the English version of the webpage from the Latvian (e.g. accreditation date of the programme).
3. Not all study programs have an increase in students.

1.2. Efficiency of the Internal Quality Assurance System

Analysis

1.2.1. According to SAR p. 29-37 (chapter 2.2.) LBTU quality assurance system is based on LBTU strategy and on the basic principles of the international standard “Investors in Excellence” (investorsinexcellence.com). The quality management system of LBTU is externally audited every two years. Since LBTU provides specific and unique study programmes connected to the field of agriculture, it is important that the University ensures close relationship with all involved stakeholders.
A general description and assurance plan of Quality management system is available at LBTU webpage: https://www.lbtu.lv/en/mission-and-vision and it is publicly available. One of the strategic goals of LBTU to achieve their defined mission is to provide an efficient university management system, that contributes to the development of an internationally competitive intellectual potential (description of LBTU QMS description p.11). In the description of QMS there are clearly defined principles for Quality Management policy, which includes stakeholder involvement in the improvement of University products, services and processes. It is stated clearly that the Universities stakeholders are current students, prospective students and graduates, employees, other educational institutions in Latvia and on the scale of Baltic States, research institutes, employers, industry experts and organizations and the State. Aims of the Quality Management system include improving the satisfaction levels of all stakeholders and continuous improvement process for the University (LBTU QMS description p.6).

In order to contribute to the achievement of aims and learning outcomes for the study programmes and continuous improvement, documents are planned in 5 levels – starting from LBTU management documents, strategic and planning documents and regulatory documents of basic activities and ending with support elements such as handbooks and methodologies. LTBTU has defined 19 main processes which are grouped into 3 categories (management, basic activity and support) (LBTS QMS description p.9).

The requirements of the quality assurance system are implemented at three levels: management,

faculty and at the level of ITF departments. Management is responsible for activities such as developing regulatory study documents according to state legislation, increasing qualification of academic staff, approving of study documents and reports etc. Quality assurance at the level of Faculty (and study field) is responsible for activities such as developing strategic plan, evaluating study programmes, plans and courses, developing annual self assessment reports etc. All of these efforts on faculty level are managed by the Dean, head of study field, directors of study programmes and department heads. Quality assurance at the level of faculty departments is responsible for activities such as improving the study programmes and study courses, evaluating quality of study programmes, analysing student success and attendance of lectures, analysing student and graduate surveys. These activities are managed by study programme directors, heads of departments, course curators and Vice Dean of Studies. (SAR p. 29 - 31). Internal quality assurance system is based on the Deming cycle. According to the self-assessment reports and answers of all involved stakeholders during the visit, the quality assurance system works well, ensuring a significant contribution to the quality of LBTU processes.

1.2.2. The development of new study programmes and procedures of renewal are described in SAR paragraph 2.2.2. Development of study programmes take place in accordance with regulations approved by LBTU Senate, which include mechanisms such as - approval and discussions of the study programme curricula in the faculty's methodological commission, council and LBTU study council before final approval. Annual reports are prepared for all study programmes (inner self-assessment reports), which are approved by the Senate and published in LBTU website. Most of the feedback mechanisms include surveys and other formal ways, but during the assessment visit there were observed also informal ways to give feedback which are as well taken seriously. Formal feedback ways include anonymous surveys for students once in a semester, where they evaluate study courses and their contents, as well as rate the teaching staff; graduates fill out surveys at the end of the study programme and employers have the ability to discuss anything during student internships and throughout different industry associations such as LIKTA and various seminars etc. It was established during the visit that the connection with the employers is well defined and efficient. During the interviews it became clear that students feel that the feedback mechanisms work well and responsible persons are approachable. It must be noted that there could be a potential to involve more graduates in the daily work, giving tours or providing more lectures about the practical experience in the field. LBTU collects statistics on relevant study fields on a regular basis, including feedback from the students involved in mobility projects. University has an easy to navigate Internet home page, all necessary documents for students and other interested parties are available in Latvian and English simply to find.

1.2.3. The mechanisms for submitting complaints and suggestions is described in SAR chapter 2.2.3. (p. 34). During the studies, students have the right to submit proposals and complaints about the study process and content. There are at least three formal ways: in writing or orally to the faculty staff (curator, study programme director, vice dean or dean), to the management level of LBTU (Study Centre, Vice Rector of Studies, Study Council and Senate) and anonymously using the possibility of whistleblowing at https://www.llu.lv/lv/trauksmes-celsana (only in Latvian).
Procedures are described in detail and available to students at Mans LBTU (inner LBTU portal). If the student has submitted a formal complaint, then, after its examination they will receive a written answer (unless the examination of the complaint took place with the presence of the student). There is a possibility to use LBTU Arbitration Court. Students also use the opportunity to discuss and submit any proposals and complaints to the faculty student council, which evaluates the suggestion/complaint and assists in solving it. Several times a year faculty Dean organises meetings with representatives of faculty student council and course leaders of programmes, where any complaints or feedback is discussed. Over the reporting period no formal written complaints were

submitted. All complaints and situations were resolved through negotiations and discussions at the faculty or study programme level.

1.2.4. The statistical data collection mechanism is described in the SAR chapter 2.2.4. (p. 35-36). LBTU centrally collects statistical data in various perspectives and with various regularity, which is dictated by external or internal stakeholders - Once a month: number of students by study programmes, study types and forms, study directions and faculties; filled out state funded study places. Once per study year: number of graduates by study programmes and types of funded study places; admission results and LBTU Statistical data compilation Augstskola-1 for State Central Statistics Bureau (CSB). Once per year: performance of each academic staff member, internship offers, performance indicators described in LBTU Development Strategy, use of state funded study places and statistical data compilation by study fields, which includes numbers of study programmes, types and forms, graduates and foreign student statistics. The mechanisms are efficient and provide effective focus on the improvement of the study field.
In March 2022, as part of the study field feedback mechanisms, companies in the ICT industry were surveyed to see whether and how many graduates of ITF programmes work in their companies. Out of the 54 surveyed companies, 22 companies answered, confirming that a total of 64 graduates are working for them.

1.2.5. The information published on LBTU website www.lbtu.lv partially corresponds to the information mentioned in the e-platform. All of the websites containing various important information are described in SAR chapter 2.2.5. It should be mentioned that during the preparation of the joint-report (June 2023) the information about the study programmes “Information Technologies for Sustainable Development” and “Information Technologies (master study programme)” has a different accreditation date on the English webpage part (15.12.2028.) while on Latvian it is 31.12.2023. Overall the webpages are easily manageable in Latvian and in English and have regular updates with various news.

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

LBTU has sufficiently developed an internal quality assurance system and it is effective. The data acquired within the system and procedures is sufficient and allows for systemic analysis of the study programmes and involved stakeholder satisfaction. The process of study programme renewal and new programme development is performed according to various procedures and stakeholder feedback. LBTU has established policies and procedures to ensure a high quality of education according to the ESG standards.

Strengths
1. Internal quality assurance system provides strong cooperation with governmental and non-governmental organisations, employers, academic staff and students.
2. The development of new study programmes and study programme renewal is done according to inner procedures involving all potential stakeholder’s interests.
3. User-friendly web page allows to easily find the necessary information. Web page is updated with regular news in Latvian and in English.
4. LBTU has defined strategic KPI’s and the monitoring system. There are clear responsibilities and roles for conducting various feedback mechanisms and analysing them.
5. The quality assurance system and policies are publicly available and cover all areas of University’s activities important for all stakeholders.
6. Feedback mechanisms include formal and informal ways and both are used and taken seriously.

Weaknesses

1. Some information for study programmes differ in the English version of the webpage from the Latvian (e.g. accreditation date of the programme).

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

The LBTU quality policy has an emphasis on Deming cycle principles that are a vital part of LBTU internal quality assurance system.

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

SAR chapter 1.2. describes the policy and procedures for quality assurance. It is publicly available. LBTU also have certificate of investor in excellence, which also indicates that quality assurance system has been developed and is implemented 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

The procedures are developed and publicly available athttps://www.lbtu.lv/sites/default/files/2019-03/Studiju_programmu_izstradasanas_noteikumi_2019.pdf (viewed 21.06.2023.) Annual reports are presented at LBTU Senate and published on LBTU webpage.

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

All of the criteria and procedures are developed and publicly available at https://www.llu.lv/sites/default/files/2021-05/Studiju_nolikums_2021.pdf (viewed 21.06.2023.)

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

All of the information about procedures and mechanisms is developed and publicly accessible at https://www.lbtu.lv/sites/default/files/2021-04/Nolikums%2014.04.2021.pdf (viewed 21.06.2023.)

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

LBTU has successfully implemented centralised mechanisms for acquiring data and collects information via various surveys and discussions.

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 principles of the Deming cycle are a vital part of quality assurance system principles.

1.3. Resources and Provision of the Study Field

Analysis

1.3.1. HEI is a state-owned university, where the amount of state-funded study places is determined in a tripartite agreement between the Ministry of Education and Science, Ministry of Agriculture and Latvia University of Life Sciences and Technologies (LBTU). Agreement defines the base cost for one study place for each study programme and the total allocated budget. The complete revenue/expenditure of LBTU consists of:
· State budget transfer for ensuring the study process (~45% of total revenue).
· Revenue from the LBTU fee (~10%).
· Science revenue/expenditure (~44%).
· ERASMUS revenues/expenditures (~2%).
· Donations received (0,06%).
Redistribution of the main budget of LBTU between the faculties is done in accordance with the law On the State Budget taken by the Saeima and the LBTU Rector's order On LBTU General Budget Planning. The process of budget distribution is defined and established. Control and audit of the general budget is performed by an independent auditor.
Total number of students in the study field (considering all 4 study programmes) has significantly increased in the last 10 years. An increase is more than 50% and comes from 246 students in 2013./2014. study year and reaching 371 students in the year 2022./2023 (this doesn’t include PhD students in the year 2022.2023.).
Science revenue builds a significant part of the total revenue of the LBTU. This comes from the attracted funding in science projects. Science funding is allocated to the faculties and study fields and includes base and performance-based parts. Science funding is used by faculties to support research work of PhD students, publications and participation at scientific conferences of researchers, procurement of required infrastructure, remuneration of researchers and other scientific research related activities. To support and strengthen research activities, LBTU has budgeted and implemented a performance system for teaching and research staff. The system provides additional remuneration for research work evaluated by the number of publications in scientific journals and other research activities.

1.3.2. In recent years, LBTU has executed multiple projects to improve general facilities in the main building as well as targeted ones to renew and enhance 12 laboratories available for ITF students. Laboratories are equipped with ~200 computers and necessary devices (printers, 3D printers, screens, projectors, and others). Additionally, LBTU has procured specific equipment to support the research work. For example, thermal camera, servers, high-performance computers, virtual reality and eye tracking equipment, and others.
HEI has established and expanded both physical resources (laboratories, special devices, library, auditoriums) and virtual ones (access to electronic libraries, virtual computing resources, internal

information systems and others). LBTU has established a cooperation agreement with Microsoft on “Azure Dev Tools for Teaching” programme and annually it is being extended. The programme provides 100 USD annually for students to use the provided credit for experimentation and practical work in Microsoft Azure cloud services. Additional cooperation agreements are in place with Oracle university, Apple iOS Developer and CISCO academy.
LBTU has established and promotes collaboration between its own faculties. Considering the size of the HEI and variety of faculties (Faculty of Forestry, Faculty of Environment and Civil Engineering, Technical Faculty, Faculty of Economics and Social Development, Language Centre), such collaboration provides extended resources for the ITF study programmes.

1.3.3. LBTU has established the library and enables students with a broad range of literature required in the study process. Collaboration with other Latvian libraries provides the possibility to order locally unavailable books that can be found in other libraries.
Library provides access to 51 databases, including: CAB Abstracts, CRC Press e-books, EBSCO databases, EBSCO eBook Academic Collection, ScienceDirect, Scopus, Scival, Web of Science, Wiley Online. LBTU monitors usage of electronic databases and determines the most relevant ones. HEI reviews on an annual basis database sources available to students and enhances them with the necessary ones. There is a special “Book request form” available to teachers to order missing books. 52 new books have been procured during the last 2 years from the Science base financing.
Library ensures students with necessary services including consultations on electronic and printed materials, interlibrary and national interlibrary subscription services, copying, scanning, spiral binding, computers with access to specialized software, such as Autodesk EDU Master suite CorelDRAW, SPSS Statistics, VISIO and others.

1.3.4. HEI has established a variety of information systems to support general students’ experience, individual study and internship processes. LBTU has implemented a Moodle system to support the study process and enable students with complete information about the study courses, assigned tasks and examinations, evaluations of them and other related processes.
HEI provides the possibility to use ZOOM and BigBlueButton (BBB) applications to ensure online conferences and lectures, deliver extended experience for students and enrich the study process with modern e-learning solutions. During pandemic years both solutions were used to deliver an unattended study process. BBB is the default application recommended to teaching staff to ensure an online study process.
Few study programmes contain an internship as a mandatory part. LBTU has implemented the internship management system (prakses.itf.llu.lv) to support and streamline the internship process, familiarise students with the process and necessary documentation that must be prepared during the internship.
On top of the above information systems, LBTU has implemented and maintains general information system (https://lais.llu.lv/) that provides possibility for students to manage their data at the university, keep track of the assigned courses and evaluations, see the study plan and the schedule, submit surveys and perform other activities.
LBTU hosts mail server and provides each student with an individual email address. This solution is used to ensure formal communication with students, to send official notifications, etc.

1.3.5. Recruitment and employment of the teaching staff is strictly formulated and defined in Regulations of the Latvian Agricultural University Regarding Academic Positions. To ensure transparency, all open vacancies are published in newspaper Latvijas vestnesis and on LBTU web page (https://www.lbtu.lv/lv/darba_piedavajumi/view_work?, few open vacancies in LBTU can be found there, as of June 18). Once candidates are applied, voting with-in the respective councils takes place and the applied candidate is being elected.

LBTU Senate may decide for the vacant academic positions not to open the vacancy, but target visiting teaching staff. In such cases, a rector decision is needed to hire selected candidates for the period up to two years.
LBTU is focused to retain its best students and involve them in academic and research work. Some of the existing personnel and teaching staff are the specialists, who previously graduated from LBTU. Such practice supports continuation of improvements and modernization processes of the study field.

1.3.6. LBTU has established a professional development program (Innovations in Didactics of a Higher Education Institution) to stimulate continuous development of the teaching staff and ensure compliance with the Law on Higher Education Institutions. Teaching staff get trained and evaluated by pedagogy specialists. Heads of departments inform the teaching staff on the planned sessions of this course and collect and get familiar with the progress and evaluation results upon completion of the course.
HEI proposes international mobility to their teaching staff. During recent years, at least one representative from the teaching staff on an annual basis participated at ERASMUS+ mobility program. In total, 19 have participated in the mobility of teaching staff to give lectures to 8 different countries and 14 have participated in the experience exchange to 10 countries. Based on the SAR and during the visit gathered information, the biggest challenges to increase the number of ERASMUS+ participants are the private reasons and the workload and involvement in day-to-day study programme activities.
Professional development is stimulated through the research activities and is being additionally sponsored by a separate scientific budget. Teaching staff can get additional remuneration upon completing necessary prerequisites related to scientific work. This can be publications in scientific journals, presentations at local and international conferences, completed professional courses or certifications.

LBTU provides opportunities to improve the English skills of the teaching staff by organizing English language trainings by their own Language centre. Within the framework of such training, several representatives of the teaching staff have improved their English skills and proven this by getting formally approved certificates.
Cooperation with industry partners (like TestDevLab, Accenture and others) enables teaching staff to stay updated with industry trends and latest developments, exchange knowledge about latest tools, platforms and approaches in software development. Guest lectures that are organized through such collaboration are beneficial to all parties: teaching staff, industry partners and students.

With-in the European Social Fund “LBTU academic staff improvement” project in 2022, academic staff got an opportunity to attend 7 training courses on: 1) effective work organisation, time management, priorities, work for results, hybrid work; 2) psychological portrait and cooperation skills of the new generation of students; 3) conflict resolution methods; 4) change mindset; 5) professional burnout and stress resilience; 6) public speaking; 7) managerial authority and leadership.

1.3.7. Workload of academic staff and their involvement in delivery of study programmes overall is balanced and corresponds to expertise. There is a good and healthy involvement of the guest lecturers (30-40%) that supports knowledge and experience exchange with industry and other HEIs.
LBTU involved 56 teaching staff to run the study field, where 36 have doctorate degrees and 20 – master’s degrees. 36 are elected to academic positions at LBTU and the rest are the guest lecturers. Majority of the teaching staff in involved in delivery of 1-5 study courses, however few have significantly higher involvement (13 study courses and 9).

Some of the teaching staff are supervisors for doctoral students, where for students research work builds the ultimate major part of their studies. In the provided list of teaching staff and relevant study courses, such involvement is considered and defined under “The course of the research direction”.

