

# Expert group joint opinion

Evaluation Procedure: Assessment of Study Field

Higher Education Institution: Mechanics and Technology College of Olaine

Study field: Chemistry, Chemistry Technologies, and Biotechnology

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

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The aim of the study field "Chemistry, Chemistry Technologies, and Biotechnology" is to prepare 5th level professional qualification biotechnology process specialists for the companies of the biochemical industry and related industries, food industry companies where biotechnological techniques are used in the production of products, as well as for the biochemistry and microbiology laboratories of the mentioned companies, where biotechnological methods and techniques are used in the development or testing of products. To prepare biotechnological process specialists who organize, manage and improve biotechnological production processes, improve the application of technologies and participate in the development of new biotechnological products and production processes. It is clearly defined and related to the offer of high-quality studies in the field of biotechnology. The short cycle professional higher education study program "Biotechnology (41526)" with the qualification "Biotechnologist" is relevant and in line with the scope of knowledge for the needs of the national economy, it is related to the Latvian and European Union forecasts for this sector in the labor market. The management of the study programme provides a gradual contribution to the development of study content. The student admission system and procedure is clear and information about it is published on the Riga Technical University Agency "Riga Technical University Olaine Technology College" (hereinafter - OTC) website.

The funding allocated to the field of study is satisfactory to ensure the education of young students, but it would be necessary to focus more on the implementation of projects in order to be able to attract more science funding, which could additionally help to serve the created infrastructure. Students have access to academic, career development and psychological support. The number of students in the study program is low and its growth yearly is small, therefore it would be necessary to develop both a student attraction plan and a plan on how to reduce student dropout rate. The level of mobility is low and OTC must change the current situation by promoting mobility possibilities better. The study program is carried out in close cooperation with the industry, which can be evaluated as a strength.

The management of the study field ensures internal communication within the framework of the study program, the results of the study program are formulated in a student-oriented approach. However, improvements are desirable in the program's internal quality management and assurance system. Nevertheless, employer satisfaction is high and students' view of studies is good. The structure and content of the study program in this field are appropriate and consistent with the professional standard.

Qualified teaching staff are involved in the implementation of study programs, but it would be necessary for the college to have a larger number of elected teaching staff. It would be necessary for the teaching staff to actively develop scientific and research activities, as well as professional experience by cooperating with the industry.

## **I - Assessment of the Study Field**

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#### **1.1 Management of the Study Field**

##### **Analysis**

1.1.1. The self-assessment report of the Mechanics and Technology College of Olaine (RTU OTC) clearly indicates the aims of the study field and the study program in such a way the respect of the needs and the development trends of the society and national economy is respected. Aim of the study program is to prepare highly qualified specialists and scientists able to compete on both the

local and international scientific labor markets in the various sectors of biotechnology and bioengineering. The goal of the study direction, which is also the goal of the study program and can be read in the parameters of the study program, corresponds and resonates with the mission of RTU OTC. The fulfillment of the purpose is important in the realization of the mission of the college. The field of study "Chemistry, chemical technologies and biotechnology" and its purpose are in accordance with the scope of activities and the direction of strategic development of the Olaine Technology College, as well as contribute to the achievement of the college's strategic goals, i.e. to offer a high quality of studies, to ensure that the theoretical knowledge acquired in the study program is maximally effectively connected with practice, etc. The achievable goals are backed up with a detailed action plan until the year 2027 and are described in the document called "Development and investment strategy for years 2021-2027", article 3 "OTC action plan".

1.1.2. The college has done a strength, weakness, opportunity and threat analysis (SWOT) based on its mission, vision and values. The strengths, weaknesses, opportunities and threats are comprehensively evaluated and according to prioritizations (6 in total) and actions are included in the above mentioned development and investment strategy for years 2021-2027, articles 1.3 "Strategical priorities for 2021- 2027" and 1.4 "Strategical goals for 2021- 2027". There are 9 strengths, 7 weaknesses, 9 opportunities and 10 treats identified. For example strengths include "In cooperation with industry partners, OTC students are provided with appropriate internships" and "Modern training laboratories meeting the highest requirements have been established and the total level of infrastructure of OTC has been purposefully developed in the direction of the most modern technological achievements". Weaknesses include "Insufficient international cooperation of academic staff and little use of mobility opportunities". Opportunities include "The importance of lifelong learning is growing throughout a person's life, based on the need to acquire new knowledge, skills, experience in order to improve or change their qualifications in accordance with the requirements of the labor market" and "Medium and long-term labor market forecasts show that the demand for specialists in chemistry and other technological sciences will increase". Threats include "Due to insufficient remuneration, qualified teaching staff may transfer to another sector or profession, incl. go to work abroad" and "Decrease in the level of knowledge of natural sciences and mathematics for primary and secondary school graduates".

1.1.3. The management structure is established and layed down as a scheme of interactions and the job descriptions for the college's employees describe their responsibilities. During the interviews with the study program's director and teaching staff it was found out that as the main tool for communication, interactions and improvements methodological commissions are used. During the interviews with students and graduates it was found out that college's management takes into account students suggestions and needs for improvements.

1.1.4. The college follows the state's laws and regulations as it regards the student admission. Admission requirements for starting students are determined in accordance with the procedures specified in the state legislation, in accordance with Articles 46 and 47 of the Law on Higher Education Institutions, as well as the regulations of the Cabinet of Ministers of the Republic of Latvia of October 10, 2006 No. 846 "On Requirements, Criteria and Procedures for Admission to Study Programs". Admission to the study program is regulated by the OTC "Regulations on the Admission Procedure for Learners". Admission process is logical and involved stakeholders are informed about the system. However prioritization of conditions for the admission need be more focused to address the weaknesses identified by the college.

1.1.5. The platform for organization of study process is called "mykoob.lv" it includes content of courses and marks etc. Students have a possibility to follow their study progress at all times. The

rules for qualification work and internships are available and clearly explained. Evaluation of performance of the students are on a 10 point scale. At the end of each course students are obligated to give feedback on it in a form of an anonymous survey.

1.1.6. The college pays attention to academic integrity and has the rules set up in the document called "Regulations on the procedure of studies and examinations (16.01.2020)". As per the regulation there are rules set for matriculation including references to internal and external normative acts like commission of the matriculation as a governing body for the matriculation, presence of study agreement and others. Organization of the study process like differentiation of mandatory, limited choice and free choice courses and responsibilities of the teaching staff during the study process. Reference to internship management. Evaluation of students like specification of the 10 mark evaluation scale. Organization and evaluation of the exams and final or qualification paper like specific responsibility of the manager of qualification paper to check the paper for plagiarism (article 9 point 9.24.) and other rules. "plag.lv" is used as an anti plagiarism tool and all qualification works are checked. Final exams and qualification papers are evaluated within a commission with a dedicated chairman and the members of the commission so the internal culture of academic integrity of the college is effective. Involved stakeholders are informed about it.

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

The defined objectives of the study field and study program correspond to the main areas of detailed action plan "Development and investment strategy for years 2021-2027", which play an important role in the development of the national economy and the needs of society. The stated objectives are achievable.

The academic staff has sufficient academic freedom and at the same time partial support is available for building professional experience.

There is a relevant system for the admission of the students with clear admissions criteria and information is available within the RTU OTC web page. The contacts are clearly stated on the mentioned web page for any required information which might not be provided in the basic rules for admission. The system is efficient and logical.

#### **Strengths:**

1. Well prepared, comprehensive SWOT analysis, clear strategy plan till year 2027. EU backed-up funding for infrastructure and personal qualification alongside participation and feedback of students, employers and teaching staff in evaluation of the present situation of the study process and related processes and improvements necessary for the future.
2. Guaranties for the existing students in case of the foreclosure of the study program. Contract of cooperation with Riga Technical University.

#### **Weaknesses:**

1. Rather weak base knowledge of life science disciplines (chemistry, biology) of applicants and significant drop-out of students possibly due to insufficient prioritization of conditions for admission to the study program.
2. No strong crisis management system in place. Since the COVID-19 hit a lot of performance indicators reported to (student count, lab. works, mobility) turn much worse and only hope that the situation will improve is presented.

### **1.2. Efficiency of the Internal Quality Assurance System**

#### **Analysis**

1.2.1. The quality policy OTC is focused on the implementation of OTC's mission, sustainable development and achievement of strategic goals - studies, research, infrastructure, organizational excellence and recognition. The quality policy is implemented in all structural units of the OTC in accordance with the internal regulatory enactments of the OTC. The higher education institution/college has established an internal quality policy that is available publicly at KVALITATES-POLITIKA.pdf (rtu.lv). It was evident from the self-assessment report, presented documents, and study visit that the RTU OTC has developed and maintains a quality assurance system, which contributes to the achievement of the aims and learning outcomes of the study field and the relevant study programs. The joint academic bachelor's "Biotechnology and bioengineering" programme of the University of Latvia (UL) and Riga Technical University (RTU) enables students to acquire both theoretical and practical knowledge and skills in the field of biotechnology and bioengineering, acquire skills in the design of equipment and processes, and product development. The studies take place in modern auditoriums and laboratories in UL and RTU, and in the study process there is an opportunity to familiarise themselves with work organisation of enterprises.

1.2.2. Aim of the study program is to prepare highly qualified specialists and scientists able to compete on both the local and international scientific labour markets in the various sectors of biotechnology and bioengineering. The study program "Biotechnology" with the acquired qualification Biotechnological process specialist trains students to solve the workforce problem now and especially in the future. According to the qualification and the basic tasks of the profession, the graduates are and will be ready to develop, organize and manage biotechnological processes in the company, participate in biotechnological production process research and collect their results, provide consultations. The college ensures continuous improvement, development, and efficient performance of the study field and the relevant study programs as demonstrated with the implementation of study changes according to a standard of qualifications, implementation of students' feedback, and labor market feedback. The direction of the study and the study program was improved according to the demand of the national economy, recommendations of experts, and development trends of the industry and science.

1.2.3. The development of OTC study programs, supervision of activities and periodic inspection are performed by program directors and methodological commissions, which are responsible for methodological work and its development in the institution. The College's new Development and Investment Strategy for 2021-2027 states that in OTC the short cycle professional higher education education methodological work is done by program directors and three methodological commissions are working: methodological commission of general education subjects, methodological commission of professional subjects and methodological commission of upbringing work. The self-assessment report showed the good intention of the development and review of the relevant study program of the study field but the feedback mechanisms (including feedback to students, employers, and graduates) have to be more precisely defined and they have to improve the logic, be efficient, and available for all stakeholders. The whole procedure does not seem fully transparent and needs to be improved. The study program is evaluated by the head of the study program and the methodological commission, which consists of 3 teaching staff, including 2 elected assistant professors, the head of the study program, and the deputy director of studies and research. In a student-oriented study program, which is required by European Association for Quality Assurance in Higher Education (ENQA) students should also be involved in this process. Even though it is evident that the methodological commission meets regularly and discusses the issues regarding quality assurance, there is no clear evidence of follow-up regarding the student's comments. Another weak point is the student survey system, where students evaluate the whole course and not specific courses, while the evaluation of the practical internship and mentors, by students, fully lacks. The distribution of power regarding the feedback given by students relies on the director of the study, to decide which

of the topics will be discussed and which not. This gives a weak point in the internal quality assurance system and possible bias in the share of students' feedback regarding the study and courses and should be improved. Additionally, feedback is shared orally and there is no clear follow-up on the implementation of the comments. The suggestion is to use a written form of communication of students' comments, to include students' representatives in of follow-up. To include more stakeholders in giving feedback, to create a logical follow - up that will be communicated with all relevant stakeholders, most importantly with students.

1.2.4. As experts were able to observe during study visit students have the opportunity to express their opinion via a questionnaire at the end of the study year. In the documents provided by the study programme management, the analysis of students survey and example of the survey questionnaire were presented (Self assessment report and Annex: Student survey questionnaire.docx and Studentu aptaujas anketa.docx). Even though there is a good intention of getting feedback from students, the questionnaire is not designed in an adequate way to assess all the aspects students could give feedback on. After the student's feedback on the study, in general, it is clear that the methodological commission meets regularly and discusses the issues regarding quality assurance, but there is no clear evidence of follow-up regarding the student's comments in the way of how their implementation is monitored. Another weak point is the student survey system, where students evaluate the whole course and not specific courses, while the evaluation of the practical internship and mentors, by students, fully lacks. The distribution of power regarding the feedback given by students relies on the director of the study, to decide which of the topics will be discussed and which not. This gives a weak point in the internal quality assurance system and possible bias in the share of students' feedback regarding the study and courses and should be improved. Additionally, feedback is shared orally and there is no clear follow-up on the implementation of the comments. The suggestion is to use a written form of communication of students' comments, to include students' representatives in follow-up. The good aspect of collecting feedback from students is that it goes via the platform [www.mykoob.lv](http://www.mykoob.lv).

