APPLICATION

Study field "Chemistry, Chemistry Technologies, and Biotechnology" for assessment

Study field	*Chemistry, Chemistry Technologies, and Biotechnology*
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Self-evaluation report

Study field "Chemistry, Chemistry Technologies, and Biotechnology"

Daugavpils University

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1. Information on the Higher Education Institution/College

1.1. Basic information on the higher education institution/ college and its strategic development fields,.

Brief characteristics of Daugavpils University

Daugavpils University (henceforth – DU) is a significant centre of science and education in Daugavpils and East Latvia. DU is a modern science-based university that offers high quality education, prepares highly qualified specialists and professionals, greatly contributes to science innovation and transfer of scientific ideas to broader public and national economy. DU is the only university in Latgale that performs the functions of the driving force for the development of the region of East Latvia and its adjacent territories, it concentrates major intellectual and technical resources in the region. DU has gained international recognition by joining the European University Association, European International Studies Association, European Union Universities of Small States Association, and European Science Events Association.

Daugavpils University mission and vision

DU mission: to contribute to the development of sustainable future society by implementing scientific research on an international level and ensuring high quality education in the fields of natural, engineering, education, health, humanities and social sciences, thus promoting the sustainable development of Latgale region and the whole country.

DU vision: In 2030 DU is a modern scientific university that offers high quality education and conducts important scientific work. The quality of the University work and its reputation in Latvia and all over the world has provided the basis for its growth and stability. DU has become a driving force of the educational, scientific, innovation and business development in Eastern Latvia. DU functions as an excellence centre in the fields of mathematics, physics, nano-materials, material engineering, biology, regional studies, literature, art, and education science. DU accumulates, preserves, and maintains regional knowledge and contributes greatly to the regional development.

Main objectives of DU activity:

1. to act as a regional university in the spheres of natural sciences, humanities, education and social sciences creating opportunities for diversified high quality studies and research;
2. to provide high quality study programmes and conduct research in compliance with the dynamics of labour market demands and needs of the community;
3. to create opportunities for enhancing the professional mobility of the population by developing further education;
4. to develop personality capable of analytical thinking, critical perception, and creative processing of information, who can, due to the acquired education, contribute to the development of the state and region of Latvia and the welfare of the population;
5. to preserve and develop Latvian national identity and culture legacy, simultaneously entering international integration;
6. to implement interior quality provision systems that build policy and procedures for the provision of the higher education quality.

DU strategic areas of specialization

According to the order of the Cabinet of Ministers of June 21, 2022 no. 449 "On strategic

specialization of state universities" (https://likumi.lv/ta/id/333471-par-valsts-augstskolu-strategisko-specializaciju - available in Latvian), three areas of strategic specialization are defined in DU:

- natural sciences;
- social Sciences;
- humanities and artistic sciences.

DU, implementing its studies and research activities in accordance with the areas of strategic specialization defined for it in paragraph 1 of this order, implements interdisciplinary studies, research and innovations, as well as cooperation with the business sector.

The university has the right to implement study programs and research activities also outside the initial areas of strategic specialization specified in this order, in accordance with Article 4 of the Law on Universities.

Implemented study directions and the number of study programmes within them

Study process at DU is implemented in 16 study directions: "Education, pedagogy, and sports" (7 study programmes), "Art" (5 study programmes), "History and philosophy " (3 study programmes), "Language and culture studies, native language studies and language programmes " (5 study programmes), "Translation" (1 study programme), "Psychology" (3 study programmes), "Economics" (3 study programmes), "Management, administration, and real estate management" (3 study programmes), "Law" (3 study programmes), "Life sciences" (3 study programmes), " Chemistry, Chemical Technologies and Biotechnologies" (2 study programmes), "Physics, material science, mathematics, and statistics" (3 study programmes), "Information technologies, computer technology, electronics, telecommunications, computer management, and computer science" (3 study programmes), "Health care" (2 study programme), "Environment protection" (2 study programmes), " Internal Security and Civil Protection " (3 study programmes).

The dynamics of student number at Daugavpils University in the period of assessment

In accordance with the Ministry of Education and Science “Survey of higher education in Latvia in 2021” (https://www.izm.gov.lv/lv/media/18744/download?attachment – available in Latvian), DU occupies 5th place among Latvian higher education institutions as to the number of students. DU provides higher education not only to East Latvia region represented by the majority of DU students but to other regions of Latvia and labour market of foreign countries.

Assessment of the dynamics of the student number in the time period from 2017 to 2022 (Figure 1) leads to a conclusion that the number of students at DU has remained steady and even increased in 2021, despite the long-term decline and emigration of the population in Latgale and Latvia. According to the informative material “Summary: Economic and labor market trends”, in the following years the number of the population of Latvia will keep diminishing (https://prognozes.em.gov.lv/en). The main reasons of this process include aging of the society, durably low birth rate and emigration of the population (https://www.em.gov.lv/lv/media/598/download - available in Latvian). Due to economic reasons, more and more secondary school leavers choose to study or get employed outside Latvia, therefore state funded budget places are not filled and the fall of the number of students concerns almost all higher education institutions.

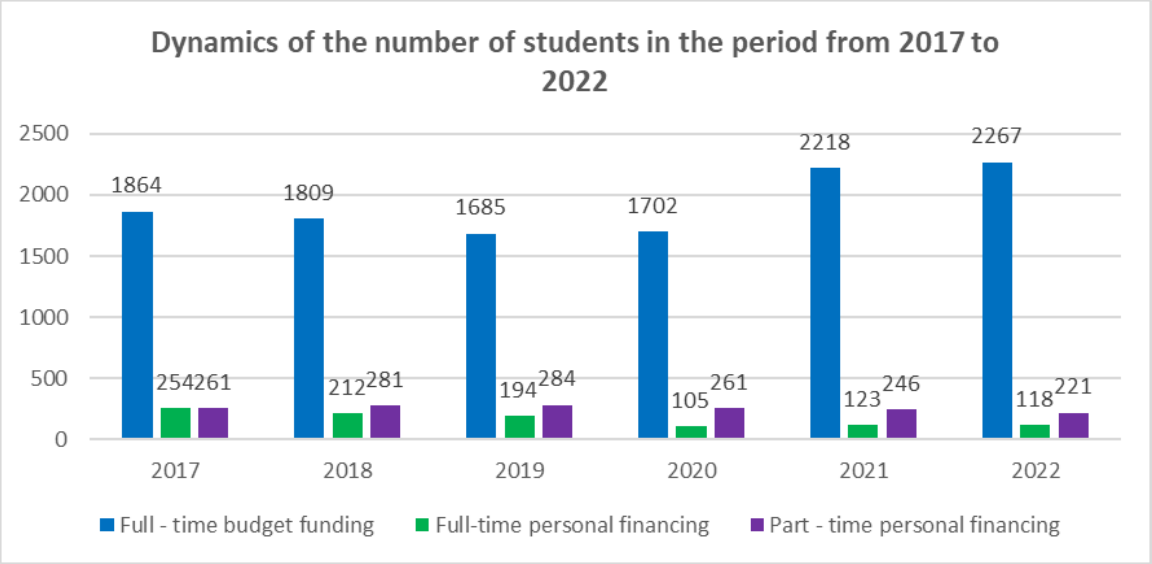


Figure 1. Dynamics of the number of students in the period from 2017 to 2022. Displayed data for October 1 of the respective year.

In order to attract students in the current conditions, Daugavpils University is developing new competitive study programmes, for example, in 2021, one of such study programmes was the professional Bachelor's study programme "Nursing", in turn, in 2022 – professional Master's study programme "Economic security".

Enlarging of the number of foreign students is one of the priority goals of DU. For the purpose of internationalization of studies, 13 study programmes are offered in English. In the time period from 2016 to 2022, there were 615 students from abroad at DU. Most of foreign students at DU are citizens of Russia, Uzbekistan, Kazakhstan, Tajikistan, Belarus, China, USA, Israel, Finland, Italy, Ukraine, Philippines and Indonesia. 3 – 4 times a year DU representative participate in higher education exhibitions in Belarus, Uzbekistan, Kazakhstan, as well as cooperate with higher education institutions and education institutions in foreign countries to inform of the current offer of study programmes, establish contacts with foreign universities for elaboration of joint programmes, to facilitate the attracting of foreign students and the academic staff.

Daugavpils University development strategy major goals and activity directions

DU development goals are envisaged by "Daugavpils University development strategy for 2015-2020" (henceforth – Strategy, https://du.lv/wp-content/uploads/2022/09/DU-Strategy-summary-1.pdf).

Based on letter No. 4-10e/21/99 "On Development Strategies of Institutions" issued by the Ministry of Education and Science on 11.01.2021, for the implementation of nationally mutually harmonized education and science policy and successful implementation of the ongoing reforms, by the decision of the DU Senate (Protocol No.1 of the DU Senate meeting of January 25, 2021) the period of "Daugavpils University Development Strategy 2015-2020" has been extended until the start of a new approved strategy (2023).

Strategy general goal is developing Daugavpils University as academic traditions based, modern, and competitive study, scientific, and innovation centre.

Strategy determines the medium-term goals:

1. To provide high quality education that corresponds with future challenges and is based on theoretical knowledge and acquiring of research skills, preparing internationally competitive specialists, developing their abilities and encouraging life-long learning.

2. To develop scientific and creative work on an international level, deepening integration of scientific research in the study process, facilitating technology transfer and development of innovations and contributing to public understanding of the science.
3. To increase the role of Daugavpils University as a consolidator of scientific educational institutions in Eastern Latvia and a driving force of the development, as well as to promote the reputation of the University in Latvia and all over the world.
4. To ensure united and efficient work of organisational structure and to introduce a quality management system.
5. To develop a modern, environmentally friendly infrastructure, safe and supporting working environment.

1.2. Description of the management structure of the higher education institution/ college, the main institutions involved in the decision-making process, their composition (percentage depending on the position, for instance, the academic staff, administrative staff members, students), and the powers of these institutions.

DU is a derived public person. DU is state founded and acts as an autonomous self-governing institution. Decision about reorganization or liquidation of DU is made by the Cabinet of Ministers on the proposal of the Minister of education and science.

DU self-governing is based on the rights and opportunities of the staff to engage in academic and scientific, administrative, and economic decision-making. DU acts on the basis of the Constitution of the Republic of Latvia, Law on Education, Law on Scientific Activity, Law on Higher Education Institutions, DU Constitution, and other laws and regulations.

DU major decision-making institutions are: Daugavpils University Council, Constitutional Assembly, Senate, rector, Academic Court of Arbitration.

In 2022, the **Daugavpils University Council** was approved – the highest decision-making body of the University, which is responsible for the sustainable development, strategic and financial supervision of the University, as well as supervises the activities of the Rector of the University and ensures the University's activities in accordance with the goals set in its development strategy. The Council is established in the composition of 7 (seven) members, of which 3 (three) members of the Council are nominated by the University Senate, 3 (three) are nominated by the Cabinet of Ministers of the Republic of Latvia, and 1 (one) by the President of the Republic of Latvia. The Council operates in accordance with the regulations of the Daugavpils University Council (available in Latvian only: https://du.lv/wp-content/uploads/2022/09/Padomes-nolikums_25.08.2022..pdf).

DU Constitutional Assembly (Satversmes sapulce) is the academic, general staff and student representative body of DU, which is elected for three years by secret ballot, from professors and other academic staff - 35 representatives (70%), students - 10 representatives (20%), and general staff - 5 representatives (10%). The Constitutional Assembly decides on the adoption, amendment, or repeal of the Constitution (Satversme); The Constitutional Assembly adopts and makes amendments to the Regulation of the Senate, elects the Senate, calls off the members of the Senate; elects the rector to the position and can initiate the removal of the rector from the position, listens to the rector's report; elects the Academic Arbitration Court and approves its regulation. The Constituent Assembly has the right to accept for examination and decision also other conceptual issues of operation and development of Daugavpils University.

DU Senate is a collegial higher academic decision-making body, which is responsible for the excellence, development and compliance of DU with internationally recognized quality standards of education, research, creative activity. The Senate regulates the academic, creative, and scientific spheres of DU. The Senate operates in accordance with the procedures established in the DU Constitution and the regulations approved by the Senate. Within the autonomy of the university, the Senate protects and ensures the academic freedom of the academic staff and students. The Senate is elected by the Constituent Assembly for three years. The Senate consists of 15 members - 11 representatives from the academic staff of DU elected by the Constitutional Assembly, 3 student representatives elected by the student self-government and approved by the Senate, as well as the rector in accordance with the position held and in accordance with the Act on Higher Education Institutions. The students represented in the Senate of DU have the delaying veto right in matters related to the interests of the students.

The highest official of DU is the **rector**. Candidates for the post of rector are selected within an open international competition by the university Council and elected by DU Constitutional Assembly. The rector administrates the university and is responsible for the achievement of the goals set in the university development strategy, as well as efficient and lawful use of the university's financial resources in accordance with the law, other regulatory enactments, as well as the university's Constitution, the decisions of the Council and the Senate. The rector carries out representative functions of the university, performs other activities to ensure successful operation of the university and represents the university in cooperation with other institutions and private individuals, within the scope of rector’s competence bearing responsibility for the compliance of the university's activities with the Act of HEI and other regulatory acts.

The Academic Arbitration Court examines applications by DU students and academic staff regarding restrictions or violations of academic freedom and rights stipulated in the DU Constitution; examines disputes between DU officials, as well as administrative institutions of DU structural units, which are in a subordinate relationship; examines, in the cases specified in the Act on HEI, submissions on challenging administrative acts or actual actions and makes relevant decisions on them, as well as performs other tasks provided for in the DU Constitution. The Academic Arbitration Court is elected for three years in the composition of seven people, including four representatives from among the academic staff by secret ballot by the Constitutional Assembly, three student representatives by the student self-government.

Council of Studies is a management authority that supervises issues of study planning, organizing, and coordinating, provides the necessary conditions for the academic work at faculties and departments. Council of Studies includes vice rector for studies, faculty deans, and the head of the Department of Studies. Main duties of the Council of Studies are coordinating the elaboration and execution of bachelor, master, and professional study programmes, elaboration of the scheme of studies, its analysis and determining the main directions of its improvement and development, organizing the investigation and implementation of foreign countries’ experience.

Council of Science is an institution of representation of branches and sub-branches of science that coordinates the scientific work at the university. Main functions of DU Council of Science are supervising the elaboration and implementation of DU strategy, science development process, allocation of funds for science, execution of promotion, and the work of professor councils. DU Council of Science consists of vice rector for science, head of the Department of Science, representatives delegated from each scientific institute council, a representative from professors delegated by faculty in case the faculty has no institute or no institute council, DU Young Scientist Association representative.

Faculty council supervises the study, scientific and/or artistic work and economic activity of the

faculty. The configuration of council corresponds to the requirements of the promotion council in the respective branch or sub-branch of science and no less than a half of its members must be professors, associate professors, senior researchers, and experts approved by Latvian Council of Science. The council is formed of the chairperson of the council, deputy chairperson of the council, and council members. The council includes the dean; deputy dean/s and/or education methodologist; heads of departments, institutes, centres and other faculty structural units; it may include study programme directors, representatives of the academic staff from the structural units; student representatives that are delegated by the faculty student self-governance (20% of the council members).

Study direction council is formed upon the recommendation of DU Council of Studies and approved by DU Senate. The members of the Study direction council are approved by DU Council of Studies. Study direction council includes study direction programme directors, the academic staff, students (at least one representative from 1st level professional education programme, bachelor, master, and doctoral study programmes) and representatives of employers. Functions of the council are: to elaborate the study programme/s of the study direction; execute the direction study programme self-assessment and implementation analysis; analyze students' academic performance; analyze the academic work of the academic staff involved in the study direction; facilitate the integration of scientific work in the study programme.

1.3. Description of the mechanism for the implementation of the quality policy and the procedures for the assurance of the quality of higher education. Description of the stakeholders involved in the development and improvement of the quality assurance system and their role in these processes.

Quality ensuring policy is part of Daugavpils University development strategy for 2015-2020.

DU study quality management system observes the compliance with ISO 9001:2017 quality standard. Compliance with this standard testifies to the fact that DU tends for the quality of its education services by maintaining the quality management system (QMS), periodically passing accreditation and verifying the efficiency of the system. QMS testifies that DU makes an effort to make out the preferences of the potential students, tends to maintain constantly good quality of studies and governance and ensure systematic and transparent processes as well as incessantly improve cooperation with cooperation partners and community.

The envisaged outcomes of DU implemented ESF project "Daugavpils University governance and management competence improvement" (No. 8.2.3.0/18/A/010) are – adjust DU study and governance quality systems and receive ISO 9001 certificate that is an internationally recognized organization quality mark.

DU Council of Studies and DU Centre of Study Quality Assessment (henceforth – CSQA) introduces quality provision systems on the basis of "Internal quality assurance policy of studies at DU" (see https://du.lv/en/about-us/documents/). The policy has been elaborated in accordance with *The Standards and guidelines for quality assurance in the European Higher Education Area* (ESG) and observing legal acts of the Republic of Latvia (Law on Higher Education Institutions, Higher education standards, etc.), DU normative acts (see "Other Annexes") and "Daugavpils University development strategy for 2015 – 2020".

To ensure the improvement of the existing normative documents and procedures at DU and

compliance with the student centered and sustainable higher education, especially assessing and updating quality policy implementation mechanisms, the study quality system is being updated within ESF project “Daugavpils University governance and management competence improvement” (No. 8.2.3.0/18/A/010). Within the framework of the project, in 2021, the new normative acts for the internal study quality assurance were drawn up, which were approved by rector's ordinance, for example, “DU Study Internal Quality Assurance Policy”, “DU Study Quality Policy and Study Quality Monitoring Strategies (see “Other Annexes”, Latvian only), “Procedures for Ensuring the Effectiveness of DU Study Internal Quality Assurance System” (see “Other Annexes”, Latvian only), etc. (see “Other Annexes”, Latvian only), which are aligned with the content of the newly developed "DU Quality Policy" and "Quality Management System Manual". All these documents are available from the DU internal network in Latvian.

Mechanisms of the study process quality provision

Study quality maintaining aims at monitoring and improving the study programme implementation and facilitating prerequisites for reaching study programme outcomes. Quality monitoring is constant: during enrolment, recruiting the academic staff, improving the study programmes, reviewing the activity of structural units and their heads according to the academic and research work outcomes.

Higher education internal and external quality provision proceeds in cooperation between DU and the Ministry of Education and Science (in distribution of State budget funded places, execution of conceptual decisions), Higher Education Council (dealing with strategic issues, drawing statements), and Academic Information Centre (study programme licensing, study direction assessment, recognition of students’ prior education).

The main forms of quality assessment are as follows:

External assessment – licencing, accreditation, and assessment of independent experts. It is ensured by the quality ensuring agency listed in the European higher education quality ensuring register (in Latvia – Higher Education Quality Agency). It is coordinated by heads of study directions along with CSQA and vice-rector for studies.

Internal assessment – constantly performed by DU study direction councils elaborating self-assessment reports. Internal assessment is implemented and coordinated by DU CSQA approved by the Senate. In accordance with DU study internal quality ensuring policy there is systematic assessment of study directions and programmes in order to make sure how the programme objectives and study outcomes are reached, the compliance of the programme with the current developments of national economy and labour market demands.

The internal quality of studies is ensured by the following measures:

Quality ensuring instrument	Implementation procedure
Strategic planning of the process of studies	Implemented by the study programme director in cooperation with the academic staff and members of the study direction council; Analyzing the shortcomings, risks, development opportunities of the study direction and study programmes wherein.

Examining the issues related to the process of studies	Study direction councils assess the process of studies within a programme, its outcomes, and proposes to the head of the study direction and study programme directors measures for the programme improvement and integration of recent ideas in the study content and process. The respective structural units discuss the submitted proposals and initiate changes in the study course amount, their content and calendar arrangements in semesters. Each semester, departments, taking into consideration the results of student surveys, formal indicators of students' academic performance as well as the professional indicators of the academic staff members in respective spheres (participation in conferences, research and other projects, applied projects, publications, etc.), analyze in detail the content of each course and the quality of its delivery. After that proposals as to changes in the study courses or study programme are discussed in faculty councils and after their support are addressed to DU Council of Studies that examines the justification of changes proposed. In case of a positive decision taken by the Council of Studies, the changes are implemented.
Surveys	At the end of each academic year surveys of students (https://aptaujas.du.lv/index.php/253299/lang-lv), employers (https://aptaujas.du.lv/index.php/544412 - available in Latvian), and alumni (https://aptaujas.du.lv/index.php/764263/lang-lv - available in Latvian) are carried out. Based on the survey results, the study programme content is reviewed and improved within study direction councils executed by study programme directors. All justified opinions, proposals, and reprimands are examined by the study programme director, in case of necessity discussing the issues in study direction councils. CSQA upon necessity carry out express surveys in order to clarify students' opinion on current issues concerning the process of studies.
Self-assessment of the study direction and preparation of the self-assessment report	The head of the study direction organizes meetings of the study direction council in order to discuss the main trends of programme development and management. For examining debatable issues (assessment of examinations, ignoring the regulations of DU by students and/or academic staff members, etc.) student representatives are invited. Once a year the head of the study direction along with programme directors prepare the self-assessment report of the study direction on the previous academic year that is examined by CSQA and approved by the Council of Studies and the Senate.
E-study environment improvement	DU e-study environment Moodle is used to provide information on the courses acquired during the semester. For each course students have access to the following information: study course description, criteria of assessment, materials for student independent work, etc.

Characteristics of the parties involved in the elaboration and improvement of quality ensuring system and their role.

Efficient results are reached by means of understanding and support of the administration, purposeful DU strategy and policy implemented by successful participation of the academic staff as

well as full partnership, resource saving approach, and process governance.

Party involved	Characteristics of the role
DU administration	- elaborates DU development strategy and implements its objectives; - facilitates the development and professional growth of the staff, elaborates and implements various motivation and support mechanisms (e.g. research activity facilitation, involvement in ERASMUS+ programmes for experience exchange and good practice); - cooperates with deans, heads of study directions, provides support for the solution of governance and financial issues.
Academic and research staff	- ensures high quality studies; - performs scientific research and integrates it into the study content; - participates in professional updating events, international mobility and experience exchange activities; - cooperates with external experts, employers, alumni, facilitates their involvement in the study direction improvement.
Administrative staff	- ensures high quality study programme governance; - provides support for students and the academic staff involved in study programmes; - tends to the updating of the material and technical base for studies.
Employers, social partners, and external experts	- provide the expertise for the study programme content and proposals for the improvement of the study content and methods; - provide opportunities for practical placement and internship, facilitating working environment-based study principles in professional study programmes.
Alumni	- use the acquired knowledge, skills, and competences in their professional activity; - provide proposals for the improvement of the study content.
Students	- provide feedback for the study quality improvement.

1.4. Fill in the table on the compliance of the internal quality assurance system of the higher education institution/ college with the provisions of Section 5, Paragraph 2(1) of the Law on Higher Education Institutions by providing a justification for the given statement. In addition, it is also possible to refer to the respective chapter of the Self-Assessment Report, where the provided information serves as justification.

1.	The higher education institution/ college has established a policy and procedures for assuring the quality of higher education.	Complies DU is being implemented “DU study internal quality ensuring policy” (https://du.lv/en/about-us/documents/) that facilitate and ensure the quality of higher education. To ensure the improvement of the existing normative documents and procedures at DU and compliance with the student centered and sustainable higher education, especially assessing and updating quality policy implementation mechanisms, the study quality system is being updated within ESF project “Daugavpils University governance and management competence improvement” (No. 8.2.3.0/18/A/010) (see section 1.3).

2.	A mechanism for the creation 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.	Complies In accordance with the “Regulation on Studies at Daugavpils University” (https://du.lv/wp-content/uploads/2022/06/ENG-NOLIKUMS_PAR_STUDIJAM_DU_2018-1-1.pdf) and “Regulations on Opening and Managing Daugavpils University Study Directions and Study Programmes” (https://du.lv/en/about-us/documents/) there are established mechanisms for the development, internal approving of study programmes, their monitoring and periodic examination.
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 made public.	Complies “Regulation on Studies at Daugavpils University” (https://du.lv/wp-content/uploads/2022/06/ENG-NOLIKUMS_PAR_STUDIJAM_DU_2018-1-1.pdf) and study course descriptions of each study programme state the criteria, conditions, and procedures of the assessment of students’ academic performance that attests to reaching the envisaged outcomes of studies. The Regulation and study course descriptions are freely available to students. Students have an opportunity of giving proposals for the criteria, conditions, and procedures of the assessment of students’ academic performance in surveys.
4.	Internal procedures and mechanisms for assuring the qualifications of the academic staff and the work quality have been developed.	Complies DU has elaborated internal normative acts and mechanisms that regulate the ensuring of the qualification and work quality of the academic staff: “Regulation on elections to academic positions in Daugavpils University” (Latvian only: https://du.lv/wp-content/uploads/2021/12/Nolikums-par-velesanam-akademiskajos-amatos-DU_APSTIPRINATAIS.pdf) and “Procedure of assessing the scientific activity of Daugavpils University academic staff” (see “Other Annexes”). Self-assessment reports include the results of surveys and measures of implementing students’ proposals and averting criticism.
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.	Complies Surveys of students, alumni, and employers are organized every year. CSQA carries out express surveys to learn students’ opinion on current issues related to the process of studies and academic staff work efficiency. There is regular cooperation with the Student Council, exchange of opinions, examination of proposals. Program directors collect, analyze and discuss information about student progress in Study direction Councils. Necessary changes in study programs are reviewed and accepted by the Study Council. Every year, the scientific efficiency of the academic staff is evaluated by the Council of Science. Information on available study funds and their costs is collected in the Finance and Accounting section, while decisions related to finances are made by the Budget Commission of DU.
6.	The higher education institution/ college shall ensure continuous improvement, development, and efficient performance of the study field whilst implementing their quality assurance systems.	Complies DU study quality management system observes the compliance with ISO 9001:2017 quality standard. Compliance with this standard testifies to the fact that DU tends for the quality of its education services by maintaining the quality management system (QMS), periodically passing accreditation and verifying the efficiency of the system. QMS testifies that DU makes an effort to make out the preferences of the potential students, tends to maintain constantly good quality of studies and governance and ensure systematic and transparent processes as well as incessantly improve cooperation with cooperation partners and community.

2.1. Management of the Study Field

2.1.1. Aims of the study field and their compliance with the scope of activities of the higher education institution/ college, the strategic development fields, as well as the development needs of the society and the national economy. The assessment of the interrelation of the study field and the study programmes included in it.

Purpose of the study field (direction) "Chemistry, chemical technologies and biotechnology" is to provide students with the acquisition of theoretical knowledge and research skills and abilities in chemistry and its sub-branches and by developing the skills of scientific –research work and skills, thus ensuring the acquisition of higher academic education and the opportunity to successfully continue studies in the master's degree.

The study programs have been developed based on the DU strategy (DU development strategy for 2015-2020 (Latvian only): https://du.lv/wp-content/uploads/2021/12/DU_attistibas_strategija_25.01.2021.-converted.pdf) and the latest trends in chemistry, chemical technologies and biotechnology in the education system in the European Union. The goals of the study programs are in line with the medium-term goal set in the DU Strategy: "Providing quality education that meets the challenges of the future and is based on theoretical knowledge and the acquisition of research skills, preparing specialists who are competitive in the international labour market, developing their abilities and motivating lifelong learning."

DU makes a significant contribution to the training of highly qualified specialists in the field of chemistry, chemical technology and biotechnology for the region of Eastern Latvia.

The economic situation in Latvia significantly limits the opportunities of high school graduates of the East Latvian region to obtain higher education in Riga. The offer of the "Chemistry, chemical technologies and biotechnology" study direction of DU gives students the opportunity to acquire higher education in the field of chemistry at two study levels.

The field of study "Chemistry, chemical technologies and biotechnology" is strategically important in connection with the international opportunities for the use of renewable resources. The impact on the environment and climate change has been considered an important criterion in the EU's energy policy until now. The 2004 European Commission statement on the use of renewable energy resources also emphasized the need to reduce dependence on resource imports and increase the use of biomass. Therefore, increasing the share of renewable energy resources in the energy balance is one of the EU's energy priorities.

At the national level, the study direction "Chemistry, chemical technologies and biotechnology" is strategically very important for the implementation of such national-level planning documents as "Latvia's sustainable development strategy until 2030", "National Development Plan 2021-2027" and "Environmental Policy Guidelines 2021-2027".

Achieving the international and national environmental protection goals formulated in the aforementioned EU and national planning documents requires highly academically and professionally trained specialists, which will be able to implement both the listed tasks and the Agenda 21 action program. It is chemistry studies in the country that ensure the preparation of specialists of this nature, as well as opportunities to develop and practically implement the balanced and sustainable development concepts of the country. Thus, it once again confirms the

strategic importance of the "Chemistry, chemical technologies and biotechnology" study direction.

The implementation of study programs of the study direction "Chemistry, chemical technologies and biotechnology" is interconnected and successive. Currently, this DU study direction includes two study programs:

1 table Study programs to be implemented in the direction of studies

Program name	Study type	Amount	Degree and/or qualification acquired
Academic Bachelor's study program "Chemistry" (43441)	Full time studies	120 CP	Bachelor of Science in Chemistry
Academic master's study program "Chemistry" (45441)	Full time studies	80 CP	Master of Science in Chemistry

2.1.2. SWOT analysis of the study field with regard to the set aims by providing explanations on how the higher education institution/ college expects to eliminate/ improve weaknesses, prevent threats, and avail themselves of the given opportunities, etc. The assessment of the plan for the development of the study field for the next six years and the procedure of the elaboration thereof. In case there is no development plan elaborated or the aims/ objectives are set for a shorter period of time, information on the elaboration of the plan for the development of the study field for the next assessment period shall be provided.