1.3.8. LBTU supports students in their different needs, starting from the early beginning in their studies until graduation and post-graduation activities. Day-to-day support is achieved through student mentorship programmes, course curators, seniors of groups.
Financial support is possible through several programmes and additional discounts: state scholarship (140 eur per month for all level students), one-time scholarship, social scholarship “Studētgods” for students from large families (160 eur per month) and 18 scholarship programs by LBTU Development Fund (from 40 eur to 1500 eur).

LBTU has established cooperation with several industry partners to support students with internship options. Despite the risk that students can start permanent employment and lose the focus on studies, LBTU cooperates with employers to provide industry experience for their students.

For foreign and local students, LBTU provides dormitories fully equipped with necessary facilities to support students in their study process. For quicker and smoother integration of foreigners, LBTU organizes “Welcome Week” with plenty of introductory corporate events during the first week of each semester. Coordinators of external relations of LBTU inform and support foreign students in visa process, consult on healthcare questions (who to reach and what is the process) as well as inform about ERASMUS programme opportunities.

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

State-owned HEI has established proven processes to manage revenue and expenses as well as keep control and tracking of the execution. LBTU is running business relevant and demanded study programmes that secures consistent growth of the students and ensures financial sustainability through state-funded budget places. HEI has established a system to fund and support research activities.
LBTU has managed to secure well balanced teaching staff, involve industry partners in study programmes delivery and internship and introduce the system to grow the research activities.
HEI has provided necessary physical and virtual facilities to graduate study field programmes.

Strengths:
1. LBTU is the HEI with history and well established and managed processes to plan and execute financial processes that support development of study programmes.
2. Total number of students in 4 study programmes has grown by 50% in the last 10 years and has reached the ultimate maximum in the year 2022.-2023.
3. Additional remuneration system for teaching and research staff ensures additional motivation and growth for the research work, scientific publications and participation at conferences.
4. Students have annually assigned credits for Microsoft Azure cloud resources.

Weaknesses:
1. Not all study programmes have an increase in students. Considering the significant growth of the total number of students, it is expected that the number of doctoral study programme will also grow, what is not the case.
2. Workload balance for some teaching staff should be reviewed to keep healthy and balanced long-term collaboration with them.

1.4. Scientific Research and Artistic Creation

Analysis

1.4.1. As provided in SAR, excellence in research integrated into the study process in one of the long-term goals of the LBTU. The research strategy of the university has domain specific focus that provides a clear vision and mission for the scientific endeavour. The focus on agriculture and life sciences is highlighted in this strategy. This focus is evident in the research/teaching infrastructure and the educational portfolio. There are examples of concrete research activities following the strategic focus as well as infrastructure development for education and research. The focused infrastructure is commended as well as the industry connections. The industry connections are evident in companies having a presence at the university and providing thesis topics and internships. Company representatives also give talks and lectures.
The industry collaboration and societal outreach are on a good level and the interviewed industry representatives provided favourable statements on the industry relevance of the degree programmes. The industry collaboration is based on a mix of informal and formal collaboration instruments. A long-term and coordinated industry collaboration program with supportive instruments is desirable.

Doctoral study programme “Information Technologies” goals and implementation are aligned with the expectations of the study field educating highly desired experts for academia and industry. Although there has been interest, and all the necessary infrastructure, materials, and equipment are available, no foreign doctoral students were admitted during the reporting period. This statistic could mean that the study programme is not sufficiently marketed to foreign students or the title or study place does not fit for individual demands. During the reporting period, 85% or 11 graduates are employed in the education sector and 62% of them work as academic/scientific staff at LBTU. The other graduates work in the Ministry of Agriculture or private sector (SAR p. 158). The doctoral study programme is significant; however, scaling the programme with larger intake of doctoral candidates would increase the impact.
IT in the context of agriculture provides great opportunities for interdisciplinary approach, which gives LBTU a unique advantage; it is a good reason for programme feasibility. Experts agree, that LBTU has focused on ensuring the targeted and efficient use of resources for high-quality studies and research.

1.4.2. The connection of research (scientific and applied for professional study programme) and education is on a good level and there are further possibilities in developing the PhD education. LBTU monitors usage of electronic databases provided in library (CAB Abstracts, CRC Press e-books, EBSCO databases, EBSCO eBook Academic Collection, ScienceDirect, Scopus, Scival, Web of Science, Wiley Online) and determines the most relevant ones for strengthening of the research activities for students and teaching staff.

LBTU is focused to involve the students in academic and research work. The practice of involving in the education process specialists from the field or previously graduated from LBTU supports continuation of improvements and modernization processes of the study field. The newest trends in research are implemented into the study process, f.e. artificial intelligence or virtual reality projects.

The lab infrastructure was up-to-date and appropriate for teaching the subjects in the educational programmes. One specific development topic pertains to the AI capabilities by having GPU/TPU hardware or access to such modern hardware. The university has connections to state of the art platforms, such as Azure.

During the interviews, the graduates valued soft skills that are integrated in almost all subjects across the programmes starting at the BSc level. The PhD students have presentation forums to present their research results. Soft skills include IT management and analytical thinking. Overall, the focused applied nature of the BSc and MSc programmes as well as emphasis on soft skills are commended providing a good basis for career development.

The overall research activities have an applied nature providing excellent basis for collaborating the industries. The research portfolio would benefit from more foundational research elements and connecting them with the more applied activities. The research project portfolio can be strengthened by further EU Research Projects and encouraging PIs to apply for ERC grants.
The information provided in Annexes "itf_kvantitativie_zinatnes_en.pdf" and "itf_publication_list_lv_en.xlsx" reflects the positive evaluated LBTU activities in international peer-reviewed scientific publications in the Web of Science or Scopus scientific literature databases, indexed journals, in international scientific conferences and projects.

1.4.3. International cooperation has been developed in terms of EU projects and Erasmus agreements. The level of Erasmus mobility has been low; however, there are now efforts to have more visits. Lecturers tell about Erasmus opportunities on their courses. The Erasmus coordinator follows the progress of visits and provides very good support.
Overall, the international collaborations are on an adequate level, but can be strengthened through participation in new networks, projects and encouraging student and researcher mobility by developing mobility instruments.

The number of international students has increased as well as the course offering in English. However, we observe that no foreign doctoral students were admitted during the reporting period raising some concerns regarding the attractiveness and marketing of the doctoral programme in the international setting.
The programmes are expected to benefit from further marketing efforts and raising the visibility of the university. We recommend to continue developing the international collaboration for research and for both incoming and outgoing student and staff mobility.

1.4.4. The teachers have opportunities to be active in research and the scientific profile of the teachers is in-line with the expectations for the BSc, MSc and PhD level programmes. Students are connected with the research activities pertaining to the field of study through lectures, exercises, assignments and thesis topics. The teachers can accommodate research activities in their work plan and the process appears to have possibilities to balance the workload. The research infrastructure supports the teaching and research activities in the study field topics. There are financial support possibilities for research from the university, faculty, research funding agencies and companies.

Overall, continuous emphasis should be placed on high quality top-tier publications. Professional development is stimulated through the research activities and is being additionally sponsored by a separate scientific budget. Teaching staff can get additional remuneration upon completing necessary prerequisites related to scientific work.

1.4.5. The students are encouraged to participate in research activities and to apply research results at a student's conference. The practice of involving in the education process specialists from the field or previously graduated from LBTU supports continuation of improvements and modernization processes of the study field.
Mentoring of the PhD students is working well. There is focus on innovation activities and the university has established an incubator for student driven innovations. We recommend to continue

to develop innovation related instruments. The industry collaboration is on a very good level with frequent interactions on multiple levels with concrete activities, such as guest lectures, theses topics and guidance, internship possibilities, and projects.

1.4.6. The study process is supported by innovative technical and managerial solutions related to the studies and research, for example the students conference, the integration of soft skills in the programmes, and how industry experts contribute to the educational content. Overall, IT in the context of agriculture provides great opportunities for interdisciplinary approach, which gives LBTU a unique advantage.

LBTU provides the access to specialized software, such as Autodesk EDU Master suite CorelDRAW, SPSS Statistics, VISIO and others, provides the possibility to use ZOOM and BigBlueButton (BBB) applications to ensure online conferences and lectures, delivers extended experience for students and enrich the study process with modern e-learning solutions. LBTU has implemented the internship management system (prakses.itf.llu.lv) to support and streamline the internship process.

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

LBTU places a strong emphasis on integrating research into its educational programmes, with a particular focus on agriculture and life sciences. The university has a well-defined research strategy and benefits from its connections with industry, providing students with opportunities for internships, thesis topics, and guest lectures from industry professionals. Infrastructure for both research and teaching is noted to be on a good level, supporting interdisciplinary approaches particularly in the area of Information Technology (IT) applied to agriculture. Despite the overall positive indicators, there is a noted absence of foreign doctoral students, possibly due to insufficient marketing efforts or specific programme attributes.

In terms of industry collaboration and societal outreach, LBTU fares well. A majority of the doctoral graduates find employment within the education sector, and many work as academic or scientific staff at LBTU itself. However, the analysis suggests that there is room for growth and greater impact through the expansion of the doctoral programme. The university also has state-of-the-art lab infrastructure suitable for research and education. Both undergraduate and graduate programmes are commendable for their applied focus and inclusion of soft skills, contributing positively to career development.
Internationally, the university has developed some collaborations, particularly through EU projects and Erasmus agreements. Nevertheless, there is room for improvement in increasing student and staff mobility and in enhancing the university’s international visibility. No foreign doctoral students were admitted during the reporting period, indicating the need for better marketing and possibly some programme adjustments to attract a more diverse student body. There is a recommendation to continue developing international collaborations for both research and student/staff mobility.

LBTU encourages active research participation among both students and faculty. The educational process is designed to be in sync with the latest trends in the field and includes the participation of specialists and alumni for continuous improvement. Facilities and technical solutions, such as specialized software and an internship management system, are provided to enrich the educational experience. While there are financial support options for research, it is suggested that emphasis be placed on high-quality, top-tier publications for sustained growth and reputation. Overall, the university shows strong potential for both educational and research excellence, particularly through its interdisciplinary approach in applying IT to agriculture.

Strengths
1. Focused Research Strategy: LBTU has a clear and focused research strategy, especially in agriculture and life sciences.
2. Industry Collaboration: Strong ties with industry representatives who offer internships, thesis topics, and guest lectures, which enhances the real-world applicability of the courses.
3. Soft Skills Integration: Programmes at LBTU commendably integrate soft skills such as IT management and analytical thinking, enriching the educational experience and better preparing students for their careers.
4. Interdisciplinary Approach: Particularly in the area of IT applied to agriculture, the university's interdisciplinary approach gives it a unique advantage for innovative research and education.
5. There's an active effort to involve students in research activities, which is further supported by practices like student conferences and student mentoring.

Weaknesses
1. Limited Foreign Doctoral Student Enrolment: Despite available infrastructure and resources, no foreign doctoral students were admitted during the reporting period.
2. Scaling of Programmes: The doctoral programme, although aligned with expectations, could benefit from scaling to have a greater societal and academic impact.
3. Formalizing Industry Collaboration: While industry collaboration exists, there's room for establishing a more structured, long-term collaboration program with supportive instruments.
4. Balance of Research Portfolio: While applied research is strong, there's a noted need for including more foundational research elements.
5. Global Visibility: There's a need for more effective marketing strategies to increase the visibility and attractiveness of the university and its programmes internationally.
6. Student and Staff Mobility: Current international mobility levels, particularly through Erasmus, are low and could be enhanced.
7. Publication Quality: Despite research activities, an emphasis on high-quality, top-tier publications is recommended for enhanced reputation and impact.

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

The required criteria are met with certain development points. The research strategy of the university has domain specific focus that provides a clear vision and mission for the scientific endeavour. Scientific and applied research supported by efficient resources and administrative planning policy.

1.5. Cooperation and Internationalisation

Analysis

1.5.1. The higher education institution/college has cooperation with other Latvian universities like University of Latvia, Riga Technical University and other Latvian universities that implement ICT study programmes. Cooperation is established for all levels of study programmes: bachelor’s, master’s and PhD. According to List of cooperation agreements (document: itf_sadarbibas_ligumi_en - https://www.llu.lv/sites/default/files/2018-10/LLU%20ligumi%20_Erasmus%2B%20partneraugstskolas_HEIs%2027.03.18.xls) the institutions with which the contract is signed:

- There are 5 institutions with collaboration type about preparing students for IT studies (gymnasiums or technical schools).
- There are 2 domestic institutions with collaboration type about cooperation in student education (Aleksandras Stulģinskas University and Šaulai University).
- There is an institution with collaboration type about the preparation of Jelgava city students for studies in the field of ICT (Jelgava Education Board).
- There is an institution with collaboration type for support in the implementation of studies and provision of internships (Accenture Latvia).
- One institution has collaboration type about the implementation of the Oracle University program (Oracle).
- There is an institution with collaboration type about cluster membership (Association Latvian Information Technology Cluster).
Several contracts were signed prior to the reporting period, for example membership in the LIKTA association, membership in Informatics Europe, participation in CISCO program and cooperation with Microsoft.

During the onsite visit participants from all studying groups (bachelor's, master's and PhD) stated that the cooperation with all types of institutions is adequate. Cooperation is achieved in the form of internships, mentoring final papers, and providing research prerequisites for PhD studying. Employers stated that they participate in the process of changing studying processes (courses).

1.5.2. Cooperation is also realised through publishing common international scientific journal. The faculty is a member of the Latvian ICT Association (LIKTA) together with several Latvian ICT educational institutions and the largest entrepreneurs and organisations. Membership in this association helps identify the development of ICT education and providing business contacts. Cooperation with scientific institutes has recently been realised through several theses of master's level and participating in several scientific projects.

There are several cooperation agreements signed within ERASMUS+ program with high education institutions in foreign countries like Malta, Hungary, Spain, Italy, Sweden, Croatia (mentioned during onsite visit).
The ITF is a member of the international association Informatics Europe which brings together the implementers of the European ICT study programmes, as well as groups of scientists.

1.5.3. LBTU developed the Internationalisation Plan in 2022. Some results of that plan are already visible in the form of student and teaching staff exchange (ERASMUS+). Further internationalisation should be performed to establish more contacts with institutions abroad. LBTU has established an English study programme to attract foreign students and lecturers. All relevant information can be found on LBTU's website.

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

The higher education institution/college has cooperation with other Latvian universities like University of Latvia, Riga Technical University and other Latvian universities that implement ICT study programmes.

Strengths
1. Excellent cooperation with all types of institutions in Latvia.
2. Development of the Internationalisation Plan in 2022 can significantly improve international cooperation.

Weaknesses
1. Further improvements in both outbound and inbound mobility should be recommended to increase the number of participants.

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: Fully compliant

The higher education institution/college has cooperation with other Latvian universities like University of Latvia, Riga Technical University and other Latvian universities that implement ICT study programmes.
The institution has agreements about cooperation in student education with universities in Lithuania - Aleksandras Stulģinskas University and Šaulai University and agreements signed within ERASMUS+ program with high education institutions in foreign countries like Malta, Hungary, Spain, Italy, Sweden, Croatia.
The cooperation ensures the achievement of the aims of this study field.

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

Analysis

1.6.1. According to SAR 2.6.1 the Previous Assessment of the study field and its four programmes was carried out by the Evaluation Commission in the composition of 13 people including the representatives of Latvian Students Union and Latvian Employers Confederation. The joint conclusion of the expert commission was: all the study programmes of the direction (study field) of LBTU (LLU) Faculty of Information Technology “Information technology, computer engineering, electronics, telecommunications, computer management and computer science” are recognised as sustainable (by citing “Programmes considered to be sustainable”).

The evaluation commission’s expert report contained general recommendations for the further improvement of study programmes: (1) to provide doctoral students with better and focused specialised access to international databases of scientific literature, (2) to actively publish scientific articles in internationally peer-reviewed journals, (3) to plan and implement a regular academic staff development policy.

The implementation of the recommendations is described in SAR 2.6.1 -
Recommendation 1: 23 databases were available to doctoral students in the previous reporting period, and 51 database in this reporting period;
Recommendation 2: In the previous reporting period, the teaching staff and researchers of the faculty had published 49 of the most important articles in scientific journals, but in this reporting period the number of the most important articles (Scopus, Web of Science) is approaching 200. The total number of publications exceeds 500;
Recommendation 3: in the previous reporting period, 28 teaching staff improved their skills in various events, but during this period, measures to improve the qualifications of teaching staff have become so versatile and their number is so large that obtaining a total number would require extensive accounting work. Full details of each faculty member are described in their CV.

The expert panel concludes that the recommendations from previous accreditation have been fully implemented. The long-term recommendation to define formally the plan of staff professional development.

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

The LBTU, as manager of the study field "Information Technology, Computer Hardware, Electronics, Telecommunications, Computer Management, and Computer Science", has proven that it considers quality assurance seriously, by transparent analysis of the recommendations received on previous accreditation.

Strengths:
1. The LBTU has seriously considered the past recommendations and has taken concrete actions toward implementing them.
2. Publishing of scientific articles in internationally peer-reviewed journals has substantially increased.

Weaknesses:
1. There is no formally defined plan of staff professional development.