1.2.5. The statistical data collection mechanism is established by the OTC in the form of the collection of analysis of various data, which serve as a basis for the development and implementation of measures to improve the field of study and is an integral part of the internal quality assurance of the college: proposals and complaints submitted by students are analyzed; regulations of study practices have been revised. Once a month, study progress and success indicators are analyzed, which helps to ensure an individual approach to serving students and providing the necessary support. Student satisfaction indicators are analyzed: - once a year for satisfaction with the program; at the end of each study course on satisfaction with the study course. The indicators obtained in the survey and the students' recommendations serve as a basis for the improvement of the study content and process, support and allow evaluation of the solutions implemented in the previous period and their efficiency. See Appendix 21 "Study Course Questionnaire". Graduate satisfaction indicators are analyzed once a year. Based on them, the content of the study program, its compliance with the needs of the labor market and the career paths of graduates are evaluated. Performance evaluation is performed in the college: once a year with administrative staff, once a year with teaching staff. The annual report of the college provides information about the college, the structure of the administration, and details the number of students and staff. External users also have the opportunity to get acquainted with the distribution and use of the state budget, revenue from economic activities, own resources and use. Detailed information on international relations is provided. The report is available on the OTC website in Latvian <https://otk.rtu.lv/koledzas-pasnovertejums/>

1.2.6. The higher education institution, OTC, in 2020, developed a new website - <https://otk.rtu.lv>.

The website has been developed in accordance with the Cabinet of Ministers Regulations No. 445 "Procedures for Institutions to Post Information on the Internet", data security and protection requirements. The website is used for the formal provision of the institution's functions. Information about OTC can also be found on the websites of several cooperation partners, for example, <https://www.rtu.lv/> , <https://www.lifescience.lv/> , <https://www.olaine.lv/lv#gsc.tab=0> etc. Through the websites of cooperation partners, OTC provides information about the educational institution and the study programs offered. The Director of the College is responsible for the compliance of the information available on the College's website with the information available in the official registers. The OTC website contains lists of study courses, as well as information about study program and study courses in English. See [https://otk.rtu.lv/wp-content/uploads/sites/29/2022/08/Studiju\\_plans\\_angl.pdf](https://otk.rtu.lv/wp-content/uploads/sites/29/2022/08/Studiju_plans_angl.pdf) From all the above mentioned it is clear that higher institution provides applicants and students with important information, is published in all languages of implementation of the study program, in this case in Latvian. The information on the web site should be updated regularly.

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

Efficiency of the Internal Quality Assurance System should be implemented within the scope of which a policy and procedures for assuring the quality of higher education shall be established; mechanisms for the creation of their study programs, for internal approval, for supervision of activities and periodic inspection thereof shall be developed; the criteria, conditions and procedures for the evaluation of student results, which enable reassurance of the achievement of the anticipated learning outcomes, shall be developed and made public; internal procedures and mechanisms for assuring the qualifications of academic staff and the work quality shall be developed; it shall be ensured that information regarding student results, graduate employment, the satisfaction of students with the study programme, the work effectiveness of academic staff, the study funds available and the disbursements thereof, essential indicators of the activities of a higher education institution is compiled and analyzed. As from the presented evidence, it is clear that the quality assurance system, policy and procedures exists and has a good intention of ensuring continuous improvement, development, and efficient performance of the study field and the relevant study programs. Still, some more improvements could be made, especially regarding the transparency of the students' feedback.

#### **Strengths:**

1. The quality assurance system exists and has a good intention of ensuring continuous improvement, development, and efficient performance of the study field and the relevant study programs.
2. The higher education institution/ college has established an internal quality policy that is available publicly at [KVALITATES-POLITIKA.pdf](#) (rtu.lv).
3. Management of the study program is compact, the head of the study program cooperates with the methodological commission, teaching staff and students and the study department. As a small HEI, cooperation is close and collegial, decision-making is fast and flexible.
4. Students can give feedback on the study program using questionnaires and orally.
5. The statistical data collection mechanism is established by the higher education institution in the form of the collection of analysis of various data, which serve as a basis for the development and implementation of measures to improve the field of study and is an integral part of the internal quality assurance of the college
6. The higher institution provides applicants and students with important information, published in all languages of implementation of the study program, in this case in Latvian on the website.

#### Weaknesses:

1. Feedback mechanisms (including feedback to students, employers, and graduates) have to be more precisely defined and they have to improve the logic, be efficient, and be available for all stakeholders. The whole procedure does not seem fully transparent and needs to be improved.
2. The distribution of the power in decision-making regarding the feedback from students relies on the study director.
3. Students do not have an opportunity to be more involved in the internal quality assurance system except by using the questionnaire for feedback.
4. The feedback on internships from students seems to not exist and is not part of the internal quality assurance system. Feedback is shared orally and there is no clear follow-up on the implementation of the comments

### 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:** Partially compliant

In general, OTC has established a policy and procedures for assuring the quality of higher education, the study program is evaluated by the head of the study program and the methodological commission, which consists of 3 teaching staff, including 2 elected assistant professors, the head of the study program and the deputy director of studies and research. The methodological commission meets once every two months and examines issues that have arisen during the course of studies in connection with methodological work. However, experts found that not all procedures are fully implemented and/ or understood by all involved parties (for example) from students' side. Also, feedback mechanisms have to be more precisely defined and they have to improve the logic, be efficient, and be available for all stakeholders. The whole procedure does not seem fully transparent and needs to be improved. (more information in sub point 1.5).

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

#### **Assessment of compliance:** Partially compliant

The higher education institution/ college has established a policy and procedures for assuring the quality of higher education:

The Policy is publicly available at [KVALITATES-POLITIKA.pdf](#) ([rtu.lv](#))

KVALITATES-POLITIKA

However, even the policy is established and procedure are there, they should be improved with more transparency and broader assessment from the students side.

- 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 development of OTC study programs, supervision of activities and periodic inspection are performed by program directors and methodological commissions, which are responsible for methodological work and its development in the institution

- 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

See <https://otk.rtu.lv/nolikums/> "Studiju un pārbaudījumu nolikums". The regulations attached to the website are available in Latvian.

Each study course has a description of the study course evaluation criteria, see the appendix "Study courses"

- 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:** Partially compliant

The course has procedures like open applications for teaching staff, where anyone with references can apply (Job\_description.zip) The course committee decides who will be accepted as teaching staff. However, in the study assessment, it was observed that some of the teaching staff seem not to be fulfilling the legal requirements for their positions, which was indicated as a lack of consistency. The internal arrangements and mechanisms that ensure the qualification and quality of academic staff seems not to be fully transparent and not to follow the set of criteria set by the law.

- 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:** Partially compliant

The annual report of the college provides information about the college, the structure of the administration, and details the number of students and staff. External users also have the opportunity to get acquainted with the distribution and use of the state budget, revenue from economic activities, own resources and use. Detailed information on international relations is provided. The report is available on the OTC website in Latvian  
<https://otk.rtu.lv/koledzas-pasnovertejums/>

In order to follow European Association for Quality Assurance in Higher Education (ENQA) student-oriented study program, it is recommended to create transparent and fair internal quality assurance system. This means that students should give feedback on specific topic and professor, including practical activity with industry. It is recommended to create a clear criteria for sharing feedback from students with teaching staff, to use a written form of communication of students' comments, to include students' representatives in of follow-up. To include more stakeholders in giving feedback, to create a logical follow - up that will be communicated with all relevant stakeholders, most importantly with students.

- 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 study program is evaluated by the head of the study program and the methodological commission, which consists of 3 teaching staff, including 2 elected assistant professors, the head of the study program and the deputy director of studies and research. The methodological commission meets once every two months and examines issues that have arisen during the course of studies in connection with methodological work.

### 1.3. Resources and Provision of the Study Field

## Analysis

1.3.1. According to the information provided in the self-assessment report (SAR 2.3.1., page 26), OTC is guided by the legislation established by the state – Cabinet of Ministers Regulation No. 1316 of November 12, 2013 "Procedure for the calculation and Granting of Basic Financing to Scientific Institutions" (Kārtība, kādā aprēķina un piešķir bāzes finansējumu zinātniskajām institūcijām), which has expired on 22 April, 2022. Instead of them, new regulations of the MK No. 252 "Procedures for Financing the Scientific Activity Base" (Zinātniskās darbības bāzes finansējuma piešķiršanas kārtība) have been adopted. It should be concluded that these regulations apply more to scientific institutions, while the college is not classified as a scientific institution, although it is part of a scientific institution, as it is included into the structure of the RTU. The college mentions that the project "Pilot Platform of Vocational Excellence Water" is being implemented (PoVE Water) 612632-EPP-1-2019-NLEPPKA2-SSA-P collaboration with Friesland College (Netherlands) and the funding available for this project is EUR 32 170, but it cannot be attributed to science-based funding. Therefore, in a general assessment, it would be necessary to develop internal regulations between RTU and OTC, which is under its authority, which would provide for an appropriate financing system to ensure and strengthen the scientific activity in the college. The source of funding for the study program is a grant from the state budget from general revenues for the provision of studies. The self-assessment report indicates (SAR 2.3.1.) that the available funding in general allows the implementation of this study program direction with one study program, including the provision and improvement of material and technical equipment. Since the base cost of a study place is 1 630.11 EUR, but the cost per student, at the optimal coefficients "2.9" is 4 992.81 EUR, which is higher than the funding allocated by the state (4 727.31 EUR) (SAR 2.3.1., page 27), it can be concluded that the field of study is not financially self-sufficient. It would be necessary to increase the amount of state funding to make it financially self-sufficient.

1.3.2. During the visit, it could be seen that the college, where the course of study is implemented, has the necessary infrastructure and extensive technical support - laboratories, equipment, etc. Many infrastructure and support units have been purchased, EU project financing has been successfully implemented. The situation is also objectively reflected in the self-assessment report (page 27). A particularly positive situation is that in 2020 a total of 11 laboratories have been opened (<https://otk.rtu.lv/laboratorijas/>), located in the main building of the college, of which exactly 9 laboratories are intended for the study program realized in the field of study. It is positive that the innovative laboratories are used for student teaching where students acquire professional competences that meet the requirements of the industry companies. It would be necessary for a college to develop a plan, how to use this modern infrastructure not only for the students in the study process, but also to use it for conducting various researches, increasing scientific activity of teaching staff and also involving students in research outside of the study process. The research process can be realized with the existing facilities. The main thing is to ensure that these equipment are used for a certain period of time and perform the necessary maintenance to make them last longer. For the implementation of the RTU OTC study direction college has the necessary IT technology, but it would be necessary to think about the use of various licensed software for the realization of the study program, because using only free versions cannot achieve a high level of quality in the study process, as they may not provide all the necessary functions. When using licensed software, RTU OTC should also think about how students could use the software in the distance study process (the software that does not have a student version or those that do not have full functionality in the student version).

1.3.3. RTU OTC has a sufficiently equipped library with various books in English, which provides certain information on the topics to be studied in the study program (at least 30% of the available

literature is related to the study program "Biotechnology"). In parallel, the entire library has missed a sufficiently wide range of major international databases (Scopus, Web of Science, ScinceDirect), since only the EBSCO database will be available from January 1, 2023 (self-assessment report, page 27; <https://otk.rtu.lv/datubazes/>), which might not provide sufficient information in the directions of various scientific sectors and in the study process. It would also be necessary to think about the use of the database outside the college premises, so that the student can access the necessary information even from home. The library and college will be advised to improve their effectiveness by encouraging students to use them more intensively in the study process. It is positive that ISO standards are also available, which can be used by students. Since the library generally recommends students to use free-access databases, it is not possible to present statistics on the use of databases and websites. In this case, the college would need to develop a unified access system and expand the range of scientific databases, which would provide the opportunity to also compile statistics on the frequency of use. In general, assessing the information contained in the self-assessment report and the library premises viewed during the visit, it would be necessary to restore them, which would motivate visiting the library more widely. The working time of the library is positive.

1.3.4. OTC has developed a good study process infrastructure: e-study environment on the Moodle and Mykoob platforms, IT equipment and peripheral devices, the necessary IT support. Students can use the Mykoob platform to familiarize themselves with study topics and their assessments, while the Moodle system is used more to access study course materials, submit independent work and perform cross-checks (tests). It is positive to mention, from the self-assessment report and after the visit, that during the pandemic (remote learning process) the teaching staff conducted lectures using various platforms - Zoom, Skype, as well as made various video recordings or online laboratory works, so that students could learn them (informally) not being present in laboratory. They even used various virtual tools - labster.com, chemcollective.org, etc. During the meeting, the students evaluated the work of the teaching staff very positively during the pandemic, it was very well organized. The only thing that the college would need to consider is to combine the necessary functions of the study process in one platform in order to make it easier for students to apply in an e-study environment. Using two platforms is not a useful process and, consequently, also teaching staff must use both platforms to insert the necessary information for students.

1.3.5. According to the information provided in the self-assessment report (SAR 2.3.5., page 33), OTC has developed the procedures for the selection of teaching staff and the election of academic staff. Vacancy announcements are published on the RTU OTC website (<https://otk.rtu.lv/vakances/>), but are not published in paid advertisements. Advertisements of this type, related to the selection of academic staff, should at least be published in the official state newspaper "Latvijas Vēstnesis". According to the self-assessment report, it can be concluded that in recent years lecturers are sought through universities, addressing them individually. The procedure for the selection of teaching staff and the election of academic staff is determined in internal regulatory documents in accordance with national legislation. The self-assessment report indicates that currently the teaching staffs are sufficient to ensure the operation of the study area, although the turnover of the teaching staff was observed before, but at the given moment (in recent years) it has stabilized. The College should explore the possibility of a wider teacher recruitment system, whereby it would be possible under the rules ([https://otk.rtu.lv/wp-content/uploads/sites/29/2021/01/Nolikums\\_-par\\_akademiskem\\_amatiem\\_20\\_10\\_2020.pdf](https://otk.rtu.lv/wp-content/uploads/sites/29/2021/01/Nolikums_-par_akademiskem_amatiem_20_10_2020.pdf)) and the Professional Education Law (<https://likumi.lv/ta/id/20244-profesionalas-izglitiba-likums>) within the framework of Article 20.2 ((1) College staff consists of: 1) academic staff - employees elected to academic positions of the respective college) to provide a larger number of elected teaching staff. The number of elected

academic staff identified in the self-assessment report is very low, with only 2 of the 17 teachers involved in the study process. The other 15 teaching staff is guest lecturers whose main work is at another university. In general, when assessing Annex 10 "Teaching\_staff\_CV\_10.zip", it can be concluded that the qualifications of the academic staff involved in the study programme are consistent with the achievement of the objectives and tasks of the college. During the reporting period, no one of teaching staff was provided full time job. Evaluating Appendix 9 of the self-assessment report "Composition\_of\_the\_academic\_staff\_9.docx", it can be concluded that the teaching staff involved have been selected according to the college regulations. The education acquired by these teaching staff meets all the conditions, with the exception of one teaching staff that would need to be prevented from obtaining a higher degree or a level of professional qualifications.