In order to ensure the quality of the study course, a review of the study course is prepared every year, which was evaluated by an expert appointed by the Vice-Rector of Studies. The report is approved by the DU Senate. An integral part of the improvement report is the consideration of SWOT analysis issues, which allows you to show the achievements in a concentrated manner and emphasize the problems. It is an essential tool for achieving the goals of the study direction. The SWOT analysis of the field of study is given below in the text.

SWOT analysis of the DU study direction "Chemistry, chemical technologies and biotechnology":

	Strengths	Weaknesses

Internal conditions	· Lecturers have high-quality necessary education and extensive pedagogical and scientific-research work experience; · Qualified and experienced teaching support staff; · Staff experience in project works; · Highly qualified and professionally prepared program graduates; · Good cooperation with DU structural units, Latvian and foreign educational and scientific research institutions; · Cooperation between teaching staff and students, regular evaluation of study program development; · Study program is purposefully oriented mainly to the needs of Latgale and other regions of Eastern Latvia; · Cooperation with employers.	· Insufficient number of published materials that reflect the activity of scientific-research and methodical personnel; inactive participation in international conferences; · Lack of a motivating system for teaching staff working with foreign students; · Renewal of academic staff; · Insufficient level of foreign language knowledge of students and teaching staff; · The relatively weak supply of modern scientific literature and periodicals in the Latvian language of the DU library; · Opportunities of student exchange programs are not utilised to their fullest extent; · Unpredictable government policy in the field of education financing; · Objective limitations to the possibilities of digitizing laboratory work, because not everything can be digitized
	Development opportunities	**Risks**
External conditions	· Independent improvement of the development strategy, taking into account changes in the labour market and the most important development trends in the world, introduction of new study programs; · Attracting funds from EU financial instruments and structural funds to improve the study environment and quality; · expanding cooperation with other European universities using ERASMUS opportunities for student and lecturer exchange; · expansion of cooperation with other Latvian higher education institutions, where chemical science study programs are implemented; · providing study courses in foreign languages, attracting foreign students to the study program; · attraction of qualified guest lecturers; · opening of new academic staff and support staff positions, election of new lecturers along with program development, creation of new programs and expansion of scientific infrastructure.	· Budget funding reduction; · Under the influence of the demographic situation, the number of potential students may decrease, as well as the initial preparation of admitted students may deteriorate; · Strengthening of competition in the educational services market; · Insufficiently used opportunities to attract funding for conducting scientific research and improving the material and technical base (Latvian Science Council (LZP), Ministry of Education and Science *[Izglītības un zinātnes ministrija]*, and other grants, EU funding); · Employers' inability to formulate precise requirements for the competences of an efficient and competitive specialist in the chemistry field in the existing labour market; · aging of personnel, insufficient number of defended doctoral theses among young scientists.

SWOT analysis matrix for strategy selection:

	Development opportunities	Risks
Strengths	**Strategies for using strengths to get the most out of the opportunities offered**	**Strategies for using strengths to minimize risks**
	· Preserving and developing traditions, improving the potential of personnel; · Constantly cooperating with companies and organizations of the region, establishing business contacts; · Development of new study courses; · Improving the content of study courses, provision of study courses in foreign languages; · Involvement of academic staff and students in scientific research projects.	· Transformation of educational content and specialist preparation structure according to demands of the labour market; · Active use of students and the potential of program graduates to develop contacts with potential employers; · Search, analysis and use of opportunities for students and teachers to participate in various competitions, grants, projects, contractual works; · Development and implementation of new learning technologies and active learning methods.
Weaknesses	**Weakness minimization strategies using the offered options**	**Weakness and risk minimization strategies**
	· raising awareness of graduates of the program, emphasizing the quality and efficiency of specialist training; · Increasing the scientific and methodical potential of lecturers; · To the extent possible, improving the material and technical base with equipment that meets modern requirements; · Activating student involvement in international exchange programs · Involving employers' specialists in the field of chemistry in the study process.	· Expansion of non-material incentives for lecturers who actively participate in scientific research, projects and contractual works, reduction of disproportions in the distribution of workloads and bonuses; · Increasing the interest of the department employees in improving their qualifications and obtaining scientific degrees; · Improvement of the monitoring system of students' attitude towards the content, forms, structure and teaching methods of the program; · Further work in the creation and modernization of the new generation of methodical materials, which perform not only informative functions, but also guide students' cognitive activity.

The development plan of the field of study is related to the development strategy of DU. The most important directions of activity are the constant improvement of the quality of all aspects of studies, strengthening and expansion of existing international relations, raising the scientific capacity of the teaching staff of the study direction, more actively engaging in the international circulation, improving the material and technical base. Activities within the study process are still relevant: promotion of renewal of academic staff; strengthening of e-study opportunities, which became especially relevant in the context of the COVID-19 pandemic, *etc.* A summary of the development plan of the study direction is attached *(2.1.2. Study direction develompent plan summary_EN*).

2.1.3. The structure of the management of the study field and the relevant study programmes, and the analysis and assessment of the efficiency thereof, including the

assessment of the role of the head of the study field and the heads of the study programmes, their responsibilities, and the cooperation with other heads of the study programmes, as well as the assessment of the support by the administrative and technical staff of the higher education institution/ college provided within the study field.

The management of the study direction "Chemistry, chemical technologies and biotechnology" is carried out in accordance with the "Regulations on opening and management of study directions and study programs of Daugavpils University" (https://du.lv/en/about-us/documents/).

The study process is organized according to

- Constitution of the Daugavpils University (available in Latvian - https://du.lv/wp-content/uploads/2022/09/DU-Satversme_17.06.2022.pdf),
- Law on Higher Education Institutions *[Augstskolu likumu]* (available in Latvian - https://likumi.lv/ta/id/37967-augstskolu-likums),

August 26, 2014 Cabinet of Ministers *[Ministru kabinets]* Regulations No. 240 "Regulations on the national standard of academic education" (available in Latvian - https://likumi.lv/ta/id/266187-noteikumi-par-valsts-akademiskas-izglitibas-standartu)

and other legislative enactments.

The overall management of the study direction is provided by the DU Study Council, the resolution of specific issues is under the responsibility of the Council of the Faculty of Natural Sciences and Health Care (DVAF), the Department of Environment and Technology and the Council of the study direction "Chemistry, Chemical Technologies and Biotechnology" (*2.1.3. Management structure of study direction)*. The study direction council evaluates the progress and results of the study process and recommends measures to improve the programs and integrate the latest knowledge into the study content and process. The Council approves the proposals of the Department of Environment and Technology and the Program Director regarding changes in the scope of study courses, in their content and calendar arrangement by semesters, taking into account the results of student surveys and student achievements, as well as the indicators of the professional performance of lecturers. Proposals for changes in study courses or study programs are discussed in the DVAF Council and forwarded to the DU Study Council.

The Department of Environment and Technology of DVAF coordinates the work related to studies, promotes feedback between lecturers and students. The head of the study direction, in cooperation with the program director, organize and coordinate the study process in the study programs included in the direction, monitoring the quality of studies. The head of the study area and the program director prepare the annual self-assessment report of the study area, collect and analyze the information to be included in it. The director of study programs cooperates with the academic staff to ensure the continuity and interconnection of the study process. At the end of each study year, the head of the Department of Environment and Technology plans the workload for the next study year and sends requests to structural units. The head of the department is responsible for appointing lecturers to teach study courses. The director of study programs communicates with students, makes improvements in study programs. If necessary, topical issues are considered by the study direction council and the Faculty Council.

DU has a Student Service Center (SSC), a secretariat in the Department of Environment and Technology, which develops and circulates documents binding to study programs, participates in final exams, and records them. The administrative staff of the department and SSC provide

information about students, achievements, study programs, lecturers in the DU Information System (DUIS), prepare diplomas and diploma supplements. Student service specialists provide informational support to students, lecturers and study program directors. DU's academic publishing house "Saule" provides printing and binding of theses. Administrative and technical staff also perform other duties within their competence.

The support provided within the study direction of the administrative and general personnel of DU can be evaluated positively. Effective communication and systematic circulation of information is ensured within the faculty. Students are informed about where to turn if they have questions or need help. Each structure has its own tasks, together they complement each other, supporting study program directors and students. Therefore, we rate the support provided within the study direction of administrative and technical personnel of DU as good.

2.1.4. Description and assessment of the requirements and the system for the admission of students by specifying, inter alia, the regulatory framework of the admission procedures and requirements. The assessment of options for the students to have their study period, professional experience, and the previously acquired formal and non-formal education recognised within the study field by providing specific examples of the application of these procedures.

Admission to the programs of the "Chemistry, Chemical Technologies and Biotechnology" study direction of DU is provided in accordance with

- "Admission rules for full-time and part-time undergraduate studies" (available in Latvian - https://du.lv/gribu-studet/uznemsana/),
- "Admission rules for full-time and part-time higher level studies" (available in Latvian - https://du.lv/gribu-studet/uznemsana/),

which are approved annually by the DU Senate. Admission rules are updated every academic year in accordance with Law on Higher Education Institutions *[Augstskolu likums]*, the October 10, 2006 Cabinet of Ministers *[Ministru kabinets]* Regulations No. 846 "Rules on requirements, criteria and procedures for admission to study programs" and in accordance with the decision of the DU Board of Studies. Admission rules at DU have been developed according to different levels of studies, "Admission rules for full-time studies for foreigners" are available separately. Detailed information on admission, as well as links to admission rules, are available on the DU website (https://apply.du.lv/).

Admission to the basic study program is competitive, based on the results of centralized examinations (CE), as well as exam grades in the secondary education document, with the exception of persons who received secondary education before 2004, as well as persons who received secondary education abroad, or persons with special needs, or persons who have been exempted from taking centralized exams in accordance with the procedures specified in the regulatory acts. Persons who have obtained secondary education, starting from 2013, participate in the competition with percentages of CE evaluations. If the study opportunities in full-time and part-time basic studies are not defined differently, then the sum of points in the competition is formed according to the relationship:

- CE level coefficient x CE in Latvian x coefficient x10 + CE level coefficient x CE in first foreign language or International test x coefficient x 10 + CE level coefficient x CE in mathematics

(average value of all parts) x coefficient x 10 + 0.15 x total CE assessment average value (taking into account the coefficient of each CE level) + additional CE in the specified subject /exam grade in the secondary education document x coefficient x10.

Outside of the competition for full-time studies for budget funding at BSP "Chemistry", if the admission requirements for the study program are met, the following are enrolled: 1st-3rd of the Republic of Latvia and International Olympiads. winners of the DU scientific work competition for students "On the way to science" in the field of chemistry and students' open scientific work competition in biology and chemistry 1st-3rd place winners.

Daugavpils University offers the opportunity to register for studies in the academic master's study program "Chemistry" in accordance with the DU Admission Regulations.

According to the regulations of the Cabinet of Ministers of May 13, 2014 No. 240 "Regulations on the State Standard of Academic Education", students with a previously obtained

- academic bachelor's degree in chemistry;
- second-level higher professional or equivalent education in the field of chemistry.

The Admissions Committee of DU can examine the applications for studies of individual graduates of bachelor's or higher professional study programs in other thematic areas of education and make a decision on matriculation. In such cases, in order to ensure the necessary amount of knowledge in Chemistry study courses, the student, after coordinating the individual study plan with the program director, additionally learns study courses up to 10 CP in the 1st study year.

Enrollment of students in the study program for full-time studies takes place by competition, based on the results of the state final exams and bachelor's theses.

Participates in the competition with an average grade in the final/state exams.

The admission process is additionally regulated and "Full and part-time study opportunities", "DU admission process", registration fee, study fee in programs, number of study places for admission are approved by the decision of the DU Senate before the start thereof. The Senate approves the deadlines for the competition and announces admission.

"DU Admission Rules" and "Study Opportunities" determine the requirements for persons who wish to study at DU, the university's and the mutual rights and obligations of this person in the admission process; documents contain information about the study programs and study forms of a specific academic year, about additional requirements for applicants' previous education, preparation or special suitability for the specific studies, about the evaluation criteria of the competition. Admission to DU study programs includes the registration of applicants for studies, the conduct of the competition for study places, the announcement of the results of the competition, the conclusion of the study contract and registration in the list of students (matriculation).

Admission to DU study programs is ensured by the Secretariat of the DU Admission Commission. The admission commission determines and approves the results of the competition. The Admissions Committee can also approve and redistribute Admission Places.

The responsibilities of the Admissions Commission and the Secretariat of the Admissions Commission are defined in the document "Mutual obligations and rights of a person and DU in the admission process" (available in Latvian - https://du.lv/gribu-studet/uznemsana/).

The decision of the DU Admission Commission on the results of the competition can be challenged in accordance with the "Procedure in which a person can challenge and appeal decisions related to admission to a study program at Daugavpils University" developed by DU (available in Latvian - https://du.lv/wp-content/uploads/2021/12/kartiba_uznemsanas_apstridesana.pdf). The DU admission

procedure and information about it are implemented efficiently and transparently. During the reception, information boards are placed in the DU foyer on the 1st floor, consultations are provided in person, by phone and via e-mail. It should be noted that most potential students communicate about admission issues through DU social media accounts.

In the programs of the study direction "Chemistry, chemical technologies and biotechnology", students in the later stages of their studies are also matriculated ("Procedure for starting studies in later stages of studies at Daugavpils University", https://du.lv/wp-content/uploads/2022/06/ENG_Procedure-for-the-initiation-of-studies-in-subsequent-study-stages-1.pdf), taking into account the applicants' professional experience, previously acquired formal and informal education recognition opportunities (Regulation on recognition of competences acquired outside of formal education or professional experience and study results achieved in previous education at Daugavpils University available in Latvian - https://ieej.lv/TDAUV). During the reporting period, 7 students underwent the procedure of recognition of previously acquired education:

- 6 students – in the academic bachelor's study program "Chemistry",
- 1 student – in the academic master's study program "Chemistry".

2 table Examples of the procedure for the recognition of previously acquired education

Study programme designation	Previous education	Year
DU Academic Bachelor Study Program (ABSP) "Chemistry" (43441)	University of Latvia, Academic Bachelor's Study Program "Chemistry"	2019
	Riga Technical University, Academic Bachelor's Study Program "Chemical Technology"	2019
	University of Latvia, Academic Bachelor's Study Program "Chemistry"	2019
	University of Latvia, Academic Bachelor's Study Program "Chemistry"	2020
	University of Latvia, Academic Bachelor's Study Program "Chemistry"	2022
	Riga Technical University, Academic Bachelor's Study Program "Chemical Technology" Riga Technical University Olaine College of Technology, 1st level professional higher education study program "Biotechnology"	2023
DU Academic Master's Study Program (ABSP) "Chemistry" (45441)	University of Latvia, Academic Master's Study Program "Chemistry"	2017

DU has concluded two agreements (with the University of Latvia), which confirm that the respective higher education institution provides opportunities for students to continue their education if the implementation of the study programs is interrupted (*2.1.4. Agreements on the transfer of*

students). A standard sample of the study contract is available in the appendix (*2.1.4. Agreement on studies DU*).

2.1.5. Assessment of the methods and procedures for the evaluation of students' achievements, as well as the principles of their selection and the analysis of the compliance of the evaluation methods and procedures with the aims of the study programmes and the needs of the students.

According to the Standards and guidelines for quality assurance in the European higher education area adopted in 2015 (Standard No. 1.3), universities must ensure that the study programs are implemented in such a way as to encourage students to actively participate in the formation of the study process, and that the assessment of student performance is consistent with this approach. Evaluation in the study programs of the direction "Chemistry, chemical technologies and biotechnology" is carried out based on the following principles:

- the evaluation criteria are clear and understandable, are previously published and available;
- evaluators are familiar with testing and examination methods;
- assessment gives students the opportunity to show to what extent they have achieved the expected learning outcomes;
- students receive feedback that, if necessary, provides advice related to the learning process;
- assessment is consistent, fair, suitable for all students and is carried out in accordance with approved procedures and legislative enactments;
- there is a procedure for examining student appeals.

The knowledge, skills, competences acquired in the theoretical basic courses of the industry are tested with tests, colloquiums, exams, reports, presentations and other assessment methods. Laboratory work and practical classes are the dominant form of program implementation in the study of industry specialization courses, and students' knowledge and practical skills are assessed in these study courses.

Depending on the teaching form and methods, the lecturer chooses the assessment forms and criteria. A large part of the study results require the student not only to demonstrate knowledge, but also to practically analyze the learned material, connecting it to everyday life and existing experience. Therefore, also seminars and practical classes play an important role. In practical lessons, during individual or group work presentations, students express their opinion, improve their analytical skills. Acting in this way, a constant dialogue is maintained with surrounding partners – students are aware of the diversity of existing opinions and enrich each other's experience.

In addition to formative assessment, lecturers also use summative assessment. Summative assessment is formed in the case of the posting of mid-examination grades. At the end of the study course, there is a test with a grade or an exam. The final exam is in oral, written form, and in the form of an achievement test.

Students can familiarize themselves with the evaluation criteria, conditions and binding procedures in the study course descriptions.

The evaluation principles and criteria are in the description of each study course, which are available in the DU e-environment. When starting work with students in the audience, lecturers introduce students to the requirements of the study course and the knowledge and skills

assessment system.

The main advantage of the summative evaluation system is that the final grade is formed from several components. Therefore, while still working during the semester, students already affect their final grade. Evaluation criteria for study courses and individual/homework are published in advance in the DU e-environment. The assessment of homework, tests, reports, presentations and other works performed during the semester is given a certain proportion in the final grade. The exam grade cannot reach 100% of the final grade. Teaching staff can also take into account and evaluate class attendance and class activity. The evaluation structure for their study course is determined by the teaching staff themselves. When choosing criteria and methods for evaluating study achievements, the specifics of each study course and the results to be achieved are taken into account.

In order to analyze the conformity of assessment methods and procedures to the achievement of study program goals and students' needs, the results of student surveys, formal student success indicators are characterized, the content of each study course and the quality of its delivery are examined in detail. If inconsistencies in assessment methods are found, then a decision is made on the necessary changes in the content of the study courses or in the organization of the study process, if necessary, considering issues at the meeting of the Department of Environment and Technology. After that, proposals for changes in study courses or the study program are discussed in the Council of DVAF, and after its acceptance, they are forwarded to the Study Council of DU, which evaluates the need for changes. In case of a positive decision of the Board of Studies, the changes are approved.

Evaluation of study results is described in detail in the "Regulations on studies at Daugavpils University" (https://du.lv/wp-content/uploads/2022/06/ENG-NOLIKUMS_PAR_STUDIJAM_DU_2018-1-1.pdf).

2.1.6. Description and assessment of the academic integrity principles, the mechanisms for compliance with these principles, and the way in which the stakeholders are informed. Specify the plagiarism detection tools used by providing examples of the use of these tools and mechanisms.

The guidelines for the ethical behaviour of DU employees and students are determined by the "Ethical Code of Daugavpils University Employees and Students" (available in Latvian - https://ieej.lv/F8WUA). The Code stipulates that students support and maintain academic and professional honesty, do not allow plagiarism, copying, other unfair use of intellectual property or cheating, on the other hand, the academic staff evaluates student work in a timely, honest and fair manner, supports and maintains academic and professional honesty, without creating conditions for manifestations of academic dishonesty, monitors the development process of students' work, does not allow plagiarism, copying, other unfair use of intellectual property or other types of cheating.

The study programs of the field of study follow the principles of academic honesty in accordance with the Regulations on studies at Daugavpils University (https://du.lv/wp-content/uploads/2022/06/ENG-NOLIKUMS_PAR_STUDIJAM_DU_2018-1-1.pdf). For example, if students use unauthorized aids in the test or whose final work shows signs of plagiarism, they will be suspended from the test as having failed the test and an appropriate entry will be made in the test protocol.

DU has developed and follows the procedure for submitting final theses for plagiarism control at Daugavpils University (https://du.lv/wp-content/uploads/2022/09/Procedure-of-thesis-submission-for-plagiarism-control.pdf), which provides for mandatory submission and storage of electronic versions of final theses in the DU Information System and provides an opportunity to compare students' final theses with the set of theses defended in previous years. All final works of DU studies, incl. The final theses of the students of the field of study "Chemistry, chemical technologies and biotechnology" are checked before the defense, using the plagiarism control system PlagLV (plag.lv). If signs of plagiarism are detected in the process of comparing the final theses, the Expert Commission established by the dean of the faculty and approved by order evaluates the work and decides on the detection of plagiarism in the work. The expert commission examines the report within three working days and submits proposals on the responsibility of the student to the dean of the faculty.

2.2. Efficiency of the Internal Quality Assurance System

2.2.1. Assessment of the efficiency of the internal quality assurance system within the study field by specifying the measures undertaken to achieve the aims and outcomes of the study programmes and to ensure continuous improvement, development, and efficient performance of the study field and the relevant study programmes.

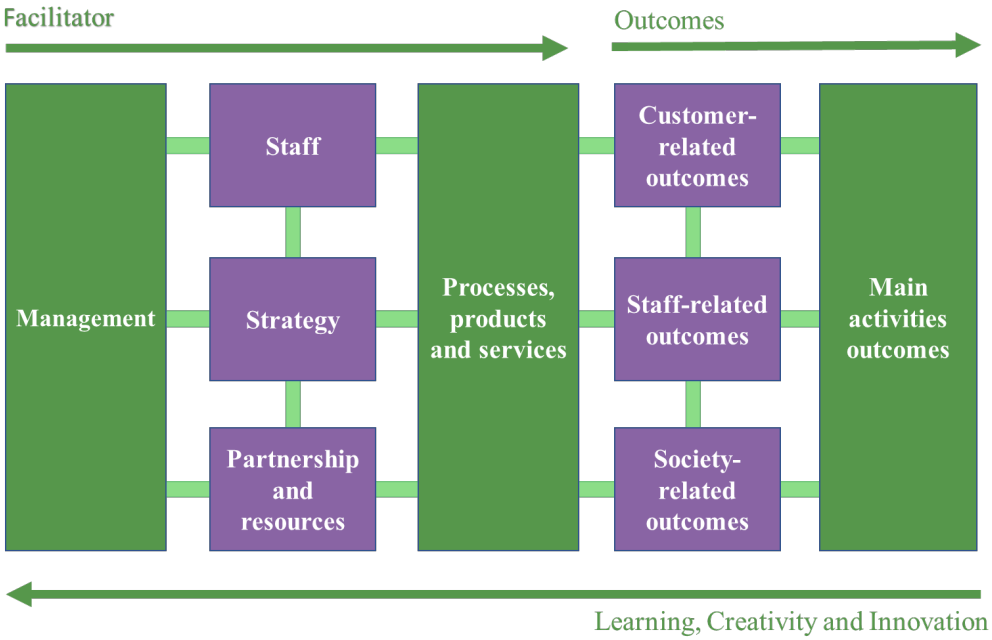
An important role in the implementation of the study process is played by the direction administration and the quality assurance system, the functioning of which is coordinated by the DU Study Council and the DU Study Quality Assessment Centre (SKNC). The purpose of ensuring the quality of the study process and the management system is to guarantee the compliance of the program content with the standard of higher education, the quality of science, as well as with the requirements of the labour market of Latvia and the European Union.

Study quality assessment is carried out with the aim of controlling the execution of study programs and planning development in order to fully achieve the goals set in the programs and fulfill the defined tasks. Quality control takes place continuously: admitting students, hiring academic staff, evaluating and improving study programs, evaluating the operation of structural units, their leaders and staff according to scientific efficiency and academic work results.

DU has developed a structured quality management system model that sets guidelines for achieving excellence. This model of excellence is binding on every DU employee. It includes nine criteria (refer to 2.2.1. figure). Five of them cover contributing factors, the other four cover outcomes and results. Contributing factors (facilitating criteria) reflect what DU does and how it is done, while outcome (result) criteria reflect the achievements obtained.

The results are achieved thanks to the contributing factors, whereas the contributing factors are improved retrospectively based on the results achieved. Effective results can be achieved with the management's understanding and support, purposefully directed DU strategy and policy, which in turn is implemented with the successful participation of the staff, as well as with the help of a full-fledged partnership, a resource-saving approach and effective management of all the processes. The arrows shown in the figure show the dynamic improvement nature of the model of excellence – the importance of creativity, innovation and education in the improvement of promoters, which in turn ensures the achievement of better results. The model of excellence makes it possible to

understand the cause-and-effect relationships between the activities that DU implements and the results it achieves (DU development strategy).



2.2.1. figure. Quality management system model that sets guidelines for achieving excellence in DU

Surveys of students, employers and graduates are regularly organized at Daugavpils University; their results are used to make operative decisions, to improve the quality of study courses, to improve the quality of programs, to improve the work of teaching staff. The operation of the programs is evaluated at the meetings of the Board of Studies. Proposals for changes in study programs are considered at the faculty council meetings.

Lecturers and docents regularly revise the descriptions of study courses and supplement them with current topics and the latest literature. At the end of the study year, lecturers add their data to the internal information system (DUIS) and discuss the year's results and directions for improvement in discussions with the director of the study program. Strategic planning of the study process is constantly carried out, analyzing the study program's weaknesses, risks, development opportunities and other related aspects; The DU e-study environment, Moodle, contains information about the courses to be studied in the semester – the students have access to the following information: description of the study course, tasks set for independent work, lectures and additional materials. In order to ensure the exchange of information and to make decisions about the study process, management and staff meetings are organized, in which the personnel involved in the provision of the program participate;

The internal quality assurance system of the study direction "Chemistry, chemical technologies and biotechnology" is implemented in accordance with the practice implemented by DU. The system can be evaluated as effective, transparent and coordinated with the goals and implementation process of the study direction "Chemistry, chemical technologies and biotechnology".

– The internal quality control of the study direction "Chemistry, chemical technologies and biotechnology" is carried out by the Council of the Study Direction, program director, teaching staff of the profiling structural units (departments). Discussion and evaluation of the study direction development plan and study quality improvement measures take place at the end of each study year or as regularly as required.

– Once in a study year, the head of the study field "Chemistry, Chemical Technologies and Biotechnology" prepares a self-evaluation report of the study field for the previous study year.

– The latest scientific literature and the experience gained by lecturers by visiting European universities within the framework of "Erasmus+" mobility are discussed at the meetings of the study direction council and department meetings.

– In the process of implementing the study programs of the study direction, there is a regular survey of the opinions of the employers involved in the programs and the graduates of the program (surveys, expertise of individual program components, involvement of employers and university graduates in the Study Direction Council), which allows for a closer alignment of program content with the needs of the labour market. The quality of study work is promoted by the intensive participation of graduates in the study process of the university, both by teaching guest lectures and by providing work places.

– Academic staff of the field of study "Chemistry, chemical technologies and biotechnology" participate in academic and scientific conferences, seminars and qualification improvement courses as lecturers or listeners, regularly improving study courses with innovative study forms and modern methods.

– While improving the skills to work remotely, lecturers of the field of study regularly participate in trainings, for example, to ensure the full use of the possibilities of the e-study environment Moodle. Within the framework of the ESF project "Reducing the fragmentation of study programs and strengthening the sharing of resources at Daugavpils University" No. 8.2.1.0/18/A/019, seminars were organized for the development and integration of study course support materials necessary for lecturers into the study process.

2.2.2. Analysis and assessment of the system and the procedures for the development and review of the study programmes by providing specific examples of the review of the study programmes, the aims, and regularity, as well as the stakeholders and their responsibilities. If, during the reporting period, new study programmes have been developed within the study field, describe the procedures of their development (including the process of the approval of study programmes).

The study program development process is regulated by the "Regulations on opening and management of study directions and study programs of Daugavpils University" (https://du.lv/en/about-us/documents/).

The development of a new study program is started in accordance with the DU strategy or other strategic and study process regulatory documents at least one study year before the start of the study program implementation. The development of the new study program is monitored by the Board of Studies, if necessary, convening meetings of the Study Direction Council to discuss the content of the study program, provision and other issues related to the development of the study program. The person responsible for the development of the study program prepares the characteristics of the study program and all its appendices in accordance with the December 11, 2018 Cabinet of Ministers *[Ministru kabinets]* Regulations No. 795 "Regulations Regarding Licensing of Study Programmes" (available - https://likumi.lv/ta/en/en/id/303957-regulations-regarding-licensing-of-study-programmes). The person responsible for developing the study program, in consultation with the head of the Studies Department, prepares the structure of the study plan and, in consultation with the head of the Secretariat of the Admissions Commission, prepares the admission requirements. The person responsible for the development of the study program in cooperation with the dean of the faculty,

representatives of the profiling structural unit and representatives of the structural units involved in the implementation of the study program, prepare the study plan of the newly created program and proposals for the author/-s of the study courses, which are submitted for approval by the faculty council. After coordinating the study plan and study course authors, the study course authors develop study course descriptions in the faculty council.

The study direction (as well as all programs included in the direction) is evaluated in accordance with the accreditation schedule of the study directions of the Republic of Latvia Ministry of Education and Science *[Izglītības un zinātnes ministrija]*, which is determined in Clause 48 of Chapter XII of the Law on Higher Education Institutions *[Augstskolu likums]*. The preparation of documents and annexes necessary for the evaluation of the field of study is carried out in accordance with the guidelines developed by the Higher Education Quality Agency of the Academic Information Centre "Guidelines for the development of the self-evaluation report of the field of study".