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: Fully compliant

The LBTU, as manager of the study field "Information Technology, Computer Hardware, Electronics, Telecommunications, Computer Management, and Computer Science", has proven that it considers seriously quality assurance, by transparent analysis of the recommendations received on previous accreditation. Previous recommendations have been implemented, the plan of staff professional development recommended to define formally.

1.7. Recommendations for the Study Field

Short-term recommendations

Review the graduates involvement into the study process for better connection; while some do participate in thesis defending committees, there could potentially be more uses with graduates.
Additional information and popularisation of BIP or other short term mobilities is advised to further increase activity and attractiveness to those students, who are employed and are afraid to leave for longer periods of time.
Encourage more active the practical (traineeship) mobilities.
The Master level programme would benefit from further marketing for prospective students.
Research oriented BSc and MSc students would benefit from a specific mentoring program targeting the PhD degree.
More emphasis on top-tier ACM and IEEE publication venues would support the scientific quality of the PhD programme

Workload of teaching staff has to be reviewed to ensure more balanced schedule without overloading.
In webpages with information for study programmes in English and Latvian factual errors should be eliminated.

Long-term recommendations

A long-term and coordinated industry collaboration program with supportive instruments is desirable.
LBTU needs to focus on the increase of the students in master's and doctoral study programmes.
LBTU needs to attract new qualified teaching staff.
Further improvements in both outbound and inbound mobility should be made.

II - "Information Technologies for Sustainable Development" ASSESSMENT

II - "Information Technologies for Sustainable Development" ASSESSMENT

2.1. Indicators Describing the Study Programme

Analysis

2.1.1. Professional bachelor study programme "Information Technologies for Sustainable Development" (code 42484 according to the Classification of the Latvian Education system) is in compliance with the study field "Information Technology, Computer Engineering, Electronics, Telecommunications, Computer Management and Computer Science". The goals of the study programme correspond to the goal of the study field. This programme is designed to prepare educated specialists in information technology development.

2.1.2. The code and degree to be obtained, as well as the professional qualification are interrelated and aligned with each other, as well as study programme aims and objectives and learning outcomes are defined based on the feedback given from various stakeholders and normative regulations. The aim of the study programme is to provide students with knowledge, skills and competences in order to become high-level software engineers with the ability to implement interdisciplinary software solutions, as well as a deeper understanding of all stages of development in the implementation of full-cycle software methodologies. It must be noted that at the time of evaluation, study programme must comply with the old professional standard approved in 2009, however it is finished content-wise and study programme management have managed to align the necessary goals and learning outcomes with the renewed standard. Students obtain the qualification "Programming Engineer", and this study programme is implemented according to the professional standard "Programming Engineer" https://registri.visc.gov.lv/profizglitiba/dokumenti/standarti/ps0227.pdf) (In Latvian).

2.1.3. The duration amount of the study programme is determined by Cabinet Regulation No. 305 and it is at least 240 ECTS points (https://likumi.lv/ta/id/342818-noteikumi-par-valsts-profesionalas-augstakas-izglitibas-standartu) (In Latvian). This programme duration is 4 years. The study programme has been implemented only in full time and starting from 2016 full time English language variation was approved. The duration,

scope of the programme implementation and language is reasonable and justified.
During the evaluation period only three changes were made in the study programme. First, the director of the study programme was changed in 2014./2015. Second, on 12 February 2014, the LBTU Senate considered the proposal to change the study programme name (previously it was named “Programming”) to “Information technologies for sustainable development”. The main reason for name change was that it no longer characterised the content and the essence of the programme. Additionally, it was decided to further emphasise the application of software in various disciplines. Third, in 2016 the study programme added implementation in English language. First students graduated in 2020, as expected on time and since 2020 foreign students graduate every year.

2.1.4. The ICT industry in Latvia is growing rapidly and many companies operate in an international environment. In general, ICT produces 6% of Latvia's gross domestic product and ranks among the top 3 Latvian export industries (https://likta.lv/nozare-skaitlos), and for several years in a row, companies in the ICT industry have emphasised the lack of qualified labour. In recent years, software developer has been the most demanded profession in Latvia. The Ministry of Economics report of 2022 on the labour demand prediction in Latvia's by 2040 (https://www.em.gov.lv/lv/media/15413/download?attachment) (In Latvian) predicts that by 2040 there will be a shortage of ICT and engineering specialists (by 2040 in Latvia there will be shortage of 6400 ICT industry specialists), therefore economical and social reasons are well justified for implementing this study programme (SAR p.81).

Regarding dynamics of the number of the students of the study programme. Throughout the evaluation period the matriculated student amount has increased from 26 (in 2012./2013.) to 65 (in 2022./2023). Unfortunately the amount of graduated students on average (15) does not change. In total, in the fall semester of 2022, 143 students are studying in the Latvian stream, while 26 students are studying in the foreign stream. In 2018, due to various delays in issuing visas, LBTU made a decision to admit foreign students twice in a year (September and February). In January 2022 the first foreign students graduated in the winter period. While initial foreign student amount is fairly low, LBTU has planned various activities such as cooperation with Tashkent State University of Economics to increase the amount of foreign students in the study programme.
2.1.5. Not relevant

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

Study programme aims, objectives and learning outcomes are clearly defined, they are achievable, they reflect on the degree and qualification awarded which students obtain. This study programme complements the overall goal of the study field.

Strengths
1. Any secondary school graduate can apply to this programme and it can be attractive to new students.
2. The growing need for specialists in the IT field provide unique opportunities for LBTU to provide highly skilled specialists with some connection to topics in agriculture.

Weaknesses
1. The study programme`s qualification, due to the not depending from LBTU reasons, must comply with the old professional standard and project of new standard during the evaluation.

2.2. The Content of Studies and Implementation Thereof

Analysis

2.2.1. The professional BSc programme is topical and well-aligned with the focus areas of the university. The programme structure is well-defined and learning goals have been defined for the courses and components. The programme development and implementation is connected with companies and company feedback is used in a continuous manner to revise content and develop courses.

In the study plan General study courses (20 CP) the study courses “Business Communication”, “Project Management”, “Economics and the Basics of Entrepreneurship” are included. In accordance with national regulations the courses “Darba un civilā aizsardzība”(2 CP), “Ekoloģija un vides aizsardzība”(2 CP) and “Profesionālā angļu valoda” (4 CP) are included in study plan for studies in Latvian language. In accordance with national regulations the courses “Labour and Civil Protection” (2 CP), “Ecology and Environmental Protection” (2 CP) and “Latvian Language I, II”(4 CP) are included in study plan for studies in English language. The study field theoretical basic courses represented with 36 CP, Field professional specialization courses - with 60 CP, elective courses – 6 CP, professional practice - 26 CP, Bachelor Thesis – 12 CP.

As provided from University the elective study courses in amount of 6 CP are offered to all university students from different disciplines every year by the order of the vice-rector in studies of LBTU and after approving by the methodological committee of the faculty. For example, in 2023 students will also be offered courses related to machine learning implemented by the University of Latvia (SAR).

The study programme structure and content are fully compliant with Latvian Cabinet Regulation Nr.512 “Regulations on the state standard of second-level professional higher education”, valid until June 20, 2023. The actual state regulation of professional higher education Cabinet Regulation Nr.305 “Regulations on the state standard of professional higher education” entered into force on June 21, 2023, during evaluation process was in progress. The compliance with Regulation Nr.305 was not assessed.
Students obtain the qualification “Programming Engineer”, and this study programme is implemented according to the professional standard “Programming Engineer” https://registri.visc.gov.lv/profizglitiba/dokumenti/standarti/ps0227.pdf) (In Latvian). It must be noted that at the time of evaluation, study programme complies with the actual professional standard approved in 2009, however the study programme is finished content-wise and study programme management have managed to align the necessary goals and learning outcomes with the renewed standard. Recommendations double-check, revise and update if necessary the aims and objectives accordingly to the new professional standard after officially accepted. Analysis based on SAR, Annexes and interviews.

The study programme design is aligned with industry expectations and there are frequent interactions with industries as well as collaboration in education in terms of guest lectures, project topics and mentoring, and internship possibilities. The programme follows the established practices in student-centered learning. The interviewed students reported that they have very good opportunities to meet the teachers and discuss matters.

2.2.2. Not relevant.

2.2.3. The study programme implementation methods is in line with the learning goals of the programme. The programme implements student-centered learning and teaching methods including

laboratory assignments. Student feedback is taken into account in developing the programme content and addressing any issues. The study programme is updated yearly with the programme director discussing with the lecturers possible development points. ACM curriculum was mentioned as a benchmark relating to computer science content, which is commendable.

The necessary quality assurance mechanisms have been implemented and there are processes for handling student complaints. Both staff and students appear to be motivated and there appear to be no major issues in graduation times. The students rarely utilize international mobility opportunities and while the situation has improved, we recommend to continue developing international mobility opportunities for the students. Both students and industry members gave favourable statements on the value of the degree.

2.2.4. The professional practice in total 26 CP in included in study programme plan in the 7th (16 CP) and 8th (10 CP) semesters. As provided in SAR, mostly the students find practices themselves, additionally, students could contact the practice supervisor to find a suitable practice from among the faculty's cooperation partners. Between internship providers are mentioned f.e. SIA “TestDevLab”, “Accenture Latvia”, “C.T.Co.” and other companies. Based on the interviews and provided materials, the internship topics and content are aligned with the learning outcome goals.

For increasing of partner`s number LBTU organizes yearly practice seminar, inviting 7–10 companies to introduce the students the potential internship opportunities. The faculty has also developed a support tool (information system) for the implementation of the professional practice programme http://prakses.itf.llu.lv. The tool includes functionality related to finding a practice, filling in practice diaries, related documents as offered by company practices, etc. (SAR).

For foreign students the internship realizing procedure organized equally to the practice programme for students from Latvia due to specific of IT companies in Latvia.

Internships enable students to know industries and acquire real-life skills.
The internship organizing and regulation mechanism was observed to work well with good feedback during the interviews.

2.2.5. Not relevant.

2.2.6. As provided in SAR, Bachelor`s thesis topics are initiated by students themselves, by teaching staff members of the faculty publishing the list of potential topics on the faculty's website, by other faculties and departments of the university, for example landscape architecture direction, veterinary science direction, construction direction, agriculture direction. The companies and enterprises also offer some of the final thesis topics, depending on demand and related to the creation of software for the development of industry.

In Annexes “itia_aizstavetie_darbi_en.pdf” and “itia_aizstavetie_darbi_lv.pdf” provided list with final thesis topics demonstrates that the topics of students' final theses are related to the programming, testing and development of information systems and technologies for sustainable environment, relevant to the evaluated study field and correspond to the study programme tasks and results.

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

The Information Technologies for Sustainable Development BSc programme, as detailed, stands out for its comprehensive and industry-aligned structure. The curriculum not only adheres to national regulations but also engages closely with industry needs and expectations, providing students with valuable professional experience. Courses like "Business Communication," "Project Management," and "Economics and the Basics of Entrepreneurship" offer essential soft skills and business context for technology roles. The inclusion of elective courses, like those related to machine learning, and the focus on student-centered learning, make the programme agile and responsive to changes in technology and industry demands.

Moreover, the professional practice component, comprising a significant portion of the study plan, enables students to gain hands-on experience. The cooperation between the university and prominent IT companies like "TestDevLab," "Accenture Latvia," and "C.T.Co." provides students with diverse and meaningful internship opportunities. With 26 CP dedicated to professional practice, students have ample opportunity to apply classroom learning in real-world scenarios. The faculty's effort to annually host practice seminars to introduce students to potential internship opportunities further enriches the practical aspect of the programme.

Quality assurance appears to be a strong point, with the programme employing a range of mechanisms to ensure academic standards. Students have a voice through regular feedback, while the university's quality assurance process facilitates complaint resolution and course refinement. Benchmarking against established frameworks such as the ACM curriculum indicates a commitment to global best practices. While the programme has gained favourable reviews from both students and industry members, there is a recommendation to enhance international mobility opportunities for students, which would contribute to a more globalized learning experience.

Finally, the programme’s adaptability in offering multi-disciplinary Bachelor's thesis topics, relevant to sustainable environment and industry development, is commendable. The final thesis projects are a testament to the programme's commitment to infusing sustainability into information technologies. With a focus on timely revisions, the curriculum seems poised to adapt to the ever-evolving standards of professional higher education and industry needs, making it a well-rounded, future-ready programme. Overall, the Information Technologies for Sustainable Development BSc programme appears to be a robust educational pathway, balancing theoretical knowledge with professional practice and industry relevance.

Strengths
1. Industry Alignment: The programme has a strong connection with the industry, including feedback mechanisms and partnerships for internships. This ensures that students are learning skills that are immediately applicable in the workplace.
2. Comprehensive Curriculum: The programme offers a wide range of courses, from soft skills like "Business Communication" to specialized courses in information technologies, making it a well-rounded educational offering.
3. Student-Centered Learning: The programme emphasizes a student-focused approach, including interactive teaching methods like laboratory assignments. This aids in better comprehension and application of skills.
4. Quality Assurance: Robust quality assurance mechanisms are in place, including student feedback and complaint resolution processes, which indicates a commitment to continuous improvement.
5. Adaptability: The programme shows a capacity for adaptation and evolution, for example, offering elective courses like machine learning, based on emerging trends and industry requirements.
6. Multi-Disciplinary Approach: The programme allows for Bachelor's thesis topics to be generated from multiple faculties and industry, encouraging a broader, multi-disciplinary understanding and

application of IT skills.

Weaknesses
1. Language Barriers: The programme is offered in both Latvian and English, but the study plans differ slightly. This might present challenges in delivering a uniform educational experience for all students.
2. Limited Elective Options: While there are elective courses, they are limited to just 6 CP, which may not offer students sufficient breadth for exploration outside their major.
3. Self-Initiated Internships: While the industry partnerships are strong, students often have to find internship opportunities themselves, which might be challenging for some.
4. Potential for Update Lags: Although the programme is aligned with a professional standard approved in 2009, it's mentioned that future alignment should be double-checked. This suggests there could be a lag in updating the programme to meet newly established professional standards.

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

Not relevant

2.3. Resources and Provision of the Study Programme

Analysis

2.3.1. LBTU has a significant and sufficient volume of auditoriums (200+ seats), 12 computer classes (7-27 computers in each) including laboratories for specific study courses to equip students with necessary hardware and software. The key asset required for students in study programme “Information Technologies for Sustainable Development” is the computer equipped with compilers, programme development and supporting environments and the internet connection supported. One of LBTU's priorities is to move towards free software solutions. To cover a wider range of software development environments and technologies, HEI has signed collaboration agreements with Microsoft (Azure Dev Tools for Teaching), Oracle (Oracle University), Apple (iOS Developer University) enabling students to leverage commercial tools and capabilities in the educational process. For specific courses, like GIS automation, LBTU has ensured ESRI and MATLAB licences that are available in laboratories or remotely through VPN connection. Through collaboration agreement with Microsoft, students have access to 100 USD credits in the cloud computing platform “Azure Cloud Computing”, which are actively utilized throughout the study process (confirmed during the discussion with students with-in the expert’s visit).
Students do have access to the LBTU library that provides access to physical and electrical materials used in study programme delivery.

LBTU has implemented a Moodle system to provide required information to students. This includes general information about the LBTU, 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 LBTU student has assigned an email address to secure formal and informal collaboration with LBTU and teaching staff.
To maximize availability of delivered lectures (especially during the pandemic period), LBTU has established hybrid delivery of them. By using BigBlueButton (BBB) and Moodle, teaching staff was

able simultaneously deliver lectures physically in the class and virtually to connected students.
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.
Study programme includes an internship part with internship tool developed. LBTU has established a number of strong collaborations with local and country level companies to provide internship options for their students. 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 study programme, but also introduces challenges, when students get full-time work and continue studies in LBTU in parallel.

2.3.2. Not relevant.

2.3.3. LBTU has defined and executed a clear financial budgeting process. Before LBTU Council reviews and approves the annual budget, the specially founded “Working group on resource use and development issues” evaluates the previous year results and prepares a budget plan for the next year.
Financial provisioning and sustainability of the study programme is directly impacted by the number of students in this programme. LBTU has managed to double the number of students in the programme from 78 in academic year 2012.-2013. to 169 in the year 2022.-2023. Meanwhile, dropout of students also has increased reaching 43 in the year 2021.-2022. Based on the feedback collected during the expert's visit, one of the main reasons is the inability of students to combine full-time jobs with the study process. Current number of students (169) is significantly higher than the minimal number (5) needed to keep the study programme financially sustainable.
Additionally, LBTU managed to leverage ERAF funds and complete several projects during recent years 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

Students and teaching staff are fully equipped to achieve learning objectives and graduate the programme. Wider range of software development environments and technologies is available for students and actively utilized throughout the study process. Study programme has doubled the number of students in 10 years and shows strong financial sustainability to ensure current implementation of the study programme and make investment in programme development.

Strengths:
1. Study programme is highly demanded and LBTU managed to reach 169 students in the year 2022-2023.
2. Students have access to 100 USD credits in the cloud computing platform “Azure Cloud Computing”.