1.3.6. As it is written in self-assessment report (SAR 2.3.6., page 34), then RTU OTC providing various training courses for teaching staff to improve their pedagogical and didactic skills. Scientific seminars are also offered, the aim of which is to promote the involvement of teaching staff in research, as well as to provide support for the preparation of publications in internationally cited databases. In parallel with the offered courses, the college should create a certain motivational system that would motivate the involved teaching staff to participate in various activities, because judging by the attachment "Data\_collection.docx", the involvement of the teaching staff is low. The college's teaching staff is also provided with the opportunity to participate in the Erasmus+ mobility program, and during the evaluation period, it is possible to observe the participation of teaching staff in the ERASMUS+ program when going outside of Latvia. The number of outgoing teaching staff is limited by the number of mobilities and the amount of allocated funding in the college. It should also be noted that mobility activities have been negatively affected by the Covid-19 pandemic in recent years. Of course, it would be desirable to ensure greater mobility of teaching staff involved in the study process, and the college administration should also look at promoting mobility with various foreign teaching staff, which could expand students' knowledge of the qualifications to be acquired. In general, no information is available on the results of these implemented measures and their effectiveness on the participating teaching staff and the implemented study program. It would be necessary to create a system in which feedback is evaluated on the usefulness and necessity of various courses.

1.3.7. As mentioned in the self-assessment report (SAR 2.3.7., page 37), then during the reporting period, no teaching staff was provided with a full-time work, but no mention was made of the capacity of the participating teaching staff in research. But since no teaching staff has been provided with full-time work, it is likely that the workload is balanced.

1.3.8. According to the information provided in the self-assessment report, RTU OTC students have access to informative support (news - <https://otk.rtu.lv/>, JAUNUMI, documents - <https://otk.rtu.lv/normativie-dokumenti/>, etc. published on the RTU OTC website, e-study platform), career support (guest lectures, excursions, participation in various professional courses, etc.), psychological support (in the Student Service of Riga technical university) etc. RTU OTC Student Self-Government and Student organizations involve students in leisure and entertainment events. As has been identified during the visit with students, in some cases information on different opportunities does not reach students, it may be necessary to improve the channels of information. The surroundings are consistent with functional aesthetics, as well as the environment and spaces are fully adapted to people with disabilities.

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

Resources and provision for the field of study are adequate. The available funding in general allows the implementation of the study direction and the relevant study program. Appropriate infrastructure and a well-organized environment for the study process and research are available for the implementation of the study direction. RTU OTC has created a sufficient infrastructure and system for the distance study process.

There is a system for the selection of teaching staff and the election of academic staff. At the moment, the amount of teaching staff is sufficient for the implementation of the study direction, but it is necessary to think about the sustainability of unique specific study courses, and that these courses would require teaching staff elected by the college, but not guest teaching staff. College need to think about how to increase the number of 2 elected teaching staff to a much higher number. A very good proportion would be, if the figures of the teaching staff mentioned in the self-assessment report were, on the contrary, that 15 elected teaching staff and only 2 guest lecturers would be involved in the implementation of the college study program.

It would be necessary for RTU OTC to develop a motivation system that would motivate the academic staff to carry out research work and prepare publications in parallel with the study process. Outgoing mobility activities take place on the part of teaching staff, but can still be strengthened, while the level of incoming mobility is not at all. RTU OTC students have access to various support and information.

#### Strengths:

1. Highly developed material and technical support for the study process.
2. The available funding allows the implementation of the study direction and program, with the existing number of students.
3. A wide range of necessary student support to meet their needs.
4. Effectively organized distance studies process.

#### Weaknesses:

1. There is no motivational system that would motivate teaching staff to go on mobility and engage in research more widely.
2. Two e-learning environment applications. Instead, a single unified e-learning environment platform should be created.
3. Low level of mobility, especially for incoming mobility.
4. Low number of international databases in the library, there is only one database - EBSCO.
5. Low number of elected teaching staff (only 2).

### **1.4. Scientific Research and Artistic Creation**

#### **Analysis**

1.4.1. The scientific research performed by the teaching staff has the direction of the research in correspondence to the development goals of the higher education institution and is relevant to the study field and industry. Some of the publications are published in relevant international peer-reviewed journals cited in relevant scientific bases (Scopus and Google Scholar) while the majority are proceedings, abstracts or posters presented in local conferences related to the study field and industry. The fundings related to scientific research are clearly available, as evident from the Memorandum of Understanding between the Ministry of Education and Science and Riga Technical University The agreement of 4 February 2019 states: Cabinet Regulation No. 1316 of 12 November 2013 "Procedures for Calculating and Granting Basic Funding to Scientific Institutions; MES annual order "On the allocation of basic funding to scientific institutions IUU. year ". Data on available funding for research and/or artistic creation, its sources, and their use for the development of the study field and corresponding study programs - 32 170 euros, project "Pilot Platform of Vocational

Excellence Water" (PoVE Water) 612632-EPP-1-2019- NLEPPKA2-SSA-P collaboration with Friesland College, The Netherlands. An online training platform was set up during the Pilot PoVE Water project, where leading experts from the participating institutions prepared training materials on various topics related to water supply and quality control. The lecturer of RTU Olaine Technology College participated in the creation and maintenance of the virtual training platform, developing the study material "Microbiological Control of Drinking Water". One of the sections of the theoretical material was devoted to potential disease-causing microorganisms that spread through water. The practical part (laboratory work protocol and video material) is dedicated to microbiological testing of water using the membrane filter method. All study materials are available to college students and faculty and can be used as additional teaching aids/study support and are available at: <https://resources.povewater.eu/pvle/>. The project strengthened international cooperation with various partners from the European Union, resulting in an increase in various activities, such as the opportunity for students and teachers to participate in online exchange events organized by Glasgow Clyde College in the UK and Friesland College in the Netherlands. Information about the organization of the study process, scientific and creative activities, internal regulations is available on the college's website or the information is sent to the platform [www.mykoob.lv](http://www.mykoob.lv). The quality of the work of the teaching staff is assessed by analyzing the scientific and creative activities (once a year). The scientific cooperation with the institute BIOR where the largest number of practice places is realized and study tours are organized regularly. Students have the opportunity to develop and defend of students' qualification papers, as well as to participate in the qualification examination commission. It is strongly recommended to set up more international scientific collaborations that would give both students and teaching staff opportunities for learning and gaining more knowledge on new technologies and scientific approaches. A good example of already present scientific collaborations should be promoted as a model of good practice.

1.4.2. The main goal of the first level professional higher education is to prepare students for the profession, therefore the study program envisages the acquisition of knowledge and skills required for a professional qualification. Consequently, the study program has a proportionately smaller amount of academic knowledge than the academic study programs. The involvement of students in research activities is mainly related to the development of term papers, independent work and final qualification papers. In the process of developing works, students get acquainted with the latest literature in the field to develop projects, the implementation of which would increase production efficiency. During the elaboration of these works, students acquire the professional competencies necessary for further academic and professional growth - independence, use of correct scientific terminology, critical evaluation of literature and obtained data. The involvement of students of the "Biotechnology" study program in scientific and applied research has increased. Students of this study program, while still in the study process, developed two very interesting and rare scientific studies, about which they also wrote articles in the OTC Scientific Articles Collection and will present the summary and results of these studies at the Scientific Conference. In both of these studies, there was close cooperation with two OTC partner institutions - AS Grindex on wastewater and ZPI Silava on the spread of tapeworms in the wolf population. After the restrictions of the Covid pandemic, more intensive use of the modern material and technical base of OTC, especially the laboratories, resumed. This will definitely promote student engagement and participation in various scientific research. The teaching staff not only publishes the results of their research in the annual collection of scientific articles of the college but also uses the results of the research in improving the content of their taught study courses. Several teaching staff members include elements and conclusions of their scientific articles and research in their lectures and practical work for students. Teaching staff also mostly compile their course descriptions on the basis of various scientific studies in their subject areas. Few teaching staff members applied methodologies of laboratory work/practical work so that students can work on the relevant topics, as well as develop a study and

then adapt the methodology of laboratory work for the study course. These good examples of applied research and the outcomes integrated in the study process in the study programmes should be encouraged and become positive practice. Newly established laboratories should promote more of research activities of teaching staff and students that will contribute to these goals.

1.4.3. International cooperation in the field of scientific research and/or applied research and/or artistic creation within the study field and the relevant study programs is present and there is tendency in development of similar initiatives. This relates mainly to the international project Pilot Platform of Vocational Excellence Water (Pilot PoVE Water). Through this project teaching staff had opportunity to participate in international exchange, develop emerging professional competencies and skills in the water sector, transforming them into a form of professional excellence and ensuring a vertical integration of vocational education with the knowledge triangle and a sustainable link with regional economic and social systems. The project aims to create the infrastructure needed to strengthen professional excellence in the water sector in Europe, laying the foundations for the development of vocational education programs and the development of competences in vocational education and training (VET) students. The project presents an example of good practice and the future should bring more similar projects and activities.

1.4.4. The higher education institution/ college teaching staff has been involved in scientific research and/or applied research and/or artistic creation that are well-functioning and efficient. International cooperation in the field of scientific research in the international project Pilot Platform of Vocational Excellence Water (Pilot PoVE Water). Through this project, teaching staff had the opportunity to participate in international exchange, develop emerging professional competencies and skills in the water sector, transforming them into a form of professional excellence and ensuring a vertical integration of vocational education with the knowledge triangle and a sustainable link with regional economic and social systems. The project aims to create the infrastructure needed to strengthen professional excellence in the water sector in Europe, laying the foundations for the development of vocational education programs and the development of competencies in vocational education and training (VET) students. Scientific research presentation opportunities for teaching staff are visible as references in their curriculum vitae, and through the organization and participation at scientific-practical conference organized continuously for more than ten years. Scientific-practical conference were attended conferences, academic staff, and industry professionals. Conference papers are conferences collections of scientific articles available in the OTC library. The research activity of the academic staff of the study program “Biotechnology” is related to the content of the course. The close cooperation with the institute BIOR, where the largest number of practice places is realized, and study tours are organized regularly is another opportunity that adds up to this goal. The teaching staff of RTU Olaine Technology College participated in the creation and maintenance of the virtual training platform, developing the study material “Microbiological Control of Drinking Water”. One of the sections of the theoretical material was devoted to potential disease-causing microorganisms that spread through water. The practical part (laboratory work protocol and video material) is dedicated to microbiological testing of water using the membrane filter method. All study materials are available to college students and faculty and can be used as additional teaching aids/study support and are available at: <https://resources.povewater.eu/pvle/> All mentioned projects and activities are example of good practice and future should be good example to bring more similar projects and activities.

1.4.5. The higher education institution/ college has developed mechanisms to promote the involvement of the students in scientific research and/or applied research and/or artistic creation. They are well-functioning and efficient. The students of the study programs of all levels are involved in scientific research and/ or applied research and/or artistic creation. The involvement of students

in research activities is mainly related to the development of term papers, independent work and final qualification papers. In the process of developing works, students get acquainted with the latest literature in the field to develop projects, the implementation of which would increase production efficiency. During the elaboration of these works, students acquire the professional competencies necessary for further academic and professional growth - independence, use of correct scientific terminology, critical evaluation of literature and obtained data. Students had the opportunity of being involved in scientific projects where they were able to develop their final thesis and present their work on scientific-practical conferences. Some students involved in scientific research developed scientific studies and wrote articles in the OTC Scientific Articles Collection and present the summary and results of these studies at the Scientific Conference. In both of these studies, there was close cooperation with two OTC partner institutions - AS Grindex on wastewater and ZPI Silava. The fact college had renewed 11 new laboratories gives a framework for future scientific research and the involvement of the students in it. Even though the focus of the vocational study is on development of the practical skills with students, they still had the opportunity to participate more in scientific research.

1.4.6. There is intention for application of innovative solutions in the study field, which will have significant impact on the study process, but still no evidence presented. The intention of the future applications of innovative solutions goes in direction of the basic principles of the "green course" to identify potential growth opportunities and future prospects in accordance with the basic principles integrated in UN Guiding Principles for Sustainable Development. These principles plan to be integrated into teaching, learning, science and governance processes, using resources in a sustainable and efficient way, thus minimizing negative impacts on the environment.

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

Scientific Research and Artistic Creation of the present program fulfills in proper manner majority of set criteria. There are evidence of good intention in the development of research activities in applied sciences related to a study program, the international project the teaching staff was involved gave many opportunities for students and teaching staff to develop their scientific research and many professional skills. The nature of the vocational study requires the involvement of students in the development of practical skills rather than academic competencies. Still, the college is taking care of developing possibilities for scientific projects that would give students and teaching staff more opportunities for learning and professional development. There are several examples of good practice regarding scientific projects and involvement of teaching staff and students that should be promoted as models of good practice. In the future it is strongly recommended to develop more of the similar projects and opportunities for students and teaching staff.

#### **Strengths:**

1. The scientific research performed by the teaching staff has the direction of the research in correspondence to the development goals of the higher education institution and is relevant to the study field and industry.
2. Some of the publications are published in relevant international peer-reviewed journals cited in relevant scientific bases (Scopus and Google Scholar) while the majority are proceedings, abstracts or posters presented in local scientific-practical conferences related to the study field and industry.
3. International cooperation in the field of scientific research and/or applied research and/or artistic creation within the study field and the relevant study programs is present and there is a tendency in develop of similar initiatives.