Each year, the field of study submits a self-assessment report for the academic year to the SKNC of the Daugavpils University. The self-evaluation includes the description of the direction and the evaluation of each program. The self-assessment shall be prepared by the head of the study field (direction). Self-evaluation includes mandatory annual surveys (surveys of students, graduates, employers) that allow evaluating the strengths and weaknesses of the programs depending on the situation. During the COVID-19 pandemic, the need for program review increased. At this stage, the program director regularly (1-2 times per semester) conducted student surveys (written and verbal to find out their attitudes and define problems). In 2021, the DU Student Council initiated a student survey with the aim of evaluating the quality of studies during remote studies. The results and recommendations of the survey were compiled and presented to the faculties, as well as discussed in the Study Direction Council.

2.2.3. Description of the procedures and/or systems according to which the students are expected to submit complaints and proposals (except for the surveys to be conducted among the students). Specify whether and how the students have access to the information on the possibilities to submit complaints and proposals and how the outcomes of the examination of the complaints and proposals and the improvements of the study field and the relevant study programmes are communicated by providing the respective examples.

Submitting and examining student complaints and proposals is an essential component of the study quality system. In order to ensure the improvement of the quality of studies, it is necessary to analyze the processes, obtain a clear statement of the reasons for the complaints and provide feedback to the person who submitted the complaint or proposal.

Students have the opportunity to submit complaints or proposals to the Study Quality Assessment Centre, in the Council of Studies, Dean's Office of the Faculty of Natural Sciences and Health Care, Department of Environment and Technology or the director of the study program. Complaints and proposals, depending on their importance, are accepted orally, in writing and electronically.

Students of the study direction prefer to solve problems within the structural units of the faculty. For example, the head of the department or the accounting secretary receives complaints about communication problems with visiting lecturers. Officially, according to the law, the director of the structural unit or program has the right to respond to a written complaint (students are informed

about it). During distance studies, several proposals were received from the students regarding the organization of the study process: the schedule of classes, the proportion of independent work, the choice of an e-platform. When organizing the state/final exams during the pandemic, the students' opinion about the form of the exams was taken into account.

Complaints and proposals are accepted individually or collectively, publicly (by identifying identity) and anonymously. Forming and acceptance of submissions to DU is carried out in accordance with the procedures set out in the "Law on Applications and Submissions" *[Iesniegumu likums]* available - https://likumi.lv/ta/en/en/id/164501). Submissions on possible violations of the norms of the "DU Code of Ethics" (available in Latvian - https://du.lv/wp-content/uploads/2021/12/Etikas-kodekss.pdf), including actions or behaviour outside DU, if the prestige of DU has been affected thereby, can be submitted by DU academic, administrative and general staff, as well as students. The application can be submitted on behalf of students by the Student Council, which can act as the student's representative during the examination of the complaint.

Submissions of students and academic staff regarding limitations and violations of academic freedom and rights stipulated in the Constitution are examined by the Academic Arbitration Court of DU.

Daugavpils University has an active Student Council, whose activities are organized in several areas, including the supervision of study work. As an example, a case can be mentioned in which, referring to the student's application, the issue of optimizing the list of lessons for the study week was considered collegially: students expressed their desire to organize lessons compactly, leaving more days a week for independent work.

Students have the opportunity to submit an open complaint and proposal (in a free form or in accordance with the procedures set out in DU's internal regulatory acts) or an anonymous complaint and proposal (on the SKNC website https://du.lv/en/about-us/study-quality-assessment-centre/); Trust questionnaire created by the Student Council – available in https://ej.uz/1jjg).

Anonymous complaints are received electronically, after examination and analysis of the content of the complaint, SKNC conducts negotiations with the involved parties and, if necessary, implements study quality monitoring. In the past practice, SKNC closely cooperated with the Student Council in examining anonymous complaints, conducting a situational study and taking the necessary measures to improve the quality of studies, because according to the "Regulations of the Daugavpils University Student Council", the Student Council has the right to request and receive information from any structural unit of DU on all matters within its competence, which affect the interests of students.

In order to consider admission-related complaints, DU operates the "Procedure in which a person can dispute and appeal decisions related to admission to a study program at Daugavpils University" (available in Latvian - https://du.lv/wp-content/uploads/2021/12/kartiba_uznemsanas_apstridesana.pdf), according to which a person can challenge the decision of the Admissions Commission on the results of the competition by submitting an application to the Rector of DU within seven working days after the results of the competition have been made public.

According to the "Regulations on studies at Daugavpils University" (https://du.lv/wp-content/uploads/2022/06/ENG-NOLIKUMS_PAR_STUDIJAM_DU_2018-1-1.pdf), students have the right to submit a motivated appeal to the dean of the faculty regarding the exam results within one working day of their notification. The appeal is examined within three working days by a commission established by the decision of the dean, with the participation of the

examiner and the head of the relevant department.

Information accessibility

All internal regulatory acts, according to which students can submit complaints and proposals, are publicly available on the DU website, in the "About Us" section. Students can get information by contacting the director of the study program, the head of the Department of Environment and Technology, the vice-dean, the dean, the Student Service Center, SKNC and the Student Council.

In the course of the implementation of the remote study process, a survey of DU students was also organized in the spring semester of the 2019/2020 academic year regarding the quality of the implementation of the remote study process, as a result of which the offer of library services was improved, as well as methods and tools for organizing remote studies were diversified, including for those studying the field of study "Chemistry, chemical technologies and biotechnology". During the implementation of the remote study process during the academic years 2019/2020, 2020/2021 and 2021/2022, the study program director communicated regularly with students of all levels, monitoring the progress of the study process in the study programs of the area.

Students are informed about the possibility to submit a complaint or proposals when starting their studies at the organizational meeting of the DVAF of DU, as well as during the meeting when information about the programs is provided. Students have access to the e-mail address of the faculty (dvaf@du.lv) and the department e-mail address (vtk@du.lv), in order to communicate and solve problems.

It is worth noting that the University regularly (once a month) has meetings between the management and the head of the SKNC with the Student Council, where students' problems, complaints, recommendations for improving the quality of studies are identified and discussed.

2.2.4. Provide information on the mechanism for collecting the statistical data, as developed by the higher education institution/ college. Specify the type of data to be collected, the regularity of collection, and the way the information is used to improve the study field. Describe the mechanism for obtaining and providing feedback, including with regard to the work with the students, graduates, and employers.

DU, when collecting data of natural persons, stores and processes personal data for specific, clear and legal purposes and only in the manner and to the extent provided for in regulatory acts.

The information system DUIS operates at DU, which contains statistical data and information about study programs, students and lecturers. The system is accessible from the DU internal network. Data entry in DUIS is provided by study program director, Student Service Centre; their collection and verification is carried out by the Studies Department. At the end of each month, the data collected in the DUIS system is exported to the State Education Information System (VIIS). Data export is implemented in accordance with the June 25, 2019 Cabinet of Ministers *[Ministru kabinets]* Regulations No. 276 "Regulations of the state education information system" (available in Latvian - https://likumi.lv/ta/id/307796). For VIIS data export, personal data of DU students, information on student status (number of matriculated and ex-matriculated students, changes in their status, *e.g.* semester membership, students on study break, etc.) are collected, as well as other relevant information.

One of the main tools promoting the improvement of study areas is the student survey, which SKNC announces to students of the 1st year of study 2 months after the start of studies, for other students – at the end of each study year. Based on the data and information provided in the surveys, if necessary, SKNC conducts lecture observations and individual surveys of student groups, as well as organizes discussions with lecturers on measures to improve the quality of studies.

The data obtained in the surveys are collected in the DU survey system (Open Source Project LimeSurvey) and are analyzed. The results of the surveys are included in the self-assessment reports of the study area (direction).

DU also organizes surveys of graduates and employers. Alumni Surveys (available in Latvian: https://aptaujas.du.lv/index.php/764263/lang-lv) and the data included in them provide information on employment trends of graduates, evaluation of studied study programs and recommendations for their improvement.

Employer surveys (available in Latvian: https://aptaujas.du.lv/index.php/544412) are implemented and the data within them is collected by study program director. Their purpose is to obtain recommendations for the improvement and development of the content of DU study programs.

The systematically obtained data, their analysis and interpretation are used in the improvement of the study direction. Survey data of students and employers ensures that the goals and tasks of the study programs meet the requirements of the labour market and society, allowing to track and evaluate the quality of each study course, their compliance with the goals and tasks of the program.

The collected student/graduate/employer survey data is used for the following purposes:

- For improvement of the study direction. For example, if the number of students expelled from one of the study programs every year is much higher than the number of students who obtained a degree/qualification, the reasons for this are searched in depth.
- If the number of students enrolled in one of the study programs decreases every year, the reason should be sought and, possibly, the study program should be closed.
- For the distribution of finance (budget positions).
- DU information materials, press, etc.

Much attention is paid to the satisfaction of students with the teaching quality of the major programs and study courses. Survey results are discussed at the meetings of the study direction council and also at the meetings of the Department of Environment and Technology. The obtained information is transferred to study program director and lecturers working in study programs. By evaluating the quality of the program of the study direction and individual study courses, it is decided on the necessary changes in the content of the study courses or the organization of the study process. The sessions discuss the possibilities of responding to students' constructive opinions expressed in the comments of the questionnaire (regarding the use of electronic learning materials, organization of the study process, *etc.*).

Mechanism for obtaining and providing feedback (working with students, graduates and employers).

In order for the creation of the study program to meet the requirements of the labour market, the feedback obtained from students and graduates is particularly important. Students and graduates evaluate the progress of the study program, as well as the applicability of acquired knowledge, skills and competences in professional activity, thus feedback becomes a valuable element of improving the study process.

At the end of each study year, SKNC organizes a student survey, the results of which provide

information on the assessment of study quality and related aspects. The student survey is available online. Survey questionnaires for graduates and employers have also been developed. The results of student surveys are taken into account when planning the next academic year, evaluating the pedagogical and professional competences of lecturers, the availability of study support materials and sources, the involvement of foreign teaching staff and other issues.

Surveys of graduates and employers are conducted on a random basis. Surveying or interviewing graduates takes place both immediately after graduation and several times after graduation (after six months, a year, three years). After processing the obtained data and examining the results, changes are made to the content of the study program. The director of the study program informs all involved parties (students, lecturers, employers, graduates) about it, thus ensuring feedback. The recommendations or reprimands and prevention mechanisms mentioned in the surveys are discussed in meetings both with the lecturers of the course and with the students, as well as consultations with representatives of the industry. Student representatives participate in direction councils and in the development of solutions for the comments made in the surveys.

Based on the results of surveys of students, graduates and employers, the content of study programs is reviewed and improved. Study program director responds to all well-founded opinions, suggestions and reprimands expressed in the questionnaires, if necessary, examining the issues in the study direction council. After making changes in the content of the study program, the director of the study program informs all involved parties (students, lecturers, employers, graduates), thereby ensuring feedback.

The analysis and evaluation of the survey results of students, graduates and employers are attached in the appendices (*2.2.4. Analysis of survey results*).

2.2.5. Specify the websites (e.g., the homepage) on which the information on the study field and the relevant study programmes is published (in all languages in which the study programmes are implemented) by indicating the persons responsible for the compliance of the information available on the website with the information published in the official registers (State Education Information System (VIIS), E-platform).

All necessary information about studies, faculty, study direction and study programs is published and updated on the DU website and is available to students. On the DU website, interested parties can find information about the following:

- Faculty of Natural Sciences and Mathematics (in Latvian: https://ieej.lv/f3dUV) (dean's office, city council, structural units, study programs, news, teaching materials, etc.),
- Academic bachelor study program "Chemistry" (in Latvian: https://ieej.lv/uAeci),
- Academic master's study program "Chemistry" (in Latvian: https://ieej.lv/z0JUe),

where information is available on admission requirements, learning outcomes, opportunities, as well as study course descriptions in Latvian and English.

The Department of International and Public Relations is responsible for the correspondence of the information available on the DU website about study courses with the information available in the official registers. The study department is responsible for providing regular and timely information about students in the State education information system (VIIS).

2.3. Resources and Provision of the Study Field

2.3.1. Provide information on the system developed by the higher education institution/ college for determining and redistribution of the financial resources required for the implementation of the study field and the relevant study programmes. Provide data on the available funding for the scientific research and/or artistic creation activities, its sources and its use for the development of the study field.

The source of funding for the field of study "Chemistry, chemical technologies and biotechnology" is state budget funding for studies (grant) and tuition fees. The cost calculation for one student in the programs of the study direction was carried out in the Department of Finance and Accounting of DU, including the costs of the wage fund and the employer's Mandatory State Social Insurance Contributions (VSAOI), business trips, materials, energy resources and inventory, book, equipment purchase and investment costs, as well as costs for student social security.

Students have the opportunity to apply for tuition fee discounts. More information about study fees and discounts – available in Latvian: https://du.lv/gribu-studet/studiju-maksa-un-atlaides/.

For the development of DU science, funds for the development of the science base are allocated from the Ministry of Education and Science *[Izglītības un zinātnes ministrija]*. Funds intended for the development of science can be obtained by the field of study based on the scientific achievements of lecturers and indicators for the previous year, which are evaluated by the Science Department of DU. The evaluation of the effectiveness of the scientific work of the academic staff of DU is carried out in accordance with the "Procedure for evaluating the effectiveness of the academic staff of the University of Daugavpils" (see "Other Annexes").

The DU academic staff (assistants, lecturers, docents, associate professors, professors, research assistants, researchers, leading researchers), within the framework of funding in the DU budget, have the right to receive royalties for scientific publications indexed in the Web of Science (hereinafter referred to as WoS) and/or SCOPUS databases, and for scientific monographs. Payment for scientific publications is made in accordance with the "Procedure in which scientific publications and monographs of academic staff of Daugavpils University are paid" developed by DU (available from the internal network of DU).

The DU academic staff (assistants, lecturers, docents, associate professors, professors, research assistants, researchers, leading researchers), within the framework of funding in the DU budget, have the right to receive compensation for the Hirsch index characterizing citation in SCOPUS and/or Web of Science databases. The amount of compensation is calculated according to the "Procedure in which the academic staff of Daugavpils University receives compensation for the Hirsch index" (see "Other Annexes").

DU academic staff have the opportunity to participate in the annual Daugavpils University research project competition and receive funding for the implementation of scientific research[1]. The general goals of the research project competition are to ensure the development of DU's scientific activity and scientific excellence; to promote the research growth of DU's academic, scientific staff and students; to promote the practical applicability of scientific results, cooperation with the private sector and attraction of additional external funding; to form innovative interdisciplinary research groups for the implementation of current research topics. Academic and scientific staff representatives working at DU on the basis of an employment contract have the right to submit individual or research group projects to the competition: the representatives thereof include

professors, associate professors, assistant professors, leading researchers, researchers, lecturers, assistants, research assistants, DU doctoral students and doctoral degree applicants. The total funding amount of the project competition for the given year is determined by the DU Budget Commission. The allocated project tender fund for 2023 was EUR 51,000.00. The maximum allowable amount of funding for one research project is EUR 3,000.00.

Students in the study programs implemented by DU can apply for the student research project competition[2]. The general goals of the research project competition are to ensure the development of DU's scientific activity and scientific excellence; promote the research growth of DU students; promote the practical applicability of scientific results, cooperation with the private sector and attraction of additional external funding; to form innovative interdisciplinary research groups for the implementation of current research topics; to involve students in DU bachelor's and master's programs in scientific activity; to promote the increase in the number of publications indexed in the Web of Science and/or SCOPUS databases at DU. The right to submit projects to the student research project competition is for successful students in DU bachelor's and master's programs who are studying the study program of the relevant level for the first time. If the student stops his studies, the scholarship payment is stopped starting from the following month. During the implementation of the project, it is planned to publish at least one publication in publications indexed in the Web of Science and/or SCOPUS databases. For the implementation of projects in DU bachelor's and master's study programs, the student receives a scholarship of EUR 200.00 per month for 10 months a year. The maximum allowable amount of funding for one research project and the total amount of funding for the project competition for the given year is determined by the DU Budget Commission. The project tender fund in 2023 was EUR 24,000.00, while the maximum allowable amount of funding for one research project was EUR 2,000.00.

Funding for improving the teaching material and technical base (for the additional improvement of auditoriums and laboratories, for the purchase of educational literature and modern research equipment, for the purchase of visual aids and software, and other events) is mainly provided from various projects (*e.g.*, ERDF, ESF).

[1] DU internal research project competition for 2023. Available in Latvian from: https://du.lv/aktualitates/daugavpils-universitate-izsludinats-ieksejo-petniecibas-projektu-konkurss-2023-gadam/ [viewed on 20.08.2023]

[2] DU Student Research Project Competition for 2023. Available in Latvian from: https://du.lv/aktualitates/daugavpils-universitate-izsludinats-studejoso-petniecibas-projektu-konkurs-2023-gadam/ [visited on 20.08.2023]

2.3.2. Provide information on the infrastructure and the material and technical provisions required for the implementation of the study field and the relevant study programmes. Specify whether the required provision is available to the higher education institution/ college, available to the students, and the teaching staff.

In the field of study "Chemistry, chemical technologies and biotechnology", the provision of the study process mainly takes place in the DU study building at Parades street 1a, where the DU Laboratory Corps is located, part of the Department of Environment and Technology, and where the lecturers involved in the study program work on a daily basis. Auditoriums and laboratories at

Parades street 1a meet the needs of the study process, they have the necessary technical equipment for the implementation of study programs (computers, video projectors, laboratory equipment), which is used both during laboratory work and also in classrooms to demonstrate lecture and seminar materials and provide practical lessons. Multi-seat auditoriums (approx. 100 seats) are used for the entire study stream lectures. Specialization courses of major study programs are implemented in 8 laboratories.

During the last 10 years, DU has purposefully invested in the modernization of study and research infrastructure, as a result of which students have access to modern teaching and scientific laboratories, which are equipped with laboratory and field research equipment necessary to ensure the study and research process. Infrastructure modernization projects implemented by DU, within the framework of which study and research opportunities have been improved for the students of the field of study:

- ERDF project "STEM, modernization of healthcare and arts study programs at Daugavpils University" (agreement No. 8.1.1.0/17/I/005, project implementation period: 2017. – 2020, total DU costs: EUR 1,425,138.00). Within the framework of the project, the material-technical information base of the study programs has been developed, hardware, laboratory materials, inventory and tools were purchased, as well as replenished library stocks and developed information technology equipment, to be able to offer high-quality, international standards-compliant and competitive education.
- ERDF project "Improving the quality of Daugavpils University study programs and ensuring environmental accessibility" (agreement No. 2010/0115/3DP/3.1.2.1.1/09/IPIA/VIAA/021, project implementation period: 2010 to 2015, total DU costs: EUR 16715991). As part of the project, the renovation and adaptation of the auditoriums of the educational building at Parades iela 1 for people with functional disabilities, increasing energy efficiency, as well as modernization of equipment, tools, equipment and information technology was carried out. Building of the DU Life Sciences and Technologies building with teaching and scientific laboratory rooms, equipped with modern equipment as part of the project, was added to the existing building. The DU library was also modernized and equipped with new equipment and furniture. Within the framework of the project, access to the modernized premises is ensured for people with functional disabilities.

All DU students are provided not only with a study environment that meets modern requirements, but also with access to modern-day living infrastructure – renovated dormitories, a sports complex with a swimming pool, *etc.*

The study and research process is sufficiently provided with the necessary photocopying equipment, visual presentation equipment, video filming and video reproduction equipment, with modern photography and audio equipment. Students and lecturers have constant access to the Internet and the local DU network Internet connection, the e-study environment *Moodle*, as well as the possibility to use e-mail and and teleconferencing, online platforms such as *ZOOM* or Microsoft Teams.

2.3.3. Provide information on the system and procedures for the improvement and purchase of the methodological and informative provision. Description and assessment of the availability of the library and the databases to the students (including in digital environment) and their compliance with the needs of the study field by specifying whether the opening times of the library are appropriate for the students, as well as the number/ area of the premises, their suitability for individual studies and research work, the

services provided by the library, the available literature for the implementation of the study field, the databases available for the students in the respective field, the statistical data on their use, the procedures for the replenishment of the library stock, as well as the procedures and possibilities for the subscription to the databases.

Supplementing the library's stock and subscribing to databases takes place at the request of faculty lecturers. Applications for the purchase of books are regularly (for each academic year) reviewed and approved by the DU Budget Commission, thereby implementing a mechanism for the purchase of the latest editions in the DU library. The library does not digitize the collection, but the final theses of DU students are uploaded to the library's information system. The library regularly informs the faculties about the latest literature, database trials and subscription options, so that faculty lecturers and students can familiarize themselves with new offers.

In accordance with the DU development strategy, the library purposefully increases the share of e-resources and develops the remote access capabilities of e-resources in order to provide users with the opportunity to use resources remotely. Within the framework of the funding allocated to the library, the number of databases is purposefully evaluated. The use of the subscribed databases is analyzed every year.

The Daugavpils University Library is included in the Library Register of the Ministry of Culture *[Kultūras ministrija]* (BLB0524). In its operation, the library uses the integrated information system ALISE (Advanced Library Information Service).

Lecturers and students have access to the services offered by the DU library – the library's electronic catalogue, ordering, reserving and renewing books on the Internet, automated user service, as well as access to electronic databases. Library users have the opportunity to use the open-access reading room with 60 workstations, incl. 15 computerized, open-access subscriptions, Bibliography and information sector. The total area of the library is 1000 m^2 , including user service spaces – 400 m^2.

More than 258,820 items of books and more than 29,692 periodicals are available in the reading rooms and specialized departments of the DU Library. Although compared to the previous year, the number of bibliographic items has decreased by 22,749, however, the decrease occurs at the expense of writing off books that are outdated in terms of content. At the same time, the funds of the scientific library are constantly replenished.

More than 21,938 books are available in the natural sciences subscription and reading room, including 2410 books in chemistry, 3225 books in biology, 3462 in environmental science;

There are known problems with the specialized literature published abroad in the sciences related to the study program, but every year the library looks for opportunities to find more funds for the purchase of new books and periodicals published in foreign countries (Western Europe, USA).

The solution to the aforementioned problems for now is the use of modern literature available in the personal libraries of teaching staff in the study process and the possibility of using the electronic system "ALISE" (Advanced Library Information Service), to which the DU library is connected and through which it is possible to work with the LU Academic Libraries, etc. catalogs of the most important scientific libraries and later - to order books separately.

Access to the following electronic databases is provided within and outside the DU network:

Name	Characteristics	Location of availability
Cambridge Journals Online	Humanities and social sciences full-text database	On and off the DU computer network
EBSCO	A multidisciplinary database consisting of several full-text and review databases	On and off the DU computer network
Latvian National Standard	More than 46 thousand Latvian standards: national, adapted European (EN) and international (ISO, IEC)	In the reading room (no more than two users at the same time).
LETA archive	Resources of the National News Agency	On and off the DU computer network
Letonika	Reference and translation database with encyclopedias, dictionaries, image, audio and video collections. Internet library of Latvian literature, where full-text works of Latvian authors are available	On and off the DU computer network
LURSOFT	Newspaper library	On the DU computer network
NOZARE.LV	Current information in the most important Latvian business sectors	On and off the DU computer network
Science Direct	Multidisciplinary database. Full texts are marked with a green icon	On and off the DU computer network
Scopus	Database of bibliographic and citation information of multidisciplinary scientific publications	On and off the DU computer network
Web of Science	Multidisciplinary database. The database offers extensive options for searching, selecting and analyzing results	On and off the DU computer network

Database usage statistics for 2020, 2021, 2022.

The name of the databases	2020	2021	2022

EBSCO	Database sessions	13230	13277	10964
	Total number of full text requests	3792	7831	2704
ScienceDirect	Total number of full text requests	5885	3901	8193
Scopus	Database sessions	4461	5268	5611
Web of Science	The library does not have administrator rights, so the statistics are unknown			

The DU library collects open access internet resources, e-books and e-journals (exact and natural sciences section contains journals related to the field of chemistry), used by both teachers and students (available in Latvian: https://ieej.lv/hrOjJ). The library's working hours are suitable for students' needs. After complaints from students about the short working hours of the library on weekdays and the unavailability on Saturdays, the working hours of the DU library have changed since the fall semester of 2018 (Workdays: from 9:00 to 20:00, Saturdays: from 10:00 to 16:00), for which the students gave a positive assessment.

2.3.4. Provide a description and assessment of information and communication technology solutions used in the study process (e.g., MOODLE). If the study programmes within the study field are implemented in distance learning, the tools specially adapted for this form of study must also be indicated.

The study process is partially based on several principles of the e-learning environment. Forms and methods of learning organization suitable for the e-study environment are used.

DU has a developed e-study environment *(Moodle)*, and as a result of providing direct communication (e-mail, consultations), information is available in each study course. Daugavpils University (DU) lecturers systematically use the e-study environment Moodle (https://estudijas.du.lv/) and place various study materials in it: materials of lectures, seminars, descriptions of laboratory work, and practical lessons, which are a support for students' independent work. At the same time, through e-studies, the risk of students dropping out is reduced in cases where it is not possible to fully attend all study courses due to work or health conditions. Activating the e-study environment is an important step for promoting the maintenance of a critical mass of students, thus ensuring the preparation of specialists not only for the Eastern Latvian region, which is represented by the majority of DU students, but also for other regions of Latvia and for other countries outside of Latvia.

As part of the study courses, it is also planned to send homework and tests by e-mail or add them online to e-study environment *Moodle*, receive evaluations and reviews of works by e-mail, consultations in the e-environment, the possibility of using library and Internet resources. Thus, by integrating diverse modern IT solutions (e-mail, Moodle, Zoom, Facebook), the program will offer more flexible conditions for e-studies. The e-study environment *Moodle* is synchronized with the Daugavpils University (DU) information system *DUIS*, which facilitates students' access to study courses created in the e-study environment without additional registration.

DU regularly organizes professional development courses for lecturers, for example, creating study courses in the e-study environment Moodle, "Using the e-study environment MOODLE in the remote study process, evaluation in the e-study environment MOODLE". Individual consultations are provided to lecturers when necessary. Students can get technical support at the Student Service Centre and from the deans' offices of faculties.

In the e-study environment Moodle, lecturers can also post lectures in video format. The process of filming video lectures is carried out by the Department of Information and Communication Technologies. At the Daugavpils University (at the address Parades iela 1a), auditorium No. 130 offers the availability of modern equipment that allows its users to create educational, informative and advertising video materials, as well as provides live broadcasts of conferences in the Internet environment. Video lectures are stored on the DU server and are available in the *Moodle* environment in the corresponding study course.

The DUIS information system operates at DU in which descriptions of all study courses are entered, a list of classes is available, and the students can see their achievements and individual orders related to the study process in their profiles.

DU DVAF Department of Environment and Technology has available the necessary methodological support for the realization of the study direction "Chemistry, chemical technologies and biotechnology": methodological materials for the development of studies, bachelor's and master's theses.

The study and research process is sufficiently provided with the necessary photocopying technique, visual presentation technique, and laboratory equipment. Students and lecturers have constant access to the Internet and the local DU network connection, the e-study environment *Moodle*, as well as the possibility to use e-mail and and teleconferencing, online platforms such as *ZOOM* or Microsoft Teams.

2.3.5. Provide information on the procedures for attracting and/or employing the teaching staff (including the call for vacancies, employment, election procedure, etc.), and the assessment of their transparency.

Election to academic positions is carried out in accordance with the requirements of the "Regulations on elections to academic positions at Daugavpils University" (available in Latvian - https://ieej.lv/9hTri). According to the regulations, academic positions at DU are professor, associate professor, leading researcher, assistant professor, lecturer, researcher, assistant, research assistant.

The number of positions of assistants, lecturers, docents is determined by the Rector according to the amount of study work to be performed, upon the proposal of the Faculty Council. The number of positions of researchers, leading researchers and scientific assistants is determined by the Rector according to the need and funding possibilities, upon the proposal of the Institute/Scientific Council. The number of associate professor positions in the relevant science or art subfields is determined by the rector according to the need and funding opportunities after approval by the DU Senate.

Information about academic position vacancies and competition announcements are published on the DU website (https://du.lv/en/about-us/vacancies/) and/or in the official publication/gazette of the Republic of Latvia "Latvijas Vestnesis", thus giving any interested person the opportunity to apply for a job at DU within a month after the announcement of the competition.

It is possible to elect both citizens of the Republic of Latvia and foreign citizens to academic positions within DU, whose academic education and professional qualifications meet the requirements of the science or art sector, study and research work at DU and who are proficient in the national language and professional English.

Elections of docents, leading researchers, lecturers, researchers, assistants and research assistants, by means of open voting, take place in the Councils of faculties or Scientific Councils of scientific institutes no later than within three months from the date of the announcement of the competition. When electing docents and leading researchers, the qualifications of the members of the Council or the Scientific Council of the scientific institute must meet the requirements of the Doctoral Council. The results of the elections of associate professors and leading researchers are confirmed at the DU Senate meeting.

Elections of professors and associate professors, by means of open voting, take place in the council of professors of the relevant branch of science.

Full-time or elected lecturers have an employment contract for six years and their workload includes a wider range of responsibilities than the visiting/guest lecturers. Visiting/guest lecturers are invited to implement a specific study course, the company contract is concluded with them for one study year or study semester. Visiting/guest lecturers mostly have additional qualifications or practical experience in the field of activity related to the study course to be implemented.

2.3.6. Specify whether there are common procedures for ensuring the qualification of the academic staff members and the work quality in place and provide the respective assessment thereof. Specify the options for all teaching staff members to improve their qualifications (including the information on the involvement of the teaching staff in different activities, the incentives for their involvement, etc.). Provide the respective examples and specify the way the added value of the possibilities used for the implementation of the study process and the improvement of the study quality is evaluated.