Weaknesses:
1. Having only a full-time study programme increases the risk of dropouts, when students start their career journeys.

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 programme. Study programme has strong financial sustainability through an increased number of students.

2.4. Teaching Staff

Analysis

2.4.1. The overall qualifications of teaching staff can be assessed as very good. Professional bachelor study programme complies with the requirements specified in regulatory enactments. There are 38 teaching staff members participating in the implementation of the study programme. Teaching staff consists of 6 professors, 8 associate professors, 7 assistant professors, 4 lecturers and assistants. Significant number of teaching staff (21 of 38) have doctoral degrees. Although some new teaching staff enrolled during the reporting period, LBTU may consider employing additional lecturers and assistants. LBTU shows significant progress in the composition of the teaching staff regarding its effect on the quality of the implementation of the study programme.

2.4.2. Teaching resources are taken into account in the planning and implementation of teaching. The teachers have sufficient time for students and there are effective feedback channels for student feedback. Student feedback is taken into account in the development of the content. There is deep collaboration with industries and frequent interaction with industry representatives takes place to ensure industrial relevance of the content.

During the onsite visit both students of this study programme and representatives of teaching staff stated that teachers have sufficient time for students (time after lectures, office hours, mentoring).

Mechanisms for ensuring that the teaching staff composition do not negatively affect the quality of implementation of the study programme are students' feedback, collaboration and frequent interactions with industry, guest lectures and workshops given by experts from industry. All these mechanisms ensure positive effect on teaching staff composition and diminish any negative effect.

2.4.3. Not relevant.

2.4.4. The teaching staff are active in research and there are opportunities to conduct research. Overall, we recommend even more opportunities for the teachers to conduct research and publish in top-tier forums. There are further possibilities in developing the M.Sc. thesis instrument in connection with research and also connect PhD students with teaching activities. Results of scientific publications and research-related projects made by academic staff might have an effect in changing course/study programme content to keep track of latest progress in technology. It may be observed at all levels of studying.

Activities that teaching staff could be involved, related to this study programme, are - participations in professional projects, or projects applications, regarding application (utilisation) of specific areas of expertise and technologies. Application (utilisation) of specific technologies can reinforce teaching staff competence regarding specific parts related to study programme. Teaching staff members with

scientific title are required to publish original scientific papers to gain higher scientific title. Teaching staff members with scientific title should aim to publish results of their research in journals with higher impact factor, foreign journals especially, to intensify their international recognition and the international recognition of the faculty.

2.4.5. The stduy programme content is examined and discussed annually by the programme director in collaboration with the teaching staff. Members of teaching staff can provide feedback and develop the content to reflect scientific progress and industry developments. Workload planning is part of the annual process.
In this manner fast changes in study programme, corresponding to the fast changes in technologies and industry, can be adopted. This mechanism can also ensure that there are no significant overlap in different study courses and that study course is compliant with study programme.

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

The overall qualifications of teaching staff can be assessed as very good. Professional bachelor study programme teaching staff complies with the requirements specified in regulatory enactments. Teaching resources are taken into account in the planning and implementation of study process. The teaching staff are active in research and there are opportunities to conduct research. Workload planning is part of the annual process.

Strengths
1. Very good teaching staff qualifications.
2. Significant number of teaching staff (21 of 38) have doctoral degrees.
3. Guest lecturers are good practices to transfer specific technical knowledge to students.

Weaknesses
1. Number of lecturers and assistants should be increased.

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

Study programme teaching staff complies with the requirements specified in regulatory enactments. The teaching staff are active in research and there are opportunities to conduct research. Teaching resources are taken into account in the planning and implementation of study process.

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

Annex III-2, SAR p.103 (itia_atbilstiba_valsts_standartam_en.pdf and itia_atbilstiba_valsts_standartam_lv.pdf) confirms that the Professional Bachelor's study

programme “Information Technologies for Sustainable Development” complies with the Cabinet of Ministers Regulations No. 512 “Regulations on the National Standard of Second Level Professional Higher Education” of August 26, 2014.

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

Annex III-2, SAR p.103 (itia_atbilstiba_profesijas_standartam_en.pdf) demonstrate compliance with the current professional standard "Programming Engineer" (approved on 17 June 2009). Additionally emphasizes that standard is obsolete and in 2022, working in the LIKTA (Latvian ICT Association) Education Group, a new wording of the standard is being considered, but it has not yet been approved.
The fulfilment by the study programme of requirements for the professional qualification according to the wording draft of the professional standard have been analysed by LBTU and SAR p.103 demonstrates the ability of the study programme to provide the necessary skills.

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

Attached study course descriptions (Annex III-2, SAR p.103 itia_kursu_programmas_en.zip and itia_kursu_programmas_lv.zip) are prepared in Latvian and English languages (programme is implemented in Latvian and English) and comply with the requirements set forth in Section 561, Paragraph two and Section 562, Paragraph two of the Law on Higher Education Institutions.

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 provided Diploma samples (SAR p.103, itia_diploms_pielikums_en.zip and itia_diploms_pielikums_lv.zip) comply with the criteria set in the Cabinet of Ministers regulation No.202 “Kārtība, kādā izsniedz valsts atzītus augstāko izglītību apliecinošus dokumentus” (https://likumi.lv/doc.php?id=256157/).

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

SAR p.72 contains link to Annex I-2 LBTU_apliecinajums_studiju_virzienam_Informacijas_tehnologijas.edoc, (signed at 15.11.2022) where the Study Vice-rector affirms that the knowledge of the official/national language of the academic staff involved in the implementation of study programme complies with the Regulations on the extent of knowledge of the national language and the procedure for testing the knowledge of the national language for performing professional and official duties.

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

SAR p.72 contains link to Annex I-2 LBTU_apliecinajums_studiju_virzienam_Informacijas_tehnologijas.edoc, (signed at 15.11.2022) where the Study Vice-rector affirms that The teaching staff members to be involved in the implementation of the study programme have at least B2-level knowledge of English language.

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 attached Templates of Study agreements Annex I-2, SAR p.72 (2_dala_05_Study_Agreement_2021_LV_ENG.pdf and 2_dala_05_Studiju_ligums_2021_LV.pdf) comply with the requirements set in the Cabinet of Ministers regulation No.70 “Studiju līgumā obligāti ietveramie noteikumi”.

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

SAR p.72 contains link to Annex I-2 LBTU_apliecinajums_studiju_virzienam_Informacijas_tehnologijas.edoc, (signed at 15.11.2022) where the Study Vice-rector affirms that at January 18, 2022 an Agreement with Riga Technical University is signed on students takeover in case of cancel of study programmes (not accredited or license is revoked).

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

SAR p.72 contains link to Annex I-2 LBTU_apliecinajums_studiju_virzienam_Informacijas_tehnologijas.edoc, (signed at 15.11.2022) where the Study Vice-rector affirms that students are guaranteed compensation of paid tuition fee in case of cancel of study programmes (not accredited or license is revoked) and the student does not wish to continue studies in another study programme.

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

Professional Bachelor's study programme "Information Technologies for Sustainable Development" (42484) complies with the requirements set forth in the Law on Higher Education Institutions, with the Cabinet of Ministers Regulations No. 512 "Regulations on the National Standard of Second Level Professional Higher Education" of August 26, 2014, and other regulatory enactments.

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

Professional bachelor study programme aims and objectives and learning outcomes are defined based on the feedback given from various stakeholders and normative regulations. The goals of the study programme correspond to the goal of the study field. The programme topics, structure, organization and implementation are relevant to the goals. The auditoriums and computer classes are sufficient for delivering study process. Students have access to wide range of advanced software, including e-study platform. Large number of teaching staff have doctoral degrees. No significant deficiencies have been identified.

Strengths
1. IT in the context of agriculture provides great opportunities for interdisciplinary approach, which gives LBTU a unique advantage; it is a good reason for programme feasibility.
2. The industry collaboration and societal outreach are on a good level and the interviewed industry representatives provided favourable statements on the industry relevance of the degree programmes.
3. The qualification of the teaching staff is appropriate for professional level study programme implementation and to achieve the aims and ensure the learning outcomes of the study programme in both Latvian and English languages.
4. The e-studies system is used actively both by academic staff and students and provides students with sufficient necessary materials.

Weaknesses
1. The programme has a small number of graduates compared to admissions.
2. Number of students engaged in mobility activities is small.

Evaluation of the study programme "Information Technologies for Sustainable Development"

Evaluation of the study programme:

Excellent

2.6. Recommendations for the Study Programme "Information Technologies for Sustainable Development"

Short-term recommendations

Additional information and popularisation of BIP or other short term mobilities is advised to further increase activity and attractiveness to those students, who are employed and are afraid to leave for longer periods of time.
There should be more encouragement for practical (traineeship) mobilities.
Number of lecturers and assistants should be increased.

Long-term recommendations

A long-term and coordinated industry collaboration program with supportive instruments is desirable.
LBTU needs to review options to deliver a study programme, when students start their full time career journeys (i.e. part-time programme or others).
LBTU needs to ensure necessary actions to adjust the study programme to comply with the new professional standard after its officially approved.
LBTU needs to analyse and discuss the reasoning for dropout rates of this study programme and to propose necessary steps to mitigate this issue.

II - "Computer Control and Computer Science" ASSESSMENT

II - "Computer Control and Computer Science" ASSESSMENT

2.1. Indicators Describing the Study Programme

Analysis

2.1.1. Academic bachelor study programme “Computer Control and Computer Science” (code 43483 according to the Classification of the Latvian Education system) is in compliance with the study field “Information Technology, Computer Engineering, Electronics, Telecommunications, Computer Management and Computer Science”. The goals of the study programme correspond to the goal of the study field.

2.1.2. The study programme code used during the reporting period were based on the assumption that the study field belongs to the thematic group of engineering sciences with an orientation to

interdisciplinary applications. Analysing the education classification codes presented in the Rules of the Ministry of Education "Regulations on the Classification of Latvian Education" (No. 322 2017.06.13) it was recognized that in the thematic group "Engineering, manufacturing and construction" none of the transferred programme groups is related to information technology, therefore the only possible programme code "Other engineering", which together make up the code - 43526. Accordingly, the degree to be awarded was "Bachelor's Degree of Academic Engineering Science in Computer Control and Computer Science".

2.1.3. Evaluating the existing study programme code at the present moment, it was found useful to clarify this classification so that the selected educational thematic groups reflect more the content of the study direction programmes. From now on, the bachelor's programme will use the classification code 43483, which corresponds to the thematic group "Natural sciences, mathematics and information technologies -> Computing -> Computer systems, databases and computer networks". (SAR p.131)
The code and degree to be obtained are interrelated and aligned with each other, as well as study programme aims and objectives and learning outcomes are defined based on the feedback given from various stakeholders and normative regulations. This programme is designed to prepare educated specialists in information technology development. The purpose of the study programme is to prepare highly qualified specialists in the field of IT, providing versatile academic knowledge in the field of computer control and computer science, understanding of the development of scientific research work, as well as the basic skills of professional and research work in information technologies, which will allow them to successfully enter the labour market, as well as continue their studies in a master's programme. The duration of the study programme is 4 years for full time studies with 240 ECTS points. The study programme has been implemented only in full time and starting from 2016 full time English language variation was approved. While 4 years is unusual for an academic bachelor programme, LBTU and other stakeholders justified the length by saying that they provide a unique skill set with the practice included in the programme. Additionally this is the first stage programme in the full academic cycle implemented by the faculty, however it does not fully successfully comply with principles in the Bologna process according to which the university should make a model of 3+2 or 4+1 years for academic bachelor and master study programmes, however this treat is justified by providing students with extra practice to prepare them better for the needs of the industry. The duration, scope of the programme implementation and language is reasonable and justified.
During the evaluation period only two parameters were changed in the study programme. First, the director of the study programme was changed in 2014./2015. Second, in 2016 the study programme added implementation in English language. The changes are logical and justified, however this programme is not as successful with foreign students as professional bachelor programme.

2.1.4. The ICT industry in Latvia is growing rapidly and many companies operate in an international environment. In general, ICT produces 6% of Latvia's gross domestic product and ranks among the top 3 Latvian export industries (https://likta.lv/nozare-skaitlos), and for several years in a row, companies in the ICT industry have emphasised the lack of qualified labour. The shortage of computer control and ICT specialists in the Latvian market is very large. This is evidenced by the fact that more than 80% of final-year undergraduate students start working in a specialty by the time they finish their studies and defend their thesis. The Ministry of Economics of Latvia also recognises the lack of ICT specialists. Long-term labour market forecasts prepared by the Ministry envisage wider use of various technologies and innovations on a daily basis, covering the employment needs of industries. The Ministry's report of 2020 on the development of Latvia's national economy predicts that by 2027 there will be a shortage of ICT and engineering specialists (up to ~14 thousand employees in STEM industries) (SAR p.134). The economic and social factors

justify this study programme feasibility. Regarding dynamics of the number of the students of the study programme. Throughout the evaluation period the total number of matriculated students has increased from 126 to 169, due to state-budget place increase in the last years. The proportion of the fee-paying student does not exceed 10% of the total amount. Unfortunately the amount of graduated students on average (21) does not change that much. In recent years there has been a decrease in graduates which can be explained by the fact that most of the students are already working and lose motivation to finish their studies. In total, in the fall semester of 2022, 169 students are studying in the Latvian stream, while 0 students are studying in the foreign stream. Admitted foreign student amount in the last 4 years is non-existent, therefore LBTU need to reconsider their marketing strategy for this study programme.

2.1.5. Not relevant.

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

Study programme aims, objectives and learning outcomes are clearly defined, they are achievable, they reflect on the degree which students obtain. This study programme complements the overall goal of the study field and allows to complete the first academic study cycle, which can be continued in the same study field master study programme.

Strengths
1. Any secondary school graduate can apply to this programme and it can be attractive to new students.
2. The growing need for specialists in the field fits the requirement for social feasibility.
3. Practice included in the study programme is well regarded by all involved stakeholders proving that the length of the study programme is justifiable, because it adds to the necessary skills required for the industry.

Weaknesses
1. Lack of foreign student enrolment can indicate bad marketing strategies.

2.2. The Content of Studies and Implementation Thereof

Analysis

2.2.1. The BSc programme "Computer Control and Computer Science" is topical and provides well organised and focused coverage of topics defined by the university. The programme structure is well defined and learning goals have been well defined.
Study plan contains 160 CP, consists of A, B and C-parts, where A-part is a compulsory part (130 CP), B-part is limited optional part (24 CP) and an optional or elective C-part (6 CP). A and B-parts include the guidelines, principles, structure and methodology of the relevant field of science, the history and current problems of the development of the field, as well as the characteristics, problems and interdisciplinary aspect of the study field.

In accordance with national regulations the courses “Darba un civilā aizsardzība”(2 CP), “Ekoloģija un vides aizsardzība”(2 CP) and “Profesionālā angļu valoda” (4 CP) are included in study plan for studies in Latvian language. In accordance with national regulations the courses “Labour and Civil Protection” (2 CP), “Ecology and Environmental Protection” (2 CP) and “Latvian Language I, II”(4 CP) are included in study plan for studies in English language.

C-part study courses list not mentioned, but, due to the from University provided information, the elective study courses are offered to all university students from different disciplines every year by the order of the vice-rector in studies of LBTU and after being approved by the methodological committee of the faculty.

The content of study programme is focused on wide range of information technologies aspects, programming, testing, as well the study courses for developing of communicative and administrative “soft” skills are offered (the study courses “Business Communication”, “Project Management”).

Frequent interactions and cooperation with industries ensures the study programme is updated and keeps track with recent technologies. Good practice of guest lectures from IT and other companies, as well as mentoring students ensures implementation of new technologies. Collaboration with the industry is a strong point and it should be developed further. Students interviewed during onsite visit stated they have very good opportunities to consult teaching staff, and guest lecturers and mentors from companies.

According to the Study programme annexes: document “DVDZ_kursu matrica_lv_eng.xlsx” one criterion that has significantly lower result is "The student acquires basic skills in scientific and research work" but it is not surprising due to the type of study programme (professional BSc). Other results are good to very good. According to the list of courses, study programme is sufficient topical and covers objectives of the programme. According to several criteria in this document learning outcomes are achieved. Needs of the industry and labour market are also fulfilled which is also confirmed during onsite visit both by students and representatives from industry.

2.2.2. Not relevant.

2.2.3. The study programme implementation is in line with the learning goals of the programme. The programme implements student-centered learning and teaching methods including laboratory assignments. The study programme is updated yearly. All participants discuss potential development possibilities. As good practice is considered student feedback when developing existing programme content. The necessary quality assurance mechanisms have been implemented and there are processes for handling student complaints.
According to the Study programme annexes: document “DVDZ_kursu matrica_lv_eng.xlsx” the study implementation methods significantly contribute to the achievement of the aims and learning outcomes of the study courses and the study programme. During the onsite visit both students and representatives from the industry stated that there are no significant obstacles in achieving given aims.

2.2.4. The supervised and mentored internship or practice, defined as study course “Information Systems [Practice]” 12CP is included in study programme plan in the 6th semesters. According to SAR, the opportunity to undergo a practice, knowledge strengthened during the practice and the acquired practical skills are positively valuated between students, giving the possibility to choose final thesis, study and find their permanent workplace after completing the practice. Internships enable students to know industries and acquire real-life skills.