4. The involvement of students in research activities is related to the development of term papers, independent work and final qualification papers.
5. The teaching staff had the opportunity to participate in international exchange, and develop emerging professional competencies and skills in the water sector, transforming them into a form of professional excellence and ensuring a vertical integration of vocational education with the knowledge triangle and a sustainable link with regional economic and social systems.
6. Scientific research opportunities for teaching staff are visible as references in their curriculum vitae, and through the organization and participation at scientific-practical conference organized continuously for more than ten years. Scientific-practical conferences were attended conferences, academic staff, and industry professionals. Conference papers are conference collections of scientific articles available in the OTC library.
7. Renewed 11 new laboratories gives a framework for future scientific research and the involvement of the students in scientific research.

#### Weaknesses:

1. There is intention for application of innovative solution in the study field, which will have significant impact on the study process, but still no evidence presented.
2. The focus of the vocational study is on development of the practical skills with students, they don't have much opportunity to participate more in scientific research by the nature of the study.

### 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

Every two years, RTU OTC organizes a scientific-practical conference in which students, teaching staff and industry professionals participate with reports. Conference reports are collected in proceedings of scientific articles, which are available in the RTU OTC library. Many visiting teachers carry out various research activities in their main workplaces - universities. It would be necessary to motivate the teaching staff of RTU OTC more to engage in scientific work, as a result of which they could use their scientific researches to improve the content of their taught study courses.

### 1.5. Cooperation and Internationalisation

#### Analysis

1.5.1. Cooperation with other institutions, especially industry, plays a huge role in providing the study program "Biotechnology". At the moment they have four cooperation agreements with institutions of higher education in Latvia (University of Latvia, Latvia University of Life Sciences and Technologies, Rēzekne Academy of Technology and The Red Cross Medical College of Rīga Stradiņš University). OTC is incorporated in a system of Riga Technical University from 2019. While the agreements in place provide opportunities, it is not entirely clear how cooperation with other HEIs works in practice and no examples of it were found in a self-assessment report. There definitely is a place for improvement and both academic staff and students of OTC could benefit from visiting laboratories, having masterclasses or guest-lectures from similar study directions in LU, LBTU, RTU. Definitely, cooperation with RTU should be most easily strengthened, e.g. through access to laboratories, research cooperation, etc. RTU has several laboratories (for example, Water Systems and Biotechnology Institute, Institute of Polymer Materials etc.) within its walls whose research areas could also be of interest to OTC students, e.g. for internships.

At the same time, cooperation with industry should be evaluated as good. As students have to have two internships during their studies and develop a qualification, it plays an important role in ensuring the content and quality of your studies. OTC has close cooperation with the Latvian Chemical and Pharmaceutical Association and the Latvian Biotechnology Association, as well as with the Council of Experts on Food and Agriculture (NEP) and The Association of Latvian Chemical and Pharmaceutical Industry (LAĶĪFA). OTC has mentioned that cooperation with LAĶĪFA helps them to ensure development of the programme by following needs of the industry. OTC has 23 agreements with industry/companies about internships and it seems that students use the opportunity to do an internship in different companies. After internships companies also give feedback about students. It seems that students do not have problems with finding places for internships and later continue to develop their qualification works there on a regular basis. A significant part of students start to work in companies where they had internships. It looks that Grindex and Olainfarm are most likely to host students on traineeships. These companies specialize in pharmaceutical and chemical technology, so it could be useful to involve even more companies/laboratories which specialize in biotechnology as regular hosts of student internships. But the current diversity of internship places looks promising and college is really trying to widen the amount of agreements about internships.

1.5.2. In a self-assessment report OTC has mentioned two agreements with institutions abroad, but only one of them - Business Academy Aarhus (Denmark) is mentioned in an annex where HEIs with whom OTC have official agreements were listed. Also, the last mobility with involvement of this institution happened in 2017. OTC mentions that it is planned to expand the network of partner universities/colleges in the coming years and experts strongly suggest that this should be done. It is important not only to make agreements, but create true partnerships, exchange of experience and regular mobilities. If it is possible, experts suggest firstly to try to make cooperation with institutions in Baltics, for example, with Vytautas Magnus University which has bachelor programme in biotechnology and Thermo Fisher Scientific Baltics, which is an international company and has world-class capabilities in manufacturing products for the life science market.

1.5.3. During the period under review there were no incoming or outgoing student mobilities and no incoming academic staff mobility. Some lecturers have been involved in mobilities in recent years (in 2019 - 8, 2020 - 2, 2021 - 2 and in 2022 - 4 mobilities happened). Regarding mobility of academic staff, it is important to mention that in most cases going on mobility is the lecturer's own initiative, of course, strongly supported by the college. To change this situation and involve more representatives of academic staff in it, a system or a programme for promoting Erasmus+ possibilities, contributing and monitoring lecturers' activities abroad should be implemented. OTC has an aim to create more cooperation agreements on student mobility and promote it more, so experts strongly suggest to stick with this plan and to think about creative ways to convince students about the usefulness of international mobility. It has to be taken into account that an important part of students are already working while studying and this is also a reason why they do not use exchange possibilities. College should pay attention to promoting Erasmus+ internships and clarifying students that skills and experience gained abroad will only help them in creating their career and time spent away won't "hold them back". It is also important to give clear information about how Erasmus+ mobilities are funded, amount of scholarships and what kind of help students will get before, during and after mobility. In a case if a student or lecturer chooses to go on a mobility trip, college should help and show support in every step of it, especially regarding documentation. In general, management of the college understands that international experience is important for the personal development of college students and academic staff and hopes to involve students in Erasmus+ mobilities.

It seems that lack of knowledge of the English language can be the reason why students and academic staff do not use Erasmus+ possibilities. During on-site visit when they met experts,

students and lecturers used translator. It seems that they are not confident about their English language skills. To improve the situation for students, it is strongly suggested that the study course "Foreign language" should be revised because it doesn't give students language skills they need. More possibilities to read, listen and talk in English should be implemented in the study process (as seminars in English, presentations in study courses, guest-lectures etc.). To improve English language skills for academic staff, out-sourced courses must be provided and also the need to use English language on a regular basis could help (for example, in exchange visits, in seminars, courses etc.).

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

Cooperation with local industry can be evaluated as good, college has several collaborations. Amount of agreements with companies for guaranteeing internship places for students is adequate and wide enough. But, collaboration with other higher education institutions must be improved, especially with those who have appropriate research facilities. It is very important to promote internationalization and college understands it very well. More agreements with institutions abroad must be made and mobility options for students must be promoted. College has to develop a system for monitoring and supporting mobility of lecturers' cause they are keen to use these opportunities. English language skills for both - students and academic staff must be improved.

#### **Strengths:**

1. Academic staff shows an interest to go on mobility abroad and college supports it.
2. Management of the college understands the benefits of internationalization.
3. College has a plan to make more agreements with HEIs abroad and promote mobility for students.
4. Good cooperation with industry of biotechnology in Latvia.
5. Good amount of agreements with companies for providing internship places for students.

#### **Weaknesses:**

1. Insufficient English language skills of students and academic staff.
2. No incoming or outgoing mobility of students.
3. Only one agreement with HEI from abroad.
4. Weak cooperation (four agreements) with other HEIs in Latvia.
5. No system for monitoring and promoting lecturers' mobilities.
6. College has no experience with helping students going abroad.

### **Assessment of the requirement [3]**

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

#### **Assessment of compliance:** Partially compliant

Cooperation with an industry in Latvia can be evaluated as good - students have a wide choice when it comes to internships, industry is happy to have students from OTC. But the internationalization level (no students mobility, only four contracts with HEIs from Latvia, one from abroad) is very low and must be improved. On the list of agreements there are contracts of cooperation signed with one international and four Latvian institutions. (AIC Annexes NR\_13\_pielikums\_30\_0-e.docx) From the document on mobility of the teaching staff it could be

concluded that staff had possibility to visit 9 European counties, in the last assessed period (AIC Annex Mobility of teaching staff abroad\_16.docx) while student did not have any inbound and outbound mobility AIC Annex NR\_15\_pielikums\_ENG.docx) None permanent contract was signed with foreign lecturers, while with Latvian there are 17 permanent teaching staff with contracts (AIC Annex Composition\_of\_the\_academic\_staff\_9.docx).

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

### **Analysis**

1.6.1. Olaine Technology College had a previous accreditation procedure in 2017 and received eight recommendations, based on these recommendations, they created a plan for implementation. They had two recommendations regarding the homepage of OTC. In general, they were asked to improve the homepage and put more information about study programmes, courses etc. At the moment it is easy to find information on the homepage (<https://otk.rtu.lv/>) and the college has fulfilled this requirement very well. There is no version of the homepage in English, but it is possible to find a study plan. However, translating all the information into English would probably require too many resources from the college, especially given that the studies are entirely in Latvian. Same time, it was mentioned that more academic staff development programs should be implemented, including English language classes, more support should be provided for international/local mobility and activities that promote cooperation with research groups established in the immediate vicinity. This recommendation is the one fulfilled most weakly. Although academic staff actively attend various courses, there is little mobility abroad and the College does not have a uniform system for monitoring the improvement of lecturers' skills. English language skills of academic staff remain problematic and only one lecturer since 2020 has taken a course for English language improvement (General English course at Intermediate II level, 54 h).

College had two recommendations regarding students which they have completed. First one was about informing students about changes to the lecture schedule, which now happens in mykoob.lv system and the homepage of OTC. Second one was about surveys that could be moved to an online environment. At the moment surveys about courses students fill in an online environment which is google forms. But it is important to mention that college is waiting and ready to implement one common online environment. At the moment they use moodle, mykoob.lv and also options given by google (google forms for surveys and drive for online books and other big files). Students from the Students Council are involved in reviewing content of surveys. As OTC has been added to RTU, the college hopes that the University will soon give access to ORTUS, thus eliminating the need to use several online platforms in parallel. It could also be a single environment for student information, study materials and surveys.

Two recommendations from previous accreditation are connected with cooperation with other institutions of higher education and industry. In general, OTC had to make more official agreements which college did. At the moment they have four cooperation agreements with institutions of higher education (University of Latvia, Latvia University of Life Sciences and Technologies, Rēzekne Academy of Technology, Business Academy Aarhus and The Red Cross Medical College of Rīga Stradiņš University. OTC is incorporated in a system of Riga Technical University, but cooperation with it could be improved. While the agreements in place provide opportunities, it is not entirely clear how cooperation works in practice. It should also be noted that for a large part of the period since the previous accreditation there was a Covid-19 pandemic, which made practical cooperation difficult. At the same time, OTC has 23 agreements with industry/companies about internships. This amount is adequate and it is visible that students are taking advantage of the wide range of internships and choosing from a variety of placements. Of course, the successful cooperation with employers needs to be continued through new contracts with new companies in the sector, but the

recommendation made before can be considered as fully met.

Last recommendation was “to consider improving the curriculum to include more courses on emerging biotechnology, such as DNA and protein identification, the cell 'factory', etc., to balance the current emphasis on chemistry and chemical technology. If the College does not decide on such changes, it must change the name of the study program to match the content.” OTC decided to improve the content of the studies, for example, by adding to study plan such courses as Cell Biology, Genetics and DNA Technology, Bioenergetics etc. The College also faced the challenge of aligning the content of the programme with the professional standard "Biotechnological Process Specialist". In general, programme contains enough biology-related courses, but it should be taken into consideration that some of these courses do not have laboratory practices and amount of is only 1 or 2 CP (for example, Planning of biotechnological experiments, Plant biotechnology, Genetics and DNA technology etc.). Some trainers' CVs do not show that they are experts in the fields they are teaching about and may lack specific and practical knowledge, for example, with plant-connected technologies, genetic manipulations of organisms, up-to-date biotechnological and molecular biology methods etc. In general, it is hard to cover all knowledge needed for biotechnologists in a college programme and attract highly qualified teachers with specific expertise, but OTC is doing their best. However, they should consider attracting more guest-lecturers from research institutes, universities and industry in specific themes. Also, some of similar study courses maybe can be merged to avoid having a lot of small amounts (1-2 CP) courses.

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

Overall, the College has made a sincere effort to address the recommendations of the previous accreditation. Some of them could probably have been better executed, but this cannot be considered a major non-compliance. The most important shortcoming is that there is no system in place to monitor and promote the development of lecturers' skills, which would ensure more equitable involvement in different courses and mobility programmes. This is probably largely due to the fact that some lecturers still have insufficient knowledge of English.

#### **Strengths:**

1. Management of the college is interested in hearing the recommendations and genuinely cares about the development of the programme.
2. The college and its management are compact, many changes can be implemented quickly and efficiently.
3. Academic staff show a desire to improve their skills.

#### **Weaknesses:**

1. College does not have a uniform system for monitoring and promoting the improvement of lecturers' skills.
2. In a short term programme with internships it is challenging to include enough study courses with practical laboratory works to cover all skills that are required for a biotechnological process specialist
3. Some of the recommendations from the previous accreditation could have been implemented better if the college had received practical and consultative assistance from RTU.

### **Assessment of the requirement [4]**

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

**Assessment of compliance:** Partially compliant

The shortcomings identified in the previous assessment of the study field have been addressed, but in expert opinion, partially and there still is a place for improvement. The most important shortcoming is the lack of a system for monitoring the development of academic staffs' skills and knowledge, including English language.

**1.7. Recommendations for the Study Field****Short-term recommendations**

1. It is necessary to improve the admission rules, including in them the fact that, in parallel with the Latvian language, mathematics and foreign language, the results of the chemistry/biology exams or the final grade of these subjects are taken into account, giving additional points at the time of admission.
2. Introduction of critically acclaimed scientific literature bases with access to internationally cited publications, therefore college should cooperate with RTU to gain access for a wider amount of electronic scientific literature bases that could be relevant to students of this study field.
3. An action plan needs to be prepared to describe clear steps that will be taken to stabilize the situation if the COVID-19 crisis prolongs and/or similar challenges appear.