DU has developed internal regulatory acts and mechanisms that regulate the qualification and quality of work of academic staff:

- Regulations on elections in academic positions at Daugavpils University (available in Latvian: https://ieej.lv/9hTri)
- The procedure for evaluating the effectiveness of scientific work of the academic staff of Daugavpils University (available at the DU intranet in Latvian: https://veidlapas.du.lv/wp-content/uploads/2021/05/zinatniskas-_efektvitates_vertesanas_kartiba_labojumi_29.03.2021..pdf).

The rector of DU approves the job descriptions of teaching staff, which determine the requirements of academic, research, organizational work and the education, knowledge and skills necessary to perform the duties of the respective position.

For the selection of teaching staff to be involved in study programs, the compliance of the teaching staff's qualifications with the requirements set by the regulatory acts, as well as the knowledge of the national language and foreign languages, is assessed.

The following basic criteria have been put forward in the evaluation system of teaching staff:

- Excellence – sustainable and continuous development, ensuring process and resource management;
- The ability to effectively use academic freedom – freely choosing directions and methods of academic activity, creating and publicizing new knowledge, openly discussing its content, looking for opportunities to implement it in practice;
- Academic culture – collegial approach, based on the principles of academic ethics, cooperation with students and other teaching staff formed in an atmosphere of mutual respect, high expectations, interest and support;
- Responsibility for one's work before society and the state, in accordance with DU's quality management system and quality culture.

The qualifications of the academic staff meet the requirements of the Law on Higher Education Institutions *[Augstskolu likums]* of the Republic of Latvia, as all lecturers have master's or doctorate degrees. Teaching study courses is permissible for teaching staff with a master's degree – both elected and visiting/guest lecturers.

In accordance with the Cabinet of Ministers *[Ministru kabinets]* Regulations No. 569 "Regulations on the necessary education and professional qualifications for pedagogues and procedures for improving the professional competence of pedagogues, professional development" (Latvian only - https://likumi.lv/ta/id/301572-noteikumi-par-pedagogiem-nepieciesamo-izglitibu-un-profesionalo-kvalifikaciju-un-pedagogu-profesionalas-kompetences-pilnveides-...), professional qualification improvement may include international mobility appropriate for the purposes of professional development, participation in projects and participation in conferences and seminars, which is confirmed by issued documents.

DU academic staff actively use the opportunities offered by the "ERASMUS+" program to improve their professional skills – within the framework of the program, DU lecturers regularly visit foreign cooperation universities or participate in staff training, improving their professional competences, ensuring participation in studies, work observation at a foreign cooperation university or industry organization.

3 table Support for the development of professional competence at DU

Teaching staff (faculty) activities	**Motivation**
Lecturers are given the opportunity to supplement and expand their knowledge and professionalism within the framework of ERASMUS+ and other mobility programs.	Gains foreign experience by doing internships and conducting lectures in foreign universities/organizations.
Participation in conferences, development of scientific publications, work in projects, organization of science communication activities, *etc.*	For the scientific performance of the previous period, the lecturers are granted funding for the scientific activities of the next period.
Preparation and publication of scientific articles included in editions and publications indexed in *Web of Science* and *SCOPUS*.	Lecturers receive compensation for expenses related to the preparation and publication of scientific articles.

Increasing the Hirsch index.	The academic staff of DU receives compensation for the citation characterizing Hirsch index in SCOPUS and/or Web of Science databases.
Payment of expenses for scientific business trips	DU pays for business trips related to participation in scientific events and conducting scientific research.
The Section of Information and Communication Technologies of DU and the Study Quality Assessment Centre organize professional development courses.	Lecturers improve their knowledge of foreign languages, learn current teaching methods and participate in e-resource usage training.

The opportunities offered to improve the qualifications of teaching staff significantly affect the quality of studies. With the support tools of professional development and scientific activities, newly acquired knowledge and experience are transferred to the content of study courses, current topics of scientific works are offered to students.

While improving the skills to work remotely, lecturers of the field of study regularly participate in trainings, for example, to ensure the full use of the possibilities of the e-study environment Moodle. Within the framework of the ESF project "Reducing the fragmentation of study programs and strengthening the sharing of resources at Daugavpils University" No. 8.2.1.0/18/A/019, seminars were organized for the development and integration of study course support materials necessary for lecturers into the study process.

Feedback on the relevance of the content of the study course is obtained from student surveys. In the free-form answers, the students express their opinion about the competence of the lecturers and the topicality of the topics covered in the content of the study courses. In addition, students are involved in the organization and provision of science transfer activities (Scientists' Night, Science Festival, Science School, etc. events).

2.3.7. Provide information on the number of the teaching staff members involved in the implementation of the relevant study programmes of the study field, as well as the analysis and assessment of the academic, administrative (if applicable) and research workload.

28 teaching staff are involved in the implementation of study programs of the field of study "Chemistry, chemical technologies and biotechnology", of them 3 professors, 4 associate professors, 6 assistant professors, 4 lecturers, 1 assistant, 2 leading researchers and 1 researchers. 16 lecturers (76.2%) have a doctoral degree:

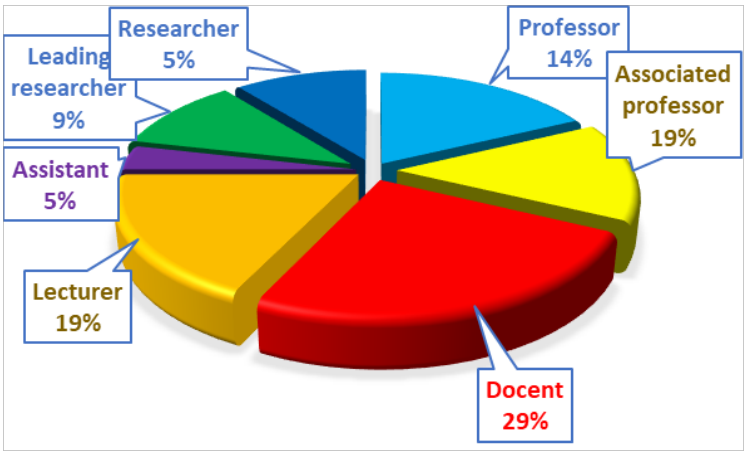


Figure 2.2. The academic composition of the staff involved in the programs of the "Chemistry, chemical technologies and biotechnology" study direction.

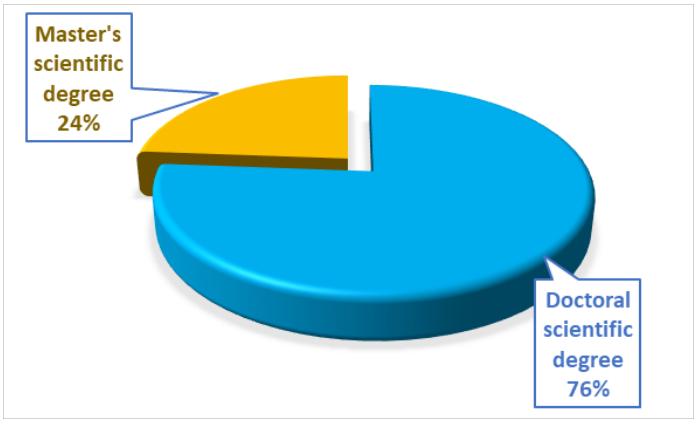


Figure 2.3. Scientific qualification of the personnel involved in the programs of the "Chemistry, chemical technologies and biotechnology" study direction.

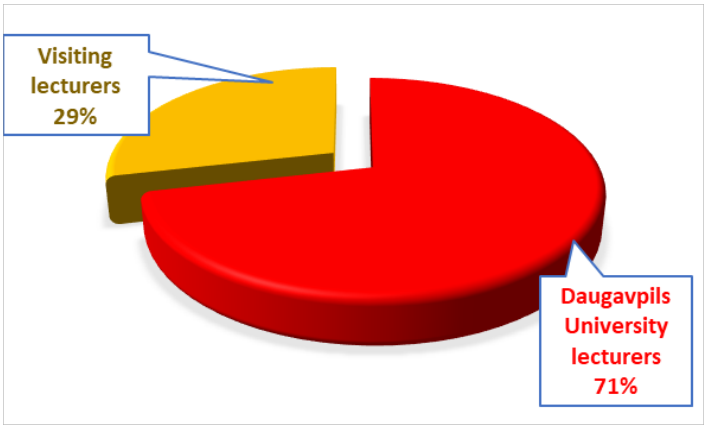


Figure 2.4. The distribution of personnel involved in the programs of the "Chemistry, chemical technologies and biotechnology" study direction between guest lecturers and Daugavpils University lecturers.

The knowledge of the national language of the academic staff employed in the implementation of the study direction complies with the regulations on the amount of knowledge of the national language and the procedure for testing the knowledge of the national language for the performance of professional and official duties.

The workload of lecturers is determined in accordance with the "Regulations for recording the workload of academic staff at Daugavpils University" (Latvian only: https://veidlapas.du.lv/wp-content/uploads/2021/01/Akademiska_personala_darba_apjoma_uzskaite

s_kartiba_DU_grozijumi_28.09.2020.pdf). If the lecturer's study work is more than 1000 hours in the academic year, then overtime is calculated only for the study work, for which the company contract for the performance of the academic work is concluded, in accordance with the procedures specified in the legislation.

The number of academic positions and the stability of persons, equal distribution of workloads, the involvement of industry professionals in the study process is encouraged in order to ensure the high-quality implementation of professional programs. The recruitment of lecturers with doctoral degrees is being intensified in order to implement high-quality study programs in accordance with regulatory enactments.

The results of the academic staff's scientific activity are collected once a year, in accordance with the "Procedure for evaluating the effectiveness of the scientific work of the academic staff of DU". Based on the evaluation of the effectiveness of the scientific work, the Science Department can make a decision to recommend to the DU Science Council and the Senate to evaluate the scientific activity of the structural units of the DU and/or the amount and relevance of academic staff remuneration to the position held. In the appendix, basic information about the teaching staff involved in the implementation of the study course, as well as the biographies of the teaching staff (Curriculum Vitae in Europass format) (*2.3.7. Basic information about the teaching staff, 2.3.7. CV*).

2.3.8. Assessment of the support available for the students, including the support provided during the study process, as well as career and psychological support by specifying the support to be provided to specific student groups (for instance, students from abroad, part-time students, distance-learning students, students with special needs, etc.).

DU students are supported in matters related to the organization of the study process by the Student Service Centre, faculty deans' offices and profiling departments (dean, vice-dean, department head, study program director, accounting secretary). Within each study course, as well as in the development of studies, qualifications, bachelor's and master's theses, students have the opportunity to receive individual advice from lecturers.

If during the semester it is observed that a student has problems related to the study process (lecture attendance, academic debts), this student is invited to an individual meeting with the program director to discuss the best possible options for solving the problem. Each program director meets on average with 1-2 students per month. After a month, students are invited to the meeting again to discuss the progress of their studies together and make sure that the situation has improved.

Students studying with the funds of natural or legal entities can apply for tuition fee discounts. Discounts are granted to those students who, after receiving a bachelor's diploma, continue their studies in a master's degree, who have excellent and excellent results, who have shown high achievements in Olympic sports, as confirmed by the recommendations of the Coaches Council, as well as according to other criteria.

The Social Support Program of the Student Council (SP) operates at DU. According to the "Regulations of the Daugavpils University Student Social Support Program" (available in Latvian: https://du.lv/studentu-padome/dokumenti/), the successful full-time undergraduate and master's degree students of DU, who live in DU service hotels (dormitories) and who need social support,

have the opportunity to receive a discount on service hotel (dormitory) rent in the amount of 50%.

DU's infrastructure has been modernized and adapted, improving the accessibility of the environment for persons with functional impairments (movement, vision, hearing impairments), and nursery rooms have been created for young parents who are studying – for changing and feeding babies, and a playroom - for keeping student children occupied during classes (available in Latvian: https://du.lv/par-mums/vides-pieejamiba/).

In 2016, the Association of Disabled Persons of Latvia and their friends "APEIRONS" awarded Daugavpils University with an award in the nomination "Education for all" with the justification "that Daugavpils University as a university has done the most in ensuring environmental accessibility. DU became accessible to people with special needs – students have ideal conditions to fully attend classes". DU has modernized facilities and buildings not only for people with mobility problems, but also for people with visual impairments, which is especially noted by the evaluators of the environmental accessibility competition, stating that "buildings are easy to navigate and move around for everyone" (available in Latvian: https://www.la.lv/ne-tikai-ieklut-eka-bet-ari-parvietoties-invalidu-apvieniba-apbalvo-labakos-vides-pieejamibas-veicinatajus).

Students can use various DU rooms and facilities: the computer room, auditorium for consultations, meetings, library rooms for literature analysis, preparation of independent and research papers, as well as specially equipped rooms for holding conferences, study and extracurricular activities (DU Sports Complex).

Lecturers and students can receive medical support at the Certified Health Office, where first aid in case of various illnesses is provided by a physician's assistant (paramedic).

In the 2022/2023 study year, a Psychological Support Centre (PSC) was established at DU (available in Latvian: https://ieej.lv/KddNN), in which DU students and employees have the opportunity to receive free psychological support in solving various daily problems in personal, work or educational matters. PSC psychologists provide up to three free consultations per person. If necessary, the number of consultations can be increased. Counselling is organized in the premises of DU in person or remotely (online format) after prior coordination of the counselling time. PSC psychologists do not advise/counsel close colleagues and students they educate to avoid multiple relationships. PSC operates in accordance with the developed "Regulations of the Psychological Support Centre of Daugavpils University" (available in Latvian: https://du.lv/wp-content/uploads/2023/02/Psihologiska-atbalsta-centra-nolikums.pdf) .

Daugavpils University Centre for Lifelong Education (available In Latvian: https://du.lv/studijas/muzizglitiba/muzizglitibas-centrs/) promotes lifelong learning and career development initiatives by acquiring new or supplementing existing knowledge, skills, competences that improve personality, as well as promote professional development.

DU operates the ERASMUS+ student exchange program, within the framework of which foreign students are assigned a responsible person from the corresponding study program/faculty, with which progress will be discussed at least once a month regarding the mobility activity plan and the progress of the mobility process itself. A volunteer "buddy" from the student environment will be assigned to each student in order to integrate him/her more easily into university life. The students meet monthly with the ERASMUS+ project coordinator to guarantee the student's safety and prevent risks that may arise during the semester. The project coordinator informs foreign students about social and non-academic developments at the university, as well as introduces them to the activities of student self-governments. Free Latvian language courses are offered to foreign students.

The Department of International and Public Relations of DU provides support functions for foreign students studying at DU.

2.4. Scientific Research and Artistic Creation

2.4.1. Description and assessment of the fields of scientific research and/or artistic creation in the study field, their compliance with the aims of the higher education institution/ college and the study field, and the development level of scientific research and artistic creation (provide a separate description of the role of the doctoral study programmes, if applicable).

The directions of scientific and applied research of the field of study are consistent with the goals of DU and the field of study. According to the collected data, the teaching staff and guest (visiting) lecturers purposefully and regularly engage in various professional development activities in the fields corresponding to their scientific interests, both at DU and also at foreign universities.

The directions of the research work of the academic staff involved in the study programs are oriented towards the successful implementation of the study program and in most cases they are related to the lecturers' specialization within the programs, taught study courses (but not only). Lecturers prepare scientific articles, including in internationally peer-reviewed journals, participate in conferences, training, practice facilities/internships and various scientific events, including developing methodical materials, participating in international and national research projects.

Fields of specific scientific research of the field of study: analytical chemistry, chemistry of renewable resources, biotechnology, synthesis of organic luminophores.

Competitions for internal research projects are announced every year at Daugavpils University. For example, in 2023, the lecturers of the "Chemistry, Chemical Technologies and Biotechnology" field of study successfully implemented several research projects of the following type:

- Assoc. Professor S. Osipov - "Improving the quality and quantity of biogas produced from fish processing waste"
- Docent J. Kirilova - "Development of new luminescent dyes with non-linear optical properties"

This information unequivocally indicates the compliance of the conducted research with the level of scientific development.

The research carried out by the academic staff is a significant contribution to the development of the branch they represent, as well as to the development of the study direction, improvement and updating of the study content. The researches cover both theoretical aspects and industry topicalities and novelties, which are used in lecturers' study courses, thus promoting the interaction of the research and study process and significantly improving the quality of the study process.

The level of research in the direction of study to the level of scientific development is confirmed by the level of scientific publications, the expert rights of the teaching staff of the Latvian Science Council.

2.4.2. The relation between scientific research and/or artistic creation and the study

process, including the description and assessment of the use of the outcomes in the study process.

As part of the study process, the latest developments in the industry are continuously followed – the academic staff participates in projects, the results are used to update the content of the study courses. Lecturers actively participate in the approval and dissemination of research results, speaking at scientific and practical conferences and seminars. The connection of scientific research with the study process is realized by using the information obtained in the scientific events in the management of the study course, study work and final work, as well as in the preparation of teaching aids. The study direction's staff consists of lecturers who regularly cooperate in improving study processes, thus achieving interdisciplinarity in the development of students' knowledge and skills.

Science communication is of great importance in the process of society's development. Teaching staff of the field of study are involved in this activity, participating in the Daugavpils Science Festival, Scientists' Night, DU Science School events, providing trainings, lectures, interactive events for different age groups, as well as engaging in consulting and evaluating the development of students' scientific research works. DU is a member of international associations active in the field of science communication (EUSEA).

2.4.3. Description and assessment of the international cooperation in the field of scientific research and/or artistic creation by specifying any joint projects, researches, etc. Specify those study programmes, which benefit from this cooperation. Specify the future plans for the development of international cooperation in the field of scientific research and/or artistic creation.

The competence of the academic staff of DU is improved by participating in the mobility of the European Union support program in the field of education, training, youth and sports within the framework of "ERASMUS+". Cooperation agreements have been signed with more than 90 higher education institutions in 22 countries.

The Erasmus+ program supports teaching – the lecturers of the field of study travel to one of the foreign universities of cooperation or are involved in staff training, improving professional competences, ensuring participation in studies, work observation at a foreign cooperation university or other relevant organization. Learning mobility gives DU lecturers and staff the opportunity to gain knowledge and specific skills by learning from the experience and good practices of foreign partners, as well as to improve the practical skills required for work at DU and professional development, to encourage the academic staff to expand and improve the range and content of the offered study courses, but it also allows students who do not have the opportunity to participate in the mobility program to benefit from the knowledge and experience provided by the academic staff of other European universities and foreign guest lecturers, it promotes the exchange of knowledge and experience of pedagogical methods between European higher education institutions.

During the reporting period, several scientific publications were developed in cooperation with foreign researchers in the direction of studies. The teaching staff of the course has established cooperation with several partner universities: with the University of Gdańsk (Poland) – the academic

staff has gone on teaching mobility, participated in seminars, students repeatedly used the opportunities of the Erasmus+ program while studying for one semester at this university; with da Beira Interior University (Portugal) – the academic staff has gone on teaching mobility. Such activities contribute to the development of study programs.

Further activities for the development of cooperation in scientific research could be: raising the scientific capacity of lecturers in the field of study by more actively engaging in the international environment (international projects, conferences, publications); conclusion of cooperation agreements and implementation of joint projects with foreign educational and scientific research institutions.

2.4.4. Specify the way how the higher education institution/ college promotes the involvement of the teaching staff in scientific research and/or artistic creation. Provide the description and assessment of the activities carried out by the academic staff in the field of scientific research and/or artistic creation relevant to the study field by providing examples.

The development and improvement of the academic staff at DU is promoted, moving towards a competent staff. The scientific capacity of the teaching staff is confirmed by the number of publications indexed in the "Web of Science" and SCOPUS databases, the number of supervised theses and research, in the implementation of which the lecturers of the study respective direction participate. DU annually evaluates the scientific activity of teaching staff, within the framework of which the results of research work, activity in projects, as well as pedagogical and organizational work are evaluated. As part of the study process, the latest developments in the industry are continuously followed – the academic staff participates in projects, the results are used to update the content of the study courses. Lecturers actively participate in the approval and dissemination of research results, speaking at scientific and practical conferences and seminars. The information obtained in the scientific events is used in the management of study courses and final theses, as well as in the preparation of teaching aids.

The research and creative activity of the academic staff is closely related to the study process, promoting students' understanding of the connection between innovation and the needs of a real organization or market. The programme staff consists of lecturers who regularly cooperate in improving study processes, thus achieving interdisciplinarity in the development of students' knowledge and skills.

The involvement of teaching staff in scientific research is ensured and promoted in accordance with the "Procedure in which scientific publications and monographs of the academic staff of Daugavpils University are paid for" (see "Other Annexes"), "Daugavpils University procedures for paying the expenses of participation fees for scientific business trips and scientific events" (see "Other Annexes"), "Procedures of the competition "Daugavpils University research projects"" (Latvian only: https://du.lv/aktualitates/daugavpils-universitate-izsludinats-ieksejo-petniecibas-projektu-konkurss-2023-gadam/).

The effectiveness of these mechanisms can be evidenced by the increase in publications indexed by SCOPUS in the period from 2016 to 2022. The total number of publications of lecturers of the study direction "Chemistry, chemical technologies and biotechnology" increased from 17 publications in 2016 to 46 publications in 2022. The number of SCOPUS publications per lecturer (expressed as full-time equivalent (FTE)) increased from about 1.25 in 2016 to about 3.4

publications/FTE per year in 2022 (data obtained from Elsevier “SciVal” database 06/2023 . in December).

Information about academic staff publications, participation in conferences and projects is available in the appendix (*2.4.4. Compilation of quantitative data, 2.4.4. Publications*).

2.4.5. Specify how the involvement of the students in scientific research and/ or applied research and/or artistic creation activities is promoted. Provide the assessment and description of the involvement of the students of all-level study programmes in the relevant study field in scientific research and/ or applied research and/or artistic creation activities by giving examples of the opportunities offered to and used by the students.

The most actively used form of student involvement in scientific and applied research in the field of study "Chemistry, chemical technologies and biotechnology" is research within the framework of studies and final theses (bachelor's and master's theses).

The main directions of student research in the "Chemistry, Chemical Technologies and Biotechnology" study program are:

- research on gasification and pyrolysis of some types of biomass;
- analyzes of the generator gas produced by the biomass gasification process;
- determination of tar in generator gas;
- hydrochemical, hydrological and hydrobiological research of the complex of surface water objects;
- synthesis of fluorescent compounds and investigation of their properties for fluorescent analysis, environmental pollution detection and biomedical purposes;
- application of environmental chemistry and bioindication methods in air quality and environmental pollution control studies;
- approval of biological monitoring methods and research of new bioindicators in the assessment of the state of the environment;
- underground water quality research and monitoring;
- environmental condition assessment, environmental impact risk assessment;
- development and research of new optical materials with innovative microscopy methods;
- animal parasitology;
- tissue and cell cultures, their application in genetics and breeding;
- the study of biological diversity, applying t. see molecular methods;
- genetics of plant immunity.

In the period from 2017 to 2023, 35 bachelor's and 25 master's theses were defended in the field of study. The topics of the defended works correspond directly to the topics of the research works of the academic staff involved in the programs of the "Chemistry, chemical technologies and biotechnology" study direction. This will make it possible to integrate the topics of lecturers' research directions into the study process, thus significantly improving the quality of both the management of students' scientific works and the quality of taught study courses.

The topics of bachelor's and master's theses are relevant from the point of view of the current field of chemistry and correspond to the specifics of the scientific activity of the department. The implementation of the bachelor and master's theses includes the use of elements of scientific research, strict justification of decisions, comparative analysis of alternative solutions and

discussion of the obtained results.

The topics of study papers, bachelor's and master's theses are coordinated with the supervisors and approved at the meeting of the Department of Environment and Technology, evaluating the topicality of the proposed topics and their relevance to the study program. At the end of the last study semester, the defense of the final theses is organized, in which the quality of the practical research carried out during the development of the work and the compliance of the work with the requirements are evaluated, as well as the admission to the defense of the work is decided.

While developing study and final theses, students carry out diverse research activities in the fields of chemistry and biochemistry; students can use the auditoriums and equipment of the Department of Environment and Technology to conduct research. The results are reported during the State Examination period.

Competitions for student research projects are announced every year at Daugavpils University. For example, in 2023, the students of the "Chemistry, Chemical Technologies and Biotechnology" field of study successfully implemented several research projects of the following type:

- 2nd year student of ABSP "Chemistry" - "Optimization of the method for reducing tar concentrations in the generator gases obtained during the biomass gasification process"
- 1st-year student of AMSP "Chemistry" - "Improving the quantity and quality of the products (bio-oil and synthetic gas) obtained in the pyrolysis process of solid waste"

As a result of the implementation of projects, students are involved in scientific research:

- The number of students involved in the research process will be increased;
- The project leader (student) will be involved in the scientific activity, and its research growth will be achieved in the course of the project;
- Human resources will be attracted to science by creating a new, interdisciplinary group of scientists.
- The number of publications included in SCOPUS databases will be increased;
- The project envisages the development of new methods and technologies, therefore its implementation will promote and develop cooperation between Daugavpils University and entrepreneurs;
- In the case of project implementation, using the scientific potential of Daugavpils University and conducting applied scientific research, entrepreneurs will achieve the common goal - satisfy their demand for a new method of increasing.

Students are also involved in the implementation of Daugavpils University's internal research projects as executors. For example, in Daugavpils University's internal research project "Improving the quality and quantity of biogas produced from fish processing waste", a 3rd-year student of ABSP "Chemistry" and PhD candidate Aleksandrs Pučkins, were recruited as executors.

2.4.6. Provide a brief description and assessment of the forms of innovation (for instance, product, process, marketing, and organisational innovation) generally used in the higher education institution, especially in study field subject to the assessment, by giving the respective examples and assessing their impact on the study process.

In the implementation of the study process, DU provides a wide knowledge base, support for research and innovation, support for the development of students' personality, as well as support

for students' employment. Various forms of innovation are applied in the field of study "Chemistry, chemical technologies and biotechnology" and DU.

Product innovation. For students' involvement in research, study work, final work and independent work, the following can be used: Environmental chemistry, Chromatography, Renewable resources, Fluorescent analysis methods and Organic synthesis laboratories with specialized laboratory equipment. This laboratory equipment is used in the implementation of study courses, research is carried out here and the introduction of innovations in the study process is ensured. These are modern laboratories, the purpose of which is to promote students' competitiveness and ability to use new technologies and sources of information. The laboratories contribute to updating the content of study programs, increasing the quality of research works by introducing innovative technological, methodological and lab solutions.

Process innovations. In the last three years, the organization of e-learning has been developed very rapidly, using Zoom to conduct online classes; video lectures are recorded; Descriptions of study courses are available on the DU e-studies website (MOODLE), necessary study materials, links to certain information for learning the study course, colloquiums and exams. Teachers have the opportunity to create a book of student evaluations and students (individually) can keep track of what they have done in the study course. The administration of the DU e-studies website is well organized, the administrator's advice is available (in person, online or by correspondence), the DU e-studies website provides instructions and advice on issues related to the use of e-studies (see Latvian only "Other Annexes").

Marketing innovations. DU uses certain marketing tools (Open Door Days online, Night of Scientists online, defending students' scientific research works online, information about DU on social networks, *etc.*), to promote the interest of future students in the study programs included in the study direction "Chemistry, chemical technologies and biotechnology". In 2022, the DU website was significantly renewed and improved.

Organizational innovations. DU uses several digitized systems: DUIS (allows system users to digitize many study organization processes and document processing: notices, orders, study contracts, their amendments, preparation of diplomas, entry of grades, compilation of statistical data), Namejs (a document management system that ensures the management of correspondence, orders, contracts, statements, procurement documents, for the efficiency of the document circulation process), HoP (employee self-service portal, which provides the employee with the opportunity to view information about him/herself, the absences of the colleagues, apply for leave, check the accumulated vacation days, *etc.*).

2.5. Cooperation and Internationalisation

2.5.1. Provide the assessment as to how the cooperation with different institutions from Latvia (higher education institutions/ colleges, employers, employers' organisations, municipalities, non-governmental organisations, scientific institutes, etc.) within the study field contributes to the achievement of the aims and learning outcomes of the study field. Specify the criteria by which the cooperation partners for the study field and the relevant study programmes are selected and how the cooperation is organised by describing the cooperation with employers. In addition, specify the mechanism for the attraction of the cooperation partners.

Cooperation with Latvian institutions is carried out within the framework of the study direction in order to promote the achievement of the objectives of the study direction and study results. The lecturers of the Department of Environment and Technology of DU have established a good cooperation with the lecturers of the University of Latvia in the field of chemistry. Cooperation takes place both by participating in joint EU co-financed projects and by participating in conferences organized by both universities.

The lecturers involved in the course of study also teach at other Latvian universities (University of Latvia and Riga Technical University) and participate in the scientific activities organized by them. Several lecturers of the direction carry out pedagogical activities in Latvian schools (Iecava secondary school, Daugavpils Saskana primary school, Daugavpils Draudziga aicinajuma secondary school), which is a real opportunity to work with potential students of the direction.

Cooperation with Latvian higher education institutions contributes to the achievement of the scientific goals of the field of study, cooperation with employers contributes to the development of students' professional skills.

Cooperation partners of DU in Latvia are selected according to the following criteria:

- similar study programs are implemented in the higher education institution (HEI).
- HEI lecturers have common scientific interests and research projects (writing scientific publications);
- the possibility of organizing students' participation in joint events;
- implementation of the study process with the support of industry specialists – industry specialists are invited as visiting/guest lecturers in the provision of study courses, in final/state examination commissions, in the organization of practice in professional programs.

Cooperation partners of employers are selected based on the specifics of the field of study programs – companies/institutions related to the field of chemistry and biochemistry that actively use services in the field of chemistry.