LBTU helps students to find practice or students find the suitable practice places independently in Latvia or abroad. For example, industry companies as TestDevLab, Posti Messaging, BBIT, AS Latvenergo, ZZ Dats and others offer study internship places.

For foreign students the internship realizing procedure is organized equally to the practice

programme for students from Latvia due to specific of IT companies in Latvia. ICT companies offer internship for foreign students as well. Foreign students also have the opportunity to do a practice in another country.
Additionally, all students can use the opportunities from internship mobilities, offered by the ERASMUS+ programme to implement practices in the other countries.
The internship mechanism was observed to work well with good feedback during the interviews.
It is our opinion that the internship programme can only be beneficial to the students. Students can acquire specific skills that can be an advantage to other students that have not participated in internship programme.

2.2.5. Not relevant.

2.2.6. In the SAR there is stated that there are various options for students for choosing the topic of a Bachelor's theses. Topics could be offered by the relevant department, initiated from student himself for the development of the topic of personal or current work interest, related to the course work (project) or to the tasks performed in professional qualification practice. When choosing topics related to existing scientific projects, the results of the work are used for project implementation.

The study programme “Computer Control and Computer Science” final thesis topics are related to the study field, are reflecting study programme aim, goals and tasks, are interdisciplinary, with an emphasis on technology applications in agriculture, forestry, and other industries. The methodology and rules for elaborating, design and approving of results of bachelor's theses are developed and approved.

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

The programme topics, structure, organization and implementation meet the expectations. The programme structure is well defined. The content of the study programme is topical, and the implementation contributes to achieving the learning objectives of the programme. Frequent interactions and cooperation with industries ensures the study programme is updated and keeps track with the recent technologies. The internship mechanism was observed to work well.

Strengths
1. Cooperation with industry is well organised in the form of guest lectures, mentoring, internship and practices.
2. The value of the degree is acknowledged both by the students and future employers from the industry.
3. Programme is well structured and it is based on learning outcomes.

Weaknesses
1. Students rarely utilise international mobility opportunities.

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

Not revelant

2.3. Resources and Provision of the Study Programme

Analysis

2.3.1. LBTU has a significant and sufficient volume of auditoriums (200+ seats), 12 computer classes (7-27 computers in each) including laboratories for specific study courses to equip students with necessary hardware and software. The key asset required for students in study programme "Computer Control and Computer Science" is the computer equipped with compilers, programme development and supporting environments and the internet connection supported. One of LBTU's priorities is to move towards free software solutions. However, to cover a wider range of software development environments and technologies, HEI has signed collaboration agreements with Microsoft (Azure Dev Tools for Teaching), Oracle (Oracle University), Apple (iOS Developer University), Cisco enabling students to leverage commercial tools and capabilities in the educational process. For specific courses, LBTU has ensured ESRI and MATLAB licenses that are available in laboratories or remotely through VPN connection. Through collaboration agreement with Microsoft, students have access to 100 USD credits in the cloud computing platform "Azure Cloud Computing", which are actively utilized throughout the study process (confirmed during the discussion with students with-in the expert's visit).
Students do have access to the LBTU library that provides access to physical and electrical materials used in study programme delivery.

LBTU has implemented a Moodle system to provide required information to students. This includes general information about the LBTU, 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 LBTU student has assigned an email address to secure formal and informal collaboration with LBTU and teaching staff.
To maximize availability of delivered lectures (especially during the pandemic period), LBTU has established hybrid delivery of them. By using BigBlueButton (BBB) and Moodle, teaching staff was able simultaneously deliver lectures physically in the class and virtually to connected students.

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.
Study programme includes a practice part. LBTU has established strong collaborations with local and country level companies to provide internship options for their students. 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 study programme, but also introduces challenges, when students get full-time work and continue studies in LBTU in parallel.

2.3.2. Not relevant.

2.3.3. LBTU has defined and executed a clear financial budgeting process. Before LBTU Council reviews and approves the annual budget, the specially founded "Working group on resource use and development issues" evaluates the previous year results and prepares a budget plan for the next year.
Financial provisioning and sustainability of the study programme is directly impacted by the number of students in this programme. LBTU has managed to slightly increase the number of students in the programme from 141 in academic year 2012.-2013. to 169 in the year 2022.-2023. Meanwhile, dropout of students also has increased reaching 46 in the year 2021.-2022.
Based on the feedback collected during the expert's visit, one of the main reasons is the inability of

students to combine full-time jobs with the study process.
Additionally, LBTU managed to leverage ERAF funds and complete several projects during recent years 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

Students and teaching staff are fully equipped to achieve learning objectives and graduate the programme. Study programme keeps a stable high number of students during the last 10 years with slight increase and shows strong financial sustainability to ensure current implementation of the study programme and make investment in programme development.

Strengths
1. Study programme is highly demanded and LBTU managed to reach 169 students in the year 2022-2023.
2. Students have access to 100 USD credits in the cloud computing platform “Azure Cloud Computing”.

Weaknesses
1. Having only a full-time study programme increases the risk of dropouts, when students start their career journeys.

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 programme. Study programmehas strong financial sustainability through an increased number of students.

2.4. Teaching Staff

Analysis

2.4.1. The teachers of the programme meet the teacher qualification requirements of the programme. The programme structure and content is based on learning objectives.

Workload of academic staff and their involvement in delivery of study programmes overall is balanced and corresponds to expertise. There is a good and healthy involvement of the guest lecturers that supports knowledge and experience exchange with industry and other HEIs. The study programme complies with the requirements specified in regulatory enactments.

Some of the teaching staff are supervisors for doctoral students, where for students research work builds the ultimate major part of their studies.

2.4.2. Teaching resources are taken into account in the planning and implementation of teaching. The teachers have sufficient time for students and there are effective feedback channels for student feedback. Student feedback is taken into account in the development of the content. There is deep

collaboration with industries and frequent interaction with industry representatives takes place to ensure industrial relevance of the content.

During the onsite visit both students of this study programme and representatives of teaching staff stated that teachers have sufficient time for students (time after lectures, office hours, mentoring). Mechanisms for ensuring that the teaching staff composition do not negatively affect the quality of implementation of the study programme are students' feedback, collaboration and frequent interactions with industry, guest lectures and workshops given by experts from industry. All these mechanisms ensure positive effect on teaching staff composition and diminish any negative effect.

2.4.3. Not relevant.

2.4.4. The teaching staff are active in research and there are opportunities to conduct research. Overall, we recommend even more opportunities for the teachers to conduct research and publish in top-tier forums. There are further possibilities in developing the M.Sc. thesis instrument in connection with research and also connect PhD students with teaching activities.

Activities that teaching staff could be involved, related to this study programme, are - participations in professional projects, or projects applications, regarding application (utilisation) of specific areas of expertise and technologies. Application (utilisation) of specific technologies can reinforce teaching staff competence regarding specific parts related to study programme. Teaching staff members with scientific title are required to publish original scientific papers to gain higher scientific title. Teaching staff members with scientific title should aim to publish results of their research in journals with higher impact factor, foreign journals especially, to intensify their international recognition and the international recognition of the faculty.

2.4.5. The programme content is examined annually by the programme director in collaboration with the teachers. Teachers can provide feedback and develop the content to reflect scientific progress and industry developments. Workload planning is part of the annual process.

Members of teaching staff can provide feedback and develop the content to reflect scientific progress and industry developments. Workload planning is part of the annual process. In this manner fast changes in study programme, corresponding to the fast changes in technologies and industry, can be adopted. This mechanism can also ensure that there are no significant overlap in different study courses and that study course is compliant with study programme.

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

The teaching staff of the programme meets the qualification requirements, ensuring the academic rigor of the programme. The involvement of guest lecturers from the industry and other Higher Education Institutes (HEIs) adds a layer of real-world experience to the curriculum. Moreover, some faculty members also supervise doctoral students, introducing a research-oriented perspective that could be particularly beneficial for undergraduate students. These features point to a robust and balanced academic environment, reinforced by compliance with regulatory standards.

The programme places a strong emphasis on responsiveness to both student needs and industry trends. Teachers are available for one-on-one interactions with students, and mechanisms are in place to collect and act upon student feedback. This feedback loop extends to the industry, with

frequent collaborations and guest lectures that help ensure the curriculum stays relevant to market needs. The system allows for quick adjustments to the study programme, reflecting the rapid pace of technological change and minimizing any overlap in course content.

Despite the programme's many strengths, there's room for improvement in the area of research. While faculty members are active in research, the evaluation suggests further growth opportunities in this direction, specifically encouraging publications in top-tier forums. Strengthening research components could not only bolster the faculty's international recognition but also enrich the educational experience for students. It could also pave the way for more integrated research opportunities in M.Sc. theses and doctoral studies, making the programme even more rounded and forward-looking.

Strengths
1. Qualified Teaching Staff: The programme has a faculty that meets high qualification standards, ensuring that students receive instruction of the highest quality.
2. Industry Collaboration: Frequent interactions with industry representatives and guest lecturers enhance the curriculum's relevance and provide students with practical insights and opportunities.
3. Student-Centered Feedback Mechanisms: The programme has effective channels for student feedback, and this input is actively used to improve course content and teaching methods. This makes the programme adaptive to student needs and industry developments.
4. Annual Review for Responsiveness: The curriculum is reviewed annually by the programme director in collaboration with the teaching staff. This allows for fast adjustments to align the programme with evolving technology and industry requirements.

Weaknesses
1. Limited Research Opportunities: Although the faculty is involved in research, there is room for expansion in this area, specifically in encouraging more publications in top-tier forums.
2. Overlap Risk: Despite the annual review, the fast pace of technological changes poses a risk of overlapping course content, which could dilute the focus and effectiveness of the curriculum.
3. Insufficient Workload Planning: While the programme claims that workload planning is part of the annual review, it's not clear how effective this is in balancing faculty workload with teaching commitments, research activities, and industry collaboration.

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 teachers of the programme meet the teacher qualification requirements of the programme.

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

Annex III-2, SAR p.152 (dvdz_atbilstiba_valsts_standartam_en.pdf) confirms that academic

bachelor study programme "Computer Control and Computer Science" complies with the Cabinet of Ministers Regulation Nr.240 “Noteikumi par valsts akadēmiskās izglītības standartu”.

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

Attached study course descriptions (Annex III-2, SAR p.152 dvdz_kursu_programmas_en.zipand dvdz_kursu_programmas_lv.zip) are prepared in Latvian and English languages (programme is implemented in Latvian and English) and comply with the requirements set forth in Section 561 , Paragraph two and Section 562 , Paragraph two of the Law on Higher Education Institutions.

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 provided Diploma samples (SAR p.152, DVDZ_diploms_pielikums_en.zip and DVDZ_diploms_pielikums_lv.zip) comply with the criteria set in the Cabinet of Ministers regulation No.202 “Kārtība, kādā izsniedz valsts atzītus augstāko izglītību apliecinošus dokumentus” (https://likumi.lv/doc.php?id=256157/).

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

SAR Annex Section 2.1 contains a file LBTU_apliecinajums_studiju_virzienam_Informacijas_tehnologijas_EN.docx, signed at 15.11.2022, where the Study Vice-rector affirms that at least five professors and associate professors elected to academic positions at LBTU participate in the delivery of compulsory and restricted elective courses of the academic bachelor programme “Computer Control and Computer Science” and the master programme “Information Technologies”. Therefore the academic staff of the academic programme complies with the requirements set forth in Section 55, Paragraph one, Clause 3 of 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: 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

SAR p.152 contains link to Annex I-2 LBTU_apliecinajums_studiju_virzienam_Informacijas_tehnologijas.edoc, signed at 15.11.2022, where the Study Vice-rector affirms that the knowledge of the official/national language of the academic staff involved in the implementation of study programme complies with the Regulations on the extent of knowledge of the national language and the procedure for testing the knowledge of the national language for performing professional and official duties.

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

SAR p.152 contains link to Annex I-2 LBTU_apliecinajums_studiju_virzienam_Informacijas_tehnologijas.edoc, signed at 15.11.2022, where the Study Vice-rector affirms that The teaching staff members to be involved in the implementation of the study programme have at least B2-level knowledge of English language.

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 attached Templates of Study agreements Annex I-2, SAR p.72 (2_dala_05_Study_Agreement_2021_LV_ENG.pdf and 2_dala_05_Studiju_ligums_2021_LV.pdf) comply with the requirements set in the Cabinet of Ministers regulation No.70 “Studiju līgumā obligāti ietveramie noteikumi”.

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

SAR p.72 contains link to Annex I-2 LBTU_apliecinajums_studiju_virzienam_Informacijas_tehnologijas.edoc, signed at 15.11.2022, where the Study Vice-rector affirms that at January 18, 2022 an Agreement with Riga Technical University is signed on students takeover in case of cancel of study programmes (not accredited or license is revoked).

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

SAR p.72 contains link to Annex I-2 LBTU_apliecinajums_studiju_virzienam_Informacijas_tehnologijas.edoc, signed at 15.11.2022, where the Study Vice-rector affirms that students are guaranteed compensation of paid tuition fee in case of cancel of study programmes (not accredited or licence is revoked) and the student does not wish to continue studies in another study programme

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

Bachelor's study programme "Computer Control and Computer Science (43483) complies with the requirements set forth in the Law on Higher Education Institutions, with the Cabinet of Ministers Regulation Nr.240 "Noteikumi par valsts akadēmiskās izglītības standartu", and other regulatory enactments.

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

Academic bachelor study programme aims and objectives and learning outcomes are defined based on on the assumption that the study field belongs to the thematic group of engineering sciences with an orientation to interdisciplinary applications. The goals of the study programme correspond to the goal of the study field. The programme topics, structure, organization and implementation are relevant to the goals. The auditoriums and computer classes are sufficient for delivering study process. Students have access to wide range of advanced software, including e-study platform. Large number of teaching staff have doctoral degrees. No significant deficiencies have been identified.

Strengths
1. IT in the context of agriculture provides great opportunities for interdisciplinary approach, which gives LBTU a unique advantage; it is a good reason for programme feasibility.
2. The industry collaboration and societal outreach are on a good level and the interviewed industry representatives provided favourable statements on the industry relevance of the degree programmes.
3. The qualification of the teaching staff is appropriate for academic level study programme implementation and to achieve the aims and ensure the learning outcomes of the study programme in both Latvian and English languages.
4. The e-studies system is used actively both by academic staff and students and provides students with sufficient necessary materials.
5. Student scientific conferences organised by LBTU give good opportunity for scientific

development.

Weaknesses
1. Very small number of foreign students.

Evaluation of the study programme "Computer Control and Computer Science"

Evaluation of the study programme:

Excellent

2.6. Recommendations for the Study Programme "Computer Control and Computer Science"

Short-term recommendations

Additional information and popularisation of BIP or other short term mobilities is advised to further increase activity and attractiveness to those students, who are employed.
Advertise the features of your modern learning environment – robotic platform, virtual reality room – to attract potential students.

Long-term recommendations

LBTU needs to review options to deliver a study programme, when students start their full time career journeys (i.e. part-time programme or others)
LBTU needs to develop a plan to attract foreign students

II - "Information Technologies" ASSESSMENT

II - "Information Technologies" ASSESSMENT

2.1. Indicators Describing the Study Programme

Analysis

2.1.1. Academic master study programme “Information Technologies” (code 45483 according to the Classification of the Latvian Education system) is in compliance with the study field “Information Technology, Computer Engineering, Electronics, Telecommunications, Computer Management and Computer Science”. The goals of the study programme correspond to the goal of the study field.

2.1.2. The study programme code used during the reporting period were based on the assumption that the study field belongs to the thematic group of engineering sciences, however after analysing the education classification codes presented in the Rules of the Ministry of Education "Regulations on the Classification of Latvian Education" (No. 322 2017.06.13) it was recognized that in the thematic group "Engineering, manufacturing and construction" none of the transferred programme groups is related to information technology, therefore the only possible programme code "Other engineering", which together make up the code - 45526. Evaluating the existing study programme code at the present moment, it was found useful to clarify this classification so that the selected educational thematic groups reflect more the content of the study direction programmes. From now on, the masters programme will use the classification code 45483, which corresponds to the thematic group "Natural sciences, mathematics and information technologies -> Computing ->

Computer systems, databases and computer networks". (SAR p.107)

The code and degree to be obtained are interrelated and aligned with each other, as well as study programme aims and objectives and learning outcomes are defined based on the feedback given from various stakeholders and normative regulations. The goal of the programme is to provide in-depth theoretical preparation, software engineering knowledge and practical skills in solving problems in universal issues related to the development, maintenance and use of software systems in order to be ready to perform leading functions in the field of IT in scientific research, software and hardware design and development, as also in the performance of works using these technologies. (SAR p.108). The duration of the study programme is 2 years for full time studies with 120 ECTS points.