**Long-term recommendations**

1. The involvement of teaching staff in scientific research work is moderate. Therefore, RTU OTK should find ways to support greater involvement and develop a motivation system for the involvement of teaching staff in research activities.
2. The college should develop an action plan to monitor and promote mobility activities, especially for academic staff. Participation in mobility projects should be thematically linked to the specific field of study or to the development of skills needed by lecturers.
3. It is necessary to create tasks aimed at strengthening the mobility of outgoing and incoming students in order to increase these numbers. More attention needs to be paid to the form of information about mobility based on the experiences and skills that mobility can provide for students.
4. Introduction of a crisis management system in order to be able to respond rationally to severe factors like decrease of people mobility options, distance practice and internships and similar events.
5. Improve the efficiency of using the library with access to databases by encouraging students to use them more intensively during the study process.
6. To review procedures for conducting student, graduate and employer surveys. The participation of students in course assessment evaluation should be 100% (mandatory participation), while surveys of graduates and employers should be carried out annually. Therefore feedback mechanisms (including feedback to students, employers, and graduates) have to be more precisely defined and they have to improve the logic, be efficient, and be available for all stakeholders. The whole procedure does not seem fully transparent and needs to be improved. Students have to be more involved in the internal quality assurance system except by using the questionnaire for feedback.

7. The feedback on practical internships from students should be implemented, it seems it does not exist and is not part of the internal quality assurance system.

8. Feedback from students should have clear follow up on implementation and some written track so the changes can be followed and given feedback on it. Students should give feedback on each course not the only the whole study, as well as practical internships in the companies.

9. There are several examples of good practice regarding scientific projects and involvement of teaching staff and students that should be promoted as models of good practice. In the future it is strongly recommended to develop more of the similar projects and opportunities for students and teaching staff

## **II - "Biotechnology" ASSESSMENT**

### **II - "Biotechnology" ASSESSMENT**

#### **2.1. Indicators Describing the Study Programme**

##### **Analysis**

2.1.1. Evaluating the self-assessment report (SAR 3.1.1., page 49), it can be concluded that the short cycle professional higher education study program "Biotechnology" corresponds to the specified study field "Chemistry, Chemistry Technologies, and Biotechnology", as this is confirmed by the name of the program (SAR 3.1.1., page 49), as well as the RTU OTC purpose (prepare 5th level professional qualification biotechnology process specialists for the companies of the biochemical industry and related industries, food industry companies where biotechnological techniques are used in the production of products, as well as for the biochemistry and microbiology laboratories of the mentioned companies, where biotechnological methods and techniques are used in the development or testing of products. To prepare biotechnological process specialists who organize, manage and improve biotechnological production processes, improve the application of technologies and participate in the development of new biotechnological products and production processes), objectives (1. To ensure high-quality, modern study content and implementation that meet the current trends of the biotechnology industry, the requirements of the labor market and the standard of the profession of a specialist in biotechnological processes. 2. To implement a study process oriented towards the development of the necessary professional knowledge, skills and competences, paying special attention to practical and laboratory works, which are carried out in modern and modernly equipped laboratories suitable for the study content. 3. To ensure the targeted acquisition of professional skills, in response to employers' requests and in accordance with the requirements of the chemical and biotechnology industry, in close cooperation with employers within the framework of study practices. 4. To encourage and support students in the development of research skills and research activities in independent studies, during the development of coursework and qualification work. 5. To ensure the quality of education so that graduates can continue their education in educational programs of the 6th professional qualification level and other higher education programs. To inspire and interest in continuous professional development), achievable results (SAR 3.1.1., page 50), content of the programme (SAR attachments: Study\_plan.xlsx and Study\_courses.zip) and the qualifications (SAR 3.1.1., page 50) to be obtained as a result of studies. When evaluating the objectives of the program, then they are more based on providing the labor market (in the field of biotechnology) with educated specialists who have acquired both theoretical and practical knowledge in a modern study environment. The objectives are reflected in many sections of self-assessment, so the college is able to perform and fulfill the defined tasks in the implementation of this program, which are closely related and corresponds to

the study field and the qualifications to be obtained. The study program includes various biotechnology and chemistry courses, such as "General and Inorganic Chemistry", "Organic Chemistry", "Physical Chemistry", "Instrumental Testing Methods", "Biochemistry", "Industrial Biotechnology", "Food biotechnology", "Environmental biotechnology", "Plant biotechnology", "Bioenergetics", "Genetics and DNA technologies", which not only demonstrate the programme's remoteness to the direction of studies, but also includes the necessary courses for obtaining qualifications – a specialist in the biotechnological processes.

2.1.2. The name of the study program "Biotechnology" corresponds to the obtainable qualification "Biotechnological process specialist". Since Biotechnology is not separately distinguished in Cabinet of Ministers Regulation No. 322 "Regulations on the Classification of Latvian Education" (MK noteikumi Nr. 322 "Noteikumi par Latvijas izglītības klasifikāciju"), then evaluating the study program code 41526, it can be concluded that this program is classified under the educational thematic group Engineering, Production and Technology, with correspondence to the thematic field Engineering and technology, and for the educational program group Other engineering. By collecting the above information, the study code can be partially linked to the name of the study program, since the study program has only a few engineering courses. There are more technological courses in the study program that could correspond to the thematic area - technologies. Although, in general, this does not change belonging to this field, because it is quite difficult to find the right code if there is no biotechnology defined anywhere. You could also think about attaching the program to code 421 Biology or 422 Biochemistry (<https://likumi.lv/ta/id/291524-noteikumi-par-latvijas-izglitiba-klasificiju>), because in biotechnological processes a large part is related to microbiology, because living cells work or the chemistry that goes into many biotechnological processes, which will be closer to the thematic field of Life Sciences.

Since the study program is very practical (from the courses included in the study plan, a sufficient amount (about 40-60%) is provided with practical lessons and laboratory works), its goal (mentioned in Joint Opinion 2.1.1.point) are formulated according to the program to be studied and are achievable with the proposed study plan ([https://otk.rtu.lv/wp-content/uploads/sites/29/2022/08/Studiju\\_plans\\_lv.pdf](https://otk.rtu.lv/wp-content/uploads/sites/29/2022/08/Studiju_plans_lv.pdf)). The objectives (mentioned in Joint Opinion 2.1.1.point) correspond to the standard of the "Biotechnological process specialist" profession (Annex6: "Compliance of the study program Biotechnology with the national education standard\_6.docx" and Annex7: Compliance of the study program "Biotechnology" with the professional standard). When evaluating the study programme "Biotechnology (41526)" admission rules (<https://otk.rtu.lv/wp-content/uploads/sites/29/2020/11/Uznemsanas-kartiba.pdf>), it would be necessary to include in the requirements as one of the conditions that the grade in the chemistry or biology exam or the semester grade obtained in these subjects is also taken into account, because the study program is largely based on the learning and knowledges of chemistry and biology (Life science). By fulfilling this condition, it can be assessed in general that the established study program and the information contained therein are also related to the admission requirements. The duration and extent of the implementation of the study program, as well as the language of implementation, shall be proportionate and justified as, in general, the study program and the plan comply with the national education standard.

Learning outcomes are formulated to consist of two parts - skills obtained by students and competencies of Biotechnologists. Both are compliant with the aims of the study program and the professional standards.

The fact that this study program is implemented as full time for 2.5 years is very good, because otherwise it would not be competitive with other universities in equivalent programs that offer to obtain a bachelor's degree within 3 years. During the meeting, the employers emphasized that they need these types of specialists who have obtained short cycle professional higher education.



2.1.3. Evaluating the corrections made in the parameters of the study program, which have been made based on the recommendations provided by the previous accreditation process, are supportable, because the recommendations have been taken into account, creating more study courses that have a greater focus on biotechnology than chemistry and chemical technology. Two new industry compulsory and two optional courses have been set up, while one study course is divided into three different courses, the basis of which is based on the direction of biotechnology - industrial, food and environmental biotechnology.

Due to the change of the professional standard approved on August 11, 2021 "Biotechnological process specialist", the college has decided to organize the study courses according to the standard and include their changes in this accreditation period. Various new courses have been created, credit points have been changed, as well as those study courses whose content was thematically very close and overlapped have been combined, as a result of which their name has been changed. In general, these changes are also supported, because the changes are carried out in accordance with the requirements of regulatory enactments, as well as the quality of education of biotechnological process specialists is improved, strengthening and providing more in-depth knowledge, skills and competence in the field of biotechnology. The only thing is that the college should think about combining study courses with each other so that there is not such a wide range of study courses with small credit points.

2.1.4. The College, in its self-assessment report (SAR 3.1.3., page 54), points out that a first-level (short-cycle) professional higher education program provides opportunities to obtain practice-oriented higher education in a relatively short time. As a result, it is the shortest path to the labor market. If you look at the purpose and objectives (mentioned in joint opinion 2.1.1.point) of the study program, then they are oriented towards the preparation of specialists in accordance with market requirements. During the visit with employers, everyone pointed out that there is still a shortage of such specialists (with short cycle professional higher education), which is mainly related to the low number of those who want to study and the high dropout rate of students, where the college would need develop a plan on how to attract more people who want to study and how to reduce student dropout. Evaluating the number of students, it can be seen that on average the dropout rate is around 50% (SAR, page 56), which is generally very high. The dropout rate should be reduced to at least 15-25%.

A very large number of graduates work mainly in various pharmaceutical companies and their laboratories (AS "Olainfarm", AS "Grindeks"), as well as in cosmetics companies, but there is no mention of any company whose activity in production processes is directly related to biotechnology, because the acquired specialty and the acquired courses, also allows you to work in various food companies that apply the principles of biotechnology. But in any case, the work of graduates in pharmaceutical companies is considered positive, because specialists also learn chemistry in sufficient quantity.

It is also positive that employers appreciate the professional training of college students and graduates, as evidenced by the fact that employers have ranked the college in 10th place among the other most recognized and recommended colleges in Latvia. Consequently, graduates should not have employment problems as graduates of a first-level (short-cycle) professional higher education program.

2.1.5. Not applicable

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

The name of the study program "Biotechnology 41526" fully reflects its content and corresponds to the obtainable qualification "Biotechnological process specialist". The aim, objectives and results in the specific study program are very closely interlinked and are in line with the standard of the Biotechnological process specialist profession.

The short cycle professional higher education education study program "Biotechnology" has many practical tasks that require a strong understanding of chemical and biological processes. Although at the moment, looking at the admission requirements, students have the opportunity to enroll without taking the centralized exams in biology or chemistry, they should be included in parallel with the centralized exams (CE) in the Latvian language, foreign language and mathematics certificates (<https://otk.rtu.lv/wp-content/uploads/sites/29/2020/11/Uznemsanas-kartiba.pdf>). The regulations shall include that one of the CE certificates in chemistry/biology must be presented when applying for studies, or the final average grade in these subjects can be taken into account, determining its minimum value (for example, not lower than 7). Based on the above, the College should evaluate and reconsider to change the code from 41526 to 41421 (Biology) or 41422 ( Biochemistry) (<https://likumi.lv/ta/id/291524-noteikumi-par-latvijas-izglitibas-klasificiju>), which would be more relevant and appropriate to the programme "Biotechnology" and with the offered courses content, as well as being closer to the thematic field of Life Sciences. This is because biotechnological processes are more focused on micro-organisms, life processes and chemical transformations. In practice, the college must work with schools to ensure that prospective students and students starting a study have adequate knowledge of chemistry and biology so that their studies are successful and there is no high risk of dropping out in the first semesters. It is necessary to study the reasons for high student dropout in order to develop and implement measures to solve this problem.

It would also be useful for the college to analyze the exact data of graduates on employment - workplace, salary, etc. Because the self-assessment report contains this information in a very limited way. Every educational institution should be proud of its graduates, and in order to attract new students, it is necessary to display and promote such information as part of this program.

### Strengths:

1. Very well formulated goal and study tasks, which are in compliance with the professional standard.

### Weaknesses:

1. High number of student dropouts, thus low number of graduates.
2. The admission rules do not include, as one of the requirements, the need for CE certificates in chemistry/biology or the final average grade of these subjects, since the study courses are very much oriented towards chemical and biological processes.

## 2.2. The Content of Studies and Implementation Thereof

### Analysis

2.2.1. The aim of the study program is to prepare biotechnology process specialists for the companies of the biotechnology related industries incl. food industry, as well as for laboratories of the biochemistry and microbiology of companies. Biotechnology process specialists should be able to organize, manage and improve biotechnological production processes, improve the application of technologies and participate in the development of new biotechnological products and production

processes. The study content in the study program covers the major general, mandatory and optional educational topics required for biotechnology process specialists (ANNEX 7.docx: Compliance of the study program Biotechnology with the national education standard\_6.docx) : Foreign language (4), Basics of psychology (1), Higher mathematics (5), Physics (3), General and inorganic chemistry (2.5), Computer science (2), Environmental protection (1), Civil protection (1), Labor protection (1), An introduction to the biotechnology sector (1), Organic chemistry (2.5), Instrumental testing methods (4), Physical chemistry (2), Biochemistry (3), Microbiology (3), Cell biology (2), Genetics and DNA technology (2), Industrial biotechnology (5), Food biotechnology (2), Environmental biotechnology (2), Plant biotechnology (1), Bioenergetics (1), Quality systems (2), Processes and equipment (3), Engineering graphics (2), Technological process automatization (3), Planning of biotechnological experiments (1), Medication extraction technology (4), Business professional competence module (6), Use of ITC in the biotechnology industry (1), Toxicology 1), Business communication (1). Total study 100 CP, average course 2.5 CP or 40 contact hours (80 h) per course and in average 75 contact h per teacher; general educational courses 820 h or 20% total; laboratory works 17% h/h; practical exercises 23% h/h (Study\_plan.xlsx). Excursions are included in several courses, for example Technology of obtaining medical preparations, Environmental Biotechnology (Study\_courses.zip).