Cooperation with employers is realized in such forms as:

- periodic targeted survey of employers;
- informal interviews, meetings, discussions;
- conversations with students and graduates about their competence, employment and career development problems;
- Department staff often play an intermediary role, helping employers to choose suitable employees from among students and graduates, and interested students to find a job.

Employer attraction mechanism

Ways of cooperation are discussed during personal meetings with employer representatives. If representatives of employers are involved in the provision of study programs (teaching study courses, final examination committees), DU concludes company/entrepreneurship contracts with them for the performance of academic work.

Cooperation with employers' representatives and Latvian higher education institutions has actively developed within the reporting period. For example, a new contract was concluded with SIA "HyroGas", which develops and researches technologies for the production of climate-neutral energy, which are based on thermochemical steam reforming of carbon-containing solids.

Information on the signed cooperation agreements is available in the appendix (*2.5.1. List of*

cooperation agreements).

2.5.2. Provide the assessment as to how the cooperation with different institutions from abroad (higher education institutions/ colleges, employers, employers' organisations, municipalities, non-governmental organisations, scientific institutes, etc.) within the study field contributes to the achievement of the aims and learning outcomes of the study field. Specify the criteria by which the cooperation partners suitable for the study field and the relevant study programmes are selected and how the cooperation is organised by describing the cooperation with employers. In addition, specify the mechanism for the attraction of the cooperation partners.

Foreign cooperation partners of the field of study are mostly selected within the Erasmus+ program of DU.

The lecturers of the course actively use the Erasmus+ program and have gone to 15 different foreign universities to exchange experience. During the visits, classes were held, and future opportunities for cooperation in the research field were discussed. Cooperation has been established for several years with the University of Gdańsk in Poland, the University of the Mediterranean in Turkey, and the University of Vytautas Magnus in Lithuania.

International cooperation activities affect the achievement of the study results of the field of study and the improvement of quality, because the cooperation partners involved in it and the lecturers of Daugavpils University exchange experience, they share knowledge and contribute to the development of the field of study and improvement of scientific potential.

Foreign cooperation partners are selected according to the following criteria:

- universities implement similar study programs in the field of chemistry, chemical technology and biotechnology;
- lecturers have common scientific interests.

The following mechanisms are used to attract foreign cooperation partners:

At the beginning of the year, the DU Erasmus+ coordinator sends an Erasmus+ information letter to all partners about how foreign students and teaching staff can apply for studies, practice places, internships, teaching or professional development. The DU Erasmus+ coordinator visits the international Staff Week several times a year, where there is an opportunity to establish new contacts and conclude inter-university agreements on the exchange of students and teaching staff within the Erasmus+ program.

2.5.3. Specify the system or mechanisms, which are used to attract the students and the teaching staff from abroad. Provide the assessment of the incoming and outgoing mobility of the teaching staff in the reporting period, the mobility dynamics, and the issues which the higher education institution/ college faces with regard to the mobility of the teaching staff.

DU actively uses the Erasmus+ program to attract foreign teaching staff and students. In order to

attract foreign students, DU provides information about its offer on the website https://du.lv/en/studies/admission/ . DU also implements marketing activities: contracts are concluded with recruitment agents, participation in international education fairs and agent forums, *etc.*

During the reporting period, the outgoing mobility of lecturers and employees took place both for professional development and for teaching at cooperation partner universities. Teaching activities were carried out in Poland at the University of Gdańsk (Uniwersytet Gdański) and the University of Warmia and Masuria in Olsztyn (University of Warmia and Mazury in Olsztyn), Vytautas Magnus University in Lithuania (Vytautas Magnus University), in Israel Ben Guriona university (Ben-Gurion University of the Negev), in North Macedonia Ss. Kiril and Metodia university Skopje (Ss. Cyril and Methodius University in Skopje), in Portugal at the University of Beira (Universidade da Beira Interior) Ko Villana, Greece at the National Technical University of Athens (National Technical University of Athens), in Turkey at the University of the Mediterranean (Akdeniz Üniversitesi). The professional development activities of employees and lecturers were carried out in Poland at the University of Gdańsk (Uniwersytet Gdański), in Finland at the University of Turku (University of Turku), in the Czech Republic at the University of Pardubice (University of Pardubice), in Cyprus at the University of Cyprus (University of Cyprus), as well as at Aarhus University in Denmark (Appendix *2.5.3. Statistical data on the outgoing mobility of teaching staff*).

During the reporting period, within the framework of the "Learn Russian in European Union" project, six foreign students from the USA studied some of the courses included in the major study programs. Students of the academic bachelor's and master's study programs "Chemistry" often used the opportunities of outgoing mobility – 11 students participated in study mobility in Poland, 1 – in Estonia and 1 – in Turkey. In turn, a total of 6 students used the opportunities for internship mobility: 3 people choose an Italian company, 1 – Lithuanian and another 1 – Swedish as the place of internship (Appendices *2.5.3. Statistical data on foreign students during the reporting period, 2.5.3. Statistical data on the outgoing mobility of program students*).

Positive dynamics of ERASMUS+ mobility can be observed during the reporting period. It can be predicted that this trend will continue in the next reporting period as well. Students and teaching staff are increasingly motivated to gain international experience abroad. The biggest difficulties that DU faces in the implementation of the mobility of teaching staff are the difficulties of rescheduling lecturers' classes during business trips due to the heavy workload. The difficulty in attracting foreign lecturers is the provision of competitive remuneration.

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

2.6.1. Assessment of the fulfilment of the plan regarding the implementation of the recommendations provided by the experts during the previous accreditation of the study field, as well as the assessment of the impact of the given recommendations on the study quality or the improvement of the study process within the study field and the relevant study programmes.

The previous evaluation of the study direction "Chemistry, chemical technologies and biotechnology" took place in 2013, when on 10.05.2013 an expert report on the evaluation of the

study direction was signed. The course of study was accredited by the decision of the study accreditation commission meeting on July 3, 2013 No. 238. The experts' report on the evaluation of the study direction contained several recommendations, which were taken into account and implemented for the development of the study direction:

1. Experts recommended expanding research and increasing the number of publications in internationally cited journals specifically in the chemical industry.

The range of research directions is increased (*e.g.*, development and research of new optical materials with innovative microscopy methods; research and application possibilities of energy obtained from biomass), which at the same time also gives opportunities to increase the range of publications.

2. The attraction of project funds for solving regional problems should be promoted.

The lecturers of the department are actively involved in projects, applied research and contractual work, thereby attracting funds and getting involved in solving current regional problems.

3. Learning modules that can be offered to exchange students should be developed. Student and lecturer exchange program plan should be created for cooperation with other Latvian and foreign universities.

The study module "Chemistry of renewable resources" has been developed (20 credit points (CP); 30 ECTS). The module is intended for both exchange students, interested parties and specialists who want to acquire knowledge and competences in specific areas in depth.

4. A personnel recruitment and development strategy should be developed.

A personnel recruitment and development strategy was developed, which is linked to the personnel recruitment and development strategy implemented by DU.

5. The technical support and laboratory facilities for the basic courses of chemistry programs must be improved.

The infrastructure of the university, including the faculties, has been restored. The construction of a new laboratory building was carried out, the equipment of teaching and scientific laboratories was renewed, significant funds were invested in the purchase of scientific equipment. Currently, the infrastructure fully meets the level of needs and further investments are planned.

The expert report on the assessment of the academic bachelor's study program "Chemistry" also made several recommendations, which were taken into account and implemented for the development of the study program:

1. The development and publicity of academic staff's scientific research in internationally cited journals in the field of chemistry should be promoted.

Growth of SCOPUS indexed publications in the period from 2016 to 2022. The total number of publications of lecturers of the study direction "Chemistry, chemical technologies and biotechnology" increased from 17 publications in 2016 to 46 publications in 2022.

2. The infrastructure of basic course laboratories should be improved.

The construction of a new laboratory building was carried out, the equipment of teaching and scientific laboratories was renovated, significant funds were invested in the purchase of scientific equipment.

3. Opportunities for students and lecturers to participate in international exchange programs should be provided.

The mobility of DU academic staff and students is improved by participating in mobilities within the framework of the European Union's support program in the field of education, training, youth and sports "Erasmus+". Cooperation agreements have been signed with more than 90 higher education institutions in 22 countries.

4. It is necessary to analyse the scope of the course "Mathematics for natural scientists" (2 CP) as well as the course "Physics" (2 CP) and to look for opportunities to expand the courses.

Two study courses will be added to the study plans:

1) Kimi1020 Mathematical data processing and statistics in chemistry (2 CP; 3 ECTS).

2) Kimi1022 Chemical physics (2 CP; 3 ECTS).

5. Teaching methods in chemistry courses should be improved.

The recommendation has been taken into account and the learning of the compulsory part of the study program is basically based on case analysis. Problem-solving skills are also learned during study courses ("Internship in the industry laboratory I" and "Internship in the industry laboratory II"), when the student's task is to get acquainted with the specifics of the internship site and propose improvements to the process. Also, a number of study courses use problem-solving methods in the teaching work. These are basically courses that are related to the development of research projects.

During the evaluation of the study direction "Chemistry, chemical technologies and biotechnology", the academic master's study program "Chemistry" was included in it, for which recommendations were made:

1. In the future, more lecturers should be attracted with dr. chem. qualification (in 2018: 5 lecturers with dr. chem. degree were elected to an academic position at DU) in order to ensure long-term and high-quality development of the programme.

The university motivates the teaching staff with master's degrees to obtain a doctoral degree by offering financial support (within various projects, grants). The recommendation is partially fulfilled – currently three lecturers with dr. chem. degree, elected to an academic position at DU.

2. In the future, it can be recommended to join a consortium with LU, RTU, RSU, LOSI and other chemistry-related institutions to subscribe to the Chemical Abstracts Service database SciFinder.

Teaching staff and students are provided with access to SCOPUS, ScienceDirect and Web of Science databases

3. It is advised to supplement the library with

1) Carey F.A., Sundberg R.J. Advanced Organic Chemistry: Part B: Reaction and Synthesis, 5th Edition, 2010.

2) Carey F.A., Sundberg R.J. Advanced Organic Chemistry: Part A: Structure and Mechanisms, 5th Edition, 2010.

3) O. D. Sparkman, Z. Penton, F. G. Kitson. Gas Chromatography and Mass Spectrometry: A Practical Guide: A Practical Guide 2nd Revised edition, 2011.

4) E. V. Anslyn, D. A. Dougherty. Modern Physical Organic Chemistry, 2005

5) D.L. Nelson, M.M. Cox. Lehninger Principles of Biochemistry, 5th ed., W.H. Freeman, 2008

6) D. Voet, J.G. Voet. Biochemistry, 3rd ed., Wiley, 2004.

In cooperation with the management of DU and the Library, we are thinking about the possibilities of improving the provision of books related to the field of chemistry with modern scientific literature and periodicals in Latvian and English (it also includes educational literature that was indicated in the recommendations in the text).

The impact of the recommendations turns out to be very positive, reflecting opportunities to improve the quality of studies and optimize processes towards studies. The analysis shows that well-developed and carefully implemented recommendations can contribute to the improvement of study programs, providing students with an optimal learning experience and efficient use of resources. These recommendations have a concrete impact on study processes, supporting both student learning outcomes and the long-term development of programs to maintain and promote excellence in the study environment. Such an analysis is essential to assess the effectiveness of the recommendations and to ensure that the improvements made have a positive impact on the overall study experience.

2.6.2. Implementation of the recommendations given by the experts during the evaluation of the changes to the study programmes in the respective study field or licensed study programmes over the reporting period or recommendations received during the procedure for the inclusion of the study programme on the accreditation form of the study field (if applicable).

During the reporting period, one study program was licensed for studies:

On September 18, 2015, the academic master's study program "Chemistry", license number 04041-92.

The study program was created based on the supply and potential demand of the European and world markets, as well as on the achievement of DU's strategic goals. The study program is considered to be in high demand, it is planned to have a high proportion of students, and it also received support from professional associations and organizations. The execution of the implementation plan of the recommendations provided by the licensing experts is attached. The recommendations of the program licensing and change approval experts were not significant and have all been taken into account.

Annexes

I - Information on the Higher Education Institution/ College		
Information on the implementation of the study field in the branches of the higher education institution/ college (if applicable)		
List of the governing regulatory enactments and regulations of the higher education institution/ college	1.2_List of the main internal laws and regulations.docx	1.2_Ieksejo normativo aktu un regulejumu saraksts.docx
The management structure of the higher education institution/ college	1.2_Governance structure.pdf	1.2_Parvaldibas struktura.pdf
II - Description of the Study Field - 2.1. Management of the Study Field		
Plan for the development of the study field (if applicable)	2.1.2. Study direction developent plan summary_EN.docx	2.1.2. Studiju virziena attistibas plana kopsavilkums_LV.docx
The management structure of the study field	2.1.3_Management structure of study diection_EN.pdf	2.1.3. Studiju virziena parvaldības struktūra_LV.pdf
A document certifying that the higher education institution or college will provide students with opportunities to continue their education in another study programme or another higher education institution/ college (agreement with another accredited higher education institution or college) if the implementation of the study programme is terminated.	2.1.4. Agreements on student transfer.zip	2.1.4. Līgumi par studējošo pārņemšanu.zip
A document certifying that the higher education institution or college guarantees compensation for losses to students if the study programme is not accredited or the study programme license is revoked due to actions (actions or omissions) of the higher education institution or college and the student does not wish to continue studies in another study programme.	2.1.4.CONFIRMATION_Compensation guarantee for students_EN.docx	Apliecinājums par zaudējumu kompensāciju.edoc
Standard sample of study agreement	2.1.4. Agreement on studies_DU_EN.docx	2.1.4. Līgums par studijām_DU_LV.docx
II - Description of the Study Field - 2.2. Efficiency of the Internal Quality Assurance System		
Analysis of the results of surveys of students, graduates and employers	2.2.4. Analysis of survey results.zip	2.2.4.Aptauju rezultātu analīze.zip
II - Description of the Study Field - 2.3. Resources and Provision of the Study Field		
Basic information on the teaching staff involved in the implementation of the study field	2.3.7. Basic information about teaching staff_EN.xlsx	2.3.7. Pamatinformācija par studiju virziena īstenošanā iesaistītajiem mācībspēkiem_LV.xlsx
Biographies of the teaching staff members (Curriculum Vitae in Europass format)	2.4.4.CV_ENG.zip	2.4.4.CV_LV.zip
A statement signed by the rector, director, head of the study programme or field that the knowledge of the state language of the teaching staff involved in the implementation of the study programmes within the study field complies with the regulations on the state language knowledge and state language proficiency test for professional and official duties.	2.3.7.STATEMENT_native language_EN.docx	Apliecinājums par valsts valodas prasmi.edoc
A statement of the higher education institution/ college on the respective foreign language skills of the teaching staff involved in the implementation of the study programme at least at B2 level according to the European Language Proficiency Assessment levels (level distribution is available on the website www.europass.lv, if the study programme or part thereof is implemented)		
II - Description of the Study Field - 2.4. Scientific Research and Artistic Creation		
Summary of quantitative data on scientific and/ or applied research and / or artistic creation activities corresponding to the study field in the reporting period.	2.4.4. Compilation of quantitative data_EN.docx	2.4.4. Kvantitatīvo datu apkopojums_LV.docx
List of the publications, patents, and artistic creations of the teaching staff over the reporting period.	2.4.4. Publications_EN.docx	2.4.4. Publikacijas_LV.docx
II - Description of the Study Field - 2.5. Cooperation and Internationalisation		
List of cooperation agreements, including the agreements for providing internship	2.5.1. List of cooperation agreements_EN.docx	2.5.1. Sadarbības līgumu saraksts_LV.docx
Statistical data on the teaching staff and the students from abroad	2.5.3. Statistical data on foreign students during the reporting period_EN.docx	2.5.3. Statistikas dati par ārvalstu studējošajiem pārskata periodā_LV.docx
Statistical data on the incoming and outgoing mobility of students (by specifying the study programmes)	2.5.3. Statistical data on the mobility of program students_EN.docx	2.5.3. Statistikas dati par programmu studējošo mobilitāti_LV.docx
Statistical data on the incoming and outgoing mobility of the teaching staff	2.5.3. Statistical data on the outgoing mobility of teaching staff_EN.docx	2.5.3. Statistikas dati par mācībspēku izejošo mobilitāti_LV.docx
II - Description of the Study Field - 2.6. Implementation of the Recommendations Received During the Previous Assessment Procedures		
Report on the implementation of the recommendations received both in the previous accreditation and in the licensing and/ or change assessment procedures and/ or the procedures for the inclusion of the study programme on the accreditation form of the study field.	2.6.1. Review of implementation of recommendations_EN.docx	2.6.1. Rekomendāciju izpildes pārskats_LV.docx
An application for the evaluation of the study field signed with a secure electronic signature	APPLICATION for the evaluation_EN.docx	Iesniegums studiju virziena Ķīmija ķīmijas tehnoloģijas un biotehnoloģija novērtēšanai.edoc
III - Description of the Study Programme - 3.1. Indicators Describing the Study Programme		
Sample of the diploma and its supplement to be issued for completing the study programme		
For academic study programmes - Opinion of the Council of Higher Education in accordance with Section 55, Paragraph two of the Law on Higher Education Institutions (if applicable)		
Compliance of the joint study programme with the provisions of the Law on Higher Education Institutions (table) (if applicable)		
Statistics on the students in the reporting period		
III - Description of the Study Programme - 3.2. The Content of Studies and Implementation Thereof		
Compliance with the study programme with the State Education Standard		
Compliance of the qualification to be acquired upon completion of the study programme with the professional standard or the requirements for professional qualification (if applicable)		
Compliance of the study programme with the specific regulatory framework applicable to the relevant field (if applicable)		
Mapping of the study courses/ modules for the achievement of the learning outcomes of the study programme		
The curriculum of the study programme (for each type and form of the implementation of the study programme)		
Descriptions of the study courses/ modules		
Description of the organisation of the internship of the students (if applicable)		
III - Description of the Study Programme - 3.4. Teaching Staff		

Confirmation that the academic staff of the doctoral study programme includes not less than five doctors, of which at least three are experts approved by the Latvian Council of Science in the branch or sub-branch of science in which the study programme intends to award a scientific degree (if applicable)		
Confirmation that the academic staff of the academic study programme complies with the requirements specified in Section 55, Paragraph one, Clause 3 of the Law on Higher Education Institutions (if applicable)		

Other annexes

Name of document	Document
DU normatīvie akti iekšējās kvalitātes nodrošināšanai	1.3_Normativie akti ieksejas kvalitates nodrosinasanai.pdf
Daugavpils University normative acts for internal quality assurance	1.3_List of Regulations for internal quality assurance.pdf
Studiju iekšējās kvalitātes nodrošināšanas politika	1.3_DU-STUDIJU-IEKŠĒJĀS-KVALITĀTES-NODROŠINĀŠANAS-POLITIKA.pdf
Internal Quality Assurance Policy of Studies	1.3_INTERNAL QUALITY ASSURANCE POLICY OF STUDIES AT DAUGAVPILS UNIVERSITY.pdf
tudiju iekšējās kvalitātes sistēmas efektivitātes nodrošināšanas kārtība	1.3_DU-STUDIJU-IEKŠĒJĀS-KVALITĀTES-SISTĒMAS-EFEKTIVITĀTES-NODROŠINĀŠANAS-KĀRTĪBA.pdf
Studiju kvalitātes politikas un studiju kvalitātes pārraudzības stratēģija	1.3_DU-STUDIJU-KVALITĀTES-POLITIKAS-UN-STUDIJU-KVALITĀTES-PĀRRAUDZĪBAS-STRATĒĢIJA.pdf
Daugavpils Universitātes akadēmiskā personāla zinātniskās aktivitātes vērtēšanas kārtība	DU AKADĒMISKĀ PERSONĀLA ZINĀTNISKĀ DARBA EFEKTIVITĀTES VĒRTĒŠANAS KĀRTĪBA_LV.zip
Procedure for evaluation of scientific work effectiveness of DU academic staff	PROCEDURE FOR EVALUATION OF SCIENTIFIC WORK EFFECTIVENESS OF DU ACADEMIC STAFF_EN.zip
Kārtība, kādā tiek apmaksātas Daugavpils Universitātes akadēmiskā personāla zinātniskās publikācijas un monogrāfijas	KĀRTĪBA, KĀDĀ TIEK APMAKSĀTAS DU AKADĒMISKĀ PERSONĀLA ZINĀTNISKĀS PUBLIKĀCIJAS UN MONOGRĀFIJAS_LV.pdf
DU kārtība, kādā tiek apmaksāti zinātnisko komandējumu un zinātnisko pasākumu dalības maksas izdevumi	DAUGAVPILS UNIVERSITĀTES KĀRTĪBA KĀDĀ TIEK APMAKSĀTI ZINĀTNISKO KOMANDĒJUMU UN ZINĀTNISKO PASĀKUMU DALĪBAS MAKSAS IZDEVUMI_LV.pdf
Procedure for reimbursement of scientific publications and monographs of DU academic staff	PROCEDURE FOR REIMBURSEMENT OF SCIENTIFIC PUBLICATIONS AND MONOGRAPHS OF DU ACADEMIC STAFF_EN.pdf
Procedure for reimbursement of expenses of scientific business trips and participation in scientific events	PROCEDURE FOR REIMBURSMENT OF EXPENSES OF SCIENTIFIC BUSINESS TRIPS AND PARTICIPATION IN SCIENTIFIC EVENTS_EN.pdf
E-studiju vides kursa satura materiālu izveides rokasgrāmata	E-studiju_vides_kursu_satura_izveides_rokasgramata_v1.pdf
KĀRTĪBA, KĀDĀ DAUGAVPILS UNIVERSITĀTES AKADĒMISKAIS PERSONĀLS SAŅEM ATLĪDZĪBU PAR HIRŠA INDEKSU	H-indekss_kartiba.pdf
PROCEDURE FOR REIMBURSEMENET OF HIRSCH INDEX OF DAUGAVPILS UNIVERSITY ACADEMIC STAFF	Procedure_H-index_EN.pdf
2.4.4. Publikacijas_LV.docx	2.4.4. Publikacijas_LV.docx
2.4.4. Publications_EN.docx	2.4.4. Publications_EN.docx
Mapping of the study courses/ modules for the achievement of the learning outcomes of the master study programme	3.2.1. AMSP_Course mapping_EN.xlsx
Studiju kursu/ moduļu kartējums maģistru studiju programmas studiju rezultātu sasniegšanai	3.2.1. AMSP_Kursu kartējums_LV.xlsx
During visit_Questions 2-6.docx	During visit_Questions 2-6.docx
During visit_DU_strategy (only in Latvian)	During visit_DU_strategija_labojumiem_IZM.pdf
During visit_Regulations on elections to academic posts (only in Latvian)	During visit_Nolikums-par-velesanam-akademiskajos-amatos-DU_APSTIPRINATAIS.pdf
During visit_Question 1 and 7_About costs (Pieprasīta informācija par finansēm).docx	Question 1 and 7_About costs (Pieprasīta informācija par finansēm).docx
In Latvian_Chemistry ABSP_Licence_2015.pdf	DU_ABSP_Kimija_Licence_2015.pdf
In Latvian_study field previous assessment_2013.doc	Virziens_DU_Gala_Vertejums_2013.doc
Answers to Q8_Study Field Council.docx	Answers to Q8_Study Field Council.docx
Answers to Q9_Projects_ongoing and completed.docx	Answers to Q9_Projects_ongoing and completed.docx
Answers to Q10_Number of publications in Web of Science Scopus journals.xlsx	Answers to Q10_Number of publications in Web of Science Scopus journals.xlsx

Chemistry (45441)

Study field	*Chemistry, Chemistry Technologies, and Biotechnology*
ProcedureStudyProgram.Name	*Chemistry*
Education classification code	*45441*
Type of the study programme	*Academic master study programme*
Name of the study programme director	*Sergejs*
Surname of the study programme director	*Osipovs*
E-mail of the study programme director	*sergejs.osipovs@du.lv*
Title of the study programme director	*Dr.chem., asoc. prof.*
Phone of the study programme director	*+371 26163221*
Goal of the study programme	*The goal of the program is preparing high-level specialists in the field of chemistry with deep theoretical knowledge and practical skills, capable of making independent decisions and conducting creative scientific research*
Tasks of the study programme	*1) provide high-quality theoretical and practical knowledge to ensure Master's specializations in environmental chemistry or practical bioanalytics, integrating various related fields of chemistry, ecology, biology, medicine and environmental science, emphasizing the interrelationship between theory and practice;* *2) during laboratory work and practical work, develop and strengthen the skills and abilities of scientific work, as well as the ability to independently organize research, obtain and process data, analyze renewable natural resources and their processing products and to draw up research reports;* *3) promote cooperation between students and teaching staff, involving students in research work, in scientific projects financed by EU or LR funds and in the work of scientific laboratories;* *4) strengthen the connection of Daugavpils University with the local governments of the Latgale region by conducting scientific research and performing contractual works of a practical nature on the basis of mutual agreements;* *5) provide those enrolled in the study program with the opportunity to learn practical skills in working with modern scientific equipment and measuring equipment that meet EU requirements and ISO standards and the latest information technology and communications products used in chemical science;* *6) implement the above-mentioned tasks, involving qualified academic personnel in the implementation of the program, as well as specialists from other Latvian and foreign scientific research and educational institutions.*

Results of the study programme	*Knowledge* *1. Students demonstrate expanded and specialized knowledge and understanding of the latest and most current discoveries and development trends in chemistry, chemical technology and selected specialization;* *2. They are familiar with the methods and equipment of planning, implementation, results processing, analysis and interpretation of scientific research and understand their nature and areas of application;* *Skills* *3. Students are able to practically and theoretically apply knowledge and understanding of chemistry, chemical technology and the latest and most relevant discoveries and development trends in practice; able to transfer this knowledge to others;* *4. Able to choose, attribute, plan and independently use the planning, implementation, result processing, analysis and interpretation methods and equipment;* *Competencies* *5. Students are able to formulate, explain, compare and summarize the obtained research results in scientific works, communications and reports and present these results to the specialists of the chemical industry and the society in general;* *6. Students are able to critically analyze, integrate, plan and implement solutions of the latest technologies and discoveries in research.*
Final examination upon the completion of the study programme	*Master's thesis*

Study programme forms

Full time studies - 2 years - latvian

Study type and form	*Full time studies*
Duration in full years	*2*
Duration in month	*0*
Language	*latvian*
Amount (CP)	*80*
Admission requirements (in English)	*Bachelor's degree in chemistry or 2nd level higher professional or equivalent education in the field of chemistry*
Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	*Master's degree of Natural Sciences in Chemistry*
Qualification to be obtained (in english)	-

Places of implementation

Place name	City	Address
Daugavpils University	DAUGAVPILS	VIENĪBAS IELA 13, DAUGAVPILS, LV-5401

3.1. Indicators Describing the Study Programme

3.1.1. Description and analysis of changes in the parameters of the study programme made since the issuance of the previous accreditation form of the study field or issuance of the study programme license, if the study programme is not included on the accreditation form of the study field, including changes planned within the evaluation procedure of the study field evaluation procedure.

Since the previous study program license was issued, the study programme has experienced significant changes, taking into account both development trends in the field of chemistry and student feedback and wishes. These changes have been made to improve the study experience and ensure that the program remains relevant to the latest industry standards and requirements.

The main points of change include the following:

1. Introduction of new courses: Several new courses in chemistry, chemical technology and biotechnology were introduced in order to stimulate student interest and develop new competencies. These courses cover current topics such as scientific research methods, environmental chemistry and the application of technology in chemistry.

When introducing new courses in the field of chemistry, chemical technology and biotechnology, several change indicators could be evaluated that reflect the impact of these innovations on the study process and student development:

- Improving the feedback and rating system

Indicator of change: Analysis of student feedback and evaluations of the new courses helped to identify the strengths and weaknesses of the study program and also contributed to the necessary improvements.

- Lecturers' satisfaction and experience

Indicator of change: Lecturers satisfaction and positive feedback on the new course management and content indicated a successful implementation of the courses.

- Increased student interest in scientific-research activity

Indicator of change: Increased student interest and engagement in scientific research, which was facilitated by the introduction of new courses that offered such opportunities.

- Study process innovations

Indicator of change: The introduction of new courses promoted innovation in the study process, offering new teaching methods, practices and interactive elements.

- Increased professional training

Indicator of change: The preparation of students in the professional sphere, which was the goal of many new course offerings, can be evaluated as an effective change.

2. Update of Study Materials: Continuous updating of study materials was carried out to incorporate the latest scientific discoveries and changes in technology. This ensures that students are well prepared and receive an up-to-date education in chemistry.

With the introduction of constant updating of study materials, several change indicators could be evaluated that reflect this innovation and its impact on the study process:

• Integration of the latest scientific discoveries in the study process

Indicator of changes: Study materials were regularly supplemented with the most current information about scientific discoveries in the field of chemistry, which in turn ensured that students learn modern research methodologies and techniques during the study process.

- Adaptability of structure and choice of study materials:

Indicator of change: The choice of study materials and structures were adjusted so that students can easily access specific modules or topical materials according to their individual needs and interest level.

3. Student involvement and feedback: student involvement in the development of the study program was emphasized. Seminars, discussions and surveys are regularly organized to listen to students' opinions and evaluate them in order to improve the quality of the program.

Indicators that reflect this approach and its impact on the development of the study program:

- Active involvement of students in the study program development process

Indicator of change: Student participation in seminars, discussions and surveys increases, showing greater interest and engagement in the study content and process.

- Regular and structured discussions

Indicator of change: The frequency and structure of discussions increases, reflecting an active exchange of information between students and lecturers.

- Improving the survey system

Indicator of change: The survey system was improved so that students' opinions are taken seriously and used to improve the study program.