The study programme has been previously implemented in full time, part time, intramural and extramural, but due to the lack of demand, it is decided to keep implementing study programme only in full time. and starting from 2016 full time English language variation was approved. This is the second stage programme in the full academic cycle implemented by the faculty, however it does not fully successfully comply with principles in the Bologna process according to which the university should make a model of 3+2 or 4+1 years for academic bachelor and master study programmes, therefore LBTU should evaluate creating a variation of this programme that could be implemented in 1 year and is designed specifically for their bachelor graduates. The duration, scope of the programme implementation and language is reasonable and justified.

2.1.3. During the evaluation period only one parameter was added in the study programme. In 2016 the study programme added implementation in English language. And the first foreign students started from 2017./2018. Academic year. It is decided to change the code and specify classification of the programme and to stop implementing the programme in part time and extramural forms. The changes are logical and justified, however this programme is not as successful with foreign students as professional bachelor programme.

2.1.4. The ICT industry in Latvia is growing rapidly and many companies operate in an international environment. In general, ICT produces 6% of Latvia's gross domestic product and ranks among the top 3 Latvian export industries (https://likta.lv/nozare-skaitlos), and for several years in a row, companies in the ICT industry have emphasised the lack of qualified labour. The shortage of computer control and ICT specialists in the Latvian market is very large. This is evidenced by the fact that more than 80% of final-year undergraduate students start working in a specialty by the time they finish their studies and defend their thesis.

The Ministry of Economics of Latvia also recognises the lack of ICT specialists. Long-term labour market forecasts prepared by the Ministry envisage wider use of various technologies and innovations on a daily basis, covering the employment needs of industries. The Ministry’s report of 2020 on the development of Latvia's national economy predicts that by 2027 there will be a shortage of ICT and engineering specialists (up to ~14 thousand employees in STEM industries) (SAR p.134).

The economic and social factors justify this study programme feasibility. In October 2021, companies were surveyed about the attitude of information technology companies towards a master's degree as desirable education for employees. The question was asked to 30 companies, of which 10 responded. It is known that companies in the ICT industry greatly promote the improvement of the qualifications of their employees, including studies, but the general opinion about a master's degree confirmed the already known "not bad, but not required". Experience

demonstrates that the formal education master's degree of employees is mostly used and provides value when companies prepare international project proposals or participate in price surveys and procurement (SAR p. 111). It was confirmed during the assessment visit, that master degrees were required to the companies that participated in international, state or municipal projects, where the company must assess their resources and employee qualifications, but otherwise they are a nice bonus, but don’t necessarily mean anything.

Regarding dynamics of the number of the students of the study programme. Throughout the evaluation period the total number of matriculated students has been stable (around 30-35). The amount of fee paying students have increased in the last years (from 2 to 5)Unfortunately the amount of graduated students fluctuate between 6 and 17 throughout the years and the dropout rates have increased in the years 2020 and 2021 (18 and 10). In total, in the fall semester of 2022, 28 students are studying in the Latvian stream, while 5 students are studying in the foreign stream. This statistic could be improved by attracting more foreign students. In order to attract LBTU graduates from bachelor programmes, it would be wise to consider implementing a 1 year version of the current study programme, which has unique admission requirements to the corresponding bachelor programmes. This could increase the attractiveness of the programme.

2.1.5. Not relevant.

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

Study programme aims, objectives and learning outcomes are clearly defined, they are achievable, they reflect on the degree which students obtain. This study programme complements the overall goal of the study field and allows to complete the second academic study cycle, which can be continued in the same study field doctoral study programme. The study programme feasibility is justified by the economic and social factors based on demand in the industry.

Strengths
1. Good satisfaction of the programme implementation from involved stakeholders (students and employers).
2. The growing need for specialists in the field fits the requirement for social feasibility.

Weaknesses
1. Lack of foreign student enrolment can indicate low efficiency of marketing strategies.
2. Large dropout rates in the last few years could be a potential sign that the programme does not have an attractive view from the potential student.

2.2. The Content of Studies and Implementation Thereof

Analysis

2.2.1. The master’s study programme provides well organised and focused coverage of topics defined by the university. Study programme plan contains 80 CP, consists of A, B and C-parts, where A-part is a Mandatory part (40 CP), B-part is Optional part (14 CP), C-part is Elective (6 CP) and Master`s thesis as state examination (20 CP). The study plan includes the study of the theoretical knowledge of the field and the approbation of the theoretical knowledge in the context of the current problems of the science branch.

Regarding C-part (Elective) study courses, in study programme plan C-part study courses list is not mentioned, but in accordance with SAR and interviews, master's students can also choose any

course from the current published list of free choice courses for the study year, approved before each academic year. In case if student wants to learn a course from another study programme of an appropriate level, in coordination with the instructors of this course the learning of the course could be organized through the Center for Lifelong Education. In case if the student has chosen to take a course not included in the study plan in the optional part, or if it is not possible for the study group to agree on a sufficient number of students in one study course due to justified reasons, the ITF has developed the procedure for individual studies.

The content of study programme is focused on wide range of information and communication technologies aspects, as well the study courses for developing research thinking and entrepreneurial skills of students (the study courses “Research Methodology”, “Writing Scientific Publications”, “IT project management”) are provided.

In accordance with national regulations, in compliance with the requirements regarding Civil and Environmental protection, in the study plan it is additionally noted that in case the master student has not acquired the mentioned requirements in previous study years, he/she acquires it in addition to the master’s study programme. The study courses “Labor and Civil Protection” (1 CP) and “Ecology and Environmental Protection” (1 CP) are offered. For study programme with English language implementation for foreign students the study course “Latvian Language” (2 CP) in 1st semester is provided.

In general, the programme structure is well defined and learning goals have been well defined. Frequent interactions and cooperation with industries ensures the study programme is updated and keeps track with recent technologies. Good practice of guest lectures from IT and other companies, as well as mentoring students ensures implementation of new technologies. Students interviewed during onsite visit stated they have very good opportunities to consult teaching staff, and guest lecturers and mentors from companies. Collaboration with the industry is a strong point and it should be developed further, in particular to better recognise master’s degree diploma.
According to study programme annex document mgr_rezultatu_kartejums_en.xlsx on learning outcomes study programme is sufficiently topical and covers objectives of the programme. According to several criteria in this document learning outcomes are achieved. Students can apply information technology to new application areas while considering relevant commercial, industrial, social, and environmental constraints.
During the onsite visit both students and representatives from industry stated that they are generally satisfied with the content of the study programme. One significant deficiency, according to students, is that master’s degree diploma is not sufficiently recognised by the industry, i.e., employers.

2.2.2. In accordance with Latvian education classification the study programme belongs to educational thematic group “Life sciences, mathematics and information technologies”, thematic field of education “Computing”, educational programme group “Computer systems, databases and computer networks”. Due to the Cabinet of Ministers “Regulations on Latvian scientific branch groups, scientific branches and sub-branches” (September 20, 2022) the relevant scientific field for awarding of Master`s degree is the branch of Computer Science and Informatics. The field of science includes computer science, informatics and bioinformatics.
In SAR provided information proves that the awarding of a degree is based on the achievements of the relevant field of science, on the knowledge, skills and competence acquired during the studies and is confirmed by the developed Master's thesis, reflecting the scientific research skills. Findings in the final thesis topics included in the programme, following the learning objectives, are related to the information technology industry and correspond to the latest information technology trends.

In general, the obtained Master Degree of Life Sciences in Information Technologies complies with field, but should be redefined according to latest changes in normative regulations related to the educational programme group.

2.2.3. The study programme implementation is in line with the learning goals of the programme. The programme implements student-centered learning and teaching methods including laboratory assignments. The study programme is updated yearly. All participants discuss potential development possibilities. Good practice that is carried out is considering student feedback when developing existing programme content. The necessary quality assurance mechanisms have been implemented and there are processes for handling student complaints. During the interview students and teaching staff expressed very good motivation. Students rarely utilise international mobility opportunities and we recommend further development of international mobility opportunities for students. The value of a master's degree is currently not recognised by the industry as it should be, indicated by the number of students enrolled to Master's programme after graduating with bachelor’s degree.

2.2.4. Not relevant.

2.2.5. Not relevant.

2.2.6. The University in SAR state that the topics of Master`s thesis are related to research, development and application of algorithms and methods for the needs of various industries. For example, 49% are related to agriculture, the development of information systems and production management systems (f. e. Precision agriculture technology application opportunities in field cropping, Analysis of wireless sensor network technologies for monitoring of agricultural processes) and 24% works are directed to the theory-oriented research work in the field (f. e. Development of the prototype of the tarification planning system of teachers, Use of online data for comparing traffic intensity, Automated management system for archival document climate, Possibilities for applying open data in Latvia). Students have the possibility to participate with final thesis in the state level competitions for the best student graduation work in computer science in the group of master's theses and are achieving good results.
Information obtained during onsite visit confirms that the topics of students' final theses are relevant to the Information Technology field and correspond to the study programme tasks, goals and results.

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

The programme topics, structure, organisation and implementation meet the expectations. The value of a master's degree is currently not recognised by the industry as it should be. The awarding of a degree is based on the achievements and findings in the topics included in the programme In general, the obtained Master degree of Life Sciences in Information Technologies complies with field, but should be redefined according to latest changes in normative regulations.

Strengths
1. Cooperation with industry is well organised in the form of guest lectures, mentoring, internship and practices.
2. The value of the degree is acknowledged both by the students and future employers from the industry.
3. Programme is well structured and it is based on learning outcomes.

Weaknesses

1. Master’s degree diploma is not recognised as added value by the industry and employers and all participating parties (university, industry) should better cooperate to resolve this matter.

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

Good cooperation of all parties in developing academic Master's study programmes reflects on incorporating the newest technologies in study programmes. Study programme is refreshed yearly. The awarding of a Master`s degree is based on the achievements of the scientific field Computer Science and Informatics and findings in the topics included in the programme following the learning objectives.

2.3. Resources and Provision of the Study Programme

Analysis

2.3.1. LBTU has a significant and sufficient volume of auditoriums (200+ seats), 12 computer classes (7-27 computers in each) including laboratories for specific study courses to equip students with necessary hardware and software. The key asset required for students in study programme “Information Technologies” is the computer equipped with compilers, programme development and supporting environments and the internet connection supported. One of LBTU's priorities is to move towards free software solutions. However, to cover a wider range of software development environments and technologies, HEI has signed collaboration agreements with Microsoft (Azure Dev Tools for Teaching), Oracle (Oracle University), Apple (iOS Developer University), Cisco enabling students to leverage commercial tools and capabilities in the educational process. For specific courses, LBTU has ensured ESRI and MATLAB licenses that are available in laboratories or remotely through VPN connection. Through collaboration agreement with Microsoft, students have access to 100 USD credits in the cloud computing platform “Azure Cloud Computing”, which are actively utilized throughout the study process (confirmed during the discussion with students with-in the expert’s visit).

Students do have access to the LBTU library that provides access to physical and electrical materials used in study programme delivery.
LBTU has implemented a Moodle system to provide required information to students. This includes general information about the LBTU, 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 LBTU student has assigned an email address to secure formal and informal collaboration with LBTU and teaching staff.
To maximize availability of delivered lectures (especially during the pandemic period), LBTU has established hybrid delivery of them. By using BigBlueButton (BBB) and Moodle, teaching staff was able simultaneously deliver lectures physically in the class and virtually to connected students.
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. Not relevant.

2.3.3. LBTU has defined and executed a clear financial budgeting process. Before LBTU Council reviews and approves the annual budget, the specially founded “Working group on resource use and development issues” evaluates the previous year results and prepares a budget plan for the next year.
Financial provisioning and sustainability of the study programme is directly impacted by the number of students in this programme. LBTU has managed to keep the number of students in the programme in the range from 30 to 40 during last 10 years. Meanwhile, dropout of students slightly increased during last 5 years. Based on the feedback collected during the expert's visit, one of the main reasons is the inability of students to combine full-time jobs with the study process.
Additionally, LBTU managed to leverage ERAF funds and complete several projects during recent years 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

Students and teaching staff are fully equipped to achieve learning objectives and graduate the programme. LBTU managed to keep the same range (30-40) of Master study programme students and keep good financial sustainability to ensure current implementation of the study programme and make investment in programme development. At the same time, the total number of students in both Bachelor programmes has significantly increased, but an increase in Master’s program is not observed.

Strengths
1. Students have access to 100 USD credits in the cloud computing platform “Azure Cloud Computing”.

Weaknesses
1. Having only a full-time study programme increases the risk of dropouts, when students start their career journeys.
2. Number of students in the programme has not increased during the 10 years period even with a significant increase of students in both Bachelor programmes.

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 programme. Study programme has a good financial sustainability keeping a stable number of students.

2.4. Teaching Staff

Analysis

2.4.1. The teachers of the programme meet the teacher qualification requirements of the programme. The programme structure and content is based on learning objectives.

Workload of academic staff and their involvement in delivery of study programmes overall is

balanced and corresponds to expertise. There is a good and healthy involvement of the guest lecturers that supports knowledge and experience exchange with industry and other HEIs. The study programme complies with the requirements specified in regulatory enactments.

Some of the teaching staff are supervisors for doctoral students, where for students research work builds the ultimate major part of their studies.

2.4.2. Teaching resources are taken into account in the planning and implementation of teaching. The teachers have sufficient time for students and there are effective feedback channels for student feedback. Student feedback is taken into account in the development of the content. There is deep collaboration with industries and frequent interaction with industry representatives takes place to ensure industrial relevance of the content.

During the onsite visit both students of this study programme and representatives of teaching staff stated that teachers have sufficient time for students (time after lectures, office hours, mentoring). Mechanisms for ensuring that the teaching staff composition do not negatively affect the quality of implementation of the study programme are students' feedback, collaboration and frequent interactions with industry, guest lectures and workshops given by experts from industry. All these mechanisms ensure positive effect on teaching staff composition and diminish any negative effect.

2.4.3. Not relevant.

2.4.4. The teaching staff are active in research and there are opportunities to conduct research. Overall, we recommend even more opportunities for the teachers to conduct research and publish in top-tier forums. There are further possibilities in developing the M.Sc. thesis instrument in connection with research and also connect PhD students with teaching activities.

Activities that teaching staff could be involved, related to this study programme, are - participations in professional projects, or projects applications, regarding application (utilisation) of specific areas of expertise and technologies. Application (utilisation) of specific technologies can reinforce teaching staff competence regarding specific parts related to study programme. Teaching staff members with scientific title are required to publish original scientific papers to gain higher scientific title. Teaching staff members with scientific title should aim to publish results of their research in journals with higher impact factor, foreign journals especially, to intensify their international recognition and the international recognition of the faculty.

2.4.5. The programme content is examined annually by the programme director in collaboration with the teachers. Teachers can provide feedback and develop the content to reflect scientific progress and industry developments. Workload planning is part of the annual process.

Members of teaching staff can provide feedback and develop the content to reflect scientific progress and industry developments. Workload planning is part of the annual process. In this manner fast changes in study programme, corresponding to the fast changes in technologies and industry, can be adopted. This mechanism can also ensure that there are no significant overlap in different study courses and that study course is compliant with study programme.

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

The teaching staff of the programme meets the qualification requirements, ensuring the academic rigor of the programme. The involvement of guest lecturers from the industry and other Higher

Education Institutes (HEIs) adds a layer of real-world experience to the curriculum. Moreover, some faculty members also supervise doctoral students, introducing a research-oriented perspective that could be particularly beneficial for undergraduate students. These features point to a robust and balanced academic environment, reinforced by compliance with regulatory standards.

The programme places a strong emphasis on responsiveness to both student needs and industry trends. Teachers are available for one-on-one interactions with students, and mechanisms are in place to collect and act upon student feedback. This feedback loop extends to the industry, with frequent collaborations and guest lectures that help ensure the curriculum stays relevant to market needs. The system allows for quick adjustments to the study programme, reflecting the rapid pace of technological change and minimizing any overlap in course content.

Despite the programme's many strengths, there's room for improvement in the area of research. While faculty members are active in research, the evaluation suggests further growth opportunities in this direction, specifically encouraging publications in top-tier forums. Strengthening research components could not only bolster the faculty's international recognition but also enrich the educational experience for students. It could also pave the way for more integrated research opportunities in M.Sc. theses and doctoral studies, making the programme even more rounded and forward-looking.

Strengths
1. Qualified Teaching Staff: The programme has a faculty that meets high qualification standards, ensuring that students receive instruction of the highest quality.
2. Industry Collaboration: Frequent interactions with industry representatives and guest lecturers enhance the curriculum's relevance and provide students with practical insights and opportunities.
3. Student-Centered Feedback Mechanisms: The programme has effective channels for student feedback, and this input is actively used to improve course content and teaching methods. This makes the programme adaptive to student needs and industry developments.
4. Annual Review for Responsiveness: The curriculum is reviewed annually by the programme director in collaboration with the teaching staff. This allows for fast adjustments to align the programme with evolving technology and industry requirements.

Weaknesses
1. Limited Research Opportunities: Although the faculty is involved in research, there is room for expansion in this area, specifically in encouraging more publications in top-tier forums.
2. Overlap Risk: Despite the annual review, the fast pace of technological changes poses a risk of overlapping course content, which could dilute the focus and effectiveness of the curriculum.
3. Insufficient Workload Planning: While the programme claims that workload planning is part of the annual review, it's not clear how effective this is in balancing faculty workload with teaching commitments, research activities, and industry collaboration.