Professional standard "Biotechnological process specialist" ("Biotehnoloģisko procesu speciālisti", approved on 11th August of 2021, <https://registri.visc.gov.lv/profizglitiba/dokumenti/standarti/2017/PS-159.pdf>) that the programme is required to meet cover huge spectrum of necessary knowledge and skills, overly specific and practically impossible for a college programme to substantially implement. This is well reflected in the many low CP courses of the study programme, but the college curriculum is inherently too small to provide all the practical knowledge required by the standard. This has led to a situation where many of the requirements of the standard are not sufficiently covered despite being mentioned in course descriptions. It also reflects shortcomings and inconsistencies of provided mapping of learning outcomes. For example, the content of course "An introduction to the biotechnology sector" shows that students do not learn anything about bioproducts, but in annex 7 "Compliance of the study program "Biotechnology" with the professional standard" it is mentioned that they do. There are other similar examples. All knowledge necessary for performing the basic tasks of professional activity is covered formally by several relevant study courses in the study program "Biotechnology" (Annex 7).

The author of the study course is a teaching staff who works at OTC. Learning takes place traditionally, from general to specific knowledge, with an emphasis on independent work and student project work. In addition to general (compulsory) skills and knowledge of biotechnology process specialists the study program gives broad knowledge about almost the whole biotechnology related sector – something from everything. The courses of Mathematics and Physics could be more tightly interconnected to practical items of instrumental analysis and bioprocess development. The course of Math could contain probability theory to understand the principles of statistical analysis rather than analytical geometry. In Physics courses the theory could be interconnected with principles of operation laboratory devices available in OTC labs (balances, microscopes, densitometers, colorimeters, nephelometers, viscosimeters, conductometers, refractometers etc.). However, all that is very difficult to implement in practice. There are some issues that can be remedied in the course descriptions, for example, 1) some courses have mandatory literature in Russian. "Medication extraction technology" - 4 of 5 sources of mandatory literature are in Russian, also "Processes and equipment" and "Bioenergetics" have mandatory literature in Russian. 2) In some courses the amount of mandatory literature is huge ("Industrial biotechnology", 15 sources (2 in Russian), altogether at least 4000 pages; "Quality systems", 13 sources, including EU, ISO 9000 standards, Minister Cabinet regulations, but none of them is specified. Also availability and being up-to-date of books used as mandatory literature should be carefully checked.

"Biotechnology" programme also has problems with the content of the studies - some courses have mandatory attendance (as it is written in courses descriptions) which is taken into account in receiving CP (getting a grade) which is inconsistent with principles of SCL. There is also a disbalance in actual amount of independent work between courses with same CP amount - there are courses where students have to do a lot (as they mentioned during the on-site visit) - lab works, protocols, exams etc. and courses with same CP amount where they have to just make 1 presentation/a small talk etc.

#### 2.2.2. Not applicable

2.2.3. As learning outcome it is expected that student: 1) knows biotechnological production processes and technologies; 2) knows and understands how to plan and manage the biotechnological production process; 3) Knows the regulatory framework in the biotechnology sector; has skills to 4) create, read, use biotechnological production process scheme for securing equipment and technical equipment; 5) to ensure the bio-technological production process, selection of energy carriers and raw materials, separation of the product, purification, transfer to further development 7) to evaluate the biotechnological production process; and has competence 8) to implement, manage and optimize the biotechnological production process. 9) to control and ensure the performance quality of the bio-technological production process, observing the binding quality requirements of the industry. The achievement of learning outcomes 4 - 9 is very ambitious and challenging to achieve between 2.5 year studies, however it is a basis to create respective skills later during practical work in the enterprises. To achieve the aims and learning outcomes various teaching methods and forms are used in the study process: lectures, seminars, practical work, laboratory work, study tours, discussions, work in groups, consultations, independent work of students, which is realized as coursework, searching for information on the Internet and creating a database, as well as practice and internship reports and qualification work. Defending coursework, practical work and qualification work, to speak in front of an audience and present your performance, as well as to concentrate and be able to answer questions would develop students' analytical thinking, reasoning, critical thinking. Still the employers have emphasized the need to further develop reasoning and thinking as well as to manage an even wider range of equipment that is available during lab work. In the surveys, students highly appreciate the considerable number of laboratory works and their organization, as a result of which it is possible to learn and understand the material very well. Laboratory facilities are superior, and could contribute in much larger extent to achieving the learning outcomes by including increased volume and level of laboratory works as well involving students already in the early stage of studies in research and development (R&D) activities. The principles of student-centered education implemented correspond to the first level of higher education. Business communication and sports are the only free choices among the courses. Students have the opportunity to make their own choices regarding the course work, the topics of the qualification papers and the places of practice. Students most often choose the topic of the qualification work. In seminar discussions, students learn to present, argue and defend their opinion, analyze problems, and delve into different experiences and opinions.

2.2.4. The study program includes two internships, the first internship is in the 2nd semester of the 1st year (6 CP), the duration of the internship is 6 weeks, and the second internship takes place in the 5th semester of the 3rd year (10 CP), the duration of the internship is 10 weeks (REGULATION\_on\_the\_organization\_of\_practice.doc). During the internship, students are provided with the opportunity to improve theoretical and practical skills in companies, to create and develop independent professional competences in the company's laboratories, production stages and documentation analysis. The student chooses an internship related to the biotechnology industry, informs the program manager, and the study department contacts companies about possible

internships and informs the student if the company agrees to offer an internship. The practice takes place in the companies of food biotechnology like AS "Food Union", SIA "Latvijas piens", AS "Cēsu alus", etc., in cosmetics companies "Kivi Cosmetics", SIA "Stenders", in pharmaceutical companies AS "Olainfarm", AS "Grindeks", AS "Rīgas farmaceitiskā fabrika", SIA "Silvanols", at the Institute of Food Safety, Animal Health and Environmental Science "BIOR", the Latvian State Forestry Institute "Silava", APP Latvian Biomedical Research and Study Center, etc. For the successful completion of the practice, the practice leader develops and each student receives a PRACTICE ASSIGNMENT, which includes the purpose, tasks and content of the practice, as well as information about the duration of the practice and the development of practice documents. When learning an internship, students have two internship supervisors: in a company and in an educational institution. Internship supervisors help students to understand the nature of the internship tasks and direct them, through counseling, to the correct execution of these tasks. The practice manager from OTC also provides advice on general practice organization issues and the defense of the practice report. The relevance of the qualification practice tasks to the achievable results of the study program is analyzed in "Linking the student internship tasks included in the study program with the study results to be achieved in the study program". The execution of practice tasks and the creation of a practice report according to the tasks should ensure the achievement of the outcomes of the study program. Feedback is regularly obtained from employers about the students' preparation - employers write the characteristics of the students in practice, which also reflects the assessment of the compliance of the acquired knowledge with the requirements of the labor market.

#### 2.2.5. Not applicable

2.2.6. The qualification thesis (SAR Annexes: 10 CP, Study\_plan.xlsx Study\_courses.zip Qualification work) is the student's independent work, defending which he obtains a professional qualification in the Biotechnology sector. By developing the qualification work, the student deepens, systematizes and strengthens the acquired knowledge. Qualification work is developed in accordance with the rules for the design of student works of OTC. The student usually chooses the topic of the qualification thesis based on the possibilities of the internship. The qualification work (research work) consists of a literature review, a practical part (technological or research), a work and environmental safety part. No thesis is yet defended in framework of study program biotechnology process specialist. The topics of students' final theses defended between framework of previous program are relevant to the biotechnology field, correspond to the respective study program and employers expectations. 13 diploma work were defended during previous 3 years: "Characterization of inflow wastewater according to its biodegradation capacity and degree of evaporation"; "Rapeseed acceptance, processing and quality control Identification of parasite species using the Sanger sequencing method "; "Mebicar production project"; "Development of a quality control method: Hardness of bath bombs"; "Technical thioguanine production project"; "Mint production project of medical device "Faringospray"; Curd cheese "Kārums" production project; "Cow spongiform encephalopathy detection project"; "Biodiesel production project"; "Medical Mildronate acquisition project "; "Y-Buterine betaine second stage production project"; "Project for production of diethyl ester of L-cyanobenzylmalonic acid", "Kefir production project".

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

The content of the study courses is interconnected and complementary, corresponds to the objectives of the program, learning outcomes and to the requirements defined in the

Biotechnological Process Specialist profession standard in Latvia and State Educational Standard (Standard 6.docx, ANNEX 7.docx; ANNEX 8.docx; Study\_plan.xlsx; Study\_courses.zip). The professional standard promotes the achievement of the needs of the Latvian industry and labor market. Although the percentage of practical and laboratory works (total 40% h/h) is more than minimum 30% of national educational standard, the volume of laboratory works could be increased to better meet the interests of both students and employers. The average CP of study course is relatively small 2.5 CP, the small size courses could be combined.

The learning outcomes meeting the interest of the wide sector of the bioindustry are as a whole too ambitious to be achieved in deep between 2.5 years of studies. The implementation of principles of student-centered education corresponds to expectations in that level of higher education. Students are free to choose the place of internship at various enterprises; relate that with further diploma work as well as with the working place. The duration of internship - 16 weeks is in accordance with Latvian educational standards. The tasks of the internship are related to achieving learning outcomes. The student, if motivated, can have real, working experience as a process specialist. This might be however not always possible working in the institutional laboratories providing experience as laboratory technician.

The topics of the final thesis defended in the past 3 years are relevant to the field "Biotechnology". The correspondence of those topics to the study program "Biotechnology process specialist" is a matter of discussions.

#### Strengths:

1. Biotechnological Process Specialist profession standard helps to meet the needs of the Latvian industry and labor market.

#### Weaknesses:

1. Study program contains a lot of small amount (1-2 CP) courses and probably some of them can be meaningfully merged to connect knowledge and skills students at the moment can get from them separately. It is also possible to combine courses into modules.
2. Low implementation of the potential of laboratory facilities of OTC in research and development

### **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 applicable

### **2.3. Resources and Provision of the Study Programme**

#### **Analysis**

2.3.1. The students are provided accommodation in student-home for a reasonable price (students opinion) and best of those are supported by scholarship (9300 EUR/31 students/year, "Self-evaluation report" p.68). The provision of study materials: An e-environment is available for the needs of the study process: OTC website, Mykoob and Moodle. Mykoob is used as a communication platform and students have transparent topics and assessments. Moodle is used as a website for study course materials, independent work, practical work and midterms (tests). Informative provision: The RTU Olaine Technology College has signed a multidisciplinary database EBSCO

national electronic resource package - Academic Search Complete subscription agreement for 2023. The library has general literature, audiovisual and periodicals in Latvian, English, Russian and German. The library has 2 rooms - a reading room 80 m<sup>2</sup> equipped with about 10 computer equipped working places. The library collection consists of a total of 9755 items, 30% of the collection items are related to the Biotechnologies program. ISO standard licenses are also offered to interested students. Thanks to the project "Improvement of the study environment of the Riga Technical University Agency "Riga Technical University Olaine Technology College" 967 books have been purchased. The library has more than 10 computer equipped working places. Technical (R&D) provision: In the autumn of 2020, 11 new, modern laboratories with equipment suitable for the implementation of educational programs were opened, which are located in the main building of the college. The equipment has been installed so that students can fully acquire the skills needed in the labor market, as well as promote new innovations and technological progress in the future. Laboratories that meet the requirements of the labor market have been established and are directly contributing to the achievement of the goal of SAM, as students in innovative laboratories acquire professional competencies that meet the requirements of companies in the sector or the development of practical skills and competencies required for the profession of bioprocessing specialist. Students are given the opportunity to use study laboratories, to develop their research work outside of classes using following facilities: 1. Inorganic and organic chemistry study laboratory: fume cupboard, rotary evaporator with vacuum pump, water deionizer, analytical balance, ultrasonic bath, hand conductivity meter, oven, etc. 2. Analytical chemistry study: laboratory fume cupboards, muffle furnace, water bath for butyrometers, milk freezing point detector, infrared spectrometer, Karl Fischer titrator, centrifuge with cooling, spectrophotometer, melting point detector, etc. 3. Chemical process laboratory: chemical reactor feed plant, stirred reactors, tube reactor, series stirred reactors, batch stirred reactor, flow reactor, laminar flow reactor, chemical catalysis equipment, oxidation and rectification training benches, etc. 4) Pharmaceutical form technology study laboratory: Main equipment installed: tablet press, tablet tester, tablet abrasion tester, tablet disintegration tester, bulk density tester for powder products, analytical balance, sieve shaker, fluidized bed granulator, gas and LC chromatography, etc. 5) Study laboratory of biotechnology and renewable energy processes: laboratory-scale bioreactors, spectrophotometer, climatic testing chamber, bioethanol, biogas production station, homogenizer, high-capacity centrifuge, cooling heating thermostat, miniature centrifuge, electrophoresis system, etc. 6. Viscous mass preparation study laboratory; draft cabinet, laboratory disperser, water deionizer, viscometer, applicator, impact tester, gloss meter, color meter, laboratory mill, combined planetary - dissolver mixer, adhesion measuring machine, non-contact coating thickness meter, hand-held pH meter etc. 7. Food technology study laboratory: pastry and baking oven, kettle, combi oven with drying/smoking function, ice generator, meat cutter, meat mincer, sausage syringe, clipper for closing the ends of the sausage, ice cream/sorbert machine, multifunctional pot, universal fruit and berry additive making machine, pasteurizer, planetary mixer, electric stove, etc.; 8. Study laboratory of water purification and treatment processes: Separation sedimentation tank, ion exchange training bench, absorption, reverse osmosis training bench, advanced oxidation, water treatment station, etc. 9. Microbiology study laboratory: fume hood, water deionizer, laminar air flow cabinet, incubator with heating and cooling function, automatic vertical autoclave, trinocular microscope with video camera, laboratory mixer, microscope, orbital shaker, electrophoresis equipment.