- Increased feedback

Indicator of change: Students receive more frequent and specific feedback on their performance and progress assessment, which helps them understand their strengths and weaknesses.

4. Active use of the electronic environment Moodle in the study process.

The active use of the Moodle system in the study process had a significant impact on the student training process, offering several positive changes and improvements:

• Increased availability and flexibility

Rate of change: Students can access study materials and complete assignments anytime, anywhere thanks to Moodle's online availability.

- Increased engagement and collaboration

Indicator of change: Interactive types of lessons, discussion forums promote active involvement of students and mutual cooperation.

- More effective communication

Indicator of change: Moodle provides a central communication point where instructors and students can exchange information, assignments and feedback, thus facilitating effective communication.

- More objective assessment:

Rate of change: Automated scoring and the ability to receive individual feedback directly on the platform improves the objectivity and speed of scoring.

3.1.2. Analysis and assessment of the study programme compliance with the study field. Analysis of the interrelation between the code of the study programme, the degree, professional qualification/professional qualification requirements or the degree and professional qualification to be acquired, the aims, objectives, learning outcomes, and the admission requirements. Description of the duration and scope of the implementation of the study programme (including different options of the study programme implementation) and evaluation of its usefulness.

The goals and tasks of the academic master's study program "Chemistry" correspond to Level 7 of the Latvian qualifications framework (LKI) and is aimed at reflectants with a bachelor's degree in chemistry, chemical technology or equivalent education with no additional admission requirements.

Reflectants participate in the competition with the average weighted grade of the bachelor study program transcript. The weighted average grade is calculated as the sum of the multiples of grades and credit points obtained in all study courses divided by the sum of credit points acquired in the study program. If credit points are not specified, then it is calculated as the sum of grades and contact hours obtained in all study courses divided by the number of contact hours of all study courses.

The name of the study program indicates the purpose of the study program which is to provide a set of knowledge, skills and competence in accordance with the level 7 knowledge, skills and competence of the framework structure determined in the Latvian education classification, to provide students matriculated at Daugavpils University with a high-quality education that meets the needs of the state, providing the opportunity to acquire theoretical and practical knowledge, to supplement the skills and abilities of research work and the opportunity to successfully continue their studies in doctoral studies. By successfully implementing the study program, it is planned to prepare internationally competitive specialists with comprehensive, up-to-date knowledge, who in turn are able to independently plan and conduct research and are competent to work in companies, institutions and other fields. The knowledge, skills and competences acquired during the studies allow the graduate to work as a leading level specialist in chemical and material industry companies and scientific research institutes, to plan, organize and manage the course of production and research processes according to the task, quality and time requirements.

In order to achieve the set goal, the following tasks of the study program have been determined:

- provide high-quality theoretical and practical knowledge to ensure Master's specializations in environmental chemistry or practical bioanalytics, integrating various related fields of chemistry, ecology, biology, medicine and environmental science, emphasizing the interrelationship between theory and practice;
- during laboratory work and practical work, develop and strengthen the skills and abilities of scientific work, as well as the ability to independently organize research, obtain and process data, analyze renewable natural resources and their processing products and to draw up research reports;
- promote cooperation between students and teaching staff, involving students in research

work, in scientific projects financed by EU or LR funds and in the work of scientific laboratories;
- strengthen the connection of Daugavpils University with the local governments of the Latgale region by conducting scientific research and performing contractual works of a practical nature on the basis of mutual agreements;
- provide those enrolled in the study program with the opportunity to learn practical skills in working with modern scientific equipment and measuring equipment that meet EU requirements and ISO standards and the latest information technology and communications products used in chemical science;
- implement the above-mentioned tasks, involving qualified academic personnel in the implementation of the program, as well as specialists from other Latvian and foreign scientific research and educational institutions.

Graduates of the study program (achievable results):

Knowledge

1. Students demonstrate expanded and specialized knowledge and understanding of the latest and most current discoveries and development trends in chemistry, chemical technology and selected specialization;
2. They are familiar with the methods and equipment of planning, implementation, results processing, analysis and interpretation of scientific research and understand their nature and areas of application;

Skills

3. Students are able to practically and theoretically apply knowledge and understanding of chemistry, chemical technology and the latest and most relevant discoveries and development trends in practice; able to transfer this knowledge to others;
4. Able to choose, attribute, plan and independently use the planning, implementation, result processing, analysis and interpretation methods and equipment;

Competencies

5. Students are able to formulate, explain, compare and summarize the obtained research results in scientific works, communications and reports and present these results to the specialists of the chemical industry and the society in general;
6. Students are able to critically analyze, integrate, plan and implement solutions of the latest technologies and discoveries in research;

The academic master's degree in chemistry is awarded after successful completion of the theoretical and practical study courses of the study program and defence of the master's thesis in the Final Examination Committee.

Thus, the mutual connection between the name of the study program, the degree to be obtained, the purpose and tasks, the study results, as well as the admission requirements is observed.

The total amount of the program is 80 credit points (120 ECTS), including its compulsory part is 40 credit points (60 ECTS), the limited optional part is 14 credit points (21 ECTS), the master's thesis is 26 credit points (39 ECTS).

The content of the study program is designed to ensure the graduate's compliance with employers' requirements for a highly qualified graduate with in-depth knowledge in the chosen field or an interdisciplinary knowledge base both in chemistry and chemical technology and biotechnology, as well as practical skills in a specific field of specialization.

The study program is intended to be learned in full-time face-to-face studies.

Code of the programme 45441 conforms to the Cabinet of Ministers *[Ministru kabinets]* Regulations No. 322 "Regulations on the classification of education in Latvia" (Latvian only: https://likumi.lv/ta/id/291524-noteikumi-par-latvijas-izglitibas-klasifikaciju). The first and second classification levels, which are denoted by the first two digits in code 45, are academic education (master's degree), which can be implemented after obtaining a bachelor's or professional bachelor's degree. Duration of studies in full-time studies is one to two years. The total duration of full-time studies is at least five years. The third, fourth and fifth levels of classification (educational thematic groups, thematic areas and program groups) denoted by the next three digits 441 are Ķīmija (44 denotes Physical Sciences).

In the period from 2016/2017 to 2022/2023 academic year, three to seven people enrolled in the academic master's study program "Chemistry" (2016/2017 - three people; 2017/2018 - five people; 2018/2019 - five people; 2019/2020 - six people; 2020/2021 - seven people; 2021/2022 - six people; 2022/2023 - five people). The total number of students (in all study years combined) varied from seven people in the 2016/2017 academic year to 15 people in the 2022/2023 academic year, which indicates the positive dynamics in the number of students.

The usefulness and demand of the academic master study program "Chemistry" can be evaluated:

1. According to the research and innovation potential of the program: the study program includes research components and cooperation with companies and/or research institutions, which clearly attract students who want to participate in innovation and scientific research projects.
2. By employment prospects: graduates of the study program have good employment prospects, as good cooperation opportunities with companies are provided, which in turn can promote the demand for the program.
3. According to the local business environment: there are constantly operating companies in the Latgale region that need chemists or specialists with chemical knowledge. The degree program may offer locally adapted educational opportunities.

3.1.3. Economic and/ or social substantiation of the study programme, analysis of graduates' employment.

The study program corresponds to the directions of the strategic development of the university, the needs of society and the economy, and development trends. The study program includes the legislative requirements of Latvia and the European Union.

The relevance of the program was determined by the need to prepare high-level specialists for the Latvian and international labor market with in-depth knowledge and practical skills in chemistry and the chosen specialization. The study program is aimed at preparing leading-level specialists for the Latvian and international labour market, who have interdisciplinary knowledge and practical skills, which are essential in solving various issues in the subfields of chemistry, chemical technology and biotechnology.

The program designed in this way provides an opportunity to combine students in one master's program, without creating a separate program for each subfield. The study courses are designed in such a way that first and second year students can learn them together, which allows to optimize the costs of program implementation.

Analyzing the employment of reflectants of previous programs, it should be noted that a large number of reflectants have already been employed in companies or scientific institutes in the chosen field of specialization before starting their studies, but upon graduating from the program, all have been involved in work in the industry.

Latvian pharmaceutical companies, construction material manufacturers and processors dominate among employers. Graduates are also employed in food and cosmetic production and recycling companies, certification laboratories, state controlling bodies. Graduates are employed as research associates in a number of Latvian scientific institutes.

Based on the analysis of the survey results of AMSP "Chemistry" graduates (total number of respondents – 14), the following statistics were obtained:

In response to the question: "**Are you currently working in a job that matches your education?**"

- Seven respondents (50%) indicated that "Yes, I work in a job that corresponds to the education I received at DU";
- Four respondents (28.57%) answered that "Yes, I work in the industry related to the acquired education";
- Two respondents (14.29%) answered: "No, I work in a job that is not related to the acquired education";
- One respondent (5%) chooses the point "Other answer" by writing the comment "Partly".

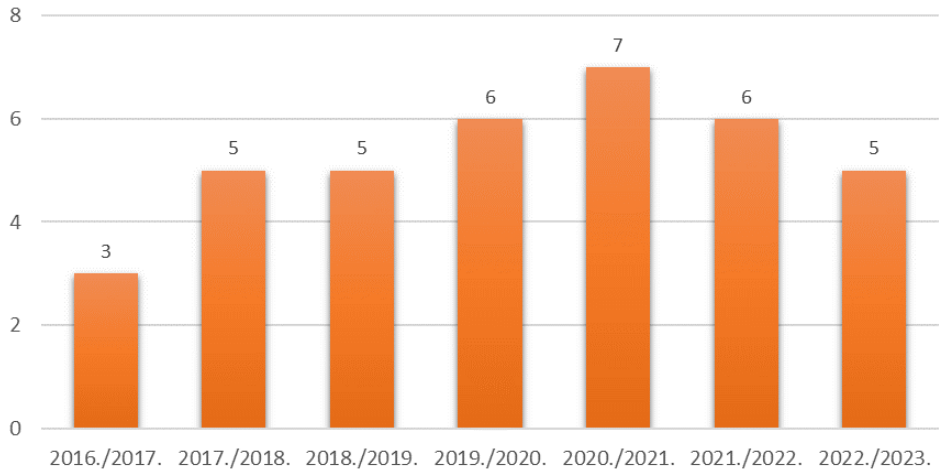
3.1.4. Statistical data on the students of the respective study programme, the dynamics of the number of the students, and the factors affecting the changes to the number of the students. The analysis shall be broken down into different study forms, types, and languages.

The study program is implemented in Latvian in Daugavpils. According to the regulations of the MK of May 13, 2014 No. 240 "Regulations on the State Academic Education Standard", students with a previously obtained degree are enrolled in the academic master's program:

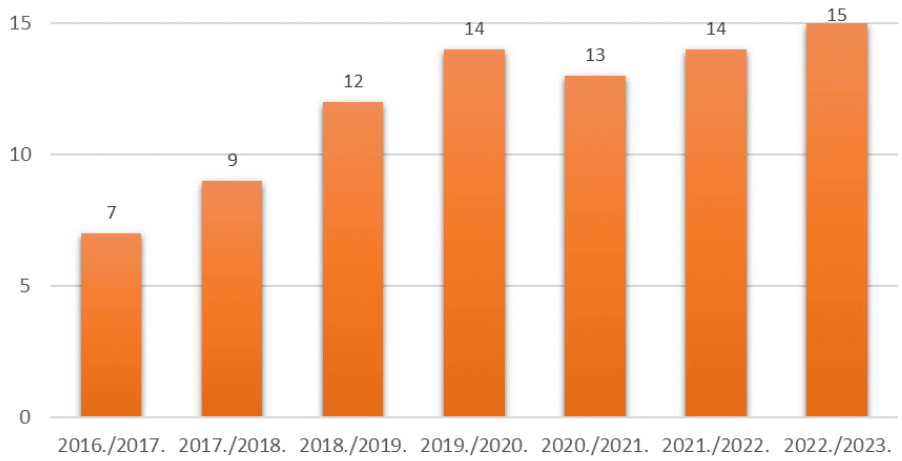
- academic bachelor's degree in chemistry;
- second-level higher professional or equivalent education in the field of chemistry.

The implementation of the study program after receiving the license has been started in the 2015/2016 study year. 4 students were enrolled in the study program.

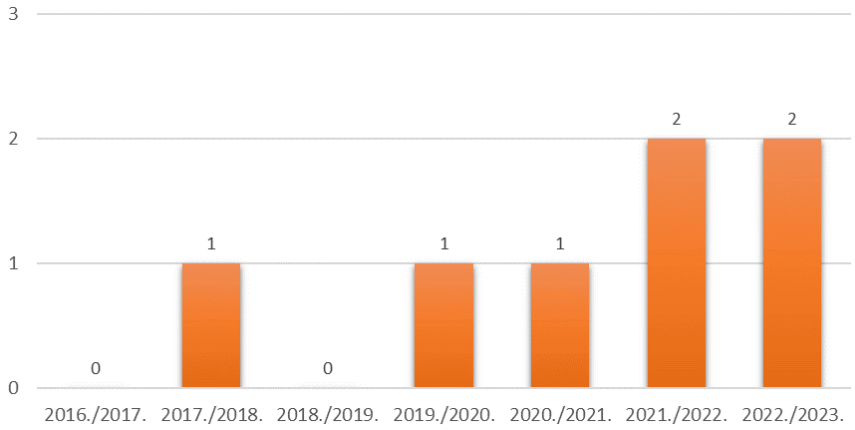
3.1.4.1. figure reflects data on the number of students enrolled in previous study programs, 3.1.4.2. figure – total number of students, whereas in 3.1.4.3. figure – the number of deducted (expelled) students is shown. The statistics of the number of students clearly show the growing interest in the study program "Chemistry". The number of expelled students in the reporting period is 7.



3.1.4.1. figure. The number of students enrolled in the study program



3.1.4.2. figure. Total number of students in the study program



3.1.4.3. figure. Total number of expelled students in the study program

The main reasons for students dropping out of the "Chemistry" program are starting work, which is not always compatible with studies.

Full-time on-site students in the study program have the opportunity to participate in the Erasmus+

international exchange project.

Statistical data on students in the reporting period are available in Appendix 3.1.4.

3.1.5. Substantiation of the development of the joint study programme and description and evaluation of the choice of partner universities, including information on the development and implementation of the joint study programme (if applicable).

3.2. The Content of Studies and Implementation Thereof

3.2.1. Analysis of the content of the study programme. Assessment of the interrelation between the information included in the study courses/ modules, the intended learning outcomes, the set aims and other indicators with the aims of the study course/ module and the aims and intended outcomes of the study programme. Assessment of the relevance of the content of the study courses/ modules and compliance with the needs of the relevant industry, labour market and with the trends in science on how and whether the content of the study courses/ modules is updated in line with the development trends of the relevant industry, labour market, and science.

When analysing the compliance with the May 13, 2014 Cabinet of Ministers *[Ministru kabinets]* Regulations No. 240 "Regulations on the national standard of academic education" (Latvian only: https://likumi.lv/ta/id/266187-noteikumi-par-valsts-akademiskas-izglitibas-standartu), it can be concluded that the academic master's study program "Chemistry" meets the requirements set forth in the standard. Appendix No. 3.2.1. provides a comparison of the study program with the standard requirements has been made.

The study program provides a connection between the information included in the study courses, the achievable results, the set goals, methods, as well as the connection of each study course with the goals of the study program and the results to be achieved. The aim of the study program has been developed in accordance with current events in the industry and the profession, as well as the needs of the economy and society. The tasks of the study program are designed in such a way as to educate students in accordance with the requirements of the Latvian qualification framework, as well as to promote students' competitiveness in changing socio-economic conditions and the international labour market.

The study program is implemented in lectures, practical lessons and laboratory work, with 60% of the time reserved for independent studies, in which the latest theories and trends in the selected fields of chemistry, chemical technology and biotechnology are studied in detail. The content of the study program meets the requirements of regulatory acts.

The program envisages students' in-depth acquisition of theoretical and practical knowledge in chemistry and its sub-branches, as well as in related sciences, i.e. biology, physics, chemical technology, food science and technology, and environmental science. As a result of successful

completion of the study program and mastering the content of the study courses, students will demonstrate in-depth and expanded knowledge and understanding, some of which correspond to the latest findings of the chemical industry and which provide a basis for creative thinking or research, about **environmental chemistry**: water, air and soil pollution, renewable resources (wood, peat, agricultural products, natural waters, etc.) composition and possible ways of use, about the chemical reactions taking place in the processing process and chemical indicators of the quality of the finished product, as well as about current global and local problems in the field of material resource use and their possible solutions. Preparation of specialists in **bioanalytics** requires knowledge in the following areas: instrumental methods in molecular biology, creating a systematic review of research, light scanning microscopy, statistics in bioanalytics, sensor evaluation of food products, methodology of obtaining and preparing samples for investigation.

The duration of studies is 2 years, divided into 4 study semesters, during which compulsory study courses and limited optional study courses are studied. At the end of the studies, a master's thesis must be developed.

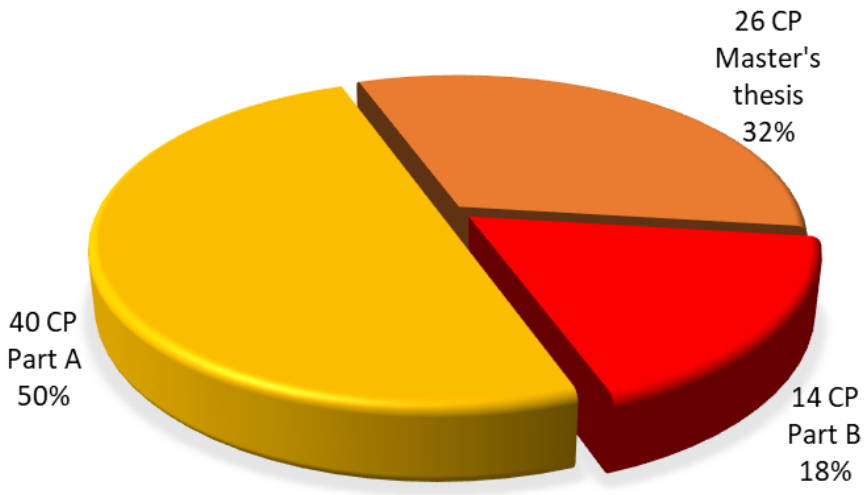
Several study course selection and learning principles operate in the study program.

In the part of the basic courses of the program (part A, 40 CP or 60 ECTS), the student deepens his knowledge and understanding of the fields of chemistry, chemical technology and biotechnology, acquires the necessary specific skills and abilities. In the part of specialization study courses (Part B, 14 CP or 21 ECTS), the student continues to learn the chosen specialization courses. This part of the program includes courses that provide insight into the field's theories and technologies, which are also applicable to solving problems in other related fields.

Lecture courses are general theoretical, during which research elements are embedded in the form of reports, studies and other independent works. The orientation of the practical lessons is individual, where each student develops an individual study project within the framework of the common topic. Attending practical classes is mandatory for all students throughout their studies. During the training of each study course, students must complete the planned tests, develop individual homework and laboratory work. Exams are allowed only to those students who have fulfilled all the requirements of the study course program. The results of exams and tests are fixed in the DU e-study environment Moodle.

Each teaching staff involved in the study program has a sufficient and up-to-date number of scientific publications on the topic of the taught study course. This confirms the ability of the participating teaching staff to include the latest scientific current affairs in the content of the study course.

The work/paper topics are offered by the departments of the faculty and they are always related to current research directions.



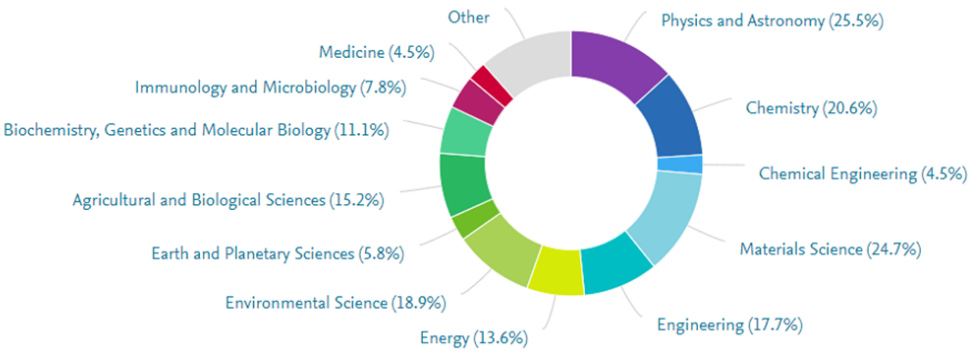
3.2.1.1. figure. The share of parts A and B in the content of the master's study program "Chemistry".

3.2.2. In the case of master's and doctoral study programmes, specify and provide the justification as to whether the degrees are awarded in view of the developments and findings in the field of science or artistic creation. In the case of a doctoral study programme, provide a description of the main research roadmaps and the impact of the study programme on research and other education levels (if applicable).

The theoretical and practical part of the study program has been developed based on the scientific current affairs of the industry. Each specialization has at least one course on the latest developments in the chosen field or a project work in which the student carries out a small research work, analyzing a specific scientific problem and applying industry-specific methods and analytical equipment. Students of the program must participate in the DU conference with an oral report on the topic of the final thesis in the last year of study. In this way, the skills in formulating, presenting and developing a scientific thought are trained.

All teaching staff of the faculty involved in the implementation of the program are scientifically active representatives of the industry, who perform not only teaching and scientific work, but also lead or participate in scientific projects.

As can be seen from the Sci-Val data (figure 3.2.2.1.), most of the publications of the teaching staff involved in the study process are in the branches and sub-branches of chemistry, physics, chemical technology, material science, environmental science and biochemistry.



3.2.2.1. figure. Distribution of publications of teaching staff involved in the realization of the academic master's study program "Chemistry" by scientific branch (Sci-Val data)

3.2.3. Assessment of the study programme including the study course/ module implementation methods by indicating what the methods are, and how they contribute to the achievement of the learning outcomes of the study courses and the aims of the study programme. In the case of a joint study programme, or in case the study programme is implemented in a foreign language or in the form of distance learning, describe in detail the methods used to deliver such a study programme. Provide an explanation of how the student-centred principles are taken into account in the implementation of the study process.

The study program is implemented in Latvian, providing an opportunity to learn in-depth the theories, technologies and latest trends of the selected industry, to gain practical skills in seminars, practical and laboratory classes. In the study program, the courses and practices to be studied and performed and the development of the final thesis are proportionally divided by semesters, so that they complement each other as much as possible, providing students with a targeted direction towards the acquisition of knowledge and skills.

In general, the study program and the planning of each semester are designed with a focus on the acquisition and strengthening of knowledge and professional skills for each student, working both individually and in a team. Evaluation of study results is described in detail in the "Regulations on studies at Daugavpils University" (https://du.lv/wp-content/uploads/2022/06/ENG-NOLIKUMS_PAR_STUDIJAM_DU_2018-1-1.pdf). The teaching staff responsible for the study courses choose the methods of structuring, teaching and evaluating the study courses according to the specifics of the study course content and study program, as well as the needs of the students.

Courses and seminars on the latest pedagogical methods are organized for the academic staff, as well as the attendance of qualification raising and development courses is encouraged both at the faculty and DU level, and also internationally. The value of the study program is a professional dialogue between teaching staff and students, involving students in updating the content and methods of study courses. Students can realize their participation in the improvement of the study process directly – by expressing their wishes to the teaching staff of the specific study course, the head of the department, the program director. Also, students' interests and opinions can be expressed through the Student Council, whose representatives are members of the Faculty Council, DU Senate, and DU Constitution (Satversme) Assembly.

In an indirect way, students express their thoughts about the study course during the mid-semester and end-of-semester anonymous questionnaires. On the other hand, graduates of the program fill out review questionnaires about the entire program as a whole. The results of the survey are examined at the department's meetings and proposals for changes are developed. The most important points of the questionnaire are also discussed at the session of the study direction commission. Careful analysis of the results of the questionnaire allows to make well-thought-out changes in the content of the study course and study program.

Faculty of Natural Sciences and Health Care (DVAF) relationship with students is built on the principles of mutual trust, respect and honesty. This creates both additional obligations and rights for the students. Students are provided with the opportunity to influence their study process, exercise their autonomy, provide feedback on the study process, aligning it with their professional development interests. The DVAF Student Council, which actively participates in all the mentioned processes, plays a major role in ensuring the connection between students, teaching staff and the administration of the study program.

At the start of each study course, the teaching staff informs the students what the study course requirements are and introduces the students to the specific evaluation criteria of the study course. They are published in the electronic environment of the study course, Moodle. Once a semester, students evaluate the work of teaching staff by answering questionnaire questions. They include evaluation of study progress, individual tasks, acquired skills, teaching staff's attitude and cooperation with students. Questionnaires and surveys are anonymous. Graduates of the program fill out graduate questionnaires.

The program director regularly discusses with the seniors of the course the topical issues of the progress and quality of studies, involving other involved parties in these discussions.

In order to ensure the interaction of the knowledge, competences and skills acquired by graduates, when developing and implementing study courses, special emphasis is devoted to the reflection of current problem situations in the content of the study program (at the level of lectures, practical and laboratory works), for the integrity and interdisciplinarity of study courses and study programs. Students' independent studies play an important role. The description of their progress is included in the description of the study course as a mandatory component. Students' ability to learn independently is purposefully developed in all study courses. Students acquire the skills of practical and research work by regularly using literature and Internet resources, including international scientific databases available in the DU library, in order to successfully develop the master's thesis.

The structural units of DU regularly inform the staff about the opportunities to improve their competence both in scientific-research, methodical and didactic skills, and general competences (foreign languages, information technology, speech and presentation skills, *etc.*), as well as in the field of specific professional activity. In the DUIS environment, information about the scientific activity of the academic staff is accumulated. In order to perform pedagogical work at a high level, methodological seminars are held for DU teaching staff on the possibilities of using various teaching methods, experiences and good practices.

The academic staff of the study program regularly improves the study content, introducing new study organization methods in the study process. International experience is integrated into the study process, the DVAF study environment and infrastructure are adapted to groups of students with different professional interests, maintaining stable study quality.

3.2.4. If the study programme envisages an internship, describe the internship

opportunities offered to students, provision and work organization, including whether the higher education institution/ college helps students to find an internship place. If the study programme is implemented in a foreign language, provide information on how internship opportunities are provided in a foreign language, including for foreign students. To provide analysis and evaluation of the connection of the tasks set for students during the internship included in the study programme with the learning outcomes of the study programme (if applicable).

3.2.5. Evaluation and description of the promotion opportunities and the promotion process provided to the students of the doctoral study programme (if applicable).

3.2.6. Analysis and assessment of the topics of the final theses of the students, their relevance in the respective field, including the labour market, and the marks of the final theses.

The final theses of the master study program "Chemistry" were very versatile and always related to current research or processes in the industry. The topics of master's theses are chosen according to the areas of specialization of the program. Listed below are the most relevant topics of specializations in the last six years.

"*Environmental chemistry*" topics of specialization master theses:

1. The use of Latvian dark-headed sheep wool fibres for the development of a methodology for the sorption analysis of volatile compounds;
2. Investigation of non-volatile residues of LPG cylinders
3. Dynamics of seasonal changes in concentrations of biogenic elements and organic substances in the Daugava River in the territory of Daugavpils city;
4. Studying the chemical composition and biological effects of lichen extracts
5. The influence of soil chemical parameters on the invasion of the Spanish slug Arion vulgaris (Moquin-Tandon, 1855) in Latvia.

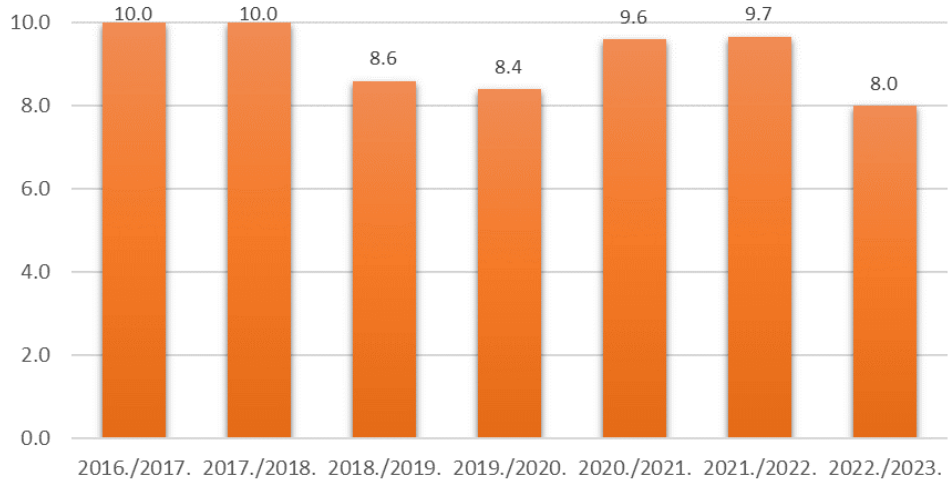
"*Practical bioanalysis*" topics of specialization master theses:

1. Synthesis and Protocol Optimization of Luminiscento α-Amino Phosphonate Dyes Studying Opisthioglyphe Ranae Using Confocal Laser Scanning Microscopy;
2. Synthesis of new fluorescent disubstituted benzantrone dyes and their use in molecular and cellular biology;
3. Optimization of luminiscento benzantrone staining protocols for studying the trematode *Parafasciolopsis fasciolaemorpha (Fasciolidae)* using confocal laser scanning microscopy;
4. Synthesis study of new mono- and disubstituted benzantrone N-containing derivatives

In order to ensure the development of high-quality final theses, at the end of the third semester and before the defense, the department organizes an intermediate control of work progress, during

which the student presents the completed work, and also receives recommendations from the department's teaching staff and scientific staff for improving their work.