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

Teachers involved in the study programme fulfill the necessary qualifications. Study programme

teaching staff complies with the requirements specified in regulatory enactments. The teaching staff are active in research and there are opportunities to conduct research.

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

Annex III-2, SAR p.127 (mgr_atbilstiba_standartam_en.pdf and mgr_atbilstiba_standartam_lv.pdf) confirms that academic master study programme "Information Technologies" complies with the Cabinet of Ministers Regulation Nr.240 “Noteikumi par valsts akadēmiskās izglītības standartu”.

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

Attached study course descriptions (Annex III-2, SAR p.127 IT_kursu_progarmmas_ENG.zip and IT_kursu_progarmmas_LV.zip) are prepared in Latvian and English languages (programme is implemented in Latvian and English) and comply with the requirements set forth in Section 561, Paragraph two and Section 562, Paragraph two of the Law on Higher Education Institutions.

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 provided Diploma samples (SAR p.127, mgr_diploms_en.zip and mgr_diploms_lv.zip) comply with the criteria set in the Cabinet of Ministers regulation No.202 “Kārtība, kādā izsniedz valsts atzītus augstāko izglītību apliecinošus dokumentus” (https://likumi.lv/doc.php?id=256157/).

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

SAR Annex Section 2.1 contains a file LBTU_apliecinajums_studiju_virzienam_Informacijas_tehnologijas_EN.docx, signed at 15.11.2022, where the Study Vice-rector affirms that at least five professors and associate professors elected to academic positions at LBTU participate in the delivery of compulsory and restricted elective courses of the academic bachelor programme “Computer Control and Computer Science” and the master programme “Information Technologies”. Therefore the academic staff of the academic programme complies with the requirements set forth in Section 55, Paragraph one, Clause 3 of 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: 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

SAR p.127 contains link to Annex I-2 LBTU_apliecinajums_studiju_virzienam_Informacijas_tehnologijas.edoc, signed at 15.11.2022, where the Study Vice-rector affirms that the knowledge of the official/national language of the academic staff involved in the implementation of study programme complies with the Regulations on the extent of knowledge of the national language and the procedure for testing the knowledge of the national language for performing professional and official duties.

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

SAR p.127 contains link to Annex I-2 LBTU_apliecinajums_studiju_virzienam_Informacijas_tehnologijas.edoc, signed at 15.11.2022, where the Study Vice-rector affirms that The teaching staff members to be involved in the implementation of the study programme have at least B2-level knowledge of English language.

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 attached Templates of Study agreements Annex I-2, SAR p.72 (2_dala_05_Study_Agreement_2021_LV_ENG.pdf and 2_dala_05_Studiju_ligums_2021_LV.pdf) comply with the requirements set in the Cabinet of Ministers regulation No.70 “Studiju līgumā obligāti ietveramie noteikumi”.

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

SAR p.72 contains link to Annex I-2
LBTU_apliecinajums_studiju_virzienam_Informacijas_tehnologijas.edoc, signed at 15.11.2022, where the Study Vice-rector affirms that at January 18, 2022 an Agreement with Riga Technical University is signed on students takeover in case of cancel of study programmes (not accredited or license is revoked).

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

SAR p.72 contains link to Annex I-2
LBTU_apliecinajums_studiju_virzienam_Informacijas_tehnologijas.edoc, signed at 15.11.2022, where the Study Vice-rector affirms that students are guaranteed compensation of paid tuition fee in case of cancel of study programmes (not accredited or license is revoked) and the student does not wish to continue studies in another study programme.

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

Master study programme "Information Technologies" (45483) complies with the requirements set forth in the Law on Higher Education Institutions, with the Cabinet of Ministers Regulation Nr.240 "Noteikumi par valsts akadēmiskās izglītības standartu" and other regulatory enactments.

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

Academic master study programme aims and objectives and learning outcomes are defined corresponding to the thematic group "Natural sciences, mathematics and information technologies -> Computing -> Computer systems, databases and computer networks". The goals of the study programme correspond to the goal of the study field. The programme topics, structure, organization and implementation are relevant to the goals. The auditoriums and computer classes are sufficient for delivering study process. Students have access to wide range of advanced software, including e-study platform. Large number of teaching staff have doctoral degrees. No significant deficiencies have been identified.

Strengths
1. IT in the context of agriculture provides great opportunities for interdisciplinary approach, which

gives LBTU a unique advantage; it is a good reason for programme feasibility.
2. The industry collaboration and societal outreach are on a good level and the interviewed industry representatives provided favourable statements on the industry relevance of the degree programmes.
3. The qualification of the teaching staff is appropriate for professional level study programme implementation and to achieve the aims and ensure the learning outcomes of the study programme in both Latvian and English languages.
4. The e-studies system is used actively both by academic staff and students and provides students with sufficient necessary materials.
5. Student scientific conferences organised by LBTU give good opportunity for scientific development.

Weaknesses
1. Very small number of foreign students.
2. The programme has a small number of graduates compared to admissions.
3. Number of students engaged in mobility activities is small.

Evaluation of the study programme "Information Technologies"

Evaluation of the study programme:

Good

2.6. Recommendations for the Study Programme "Information Technologies"

Short-term recommendations

Improve marketing activities to attract foreign students.
Cooperate with the industry to recognise the value of master's degree diploma.
Provide more opportunities for lecturers to take part in research.
Additional information and popularisation of BIP or other short term mobilities is advised to further increase activity and attractiveness to employed students.

Long-term recommendations

Consider and discuss implementing a shorter variant for this study programme, designed specifically for graduates of professional and academic bachelor study programmes of this field.
LBTU needs to review options to deliver a study programme, when students start their full time career journeys (i.e. part-time programme or others).
LBTU needs to focus on the increase of students in the Master’s study programme.
LBTU needs to analyse reasons for high dropout.

II - "Information Technologies" ASSESSMENT

II - "Information Technologies" ASSESSMENT

2.1. Indicators Describing the Study Programme

Analysis

2.1.1. Doctoral study programme “Information Technologies” (code 51483 according to the Classification of the Latvian Education system) is in compliance with the study field “Information Technology, Computer Engineering, Electronics, Telecommunications, Computer Management and Computer Science”. The goals of the study programme correspond to the goal of the study field. Study programme's goal is to promote the development of information technologies engineering and create an international generation of highly qualified young scientists in the information technologies sector, as well as provide the academic and scientific staff of the Information Technologies Faculty of LBTU.

2.1.2. The code and degree to be obtained are interrelated and aligned with each other, as well as study programme aims and objectives and learning outcomes are defined based on the feedback given from various stakeholders and normative regulations. The duration of the study programme is 3 years for full time studies with 180 ECTS points. The study programme has been previously implemented in full time and part time, but due to the lack of demand, it is decided to keep implementing study programme only in full time.

2.1.3. During the evaluation period a bunch of parameters changed in the study programme. In 2014./2015. the study programme director was changed and in 2020 the degree to be awarded was changed to “Doctor of Science degree Doctor of Science (Ph.D.) in electrical engineering, electronics, information and communication technologies'' due to the changes in regulatory enactments. And now, for the evaluation procedure, the degree to be awarded is being changed to Doctor of Science (Ph.D.) in Engineering Science and Technology” which corresponds to the current regulatory enactments and rules of classification about Latvian Science groups and branches. The changes are logical and justified.
The right to participate in the competition for LBTU ITF doctoral studies in information technology, computer engineering, electronics, telecommunications, computer management and computer science in the field of study is for persons who have obtained a master's degree or an equivalent higher education in information technology, computer technology, electronics, telecommunications, computer management and computer science and related sciences. in industries. For those admission applicants who obtained a master's degree in another field of science, the director of the relevant doctoral study programme and the department/institute may set an entrance exam in the chosen field of science. The main evaluation criterion of the entrance exam is the applicant’s level of knowledge in the basic theoretical topics of the specialisation chosen as part of the study programme. (SAR p. 157).

2.1.4. The ICT industry in Latvia is growing rapidly and many companies operate in an international environment. In general, ICT produces 6% of Latvia's gross domestic product and ranks among the top 3 Latvian export industries (https://likta.lv/nozare-skaitlos), and for several years in a row, companies in the ICT industry have emphasised the lack of qualified labour. The shortage of computer control and ICT specialists in the Latvian market is very large. This is evidenced by the fact that more than 80% of final-year undergraduate students start working in a specialty by the time they finish their studies and defend their thesis. The Ministry of Economics of Latvia also recognises the lack of ICT specialists. Long-term labour market forecasts prepared by the Ministry envisage wider use of various technologies and innovations on a daily basis, covering the employment needs of industries. The Ministry’s report of 2020 on the development of Latvia's national economy predicts that by 2027 there will be a shortage of ICT and engineering specialists (up to ~14 thousand employees in STEM industries) (SAR p.134). The economic and social factors justify this study programme feasibility.

Regarding dynamics of the number of the students of the study programme. Between the 2014/2015 and 2021/2022 academic years, the number of doctoral students varied from 5 to 10. The variability in the number of doctoral students in the programme can be largely explained by the changing number of ICT master graduates in all Latvian universities, including the variability in the number of LBTU ITF bachelor and master students, as well as the huge demand for IT students on the labour market, where bachelor and master students and graduates are employed at various levels of ICT companies, without the need for a higher academic degree. (SAR p. 159). In total, in the fall semester of 2022, 6 Ph.D. students are studying in the Latvian stream, while no students are studying in the foreign stream. During the reporting period, 3 part-time students were admitted to the study programme and they successfully completed their doctoral studies, with only 1 graduate (with a defended doctoral thesis).

Although there has been interest, and all the necessary infrastructure, materials, and equipment are available, no foreign doctoral students were admitted during the reporting period. This statistic could mean that the study programme is badly marketed to foreign students or the title or study place does not fit for individual demands. Recommended
re-evaluate the policies regarding programme marketing and advertising abroad in order to increase foreign student amount.

During the reporting period, 85% or 11 graduates are employed in the education sector and 62% of them work as academic/scientific staff at LBTU. The other graduates work in the Ministry of Agriculture or private sector (SAR p. 158).

2.1.5. Not relevant.

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

Study programme aims, objectives and learning outcomes are clearly defined, they are achievable, they reflect on the degree which students obtain. This study programme complements the overall goal of the study field.

Strengths
1. Study programme is well regarded by involved stakeholders (graduates, students).
2. Study programme directly contributes to providing academic personnel regrowth for LBTU needs.

Weaknesses
1. No foreign student enrolment means lack of advertisement and marketing of Ph.D. programmes.

2.2. The Content of Studies and Implementation Thereof

Analysis

2.2.1. The PhD programme is topical and well structured.
From 120 CP doctoral study programme in total, the A - Mandatory part consisted of 20 CP and B – Scientific research part consisted of 100 CP. The study plan includes for doctoral students important study courses “Realization of scientific research”, “Research methodology in information technologies”, “Preparation of scientific papers”. The doctoral student, within the framework of his research part, has the opportunity to choose some more theoretical courses (Annex phd_studiju_plans_lv_en.pdf).
If the doctoral student has not acquired the requirements specified in the Environmental Protection Law and the Civil Protection Law in the lower level study programme, the study courses “Labor and

Civil Protection" and "Ecology and Environmental Protection" are provided. If the studies are conducted in English, for foreign doctoral students the study courses "Latvian Language I, II" are offered.
The study programme is implemented through lectures, seminars, practical lessons, independent assignments and consultations with course instructors and scientific advisors. Students have a clearly defined promotion (doctoral thesis defence) opportunities according to the procedure for awarding a doctoral degree in science set in Section 11 of the Law on Scientific Activity.

2.2.2. The awarding of the doctoral degree is based on achievements and findings in scientific topics included within the scope of the programme. The topics of students' final theses are relevant to the field and correspond to the study programme which is defined during the enrolment procedure and approved by the Council of Science. As stated in SAR, the topics of doctoral theses are chosen in accordance with the priority research fields determined in the LBTU Strategy and, as evaluated, are in close connection with research projects according with current situation in the science field and industry (f. e. "Prototype of interactive decision-making support system with an automatic rejection mechanism", "Development of a learning competence management solution", "Use of a decision assistance system in the management of multi-object biological systems" etc.).
The awarding of a degree has strict protocol that should be followed. During the onsite visit PhD students stated that there are requirements necessary to be fulfilled, like number of published journal papers and conference papers and that requires significant research work.

2.2.3. There are four fields of study in the IT doctoral study programme: Computer Control of Technical Systems; Computer Control of Biosystems; Systems Analysis, Modelling, and Design; E-learning Technologies and Management. The implementation of the programme contribute to the aims and objectives of the programme.
Qualifications of the academic staff involved in teaching of the study programme enables that latest achievements and knowledge of the relevant fields is provided to the students. International reviewers of the doctoral thesis ensure good quality for both doctoral papers and research conducted. Academic staff involved in study programmes have to demonstrate their qualifications, academic and research activities every six (6) years as a part of competition for the position. The content of individual courses of the doctoral programme is adjusted according to the needs of the industry and the labour market and current trends related to the scientific topic chosen by the doctoral student.
High quality of the academic teaching staff ensures the doctoral degree in relevant fields is rooted in the most recent advancements.
The research fields taught as part of doctoral studies largely determine the range of topics covered in bachelor and master theses, especially given that many doctoral thesis advisors also supervise master and bachelor theses.

2.2.4. Not relevant.

2.2.5. Students have clearly defined promotion (doctoral thesis defence) opportunities according to the procedure for awarding a doctoral degree in science set in Section 11 of the Law on Scientific Activity.
As stated in the regulations of the LBTU doctoral promotion council (annex LBTU_Promocijas_padomes_nolikums_en.pdf), a doctoral degree in science is awarded for a doctoral thesis that is independently prepared and publicly defended under the guidance of an experienced scientist ('thesis advisor'), and which contains the results of original scientific research and provides new knowledge in the relevant field or subfield of science.
The process of promotion in University doctoral programme is strong regulated process from

applicant document submission, trough doctoral thesis elaboration and doctoral promotion, until the obtaining of doctoral degree after defending of promotion. The mechanism is developed and due to expert panel opinion is efficient.

2.2.6. The topics of students' final theses are relevant to the field and correspond to the study programme which is defined during the enrolment procedure and approved by the Council of Science.
Both academic teaching staff and doctoral students may consider publishing their research results in journals with higher impact factors. University might consider increasing the number of doctoral students to be able to educate potential employees.

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

Study programme is very well defined and structured and all procedures have clearly defined steps and requirements. A smaller number of students may affect the maintenance of a sufficient number of academic staff for the needs of the university.

Strengths
1. Programme is well structured and it is based on learning outcomes.
2. Overall procedures are well defined and conducted.
3. Very good qualification of academic teaching staff.

Weaknesses
1. Smaller number of doctoral students.

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

Qualifications of the academic staff involved in teaching of the study programme enables that latest achievements and knowledge of the relevant fields is provided to the students. The awarding of a doctoral degree is based on the achievements and findings in the topics included in the programme following the learning objectives and fully complies with related field.

2.3. Resources and Provision of the Study Programme

Analysis

2.3.1. LBTU has a significant and sufficient volume of auditoriums (200+ seats), 12 computer classes (7-27 computers in each) including laboratories for specific study courses to equip students with necessary hardware and software.
The key asset required for students in doctoral study programme “Information Technologies” is the computer equipped with compilers, programme development and experimentation (if any) and supporting environments. HEI has signed collaboration agreements with Microsoft (Azure Dev Tools for Teaching), Oracle (Oracle University), Apple (iOS Developer University), Cisco enabling students to leverage commercial tools and capabilities in the educational process. Using the funding of the STEM project, a set of equipment for robot programming was purchased, which includes robot

chassis, manipulators, equipment controllers, sensors for various applications and tool sets that are available in laboratories or remotely through VPN connection. Through collaboration agreement with Microsoft, students have access to 100 USD credits in the cloud computing platform “Azure Cloud Computing”, which are actively utilized throughout the study process (confirmed during the discussion with students with-in the expert’s visit).

Students do have access to the LBTU library that provides access to physical and electrical materials including the access to various scientific databases.

LBTU has implemented a Moodle system to provide required information to students. This includes general information about the LBTU, 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 LBTU student has assigned an email address to secure formal and informal collaboration with LBTU and teaching staff.
To maximize availability of delivered lectures (especially during the pandemic period), LBTU has established hybrid delivery of them. By using BigBlueButton (BBB) and Moodle, teaching staff was able simultaneously deliver lectures physically in the class and virtually to connected students.

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. LBTU has targeted doctoral studies towards practical research work and students’ involvement into research projects. Joined research work with other LBTU faculties increases practical application of the gathered skills and solves industry problems.

LBTU financially supports doctoral students with base science funding to pay conference participation fees and for publication as part of various international scientific conferences.