#### 2.3.2. Not applicable

2.3.3. The source of funding available for the study program biotechnology is a grant from the state budget from general revenues for the provision of studies. According to "Self-evaluation report" p. 68 the basic cost of a study place in Latvia 2022 is 1,630.11 euros at the optimal coefficients "2.9"

and 100% provision – it equals to  $1,630.11 \times 2.9 = 4,727.31$  euros. The reported number of study places financed from the state budget in 2022 in the program is 31, total  $1630 \times 2.9 \times 31 = 146547$ . The total available funding in 2022 was 184,734 euros, including 9,323.26 scholarships, social security etc. That makes costs per student close to 5000 EUR/year 2022 or 10000 EUR/year 2020-2022 per graduate. Total budget of OTC as well as contribution of biotechnology grant into total is not reported. However, taking into account labor cost of administrative staff (12 people) and maintenance costs of facilities it can be estimated that total costs per graduated Biotechnology process specialist reach over 25000 EUR per graduate.

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

The equipment that has been installed enables students to acquire the skills and knowledge needed in the biotechnology related labor market and create potential to promote R&D in the future. Laboratories support the development of practical skills and competencies required for the profession of Biotechnology process specialist. The list of apparatus provided is superior for training laboratory technicians and contains instruments for simulation of industrial biotechnology processes. The students have access to teaching materials through library, internet and OTC website with Moodle and EBSCO national electronic resource package.

The provided data related to funding of biotechnology programs are not transparent enough to predict the actual costs per 1 graduated biotechnology process specialist. The state funding (185 000 EUR per 31 study places in 2022 + administrative expenses funded separately) ensures the implementation of the biotechnology study program if the number of students (study-places) does not decrease in the future. Increasing the number of students of the Biotechnology program, keeping lectures together with students of other study programs as well as introducing new study programs would increase the economic efficiency of studies.

#### **Strengths:**

1. Outstanding laboratory facilities for training laboratory and biotechnology process specialists.
2. Relatively good and ensured funding of study program and OCT from the state budget.

#### **Weaknesses:**

1. Incomplete and low exploitation rate of laboratory facilities (300 contact hours per 9 laboratories) and particularly no R&D reported.
2. High (about 10000 EUR/year 2020-2022) teaching (+ administrative) costs per graduated biotechnology process specialist might in long perspective be not sustainable.

### **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

According to the self-assessment report and the findings at the expert visit, the provision (informative, material and technical) of the study programme is very satisfactory. The available funding, in general, allows the implementation of the study programme.

## **2.4. Teaching Staff**



## Analysis

2.4.1. By National Legislation Rule (Law on Higher Education Institutions.doc) In a higher education institution at least five per cent of academic staff shall be visiting professors, visiting associate professors, visiting docents, visiting lecturers, professors, associate professors, docents and lecturers who have been employed in an academic position in any of accredited higher education institutions of the European Union, European Economic Area or Organisation for Economic Co-operation and Development countries, except for Latvia, for an uninterrupted period of one year during the previous five years. By taking into account the necessity to acquire practical skills and knowledge, the position of a docent, lecturer, and assistant in the subjects of the vocational study programme profile may be held by a person with higher education without the doctoral degree or without vocational Ph. D. in Arts if he or she has sufficient practical work experience corresponding to the subject to be taught. In order to elect a person in a position of a docent who has no doctoral degree or vocational Ph. D. in Arts, such person requires at least a seven-year practical work experience. The requirements to be defined for the candidates of such position of a docent shall be approved in a higher education institution and college by the senate or council accordingly. Lecturers and assistants who do not have a scientific and academic degree need a five-year practical work experience corresponding to the subject to be taught. It is evident that total of 17 lecturers are involved in the implementation of the study program, of which 3 lecturers or 12 % and 15 visiting lecturers or 88 % are employed in the main work of OTC, out of which 3 doctors of sciences and 11 lecturers with a master`s degree participate in the implementation of the study program. The majority of the teaching staff involved in the implementation of the study program has qualifications that comply with the requirements for the implementation of the study program and the requirements set forth in the regulatory enactments, and it enables the achievement of the aims and learning outcomes of the study program and the relevant study courses. From the presented CVs, as in Biographies of the teaching staff members (Annexes: Curriculum Vitae in Europass format) Teaching\_staff\_CV\_10.zip, in Self-assessment report Annexes) it is evident that teaching staff involved in the accredited program have the necessary skills to transfer their knowledge and experience to students and receive feedback on their work. All teaching staff are provided with the opportunity to supplement their knowledge, participate in in-service training courses, study for a doctorate, work in research and practice abroad, within the framework of exchange programs, as well as publishing their articles in collections of scientific articles. The implementation of the study program is ensured by 17 lecturers with whom an employment contract has been concluded. The policy of the College is to ensure that all study courses are taught by qualified, scientifically and methodically trained teachers who use modern teaching methods. Most lecturers, including lecturers of specialized courses, have significant practical experience in the relevant field of activity, thus ensuring the compliance of the specialized knowledge, skills and competencies acquired in the study program with the acquired qualification and use in further professional activities. The main criteria for the selection of lecturers are education (degree), professional experience, research and creativity and communication skills. The knowledge of the state language of the academic staff employed in the study program complies with the regulations on the amount of knowledge of the state language and the procedure for testing the state language proficiency for professional and official duties and allows any course of study to be taught in the state language. For two teaching staff, it is not clear if they are fulfilling the required conditions.

2.4.2. As explained in Self assessment report and observed in discussion with RTU OTC staff during study visit; during the reporting period, there have been qualitative changes in the composition of the teaching staff. Teachers of branch study courses have terminated their employment with OTC, and new, professional and qualified teachers have been found instead. In the period from 2020/2021 until 2022/2023 The change of lecturers has taken place under the influence of two factors. One of

the factors has been personal reasons, the main lecturers indicated the distance from one workplace to another and low workload. The second factor for the turnover of lecturers was the Covid-19 pandemic, during which lecturers had to be able to adapt to doing quality work remotely, but not all of them could, as a result of which the College had to invite other lecturers. Changes in the composition of the teaching staff have had a positive effect on the quality of studies, as evidenced by the results of the survey of students and graduates, providing a positive assessment of the lecturer's work. The policy of the College is to ensure that all study courses are taught by qualified, scientifically and methodically trained teachers who use modern teaching methods. During the reporting period, several teachers have changed; teachers of branch study courses have terminated their employment with OTC, and new, professional and qualified teachers have been found instead. Study courses "Higher mathematics", "Physics", "Organic chemistry", "Fundamentals of automation of technological processes", "Environmental Biotechnology", "Computer Science", "General and Inorganic Chemistry", "Organic Chemistry" was held by new lecturer. The attraction of new lecturers has allowed to improve the quality of the respective study courses, as well as to give students more knowledge based on the previous professional and academic experience of the lecturers.

An expert opinion on indicated changes goes in favor of the changes. The diversity of teaching staff can provide broader access to the knowledge and skills for students. Each member of teaching staff, even having similar background, can provide some new insights and trends in the professional field. Even the mobility of teaching staff abroad was not high during COVID19, the fluctuations and changes in composition are seen as positive.

#### 2.4.3. Not applicable.

2.4.4. Members of the academic staff, namely docent and lecturers, fully employed and elected at the study course are 2 docents out of 17 involved teaching staff (Self assessment report, Annex Composition\_of\_the\_academic\_staff\_9.docx, Teaching\_staff\_CV\_10.zip). One of the elected docents has been published in peer-reviewed editions, including international editions, and has five years of practical experience (except for experience in the implementation of the study program), for another docent fulfilling these criteria is not clear (Self assessment report, Annex Composition\_of\_the\_academic\_staff\_9.docx, Teaching\_staff\_CV\_10.zip, NR\_12\_pielikums.docx). Other members of the teaching staff are fulfilling the conditions of published in peer-reviewed editions, including international editions (7 out of 17) or five years of practical experience (Self assessment report, Annex Composition\_of\_the\_academic\_staff\_9.docx, Teaching\_staff\_CV\_10.zip, NR\_12\_pielikums.docx). Two lecturers seem like not fulfilling the conditions for this position, by having 1st level higher professional education in biotechnology/ Bachelor's degree and 2 years of practical experience (except for experience in the implementation of the study program) (Self assessment report, Annex Composition\_of\_the\_academic\_staff\_9.docx, Teaching\_staff\_CV\_10.zip). One lecturer has a doctoral degree, years has published in peer-reviewed editions, including international editions and works on lecturer position, while it could be promoted to a higher position of a docent (Self assessment report, Annex Composition\_of\_the\_academic\_staff\_9.docx, Teaching\_staff\_CV\_10.zip). This indicates that the human resources management of the teaching staff, their competences and self development, should be better taken care of.

2.4.5. The implementation of the short cycle professional higher education study program "Biotechnology" is coordinated by the program director (Self assessment report, Annex Regulations\_1.docx; Annex Administration\_structure\_2.xls, ANNEX 4\_Studiju virziena pārvaldības struktūra.docx, DEVELOPMENT\_AND\_INVESTMENT\_STRATEGY\_3.docx. The academic staff performs teaching, methodological and scientific work, gives lectures within the study work, conducts seminars and practical classes, accepts examinations, reports, regular work (incl. Tests, etc.), organizes consultations, conducts and reviews qualification work, performs other work duties.

related to the organization of study work. The development of OTC study programs, supervision of activities and periodic inspection are performed by program directors and methodological commissions, which are responsible for methodological work and its development in the institution. Methodical commission is a mechanism through which cooperation of teaching staff takes place. Involved teaching staff are invited to meetings of the methodological commission and questions are discussed, for example, about practice or qualification work requirements, about the content of study courses, so that the content required for the standard is provided, but so that there is no overlap (Self assessment report, Annex Tasks\_of\_methodological\_commissions.docx, Annex DEVELOPMENT\_AND\_INVESTMENT\_STRATEGY\_3.docx.) The College's new Development and Investment Strategy for 2021-2027 (Self assessment report, Annex DEVELOPMENT\_AND\_INVESTMENT\_STRATEGY\_3.docx) states that in OTC the short cycle professional higher education methodological work is done by program directors and three methodological commissions are working: methodological commission of general education subjects, a methodological commission of professional subjects and methodological commission of upbringing work. Work goals of methodological commissions are: 1. To rise the quality and effectiveness of learning process; 2. To provide the necessary support to teaching staff for education process implementation; 3. To promote the comprehensive development of learners and formation of a creative personality; 4. To promote learners creative work, research, motivation, participation in the implementation of the educational process. Work tasks of methodological commissions are: 1. To implement the achievable results specified in the professional standard; 2. To ensure the interdisciplinary connection between general and professional education subjects; 3. To promote and support creative activity and professional development of teachers; 4. To analyse achievements of OTC students in learning/study work, causes of underachievement, as well as the results of the work of the teaching staff; 5. To motivate learners to improve by developing skills to learn/study and inquire about processes in OTC, society and world; 6. By cooperating with industry members evaluate each qualification and determine the optimal scope of practice and duration of the acquisition of qualification. The teaching staff of the study program cooperates by preparing descriptions of study courses, creating e-courses in the e-environment, working in research directions and projects. Teaching staff is involved in work of methodological commission (Self assessment report, Annex Tasks\_of\_methodological\_commissions.docx, Annex DEVELOPMENT\_AND\_INVESTMENT\_STRATEGY\_3.docx.)

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

The qualification of the teaching staff members involved in the implementation of the study programme in majority complies with the requirements for the implementation of the study program and the requirements set forth in the regulatory enactments, and it enables the achievement of the aims and learning outcomes of the study program and the relevant study courses. Some of the teaching staff seems to not fulfill the criteria required while some are fulfilling the criteria for higher position, but work on lower position. The human resources management of the teaching staff, their competences and self development, should be better taken care of. A mechanism for mutual cooperation of the teaching staff in the implementation of the study programme has been well established, and it ensures the achievement of the aims of the study programme and the interconnection of study courses within the study programme.

#### **Strengths:**

1. Total of 17 lecturers are involved in the implementation of the study program, of which 3 lecturers or 12 % and 15 visiting lecturers or 88 % are employed in the main work of OTC, out of which 3 doctors of sciences and 11 lecturers with a master`s degree participate in the implementation of the study program.

2. During the reporting period, there have been qualitative changes in the composition of the teaching staff. Changes in the composition of the teaching staff have had a positive effect on the quality of studies, as evidenced by the results of the survey of students and graduates, providing a positive assessment of the lecturer's work.

3. A mechanism for mutual cooperation of the teaching staff in the implementation of the study programme has been established, it ensures the achievement of the aims of the study programme and the interconnection of study courses within the study programme

Weaknesses:

1. Some of the teaching staff seems to not fulfil the criteria required while some are fulfilling the criteria for higher position, but work on lower position.

2. The human resources management of the teaching staff, their competences and self development, should be better taken care of.

### **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:** Partially compliant

According to the information provided (Annexes: "Composition\_of\_the\_academic\_staff\_9.docx" and "Teaching\_staff\_CV\_10.zip"), all teaching staff (except for one) complies with the conditions of the study program implementation and the requirements of regulatory enactments. One of the teaching staff needs an education diploma with higher education (at least 6th qualification level - bachelor's) in order to implement study courses in the study program. At the given moment (after the visit meeting), it was found out that this person is studying at the university in the last year, which therefore allows for the realization of study courses at the college for the given moment. Additionally, it is not clear if one of the docents is fulfilling criteria for docent position, while there is one lecturer that has a doctoral degree, has published in peer-reviewed editions, including international editions and works on lecturer position, where it could be promoted to a higher position of a docent. This indicates that the human resources management of the teaching staff, their competences and self-development, should be better taken care of.