The average rating of the final theses of the previous programs is consistently high –hovering around 9.0 points (3.2.6.1. figure). The quality of Master's theses development has not been affected by the pandemic, as most students start developing theses already in the first year of study and this is often related to their direct work responsibilities.



3.2.6.1. figure. Evaluation of the average final work

3.3. Resources and Provision of the Study Programme

3.3.1. Assessment of the compliance of the resources and provision (study provision, scientific support (if applicable), informative provision (including libraries), material and technical provision, and financial provision) with the conditions for the implementation of the study programme and the learning outcomes to be achieved by providing the respective examples.

The study program is basically implemented by the (DU DVAF) Department of Environment and Technology and the DU Institute of Life Sciences and Technologies (DZTI), which provide teaching and methodical work for both compulsory and limited optional part study courses – it creates and updates study course descriptions, ensures the implementation of relevant study courses (including practical, laboratory and seminar classes), management and defence of final theses, and performs other activities related to teaching, methodical and scientific work.

All the mentioned institutions are actively involved in the development of scientific projects, which contribute to the systematic renewal of the scientific-technical base, which is also available to students both during study courses and in the development of final theses. Since 2016 the realization of the study program mainly takes place in the new DU Life Sciences and Technologies building (Daugavpils, Parades 1A), which is equipped with modern laboratories and classrooms. Thus, the students are given ample opportunities during their studies to get acquainted with the basic methods and equipment of chemistry, chemical technology and biotechnology and to gain

practical experience in their use.

The following rooms are intended for the learning process:

- 112.5 m^2 lecture hall equipped with computer (INTERNET, *etc.*), multimedia projector, drafting cabinet;
- 16.9 m^2large laboratory space designed for the preparation of lectures and demonstrations;
- 61.2 m^2general and inorganic chemistry laboratory equipped with a fume cupboard and all necessary reagents, vessels and equipment for practical lessons;
- 66.4 m^2laboratory of analytical and physical and colloidal chemistry, equipped with a fume hood and all necessary reagents, vessels and apparatus for conducting practical lessons;
- 16.9 m^2large laboratory room for the preparation of laboratory work in the two laboratories mentioned above;
- 66.3 m^2organic chemistry and biochemistry laboratory equipped with a fume cupboard and all necessary reagents, vessels and equipment for practical lessons;
- 16.9 m^2large laboratory room intended for the preparation of laboratory work in the aforementioned laboratory;

The following premises are intended for research:

- 63.9 m^2environmental chemistry laboratory equipped with fume cupboards, furniture and equipment:
    - Atomic Absorption Spectrometer "Shimadzu AA-7000". Used to detectmetals and other elements in different environments (water, soil etc.);
    - Wave dispersive X-ray fluorescence spectrometer – Rigaku Supermini Benchtop WDXRF. Used for elementary analysis of various matrices;
    - Mineralization furnace for sample preparation – Multiwave3000 Microwave Oven. Designed for the preparation of various samples;
    - Spectrophotometer "CECIL 1021" UV and visible light range;
    - Flow injection apparatus "FIAlab-2500", autoclave. The mentioned facilities allow to carry out studies accordingto ISO methods;
- 43.4 m^2chromatography laboratory laboratory equipped with fume cupboards, furniture and equipment:
    - Multidimensional gas chromatography mass spectrometry system – "Shimadzu MDGC/GCMS-2010". It is used for the analysis of mixtures of complex organic compounds;
    - Ion chromatograph with sample preparation systemsfor surface water and atmospheric gas analysis;
    - Analyzer of esters, glycerides and bioethanol. Used to control biofuel and bioethanol production processes;
    - Gas chromatograph "Shimadzu GCMS-QP2010" with mass spectrometric detector;
    - HPLC chromatograph "Shimadzu LC20" with spectrometric diode matrix detector;
- 40.9 m^2renewable resources laboratory equipped with fume cupboards, furniture and equipment:
    - Density meter-DMA 4500 M;
    - Viscometer-Stabinger Viscometer SVM 3000;
    - The device for biomass pyrolysis process research. Used for pyrolysis and gasification of different types of biomass and analysis of their products;
    - Automatic calorimeter;
    - Equipment for the oxidative stability of oils. Used to determine the oxidative stability of various oils (*g.*biofuels);

    - Potentiometric titrator for fuels. Used to study fuel characteristics;
    - Coulometric titrator for water determination. Used to determine water in biofuel;
- 19.5 m^2laboratory of fluorescent analysis methods equipped with fume cupboards, furniture and equipment:
    - Spectrofluorimeter (Time-resolved spectrofluorimeter);
    - Automated thermostated titrator with spectrophotometer;
- 32.0 m^2organic synthesis laboratory equipped with fume cupboards, furniture and equipment:
    - Rotary evaporators;
    - Moisture analyzer;
    - Melting point measuring apparatus;
    - Centrifuge;
    - Distiller;
    - Refrigerators;

More than 258,820 items of books and more than 29,692 periodicals are available in the reading rooms and specialized departments of the DU Library. Although compared to the previous year, the number of bibliographic items has decreased by 22,749, however, the decrease occurs at the expense of writing off books that are outdated in terms of content. At the same time, the funds of the scientific library are constantly replenished.

More than 21,938 books are available in the natural sciences subscription and reading room, including 2410 books in chemistry, 3225 books in biology, 3462 in environmental science;

There are known problems with the specialized literature published abroad in the sciences relevant to the study program, but the library is looking for opportunities to find more funds every year for the purchase of new books and periodicals published in foreign countries (Western Europe, USA).

The solution to the aforementioned problems for now is the use of modern literature available in the personal libraries of teaching staff in the study process and the possibility of using the electronic system "ALISE" (Advanced Library Information Service), to which the DU library is connected and through which it is possible to operate with the LU Academic Library, and other catalogues of the most important scientific libraries and later – to order books separately.

In general, it can be concluded that the resource and provision base meets the conditions for the implementation of the study program and the achievement of the study results.

3.3.2. Assessment of the study provision and scientific base support, including the resources provided within the framework of cooperation with other science institutes and higher education institutions (applicable to doctoral study programmes) (if applicable).

3.3.3. Indicate data on the available funding for the corresponding study programme, its funding sources and their use for the development of the study programme. Provide information on the costs per one student within this study programme, indicating the items included in the cost calculation and the percentage distribution of funding between the specified items. The minimum number of students in the study programme in order to ensure the profitability of the study programme (indicating separately the information on each language, type and form of the study programme implementation).

DU financing from the state basic budget consists of study base financing corresponding to the list of study programs and the number of students, which consists of funds for utility payments, taxes, infrastructure maintenance (including providing data for the register of students and graduates), for the purchase of inventory and equipment and for staff salaries, as well as funding for scientific activities, state budget grants and student funds are used for the implementation of the study program.

The number of study places is allocated after discussions with the Ministry of Education and Science *[Izglītības un zinātnes ministrija]*. Study base financing from the state budget is allocated to full-time studies. The amount of study base financing is determined on the basis of the state-determined number of study places at DU, as well as the state-determined study place base costs and study cost coefficients of the thematic areas of education.

Information on the calculation of costs per student in the academic master study program "Chemistry" is reflected in Table 3.3.3.

According to the decision of the DU Senate on October 1, 2022, the following minimum number of students is determined in the academic master's study program of DU to implement each of the specializations included in the program - starting from three students (the number of students in the specialization/subprogram, if up to 50% of the total KP of the program is implemented in subgroups).

Costs per student have increased, which is justified by the overall increase in DU costs (utilities, building maintenance, etc.).

Tuition fees are determined in compliance with the instructions of the State Audit Office that tuition fees for students who study together with budget students cannot be less than the state funding for this service.

The specific development of each study program is the responsibility of each study program director, as well as the responsible faculty. For the development of all study programs, centralized funding is used for the renewal of the scientific library fund, the improvement and maintenance of shared auditoriums, public relations, program marketing activities, development and maintenance of information systems related to the study process and other activities.

3.4. Teaching Staff

3.4.1. Assessment of the compliance of the qualification of the teaching staff members (academic staff members, visiting professors, visiting associate professors, visiting docents, visiting lecturers, and visiting assistants) involved in the implementation of the study programme with the conditions for the implementation of the study programme and the provisions set out in the respective regulatory enactments. Provide information on how the qualification of the teaching staff members contributes to the achievement of the learning outcomes.

All academic staff of the study program meet the requirements specified in the third paragraph of the first part of Article 55 of the Law on Universities *[Augstskolu likums]*. The selection of teaching staff involved in the implementation of the study program is based on several criteria to ensure that the study courses are led by qualified lecturers who are specialists in their field with active scientific activity.

12 teaching staff are involved in the realization of the study program, of which two are professors, three associate professors, one docent, three lecturers, two leading researchers and one researcher. 75% of teaching staff have doctorate degrees in chemistry, biology, mathematics, geology *etc.*

All involved teaching staff have versatile knowledge and skills in both academic, scientific and practical fields. 60% of the teaching staff of DU are experts of the Latvian Science Council, which confirms the competence of the teaching staff in the scientific current affairs of the topic. Qualification is also confirmed by active participation in study courses of other study programs, their teaching and participation in various institutional positions.

Short CVs of the basic teaching staff involved in the study program (full CVs are available in the appendix *2.4.4_CV_ENG*):

- chem., docent, lead. researcher **Jelena Kirilova** *[Jeļena Kirilova]* is the author/co-author of more than 60 scientific publications and 4 patents, has presented papers at 12 international conferences, is the manager of several projects. Supervisor of 11 master's and 9 bachelor's theses. Expert of the Latvian Science Council in the field of Chemistry (Organic Chemistry).
- chem., assoc. prof., lead. researched **Sergejs Osipovs** *[Sergejs Osipovs]* is the author of more than 13 scientific publications and 1 patent, presented papers at 17 international conferences, read 10 guest lectures at foreign universities and research institutes. Supervisor of 1 doctoral, 10 master's and 10 bachelor's theses. Expert of the Latvian Science Council in the field of Chemistry (Analytical Chemistry). Participant of several Latvian and International projects and programs.
- chem., lecturer **Arturs Zarins** *[Artūrs Zariņš]* is the author/co-author of more than 60 scientific publications, gave oral reports at 5 international conferences, manager/participant of several LZP and ERDF projects. Expert of the Latvian Science Council in the field of Chemistry (Radiation Chemistry).
- sc.chem, lecturer, researcher **Aleksandrs Puckins** *[Aleksandrs Pučkins]* is the co-author of 21 publications and 3 patents, has presented papers at 17 international conferences. Participant/executor of 8 projects of various scales (for example, the Horizon 2020 project "Optimal strategies for water and nutrient conservation and reuse in small agricultural catchments in different soil and climatic regions in Europe (OPTAIN)"). Supervisor of 4 bachelor theses. Has given 10 guest lectures at foreign universities and research institutes.
- biol., professor **Inese Kokina** *[Inese Kokina]*is the author/co-author of 27 publications, presented papers at 5 international conferences. Participated in 8 Latvian and European projects as manager/executor/expert. LZP expert in the field of Biology. Member of the Doctoral Council of DU, opponent of several theses.
- biol., lead researcher **Muza Kirjusina *[Muza Kirjušina]*** is the author/co-author of 29 publications and 1 patent, author/co-author of 6 monographs. Published in more than 100 conference abstracts. Participated in 7 Latvian and European projects as manager/executor/expert. Latvian Science Council expert in the field of Biology. Member of the Doctoral Council of DU, opponent of several theses. Supervisor of 6 doctoral theses. Has given more than 10 guest lectures at foreign universities and research institutes.

3.4.2. Analysis and assessment of the changes to the composition of the teaching staff over the reporting period and their impact on the study quality.

Since the licensing of the study program in 2015, there have been no significant changes in the composition of the provided study courses –all the teachers involved continue to teach the courses.

In order to reduce the risks of not having substitutes, the number of lecturers was increased with the new generation of academic staff (lect., MSc. chem. A. Puckins *[A. Pučkins]*; doc., dr. chem. A. Zarins *[A. Zariņš]*; visiting lecturer, MSc. chem. A. Zaicenko *[A. Zaičenko]*).

Changes in teaching staff have a positive effect on the quality of the study process. Students have the opportunity to get acquainted with a wider range of research equipment, to use it in the study process and in their research in final theses. Students are regularly involved in scientific and practical projects implemented in the faculty of various levels – this attracts young people to the university.

3.4.3. Information on the number of the scientific publications of the academic staff members, involved in the implementation of doctoral study programme, as published during the reporting period by listing the most significant publications published in Scopus or WoS CC indexed journals. As for the social sciences, humanitarian sciences, and the science of art, the scientific publications published in ERIH+ indexed journals or peer-reviewed monographs may be additionally specified. Information on the teaching staff included in the database of experts of the Latvian Council of Science in the relevant field of science (total number, name of the lecturer, field of science in which the teaching staff has the status of an expert and expiration date of the Latvian Council of Science expert) (if applicable).

3.4.4. Information on the participation of the academic staff, involved in the implementation of the doctoral study programme, in scientific projects as project managers or prime contractors/ subproject managers/ leading researchers by specifying the name of the relevant project, as well as the source and the amount of the funding. Provide information on the reporting period (if applicable).

3.4.5. Assessment of the cooperation between the teaching staff members by specifying the mechanisms used to promote the cooperation and ensure the interrelation between the study programme and study courses/ modules. Specify also the proportion of the number of the students and the teaching staff within the study programme (at the moment of the submission of the Self-Assessment Report).

The mutual cooperation between the teaching staff of the study courses and the linking of the courses was carefully planned during the creation of the study program. Study courses are grouped by study year in such a way that their learning is based on previously acquired knowledge and coordinated with the achievable results. Within one year, the study courses are thematically linked, thus strengthening the achievement of the goals of the study program.

When creating the study program, each teaching staff familiarized themselves with the content and implementation method of the other study courses in order to prevent duplication of content and reduce the possibility of unlearned topics. In the joint discussions of the study program formation, points of contact between the study courses were sought, which would allow understanding and experiencing the connection of the various fields of chemistry, chemical technology and biotechnology. Such targeted creation of the study program has enabled the teaching staff to realize the need for cooperation and the ways to achieve it.

At the end of each study year, there is an evaluation of the results of the teaching staff questionnaire and an exchange of experiences with the discussion of further cooperation. The conformity of the evaluation criteria and the achievable results of the study courses to the overall achievable results of the study program is an important part of the discussion.

The ratio of the number of students to teaching staff within the study program at the time of submitting the self-evaluation report is 11/15 or one teaching staff to 0.73 students.

Annexes

III - Description of the Study Programme - 3.1. Indicators Describing the Study Programme		
Sample of the diploma and its supplement to be issued for completing the study programme	3.1.2. AMSP_Diploma and supplement example_EN.zip	3.1.2. AMSP_Diploms un pielikuma paraugs_LV.zip
For academic study programmes - Opinion of the Council of Higher Education in accordance with Section 55, Paragraph two of the Law on Higher Education Institutions (if applicable)		
Compliance of the joint study programme with the provisions of the Law on Higher Education Institutions (table) (if applicable)		
Statistics on the students in the reporting period	3.1.4. Statistics about students_EN.xlsx	3.1.4. Statistika par studentiem_LV.xlsx
III - Description of the Study Programme - 3.2. The Content of Studies and Implementation Thereof		
Compliance with the study programme with the State Education Standard	3.2.1. AMSP_Compliance with the national educational standard_EN.docx	3.2.1. AMSP_Atbilstība valsts izglītības standartam_LV.docx
Compliance of the qualification to be acquired upon completion of the study programme with the professional standard or the requirements for professional qualification (if applicable)		
Compliance of the study programme with the specific regulatory framework applicable to the relevant field (if applicable)		
Mapping of the study courses/ modules for the achievement of the learning outcomes of the study programme	3.2.1. ABSP_Course mapping_EN.xlsx	3.2.1. ABSP_Kursu kartējums_LV.xlsx
The curriculum of the study programme (for each type and form of the implementation of the study programme)	3.2.1. AMSP_Study plan_EN.docx	3.2.1. AMSP_Studiju plans_LV.docx
Descriptions of the study courses/ modules	3.2.1.AMSP_Study course descriptions_EN.zip	3.2.1. AMSP_Studiju kursu apraksti_LV.zip
Description of the organisation of the internship of the students (if applicable)		
III - Description of the Study Programme - 3.4. Teaching Staff		
Confirmation that the academic staff of the doctoral study programme includes not less than five doctors, of which at least three are experts approved by the Latvian Council of Science in the branch or sub-branch of science in which the study programme intends to award a scientific degree (if applicable)		
Confirmation that the academic staff of the academic study programme complies with the requirements specified in Section 55, Paragraph one, Clause 3 of the Law on Higher Education Institutions (if applicable)	3.4.1.AMSP Chemistry_Statement_Article 55_EN.docx	Apliecinājums par AMSP Ķīmija akad. pers. atbilstību MK noteikumu 55.pantam.edoc

Chemistry (43441)

Study field	*Chemistry, Chemistry Technologies, and Biotechnology*
ProcedureStudyProgram.Name	*Chemistry*
Education classification code	*43441*
Type of the study programme	*Academic bachelor study programme*
Name of the study programme director	*Sergejs*
Surname of the study programme director	*Osipovs*
E-mail of the study programme director	*sergejs.osipovs@du.lv*
Title of the study programme director	*Dr.chem., asoc. prof.*
Phone of the study programme director	*+371 26163221*
Goal of the study programme	*Providing the DU matriculated students with the acquisition of quality theoretical knowledge and research skills and abilities in the field of chemistry, theoretical and practical training corresponding to the needs of the state, which gives the opportunity to successfully engage in solving the problems of the national economy, to compete in the Latvian and foreign markets, as well as to continue professional and academic education.*
Tasks of the study programme	*1) Provide a competitive education in chemistry corresponding to the bachelor's study level and the EFCE (European Federation of Chemical Engineering) Bologna recommendations, as well as in chemical technology and biotechnology;* *2) Provide the students with theoretical knowledge and practical skills as a basis for professional activity, developing scientific analysis abilities and the ability to solve problems independently, as well as to prepare students for further studies at the master's degree.*

Results of the study programme	*Knowledge:* *1. Students demonstrate in-depth theoretical and practical knowledge in the field of chemistry and a selected sub-field;* *2. Students understand the most important knowledge of chemistry about the reactions of substances and their effects on chemical systems;* *3. Students are familiar with the basic principles of scientific research in the field of chemistry and a selected sub-field.* *Skills:* *4. Able to independently select, critically evaluate and analyse the obtained information;* *5. Able to independently conduct scientific research in the field of chemistry and a selected sub-sector;* *6. Able to present and publicly defend the results of their research.* *Competencies:* *7. Able to take initiative and responsibility, working individually or in a team;* *8. Able to integrate the knowledge of fields related to chemistry in the process of self-development and self-improvement in the perspective of the future professional career;* *9. Able to strengthen general human attitudes and at the same time clarify attitudes related to chemical science (and its sub-branches), creating awareness and understanding of the most important chemical processes.*
Final examination upon the completion of the study programme	*Bachelor's thesis*

Study programme forms

Full time studies - 3 years - latvian

Study type and form	*Full time studies*
Duration in full years	*3*
Duration in month	*0*
Language	*latvian*
Amount (CP)	*120*
Admission requirements (in English)	*Secondary education*
Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	*Bachelor's degree of Natural Sciences in Chemistry*
Qualification to be obtained (in english)	*-*

Places of implementation

Place name	City	Address
Daugavpils University	DAUGAVPILS	VIENĪBAS IELA 13, DAUGAVPILS, LV-5401

3.1. Indicators Describing the Study Programme

3.1.1. Description and analysis of changes in the parameters of the study programme made since the issuance of the previous accreditation form of the study field or issuance of the study programme license, if the study programme is not included on the accreditation form of the study field, including changes planned within the evaluation procedure of the study field evaluation procedure.

Since the previous study program license was issued, the study programme has experienced significant changes, taking into account both development trends in the field of chemistry and student feedback and wishes. These changes have been made to improve the study experience and ensure that the program remains relevant to the latest industry standards and requirements.

The main points of change include the following:

1. Introduction of new courses: Several new courses in chemistry, chemical technology and biotechnology were introduced in order to stimulate student interest and develop new competencies. These courses cover current topics such as scientific research methods, environmental chemistry and the application of technology in chemistry.

When introducing new courses in the field of chemistry, chemical technology and biotechnology, several change indicators could be evaluated that reflect the impact of these innovations on the study process and student development:

- Improving the feedback and rating system

Indicator of change: Analysis of student feedback and evaluations of the new courses helped to identify the strengths and weaknesses of the study program and also contributed to the necessary improvements.

- Lecturers' satisfaction and experience

Indicator of change: Lecturers satisfaction and positive feedback on the new course management and content indicated a successful implementation of the courses.

- Increased student interest in scientific-research activity

Indicator of change: Increased student interest and engagement in scientific research, which was facilitated by the introduction of new courses that offered such opportunities.

- Study process innovations

Indicator of change: The introduction of new courses promoted innovation in the study process, offering new teaching methods, practices and interactive elements.

- Increased professional training

Indicator of change: The preparation of students in the professional sphere, which was the goal of many new course offerings, can be evaluated as an effective change.

2. Reorganization and optimization of the study plan of the ABSP "Chemistry": since the previous study program license was issued, significant changes were made in the composition of the study plan. The model was changed, when starting from the 1st year of

study, students had to immediately choose a specialization ("Practical bioanalytics" or "Chemistry of renewable resources"), thus already within the 1st year learning both the subjects of the compulsory (Part A) part and the limited electives (Part B) items. Currently, the specialization (sub-field) is chosen starting from the 2nd year of study. Respectively, the subjects of the limited choice (part B) are studied starting from the 2nd year of study.

Such changes in the study process provided several benefits:

- Wider familiarization with the topics: Starting to specialize from the 2nd year of study, students have the opportunity to learn a broader basis in advance and understand the diversity of the field of chemistry. It helps to build a solid and broad foundation before choosing a specialization.
- Greater freedom of choice: Choosing a specialization starting from the 2nd year of study gives students additional time to evaluate their interests and strengths. This allows for more informed choices about future careers, as students are better informed about their interests and goals.
- Better preparation for specialization: Starting from the 2nd year of study, students who have already acquired basic knowledge can focus on specific areas and deepen their knowledge. This can contribute to better preparation for specialized subjects, improving the quality of education and students' skills in their chosen field.
- Increased motivation and flexibility: Students are more motivated and interested in their studies if they have the opportunity to choose their own specialization based on the acquired knowledge and experience. It promotes engagement and a positive attitude towards learning.

3. Update of Study Materials: Continuous updating of study materials was carried out to incorporate the latest scientific discoveries and changes in technology. This ensures that students are well prepared and receive an up-to-date education in chemistry.

With the introduction of constant updating of study materials, several change indicators could be evaluated that reflect this innovation and its impact on the study process:

• Integration of the latest scientific discoveries in the study process

Indicator of changes: Study materials were regularly supplemented with the most current information about scientific discoveries in the field of chemistry, which in turn ensured that students learn modern research methodologies and techniques during the study process.

- Adaptability of structure and choice of study materials:

Indicator of change: The choice of study materials and structures were adjusted so that students can easily access specific modules or topical materials according to their individual needs and interest level.

4. Active use of the electronic environment Moodle in the study process.

The active use of the Moodle system in the study process had a significant impact on the student training process, offering several positive changes and improvements:

• Increased availability and flexibility

Rate of change: Students can access study materials and complete assignments anytime, anywhere thanks to Moodle's online availability.

- Increased engagement and collaboration

Indicator of change: Interactive types of lessons, discussion forums promote active involvement of

students and mutual cooperation.

- More effective communication

Indicator of change: Moodle provides a central communication point where instructors and students can exchange information, assignments and feedback, thus facilitating effective communication.

- More objective assessment:

Rate of change: Automated scoring and the ability to receive individual feedback directly on the platform improves the objectivity and speed of scoring.

5. Student involvement and feedback: student involvement in the development of the study program was emphasized. Seminars, discussions and surveys are regularly organized to listen to students' opinions and evaluate them in order to improve the quality of the program.

Indicators that reflect this approach and its impact on the development of the study program:

- Active involvement of students in the study program development process

Indicator of change: Student participation in seminars, discussions and surveys increases, showing greater interest and engagement in the study content and process.

- Regular and structured discussions

Indicator of change: The frequency and structure of discussions increases, reflecting an active exchange of information between students and lecturers.

- Improving the survey system

Indicator of change: The survey system was improved so that students' opinions are taken seriously and used to improve the study program.

- Increased feedback

Indicator of change: Students receive more frequent and specific feedback on their performance and progress assessment, which helps them understand their strengths and weaknesses.

3.1.2. Analysis and assessment of the study programme compliance with the study field. Analysis of the interrelation between the code of the study programme, the degree, professional qualification/professional qualification requirements or the degree and professional qualification to be acquired, the aims, objectives, learning outcomes, and the admission requirements. Description of the duration and scope of the implementation of the study programme (including different options of the study programme implementation) and evaluation of its usefulness.

The Cabinet of Ministers *[Ministru kabinets]* Order No. 594 of August 11, 2009 "On the priority directions of science for funding fundamental and applied research in 2010-2013" (Latvian only: https://likumi.lv/ta/id/196878-par-prioritarajiem-zinatnes-virzieniem-fundamentalo-un-lietisko-petijumu-finansesanai-20102013gada), Energy and environment are mentioned as one of the priorities. This priority includes the widespread implementation and use of technologies for the extraction and use of renewable energy resources and technologies that reduce climate change, as well as the preservation of biological diversity. In order to realize this priority, it is necessary to prepare specialists, including chemists, who are able to adequately assess the current situation in the field

of resource use, are able to conduct research on the possibilities of using renewable resources and on the basis of these studies to successfully introduce new technologies into the national economy. The same order also specifies the priority of public health (prevention, treatment, diagnostic means and methods, biomedical technologies). The realization of the priority requires highly qualified specialists who could work in biological, clinical, biotechnology and other laboratories of various profiles, ensuring the determination, evaluation and prevention of possible risks of human and animal health, environmental and food safety criteria. DU offers a study program in chemistry, which is directly aimed at training specialists in the chemistry of renewable resources and specialists in biomedical laboratory examinations.

Latvia is not rich in non-renewable mineral resources, but bio-resources such as soil, peat, wood, as well as green plant biomass are available in significant quantities. The mentioned resources are currently very little used to produce energy resources – *i.e.*, production with a high added value. Dry steaming of wood is carried out by some small companies in several regions of Latvia. In Riga, Liepaja and other cities of Latvia, cogeneration plants are operating, where biomass is used to obtain energy. The mentioned examples show that the existing renewable resources are not used efficiently and to their full extent.

Currently, the development of the production of energy resources with high added value from biomass is limited not only by the lack of financial resources, but also by the lack of such qualified specialists, who would be capable of conducting scientific and applied research, both determining the quality of raw materials and providing recommendations on improving the technological process.

The training of such specialists will give an opportunity to successfully engage in solving the problems of the modern economy, will increase Latvia's competitiveness in the European and world markets, and will reduce our country's dependence on external energy resources, and will also provide opportunities for professional and academic education and further education, thus also fulfilling the guidelines of the Bologna Declaration.

The chemical industry still lacks qualified employees of various levels, industry experts admit (available in Latvian: http://nozare.lv/nozares/edu/item/20130227140350024 2857B574836B258/). Teachers of chemistry vocational education will have the opportunity to learn in various free seminars related to increasing competence. During the exhibition, educators will meet with representatives of the largest companies in the industry to learn about current events and share their experience of training young specialists. Educators and teachers have already visited the Institute of Organic Synthesis, where they got acquainted with the everyday life and work organization of professionals, as well as technologies that are not yet available in schools. Industry representatives point out that the event is a platform for building relationships between educational institutions and companies –educators and teachers are most often the ones who prepare future specialists. The greater the awareness of innovations in the industry, the greater the opportunity for educators to transfer knowledge to students.

The goals and objectives of the study program correspond to Level 6 of the Latvian Qualifications Framework (LKI) and it is oriented towards students with general secondary education or vocational secondary education without additional admission rules.

Admission of reflectants to the full-time undergraduate study program () takes place after the results of the centralized exams (in Latvian, in foreign language, in chemistry and with year grades in individual subjects in the secondary education document) (Study opportunities in 2024, Latvian only: https://du.lv/wp-content/uploads/2023/11/Stud_iesp_pil_nep_laika_pamatstud_2024.pdf).

The aim of the study program is to prepare highly qualified LKI Level 6 specialists in chemistry,

chemical technology, biotechnology, applied chemistry for the field of chemistry and chemical technology, as well as to ensure the acquisition of high-quality theoretical knowledge and research skills and abilities in the field of chemistry, theoretical and practical training corresponding to the needs of the state, which gives the opportunity to successfully engage in solving economic problems, compete in the Latvian and foreign markets, as well as further professional and academic education.

In order to achieve the set goal, the following tasks of the study program have been determined:

- Provide a competitive education in chemistry corresponding to the bachelor's study level and the EFCE (European Federation of Chemical Engineering) Bologna recommendations, as well as in chemical technology and biotechnology;
- Provide the students with theoretical knowledge and practical skills as a basis for professional activity, developing scientific analysis abilities and the ability to solve problems independently, as well as to prepare students for further studies at the master's degree.

Graduates of the study program (achievable results):

Knowledge

1. Students demonstrate in-depth theoretical and practical knowledge in the field of chemistry and a selected sub-field;
2. Students understand the most important knowledge of chemistry about the reactions of substances and their effects on chemical systems;
3. Students are familiar with the basic principles of scientific research in the field of chemistry and a selected sub-field.