In collaboration with University of Latvia, Liepāja University, Vidzeme University of Applied Sciences, Vilnius University, LBTU publishes the international scientific journal Baltic Journal of Modern Computing (quarterly international scientific open-access electronic peer-reviewed journal). This collaboration creates a platform for students and academic staff so they can share results of their research and get professional feedback.

2.3.3. LBTU has defined and executed a clear financial budgeting process. Before LBTU Council reviews and approves the annual budget, the specially founded “Working group on resource use and development issues” evaluates the previous year results and prepares a budget plan for the next year.

Financial provisioning and sustainability of the study program is directly impacted by the number of students in this program. LBTU has managed to keep the number of students in the program in the range from 6 to 8 in last 10 years. In the last reported year 2021.-2022. there were 6 students and all leveraging budget seats. However, during last 2 reported periods (2019.-2020. and 2020.-2021. as per appendixes in SAR) there were 0 graduates in this study program.

LBTU managed to leverage ERAF funds and complete several projects during recent years 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

Students and teaching staff are fully equipped to achieve learning objectives and graduate the programme. LBTU managed to keep the same range (6-8) of Doctoral study programme students. At the same time, the total number of students in the whole study field has significantly increased, but an increase in Doctoral programme is not observed. Number of graduated students during last 2 reported years (2019.-2020. and 2020.-2021.) is 0.

Strengths
1. Students have access to 100 USD credits in the cloud computing platform “Azure Cloud Computing”.
2. LBTU promotes and supports cross-faculty collaboration also in the research area.

Weaknesses
1. Number of students in the programme has not increased during the 10 years period even with a significant increase of students in both Bachelor programmes.
2. Zero(0) students have graduated from the programme during the last 2 reported years.

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 programme. Study programme is supported by budget seats, however there is a low number of graduates.

2.4. Teaching Staff

Analysis

2.4.1. The teaching staff meets the qualification requirements for a doctoral programme.
In the study programme implementation are involved in total 26 professors and researchers, 12 from above mentioned hold the Doctor degree in Engineering sciences, 3 – Doctor degree in Mathematics, 3 – Doctor degree in Physics, 1 – in Computing sciences, 7 – in other sciences (Annexes itf_macibspeku_saraksts_lv_en.xlsx and phd_macibspeki_publikaciju_skaits_lv_en.pdf). From the totally involved teaching staff - 8 (31%) professors, emeritus professors, and guest professors, 8 (31%) associate professors, emeritus associate professors, and guest associate professors, 7 (27%) docents and guest docents, 2 leading researchers and one guest lecturer.

The high number of professors and researchers in the field of studies positively affects the study process and study programme results achieving. 5 academics of the teaching staff for study programme are experts of the Latvian Council of Science (LZP) in the field Electrical engineering, Electronic engineering, Information and Communications Technologies. The confirmation about the study field Information Technology, Computer Hardware, Electronics, Telecommunications, Computer Management, and Computer Science is added in Annexes part (LBTU_apliecinajums_studiju_virzienam_Informacijas_tehnologijas_EN.docx).

The PhD programme is relatively small with very good mentoring of the students. The PhD education

is supported by the research projects and research infrastructure. The focused research strategy of the university is visible in a positive manner in the PhD education. There are very good synergies with companies and the students have opportunities to discuss and work together with industry experts.

2.4.2. Teaching resources are taken into account in the planning and implementation of teaching.
The composition of the teaching staff is well balanced according to the study programme goals and tasks. The changes is the teaching staff composition during the period after last study field accreditation are analysed and adjusted to the current situation in the industry and higher education sector.

As stated in SAR, the composition of the academic staff during the reporting period changed significantly, because of promoting employed teaching staff to get the doctoral degree and new doctors from own University. Involving and supporting the students from Master`s level to get the Doctor degree ensuring the succession of academic and scientific staff of the Faculty of Information Technology.

Student feedback results and suggestions are taken into account in the development of teaching staff composition for doctoral study programme.

2.4.3. The faculty members are actively involved in research, providing ample opportunities for exploration and innovation.
All teaching staff is active in research and projects. University submitted information and Annexes phd_macibspeki_publikaciju_skaits_lv_en.pdf, phd_projektu_saraksts_lv_en.pdf, phd_svarigako_publikaciju_saraksts_lv_en.pdf demonstrate that the research and project subjects have close relation to the study field and actuality for industry, f. e. "Collection and analysis of the experience of using the methods and technologies of intelligent systematization of documents", "Development of digital economy platform models of the city of Jelgava and research and development of cyber-physical models and their integration into the monitoring system of the smart city of Jelgava" and "Futuristic Beehives for a Smart Metropolis" for private, and state sectors, as well as for European Commission.

Involving the students in the research activities strengthens the quality of study of doctoral study programme Information Technologies.

2.4.4. The faculty members are active in publishing scientific articles.
In the SAR and Annex phd_macibspeki_publikaciju_skaits_lv_en.pdf provided information confirms that the teaching staff members have publications in the last six years in peer-reviewed editions, including international editions (Scopus, Web of Science, INSPEC, Engineering Village etc.). Publications directly or interdisciplinary related to the Applied Informatics and Computer and Information Science, f. e. "Multi-object tracking for urban and multilane traffic: building blocks for real-world application" and "LiDAR and camera data for smart urban traffic monitoring: challenges of automated data capturing and synchronization".

Despite this, we encourage an increase in opportunities for teachers to conduct more research and publish their work in top-tier forums. We see potential for further development in the utilisation of the M.Sc. thesis as a research tool. Additionally, incorporating Ph.D. students into teaching activities could provide a valuable connection between the teaching and research aspects of the programme.

The programme is not very international and would benefit from marketing efforts. The level of

international collaborations can be increased. Currently, the level of these interactions is not as high as it could be. Enhancing international academic partnerships would be a beneficial step, as it would further enrich the educational experience by offering a broader range of perspectives and access to an even wider pool of knowledge.

2.4.5. Teaching staff implementing study programme collaborate during the study programme realization in points of study course curricula, final thesis topics and other important issues.
The teaching commissions of the Faculty of Information Technology is established and, due to SAR, the members of the teaching commission cooperate for evaluating and improvement of study process and study courses.

Additionally, the programme content is examined annually by the programme director in collaboration with the teaching staff. Teachers can provide feedback and develop the content to reflect scientific progress and industry developments. Workload planning is part of the annual process.

The teachers have sufficient time for students and there are effective feedback channels for student feedback. Student feedback is taken into account in the development of the content. Sufficient time is allocated for lecturers to engage with students, and efficient feedback mechanisms are in place for students to express their thoughts and concerns. Student feedback is a critical factor in the evolution and refinement of the course content.

There is deep collaboration with industries and frequent interaction with industry representatives takes place to ensure industrial relevance of the content.

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

The doctoral programme benefits from a well-qualified teaching staff. The programme places a strong emphasis on research, with faculty members actively engaged in scholarly work. The small size of the PhD programme allows for excellent student mentoring, bolstered by a focused research strategy and synergies with companies. The faculty is also involved in professional development training, covering various skills ranging from time management to leadership, thanks to a European Social Fund project in 2022.

In terms of teaching resources and student engagement, the programme is designed to be highly responsive to student needs. Effective feedback mechanisms are in place, and this feedback is considered in the ongoing development of course content. The programme also makes room for deep industrial collaborations, ensuring that the education students receive is highly relevant to real-world applications. Furthermore, the content and workload are reviewed annually, which allows for quick adaptation to scientific progress and industry demands.

However, despite these strengths, there are areas where the programme could improve. For example, there is a recommendation for faculty to publish more in top-tier forums and to better integrate PhD students into teaching activities. This could help form a more holistic learning environment that balances both teaching and research. Additionally, the programme could benefit from a more international perspective; current levels of international collaboration are not as high as they could be. Expanding these international academic partnerships could further enrich the educational experience, offering students a broader range of perspectives and access to a wider pool of knowledge.

Strengths
1. Highly Qualified Staff: The teaching staff are well-equipped to guide doctoral students through the rigors of research and academic exploration.
2. Strong Industry Collaboration: The programme has excellent links with industries, ensuring that the coursework is highly relevant and applicable to real-world challenges. These ties also offer students a chance to engage with industry experts.
3. Adaptive Curriculum: The programme places a strong emphasis on being responsive to student needs and feedback, as well as industry developments. The annual review of the programme allows for quick updates to the curriculum to align with scientific and industrial advancements.

Weaknesses
1. Limited International Exposure: The programme currently lacks a strong international dimension, in terms of both student intake and academic partnerships, which could limit the diversity of perspectives and educational enrichment.
2. Research Publication: Although faculty members are active in research, there is room for improvement in the quality and quantity of publications, particularly in top-tier journals.
3. Integration of PhD Students in Teaching: The programme could benefit from integrating doctoral students into teaching roles, bridging the gap between research and teaching to create a more comprehensive educational experience.
4. Room for Professional Development: While the European Social Fund project provided some professional development opportunities for the faculty, ongoing programmes for skill development could further enhance the quality of teaching and research.

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 meets the qualification requirements for a doctoral programme.

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: Not relevant

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

Attached study course descriptions (Annex III-2, SAR p.173 phd_kursu_programmas_en.zip and phd_kursu_programmas_lv.zip) are prepared in Latvian and English languages (programme is implemented in Latvian and English) and comply with the requirements set forth in Section 561, Paragraph two and Section 562, Paragraph two of the Law on Higher Education Institutions.

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 provided Diploma samples (SAR p.173, Doktora_diploms_Informacijas_EN.pdf and Doktora_diploms_Informacijas_LV.pdf) comply with the criteria set in the Cabinet of Ministers regulation No.202 “Kārtība, kādā izsniedz valsts atzītus augstāko izglītību apliecinošus dokumentus” (https://likumi.lv/doc.php?id=256157/).

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

SAR p.173 contains a link to Annex I-2 LBTU_apliecinajums_studiju_virzienam_Informacijas_tehnologijas.edoc, signed at 15.11.2022, where the Study Vice-rector affirms that the scientific and pedagogical qualifications of the academic personnel involved in the delivery of the doctoral programmes “Information Technologies” meet the criteria specified in the legal acts regarding evaluation of the scientific and pedagogical qualifications of a candidate for the professor and associate professor position.

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

Annex III-2, SAR p.173 has a link to rhe decision of Council of Higher Education (CHE) (4 March 2022) in view of the fact that Latvia University of Life Sciences and Technologies has met the requirements of the Law on Higher Education Institutions in respect to the number of teaching personnel as well as the importance of the programme, the CHE, in accordance with Part 2 of Section 55 of the Law on Higher Education Institutions, to support the implementation of the academic doctoral programme Information Technologies with less than 250 full-time students by Latvia University of Life Sciences and Technologies (dok_stud_progr_Informācijas tehnologijas_AIP atzinums_EN.docx).

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: Fully compliant

SAR p.173 contains a link to Annex I-2

LBTU_apliecinajums_studiju_virzienam_Informacijas_tehnologijas.edoc, signed at 15.11.2022, where the Study Vice-rector affirms that 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.

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

SAR p.173 contains a link to Annex I-2
LBTU_apliecinajums_studiju_virzienam_Informacijas_tehnologijas.edoc, signed at 15.11.2022, where the Study Vice-rector affirms that the knowledge of the official/national language of the academic staff involved in the implementation of study programme complies with the Regulations on the extent of knowledge of the national language and the procedure for testing the knowledge of the national language for performing professional and official duties.

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

SAR p.173 contains link to Annex I-2
LBTU_apliecinajums_studiju_virzienam_Informacijas_tehnologijas.edoc, signed at 15.11.2022, where the Study Vice-rector affirms that The teaching staff members to be involved in the implementation of the study programme have at least B2-level knowledge of English language.

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 attached Templates of Study agreements Annex I-2, SAR p.72 (2_dala_05_Study_Agreement_2021_LV_ENG.pdf and 2_dala_05_Studiju_ligums_2021_LV.pdf) comply with the requirements set in the Cabinet of Ministers regulation No.70 “Studiju līgumā obligāti ietveramie noteikumi”.

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

SAR p.72 contains a link to Annex I-2
LBTU_apliecinajums_studiju_virzienam_Informacijas_tehnologijas.edoc, signed at 15.11.2022, where the Study Vice-rector affirms that at January 18, 2022 an Agreement with Riga Technical University is signed on students takeover in case of cancel of study programmes (not accredited or license is revoked).

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

SAR p.72 contains a link to Annex I-2 LBTU_apliecinajums_studiju_virzienam_Informacijas_tehnologijas.edoc, signed at 15.11.2022, where the Study Vice-rector affirms that students are guaranteed compensation of paid tuition fee in case of cancel of study programmes (not accredited or license is revoked) and the student does not wish to continue studies in another study programme.

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

Annex III-2, SAR p.173 has a link to The decision of Council of Higher Education (CHE) (4 March 2022) in view of the fact that Latvia University of Life Sciences and Technologies has met the requirements of the Law on Higher Education Institutions in respect to the number of teaching personnel as well as the importance of the programme, the CHE, in accordance with Part 2 of Section 55 of the Law on Higher Education Institutions, to support the implementation of the academic doctoral programme InformationTechnologies with less than 250 full-time students by Latvia University of Life Sciences and Technologies (dok_stud_progr_Informācijas tehnologijas_AIP atzinums_EN.docx).

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

Doctoral study programme aims and objectives is to promote the development of information technologies engineering and create an international generation of highly qualified young scientists in the information technologies sector, as well as provide the academic and scientific staff of the Information Technologies Faculty of LBTU. The goals of the study programme correspond to the goal of the study field. The study programme is learned through lectures, seminars, practical lessons, independent assignments and consultations with course instructors and scientific advisors. Students do have access to the LBTU library that provides access to physical and electrical materials including the access to various scientific databases. LBTU has implemented an e-studies system to provide required information to students. In collaboration with University of Latvia, Liepāja University, Vidzeme University of Applied Sciences, Vilnius University, LBTU publishes the international scientific journal Baltic Journal of Modern Computing (quarterly international scientific open-access electronic peer-reviewed journal). This collaboration creates a platform for students and academic staff so they can share results of their research and get professional feedback. Large number of teaching staff have doctoral degrees. No significant deficiencies have been identified.

Strengths

1. IT in the context of agriculture provides great opportunities for interdisciplinary approach, which

gives LBTU a unique advantage; it is a good reason for programme feasibility.
2. The qualification of the teaching staff is appropriate for academic level study programme implementation and to achieve the aims and ensure the learning outcomes of the study programme in both Latvian and English languages.
3. The e-studies system is used actively both by academic staff and students and provides students with sufficient necessary materials.
4. Participation in several European Commission projects.

Weaknesses
1. Very small number of foreign students. Increasing dropout.
2. Small number of Scopus level publications.

Evaluation of the study programme "Information Technologies"

Evaluation of the study programme:

Good

2.6. Recommendations for the Study Programme "Information Technologies"

Short-term recommendations

The level of international collaborations should be increased.
The level of dropout should be decreased by involving doctoral students in scientific projects.
LBTU needs to investigate the low number of graduations and work on improvement to achieve a stable high number of graduations.

Long-term recommendations

Both academic teaching staff and doctoral students may consider publishing their research results in journals with higher impact factors.
LBTU needs to focus on the increase of the students in the Doctoral study programme.

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			The LBTU quality policy has an emphasis on Deming cycle principles that are a vital part of LBTU internal quality assurance system.
R2 - Compliance of scientific research and artistic creation with the level of development of scientific research and artistic creation (if applicable)	Fully compliant			The required criteria are met with certain development points. The research strategy of the university has domain specific focus that provides a clear vision and mission for the scientific endeavour. Scientific and applied research supported by efficient resources and administrative planning policy.
R3 - The cooperation implemented within the study field with various Latvian and foreign organizations ensures the achievement of the aims of the study field.	Fully compliant			The higher education institution/college has cooperation with other Latvian universities like University of Latvia, Riga Technical University and other Latvian universities that implement ICT study programmes. The institution has agreements about cooperation in student education with universities in Lithuania - Aleksandras Stulģinskas University and Šaulai University and agreements signed within ERASMUS+ program with high education institutions in foreign countries like Malta, Hungary, Spain, Italy, Sweden, Croatia. The cooperation ensures the achievement of the aims of this study field.

Requirements	Requirement Evaluation			Comment
R4 - Elimination of deficiencies and shortcomings identified in the previous assessment of the study field, if any, or implementation of the recommendations provided.	Fully compliant			The LBTU, as manager of the study field "Information Technology, Computer Hardware, Electronics, Telecommunications, Computer Management, and Computer Science", has proven that it considers seriously quality assurance, by transparent analysis of the recommendations received on previous accreditation. Previous recommendations have been implemented, the plan of staff professional development recommended to define formally.

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	Information Technologies for Sustainable Development (42484)	Not relevant	Fully compliant	Fully compliant	Fully compliant	Excellent
2	Computer Control and Computer Science (43483)	Not relevant	Fully compliant	Fully compliant	Fully compliant	Excellent
3	Information Technologies (45483)	Fully compliant	Fully compliant	Fully compliant	Fully compliant	Good
4	Information Technologies (51483)	Fully compliant	Fully compliant	Fully compliant	Fully compliant	Good

The Dissenting Opinions of the Experts

None