## **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:** Partially compliant

Study programme (100 CP, length of the programme - 2,5 years) in general complies with regulations for first-level professional higher education, Cabinet of Ministers Regulation No. 141 "Noteikumi par pirmā līmeņa profesionālās augstākās izglītības valsts standartu" (<https://likumi.lv/ta/id/6397-noteikumi-par-valsts-pirma-limena-profionalas-augstakas-izglitibas-standartu>), however, in study plan there is mentioned C course (in 1CP amount). This C course can be fulfilled by choosing one study course out of offered two courses - Sports or Business Communication. It must be highlighted that this does not follow the Law on Higher Education Institutions Augstskolu likums (likumi.lv) AIC Annex Law on Higher Education Institutions.doc) (<https://likumi.lv/ta/id/37967-augstskolu-likums>) Chapter 6 which states that students have

rights to choose any courses within C part.

Also, the programme contains module for building business professional competence (6 CP) as required in Standard, but it is in limited electives (B courses) part of studies.

- 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:** Partially compliant

Although all knowledge necessary for performing the basic tasks of professional activity is covered by several relevant study courses in the study program "Biotechnology" (Annex7) the professional standard contains a lot of specific requirements and knowledge, it is hard to put it all as a learning outcome in a college level study program. Significant part of knowledge and skills mentioned in standard students learn theoretically and it doesn't mean that they understand and can fulfill everything mentioned in standard in practice, for example, "mother plant selection and preparation", "meristems, their types and preparation", "various information technology tools to promote collaboration" etc. (professional standard "Biotechnological process specialist"/"Biotehnoloģisko procesu speciālists", approved on 11th August of 2021, <https://registri.visc.gov.lv/profizglitiba/dokumenti/standarti/2017/PS-159.pdf>). Also the college, according to the standard, need to include one more foreign language until the next accreditation, because the professional standard stipulates that a specialist is able to use two foreign languages at a professional level, communicating effectively in a multicultural environment (<https://registri.visc.gov.lv/profizglitiba/dokumenti/standarti/2017/PS-159.pdf>, point 5.2).

- 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:** Partially compliant

OTC has prepared all descriptions of the study courses in Latvian as this is the working language of studies. There are several minor problems in some of the course descriptions (some do not contain required prior knowledge (for example, "Basics of psychology" , "Business communication") or it is defined very generally - as "Biology", "Mathematics", "Economics" etc. (study courses "Microbiology", "Bioenergetics", "Quality systems" etc.). Some course descriptions do not describe the organization and tasks of students' independent work (for example, courses "Use of ICT in the biotechnology industry", "Foreign language"), in some cases the criteria for evaluation of study results are not described clearly enough (for example, study course "Technological processes automation" states only "Attending lectures is mandatory", study course "Course An introduction to the biotechnology industry" states that requirements for obtaining credit points is "course grade is pass/fail". Some mandatory literature sources were in Russian (courses "Medication extraction technology", "Processes and equipment", "Bioenergetics"). There is a problem that in several courses lecturers' ask for mandatory attendance of lectures and mention it as a requirement for getting CP. Not all course descriptions have problems, but all of them should be revised and it could be beneficial to use a united form and similar approach to define description of students' independent work, requirements for getting CP, course calendars, level of details for practical and laboratory works in course descriptions.

- 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 sample diploma to be issued states that graduates are awarded with 5th level professional qualification and is prepared in accordance with the Professional Education Law, which came into force on 01.04.2022. But it does not comply with the current regulations of the MK No. 451 "Procedure for issuing state-recognized vocational education and professional qualification documents..." ("Kārtība, kādā izsniedzami valsts atzīti profesionālo izglītību un profesionālo kvalifikāciju apliecinoši dokumenti...") annex 3 and MK No. 141 "Rules on the state standard of first-level professional higher education" ("Noteikumi par pirmā līmeņa profesionālās augstākās izglītības valsts standartu") paragraph 15. However, since the Law is higher than the regulations of the Cabinet of Ministers, the Diploma sample has been prepared in accordance with the information specified in regulatory enactments that students will receive a diploma with the record that "The obtained qualification corresponds to the fifth level of professional qualification".

But it must also be highlighted that professional standard is graded as 4th level professional qualification.

- 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

Not applicable

- 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

Not applicable

- 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

Not applicable

- 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

RTU OTC have electronically signed acknowledgment (Annex 11 ACKNOWLEDGMENT\_11.edoc) by the director of the college that the national language proficiency of the teaching staff involved in the implementation of the relevant study program in the study field complies 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. The level and level of proficiency in the official language in accordance with the language policy of the Council of Europe and the developed document "Common European Guidelines for Language Learning: Learning, Teaching, Assessment. Cabinet of Ministers No 157 (<https://likumi.lv/ta/id/330669-noteikumi-par-valsts-valodas-zinasanu-apjomu-valsts-valodas-prasmes-parbaudes-kartibu-un-valsts-nodevu-par-valsts-valodas-prasmes-parbaudi>).

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

**Assessment of compliance:** Not relevant

not applicable

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

**Assessment of compliance:** Partially compliant

The study agreement (Study\_AGREEMENT\_7.doc) partly complies with the requirements of the Cabinet Regulation No. 70 of 23.01.2007 "Regulations to be included in the Study Agreement" (<https://likumi.lv/ta/id/152072-studiju-liguma-obligati-ietveramie-noteikumi>). Agreement does not fulfill two points - 5.4. states that institutions of higher education or college must inform students about changes in data connected with accreditation or licensing a study programme, but 7.4. states that sides must have an agreement about processing personal data of students.

Also, study agreement states that graduates will receive professional qualification "Biotechnologists", but sample of diploma (1\_DIPLOMS\_biotehnologijas\_spec) and professional standard states that qualification is "Biotehnoloģisko procesu speciālisti". Classification code of the programme that is mentioned in the study agreement (41524) differs from code that is mentioned on e-platform and other documents (41526).

- 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

In case if the study programme is terminated, students have an opportunity to continue studies in academic bachelor study program Biotechnology and bioengineering in the field of study "Chemistry, chemical technologies and biotechnology", realized as a joint programme between RTU and LU. Stated in "AGREEMENT BETWEEN RIGA TECHNICAL UNIVERSITY AND AGENCY OF RIGA TECHNICAL UNIVERSITY "RIGA TECHNICAL UNIVERSITY OLAINTE TECHNOLOGY COLLEGE

- 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:** Non-compliant

Until the decision on the accreditation of the study field is made, submit approval about the compensation of losses and the possibilities of continuing the studies (possible contract with

another educational institution) in case the study programme is closed.

- 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

Not applicable

- 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

Not applicable

### **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:** Partially compliant

The study program mostly complies with the legal requirements specified in the Law on Higher Education Institutions and other regulatory enactments with some rather easily changeable exceptions - college need to make some clarifications in study agreements, course descriptions, compliance with professional standard etc.

The skills of a teaching staff and students should be improved, especially regarding the foreign languages: The admission rules should have more criteria for application. The courses should be improved and aligned with standard of qualifications and learning outcomes. The study desing should go in direction of deepening the theoretical knowledge of corse subjects like chemistry and or creating larger study modules, which should be aligned with changes in professional standard. The sustainability of the study program should be improved in the manner of finances, research projects, international cooperation and human resources. Human resources management of the teaching staff, their competences and self development, should be improved.

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

Overall the study programme reflects its content and is compliant with the qualification "Biotechnological process specialist" to be obtained. All structural components (aims, objectives, outcomes) are interrelated and belong to a professional standard. The study program is strongly based on the acquisition of practical skills. In general, the college would need to make various corrections in documents, study plans and courses, but this does not affect the continuation of the study process at the given moment. It should be noted that material and technical provision coupled with excellently equipped facilities can ensure high-quality studies, as well as close cooperation with the industry. Where both these things are available to the college. Industry representatives also pointed out that professionals with such qualifications are in demand on the labor market. In addition, before a decision on the accreditation of the field of study is taken, it is necessary to provide confirmation of the compensation for losses and the possibility of continuing studies



(possibly an agreement with another educational institution), otherwise, students are not guaranteed to continue their studies at any other institution in Latvia if the programme is closed. The contract on the possibility of continuing studies has been concluded with Riga Technical University and submitted to the accreditation commission (AIC-ANNEXES "VIENOŠANĀS STARP RĪGAS TEHNISKO UNIVERSITĀTI UN RĪGAS TEHNISKĀS UNIVERSITĀTES AĢENTŪRU "RĪGAS TEHNISKĀS UNIVERSITĀTES OLAINES TEHNOLOĢIJU KOLEDŽA).

#### Strengths

1. Well-formulated goals and study tasks, which are in compliance with the professional standard.
2. Very well-equipped facilities for the training of specialists.
3. Well compiled the practical study programme for future biotechnologists.
4. Teaching staff is fostering their own additional education in versatile forms and means. This serves very well for the outcomes of the study programme.

#### Weaknesses

1. Need to include the grade of the centralized examination of chemistry and biology or the average grade of the subject in the admission requirements.
2. Insufficient cooperation of teaching staff.
3. Low mobility of outgoing students, not fully incoming mobility.

### Evaluation of the study programme "Biotechnology"

Evaluation of the study programme:

Good

### 2.6. Recommendations for the Study Programme "Biotechnology"

#### Short-term recommendations

- |   |
|---|
| 1. To formulate utilization of two foreign languages in the studies and to measure the success rate of decided method or methods.   |
| 2. To review course descriptions, implement a united form and similar approach to define description of students' independent work, requirements for getting CP, course calendars, level of details for practical and laboratory works etc.                             |
| 3. In the admission rules, it would be necessary to include as one of the requirements to evaluate the CE certificate in chemistry/biology or the average grade of the final evaluation of one of these subjects  |
| 4. Until the decision on the accreditation of the study field is made, submit approval about the compensation of losses and the possibilities of continuing the studies (possible contract with another educational institution) in case the study programme is closed. |
| 5. To change code from 41526 to 41421 or 41422. It is required, as belonging to one of these codes will be more appropriate for the study programme "Biotechnology".  |

## Long-term recommendations

1. To initiate a review of the current version of the professional standard in order to get rid of small CP courses. For this to be accomplished the responsible authorities and employers should be involved so that the teaching outcome does not differ from the reviewed standard. It is noted that much of precious time is reserved for spending just to fulfill requirements of the standard rather than deepening the theoretical knowledge of core subjects like chemistry and or creating larger study modules.
2. To improve the sustainability of the study program: i) involve the money directly from the industry: personal grants for students, common research projects etc. ii) consider merging the Biotechnology study program to the respective study fields of Riga Technical University.
3. Since a significant part of the teaching staff is on a guest status, a certain plan for attracting academic staff in this area is essential to ensure a stable continuity in the realization of study courses and scientific research work, as a balance is needed between the above-mentioned employees who are elected in the college and who are on a guest status.
4. The human resources management of the teaching staff, their competences and self development, should be better taken care of. First of all, all teaching staff should fulfill criteria for positions they are holding, second, their personal growth should be taken care of and if possible, candidates with higher level of education should be considered for higher teaching positions.
5. It is necessary to identify new partners/universities in Latvia and abroad, to conclude cooperation agreements in order to strengthen cooperation, which could bring added value to the study program.

## 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:		Partially compliant	In general, OTC has established a policy and procedures for assuring the quality of higher education, the study program is evaluated by the head of the study program and the methodological commission, which consists of 3 teaching staff, including 2 elected assistant professors, the head of the study program and the deputy director of studies and research. The methodological commission meets once every two months and examines issues that have arisen during the course of studies in connection with methodological work. However, experts found that not all procedures are fully implemented and/ or understood by all involved parties (for example) from students' side. Also, feedback mechanisms have to be more precisely defined and they have to improve the logic, be efficient, and be available for all stakeholders. The whole procedure does not seem fully transparent and needs to be improved. (more information in sub point 1.5).
R2 - Compliance of scientific research and artistic creation with the level of development of scientific research and artistic creation (if applicable)	Fully compliant		Every two years, RTU OTC organizes a scientific-practical conference in which students, teaching staff and industry professionals participate with reports. Conference reports are collected in proceedings of scientific articles, which are available in the RTU OTC library. Many visiting teachers carry out various research activities in their main workplaces - universities. It would be necessary to motivate the teaching staff of RTU OTC more to engage in scientific work, as a result of which they could use their scientific researches to improve the content of their taught study courses.

Requirements	Requirement Evaluation		Comment
R3 - The cooperation implemented within the study field with various Latvian and foreign organizations ensures the achievement of the aims of the study field.		Partially compliant	Cooperation with an industry in Latvia can be evaluated as good - students have a wide choice when it comes to internships, industry is happy to have students from OTC. But the internationalization level (no students mobility, only four contracts with HEIs from Latvia, one from abroad) is very low and must be improved. On the list of agreements there are contracts of cooperation signed with one international and four Latvian institutions. (AIC Annexes NR_13_pielikums_30_0-e.docx) From the document on mobility of the teaching staff it could be concluded that staff had possibility to visit 9 European countries, in the last assessed period (AIC Annex Mobility of teaching staff abroad_16.docx) while student did not have any inbound and outbound mobility AIC Annex NR_15_pielikums_ENG.docx) None permanent contract was signed with foreign lecturers, while with Latvian there are 17 permanent teaching staff with contracts (AIC Annex Composition_of_the_academic_staff_9.docx.
R4 - Elimination of deficiencies and shortcomings identified in the previous assessment of the study field, if any, or implementation of the recommendations provided.		Partially compliant	The shortcomings identified in the previous assessment of the study field have been addressed, but in expert opinion, partially and there still is a place for improvement. The most important shortcoming is the lack of a system for monitoring the development of academic staffs' skills and knowledge, including English language.

#### 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)
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<b>No.</b>	<b>Study programme</b>	<b>R5</b>	<b>R6</b>	<b>R7</b>	<b>R8</b>	<b>Evaluation of the study programme (excellent, good, average, poor)</b>
1	Biotechnology (41526)	Not relevant	Fully compliant	Partially compliant	Partially compliant	Good

### **The Dissenting Opinions of the Experts**

The Experts did not have dissenting opinions