Skills

4. Able to independently select, critically evaluate and analyse the obtained information;
5. Able to independently conduct scientific research in the field of chemistry and a selected sub-sector;
6. Able to present and publicly defend the results of their research.

Competencies

7. Able to take initiative and responsibility, working individually or in a team;
8. Able to integrate the knowledge of fields related to chemistry in the process of self-development and self-improvement in the perspective of the future professional career;
9. Able to strengthen general human attitudes and at the same time clarify attitudes related to chemical science (and its sub-branches), creating awareness and understanding of the most important chemical processes.

The knowledge, skills and competences acquired in the course of studies allow the graduate to work in chemical and material production companies and scientific research institutes, to plan, organize and ensure the progress of production and research processes according to the task, quality and time requirements. Graduates are also prepared for further studies at the master's degree.

The content of the study program is designed in such a way that the included goals and achievable results of the study courses ensure the achievement of the overall goal and results of the study program. This is confirmed by the mapping of the results achieved in the study courses. The greatest emphasis in the study process is placed on the acquisition of knowledge, professional and practical competences, based on scientific achievements, theoretical knowledge and specifics of the industry. The study program is almost the only one in Latvia that prepares human resources

with chemical technology competencies.

The academic bachelor's degree in chemistry is awarded after successful completion of the theoretical and practical study courses of the study program and defence of the bachelor's thesis in the Final Examination Committee.

Thus, the mutual connection between the name of the study program, the degree to be obtained, the purpose and tasks, the study results, as well as the admission requirements is observed.

The total amount of the study program is 120 CP (credit points) (180 ECTS), including the compulsory part is 76 CP (114 ECTS), the limited optional part is 28 CP (42 ECTS), the free optional part is 4 CP (6 ECTS), the bachelor's thesis is 12 CP (18 ECTS).

The content of the study program is designed in such a way as to ensure the graduate's compliance with employers' requirements for a highly qualified graduate with a wide range of knowledge in chemistry, chemical technology, and biotechnology, as well as practical skills in a certain field of specialization. In order to provide a graduate with the necessary qualification, the structure of the study program includes the sequential acquisition of knowledge, skills and competences according to the following principles:

- in the first year of study, the student consolidates and deepens the basic knowledge acquired in high school in the exact areas –mathematics, physics, general chemistry and inorganic chemistry;
- in the second year of study, the student theoretically and practically learns the other three basic fields of chemistry –analytical, organic and physical chemistry, theory and methods; in this year, the student starts studying the chosen specialization, develops the course work;
- in the third year of study, the student studies in depth analytical, physical and colloidal, organic chemistry, as well as the subjects of the chosen specialization; is developing a bachelor's thesis.

In this way, the acquisition of the necessary knowledge, skills and competences is ensured, so that, upon starting professional activity, the graduate has the appropriate qualification to quickly and successfully engage in the performance of work duties in the chosen sector in both Latvian and foreign companies and research institutions.

The study program is intended to be learned in full-time face-to-face studies. Code of the programme 43441 conforms to the Cabinet of Ministers *[Ministru kabinets]* Regulations No. 322 "Regulations on the classification of education in Latvia" (Latvian only: https://likumi.lv/ta/id/291524-noteikumi-par-latvijas-izglitibas-klasifikaciju). The first and second level of classification, denoted by the first two digits in code 43, is academic education (bachelor's degree), which can be implemented after general or professional secondary education. Duration of studies in full-time studies is three to four years. The third, fourth and fifth levels of classification (educational thematic groups, thematic areas and program groups) denoted by the next three digits 441 are Chemical Technologies (44 denotes Physical Sciences).

In the period from 2016/2017 to 2022/2023 academic year, six to 12 people enrolled in the academic bachelor study program "Chemistry" (2016/2017 - seven people; 2017/2018 - seven people; 2018/2019 - six people; 2019/2020 - eight people; 2020/2021 - 11 people; 2021/2022 - 12 people; 2022/2023 - seven people). The total number of students (in all three study years together) varied from 18 people in the 2018/2019 academic year to 31 people in the 2022/2023 academic year, which indicates the positive dynamics in the number of students.

The usefulness and demand of the academic bachelor study program "Chemistry" can be evaluated:

1. According to the research and innovation potential of the program: the study program includes research components and cooperation with companies and/or research institutions, which clearly attract students who want to participate in innovation and scientific research projects.

2. By employment prospects: graduates of the study program have good employment prospects, as good cooperation opportunities with companies are provided, which in turn can promote the demand for the program.
3. According to the local business environment: there are constantly operating companies in the Latgale region that need chemists or specialists with chemical knowledge. The degree program may offer locally adapted educational opportunities.

3.1.3. Economic and/ or social substantiation of the study programme, analysis of graduates' employment.

The relevance of the study program was determined by the need to prepare specialists for the Latvian and international labour market with extensive knowledge and practical skills in chemistry, as well as with specialization in one of its subfields. The study program is aimed at preparing specialists needed for Latvia, who would have interdisciplinary knowledge and practical skills, which are essential in solving chemistry, biotechnology, chemical production and research issues in various subfields of chemistry, biotechnology, chemical technology.

A study program designed in this way provides an opportunity to combine students in one bachelor's study program, without creating a separate study program for each subfield.

Among the employers, Latvian pharmaceutical companies, manufacturers of construction materials and other manufacturers and processors related to the chemical industry dominate. Graduates are also employed in food and cosmetic production and recycling companies, certified laboratories, state controlling institutions. Graduates are employed as research associates in a number of Latvian scientific institutes, for example, RTU's Institute of Organic Chemistry Technology, *etc.*

Analyzing the employment of graduates of previous study programs, it should be noted that a large number of graduates already start working during their studies. Some of them deal with production process and product quality control, the other part are employed as scientific collaborators.

Based on the analysis of the survey results of ABSP "Chemistry" graduates (total number of respondents – 20), the following statistics were obtained:

In response to the question: "**Are you currently working in a job that matches your education**?"

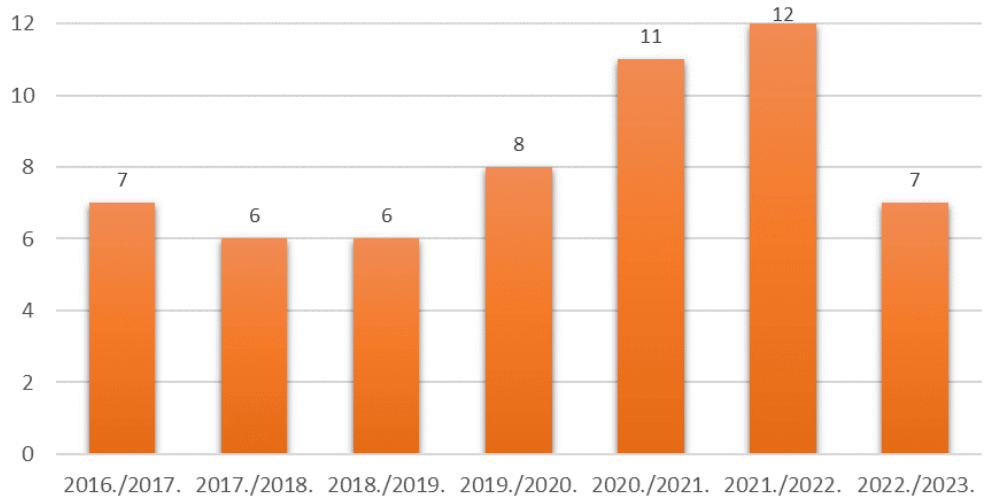
- Four respondents (20%) indicated that "Yes, I work in a job that corresponds to the education I received at DU";
- 11 respondents (55%) answered that "Yes, I work in the industry related to the acquired education";
- Four respondents (20%) answered: "No, I work in a job that is not related to the acquired education";
- One respondent (5%) chooses the item "Other answer", writing the comment "I don't work because I plan to study".

3.1.4. Statistical data on the students of the respective study programme, the dynamics of the number of the students, and the factors affecting the changes to the number of the students. The analysis shall be broken down into different study forms, types, and languages.

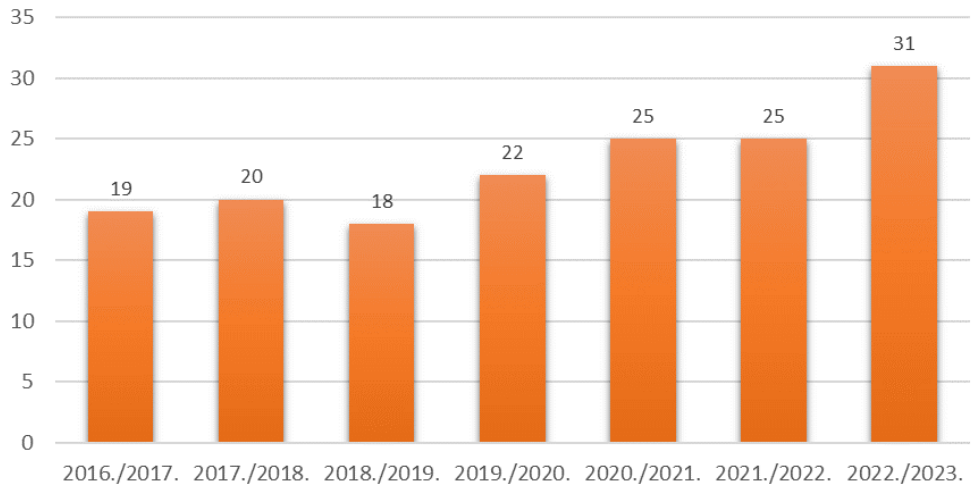
The study program is implemented in Latvian language in the city of Daugavpils. Both graduates of general secondary education institutions and graduates of technical schools and vocational schools with secondary education study in the study program.

The implementation of the study program after receiving the license has been started in the 2011/2012 study year. 10 students were enrolled in the study program.

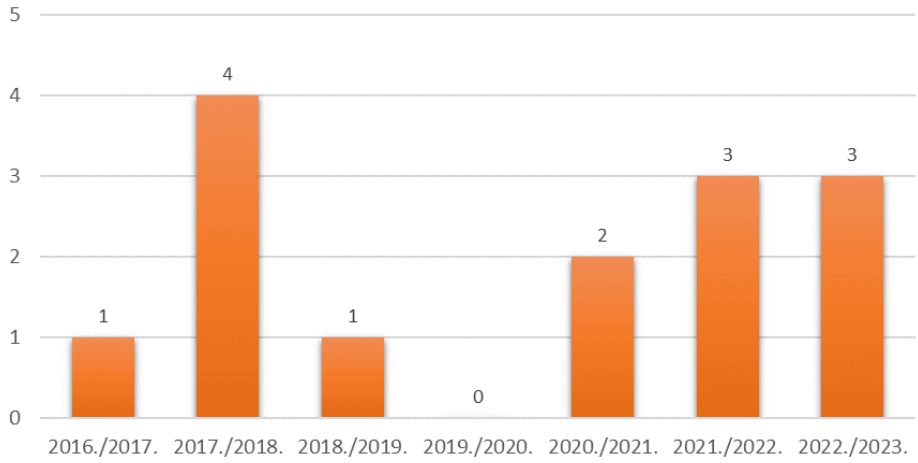
3.1.4.1. figure reflects data on the number of students enrolled in previous study programs, 3.1.4.2. figure – total number of students, whereas in 3.1.4.3. figure – the number of deducted (expelled) students. The statistics of the number of students clearly show the growing interest in the study program "Chemistry". The number of expelled students in the reporting period is around 15. Due to the COVID-19 pandemic and various restrictions in the assessment of students in the 2019/2020 study year, there is a drop in the statistics of expelled students, which will level off at the expense of the next study year.



3.1.4.1. figure. The number of students enrolled in the study program



3.1.4.2. figure. Total number of students in the study program



3.1.4.3. figure. Total number of expelled students in the study program

The main reasons for students dropping out of the "Chemistry" study program are student failure, the knowledge gained during studies that the chosen field does not meet expectations, family reasons or financial considerations. Due to the epidemiological situation, the reason for student dropout is also the inability to study remotely.

Statistical data on students in the reporting period are available in Appendix 3.1.4.

3.1.5. Substantiation of the development of the joint study programme and description and evaluation of the choice of partner universities, including information on the development and implementation of the joint study programme (if applicable).

3.2. The Content of Studies and Implementation Thereof

3.2.1. Analysis of the content of the study programme. Assessment of the interrelation between the information included in the study courses/ modules, the intended learning outcomes, the set aims and other indicators with the aims of the study course/ module and the aims and intended outcomes of the study programme. Assessment of the relevance of the content of the study courses/ modules and compliance with the needs of the relevant industry, labour market and with the trends in science on how and whether the content of the study courses/ modules is updated in line with the development trends of the relevant industry, labour market, and science.

When analysing the compliance with the May 13, 2014 Cabinet of Ministers *[Ministru kabinets]* Regulations No. 240 "Regulations on the national standard of academic education" (Latvian only: https://likumi.lv/ta/id/266187-noteikumi-par-valsts-akademiskas-izglitibas-standartu), it can be concluded that the academic bachelor's study program "Chemistry" meets the requirements set forth in the standard. Appendix No. 3.2.1. provides a comparison of the study program with the standard requirements has been made.

The study program provides a connection between the information included in the study courses, the achievable results, the set goals, methods, as well as the connection of each study course with the goals of the study program and the results to be achieved. The connection is reflected in the mapping of the study program (Appendix No. 3.2.1.).

The aim of the study program has been developed in accordance with current events in the industry, as well as the needs of the economy and society. The tasks of the study program are designed in such a way as to educate students in accordance with the requirements of the Latvian qualification framework, as well as to promote students' competitiveness in changing socio-economic conditions and the international labour market.

The study programme is implemented in lectures, practical lessons and laboratory work, reserving half of the time for independent studies, in which basic principles and theories of chemistry, chemical technology and biochemistry are studied in detail. The content of the study program meets the requirements of regulatory acts.

Both specializations of the study program, "Practical Bioanalytics" and "Chemistry of Renewable Resources", are related to natural sciences and chemistry, but they focus on different aspects and demands from students:

Specialization "Practical bioanalytics"

1. Biological basis:

- Human and Animal Physiology: Enhances understanding of life processes in human and animal organisms.
- Microscopy technique: Acquire skills for microscopic analysis and observation.

2. Bioanalytical methods:

- Testing methods in bioanalytics I, II, III: Develops skills in practical analytical techniques and use of instruments/equipment.

3. Laboratory management:

- Development, design and archive organization of laboratory documents: Combines theoretical and practical skills for more efficient management of laboratory work.
- Organization of the quality system in the laboratory: Teaches to develop and maintain quality standards in the operation of the laboratory.

4. Research and legislation:

- Organization of research work in bioanalytics: Develops research skills and analytical thinking.
- Legislation in biomedicine: Provides an understanding of legal regulations in the field of biomedicine.

Specialization "Chemistry of renewable resources"

1. Environmental aspects:

- Environmental chemistry: Investigates environmental pollution, its detection and analysis methods, behavior of substances in the environment, transformations of substances of both natural and anthropogenic origin.
- Water resources management: Offers solutions for the sustainable use of water resources.

2. Use of resources and energy:

- Chemistry of renewable resources: Introduces the use of chemical processes in obtaining renewable resources.
- Renewable energy resources: Explores and evaluates the possibilities of using renewable energy sources.
- Biomass management: Promotes sustainable use of biomass.

3. Chemical technologies and ecology:

- Basics of chemical technology: Offers innovative approaches in the development and optimization of chemical processes.
- Ecology: Develops an understanding of ecosystems and their impact on human activity.

The duration of studies is 3 years, divided into 6 study semesters, during which compulsory study courses, limited and optional study courses are studied. At the end of the studies, a bachelor's thesis must be developed.

The study program is implemented in Latvian language.

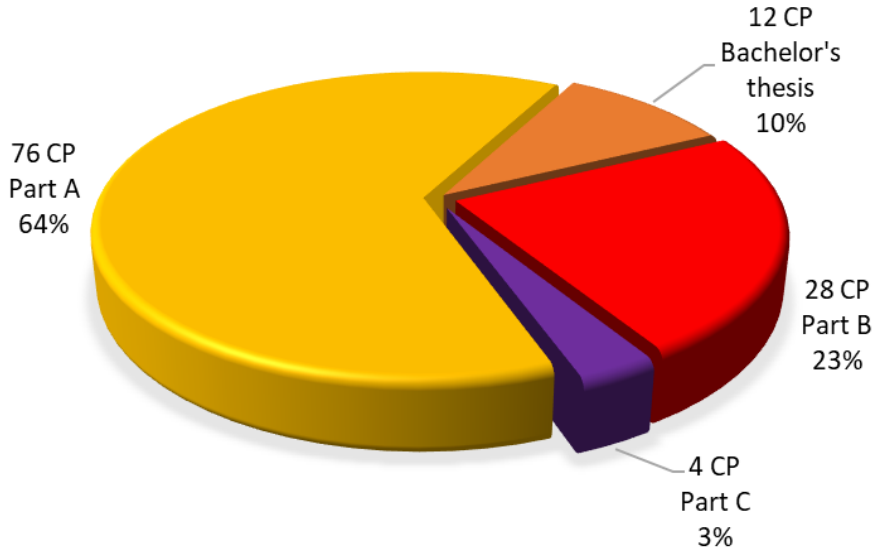
Several study course selection and learning principles operate in the study program. Those study courses whose purpose is to provide the minimum set of knowledge, abilities and skills necessary for the field of chemistry are included in the compulsory section, and all students learn them in their entirety. The volume of compulsory study courses of the study program is 76 CP (114 ECTS). These study courses develop students' knowledge and skills in the basic directions of chemistry – general, inorganic, organic, physical and analytical, as well as in the basic processes of chemical technology and biotechnology.

Study courses that expand knowledge and understanding or offer in-depth learning of specific skills and abilities in a particular area are included in the limited choice section, and students must choose them within the limits set in the study program (28 CP or 42 ECTS).

At the end of the study program, the student must prepare a bachelor's thesis, which includes the preparation of a literature review on the topic of the thesis, the practical part of the thesis and the compilation of results. The work/paper topics are offered by the departments of the faculty and they are always related to current research directions.

Each teaching staff involved in the study program has a sufficient and up-to-date number of scientific publications on the topic of the taught study course. This confirms the ability of the participating teaching staff to include the latest scientific current affairs in the content of the study course.

A series of study courses provides for practical lessons and excursions to production companies, during which the student will have the opportunity to familiarize himself with the specifics of the industry and work opportunities.



3.2.1.1. figure. The proportion of parts A, B and C in the content of the bachelor study program "Chemistry".

3.2.2. In the case of master's and doctoral study programmes, specify and provide the justification as to whether the degrees are awarded in view of the developments and findings in the field of science or artistic creation. In the case of a doctoral study programme, provide a description of the main research roadmaps and the impact of the study programme on research and other education levels (if applicable).

3.2.3. Assessment of the study programme including the study course/ module implementation methods by indicating what the methods are, and how they contribute to the achievement of the learning outcomes of the study courses and the aims of the study programme. In the case of a joint study programme, or in case the study programme is implemented in a foreign language or in the form of distance learning, describe in detail the methods used to deliver such a study programme. Provide an explanation of how the student-centred principles are taken into account in the implementation of the study process.

The study program is implemented in the Latvian language, providing the opportunity to acquire basic knowledge in all directions and issues of chemistry and chemical technology and biotechnology sub-branches, as well as the opportunity to develop practical skills in seminars, practical and laboratory classes. In the study program, the courses to be studied and the development of the final thesis are proportionally divided by semesters, so that they complement each other as much as possible, providing Councils with a targeted direction towards the acquisition of knowledge and skills.

In general, the study program and the planning of each semester are designed with a focus on the acquisition and strengthening of knowledge and professional skills for each student, working both individually and in a team.

Study courses are general theoretical, during which research elements are embedded in the form of reports, studies and other independent works. The orientation of the practical lessons is individual, where each student develops an individual study project within the framework of the common topic. Attending practical classes is mandatory for all students throughout their studies. During the training of each study course, students must complete the planned tests, develop individual homework and laboratory work. Exams are allowed only to those students who have fulfilled all the requirements of the study course program. The results of exams and tests are fixed in the DU e-study environment Moodle.

Evaluation of study results is described in detail in the "Regulations on studies at Daugavpils University" (https://du.lv/wp-content/uploads/2022/06/ENG-NOLIKUMS_PAR_STUDIJAM_DU_2018-1-1.pdf). The teaching staff responsible for the study courses choose the methods of structuring, teaching and evaluating the study courses according to the specifics of the study course content and study program, as well as the needs of the students.

At the start of each study course, the teaching staff informs the students what the study course requirements are and introduces the students to the specific evaluation criteria of the study course. They are published in the electronic environment of the study course, Moodle. At the end of each study year, SKNC organizes a student survey, the results of which provide information on the assessment of study quality and related aspects. The student survey is available online. They include evaluation of study progress, individual tasks, acquired skills, teaching staff's attitude and cooperation with students. Questionnaires and surveys are anonymous. Graduates of the study program fill out graduate questionnaires.

The results of the survey are examined at the department's meetings and proposals for changes are developed. The most important points of the questionnaire are also discussed at the session of the study direction commission. Careful analysis of the results of the questionnaire allows to make well-thought-out changes in the content of the study course and study program.

The director of the study program regularly discusses with the students the topical issues of the progress and quality of studies, involving other involved parties in these discussions.

The methods used in the study program contribute to the achievement of the goals and results of the study courses and study program, observing the principles of student-centered education. The value of the study program is a professional dialogue between teaching staff and students, involving students in updating the content and methods of study courses. Students can realize their participation in the improvement of the study process directly - by expressing their wishes to the teaching staff of the specific study course, the head of the department, the director of the study program, or through the Student Council.

Faculty of Natural Sciences and Health Care (DVAF) relationship with students is built on the principles of mutual trust, respect and honesty. This creates both additional obligations and rights for the students. Students are provided with the opportunity to influence their study process, exercise their autonomy, provide feedback on the study process, aligning it with their professional development interests. The DVAF Student Council, which actively participates in all the mentioned processes, plays a major role in ensuring the connection between students, teaching staff and the administration of the study program.

When developing and implementing study courses, special emphasis is placed on reflecting actual problem situations in the content of the study program (at the level of lectures, practical and laboratory works), for the integrity and interdisciplinarity of study courses and study programs, for the improvement of study content in cooperation with external experts and industry

representatives. Thus, the interaction of the acquired knowledge, competences and skills of the graduates is ensured.

Students' independent studies play an important role. The description of their progress is included in the description of the study course as a mandatory component. Students' ability to learn independently is purposefully developed in all study courses. Students acquire the skills of practical and research work by regularly using literature and Internet resources, including international scientific databases available in the DU library, in order to successfully develop research studies, as well as a bachelor's thesis.

The structural units of DU regularly inform the staff about the opportunities to improve their competence both in scientific-research, methodical and didactic skills, and general competences (foreign languages, information technology, speech and presentation skills, *etc.*), as well as in the field of specific professional activity. In the DUIS environment, information about the scientific activity of the academic staff is accumulated. In order to perform pedagogical work at a high level, methodological seminars are held for DU teaching staff on the possibilities of using various teaching methods, experiences and good practices.

The academic staff of the study program regularly improves the study content, introducing new study organization methods in the study process. International experience is integrated into the study process, the DVAF study environment and infrastructure are adapted to groups of students with different professional interests, maintaining stable study quality.

In order to reduce the costs of ABSP "Chemistry" (taking into account the small number of students), the following program planning measures were taken: implementation of several study courses together with the academic bachelor's study programs "Biology" and "Environmental Science", as well as the organization of flow lectures (flow lecture – a lecture that is read simultaneously in one auditorium for several students of the study programs implemented by DU) together with other study programs implemented by DU, which allows to save the time of DU lecturers, as well as significantly save DU budget funds. Budget savings are also created by the fact that study courses such as "Practice in the industry laboratory I" and "Practice in the industry laboratory II" are implemented in the laboratories of cooperating institutions, with which the university has concluded relevant cooperation agreements.

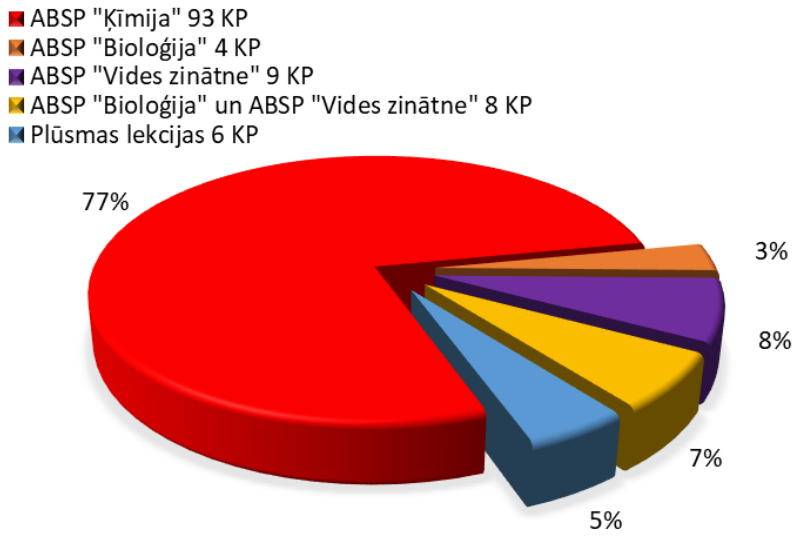
A total of 11 study courses are implemented, of which 4 are conducted together with ABSP "Biology" students, 6 – with ABSP "Environmental Science" students and 4 – with PBSP "Physiotherapy" (Table No. 3.2.3.1.).

Table No. 3.2.3.1. Study courses included in ABSP "Chemistry" program, which are read in parallel with those studied in other programs

Courses that are conducted together with ABSP "Biology"		Courses that are conducted together with ABSP "Environmental science"		Stream lectures	
Name	CP	Name	CP	Name	CP
Human and animal physiology	4	Environmental chemistry	4	Interpersonal relationships	2

		Environmental science	4	Nutrition and environment for human health	2
		Occupational Health and Safety	1	Civil protection	1
Mathematical methods in natural sciences			2	Environment protection	1
General physics			2		
General ecology			4		
In total					**27**

The total volume of the combined courses is 27 CP, which is 22.5%, that is, more than a fifth of the total number of credit points included in the ABSP "Chemistry" (figure No. 3.2.3.1.).



3.2.3.1. figure. Study courses that are read only for ABSP "Chemistry" students, as well as study courses that are read in parallel to those studying in other programs.

3.2.4. If the study programme envisages an internship, describe the internship opportunities offered to students, provision and work organization, including whether the higher education institution/ college helps students to find an internship place. If the study programme is implemented in a foreign language, provide information on how internship opportunities are provided in a foreign language, including for foreign students. To provide analysis and evaluation of the connection of the tasks set for students during the internship included in the study programme with the learning outcomes of the study programme (if applicable).

3.2.5. Evaluation and description of the promotion opportunities and the promotion process provided to the students of the doctoral study programme (if applicable).

3.2.6. Analysis and assessment of the topics of the final theses of the students, their relevance in the respective field, including the labour market, and the marks of the final theses.

The final theses of the study program "Chemistry" were very versatile and always related to current research or processes in the fields of chemistry, chemical technology or biotechnology.

The topics of bachelor's theses are chosen according to the areas of specialization of the program. Listed below are the most relevant topics of specializations in the last six years.

"*Chemistry of renewable resources*" topics of specialization bachelor theses:

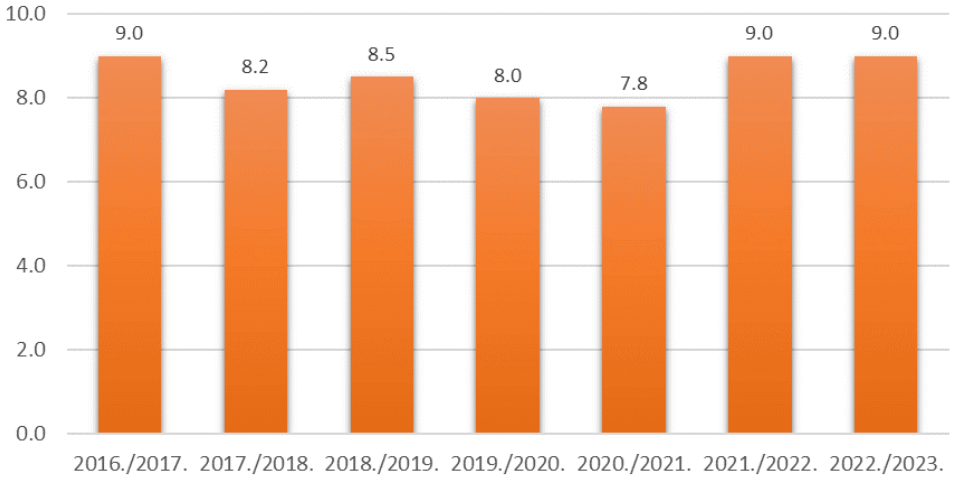
1. Analysis of photophysical parameters of N-containing benzantrone derivatives;
2. Spectroscopic and ecotoxicological investigation of new phosphoryl-containing dyes;
3. Synthesis of polymerizable compounds for the development of new emitting copolymers
4. Analysis of hookah tobacco smoke by adsorption on solid sorbent (ACS) method
5. Synthesis of luminescent isothiocyanate and amidine group-containing features
6. Preparation of raw material for biofuel production using the esterification method: search for the most suitable catalysts

"*Practical bioanalysis*" topics of specialization bachelor theses:

1. Comparison of different fluorescent dyes for visualization of the trematode *Prototocus confusus*
2. Development of a staining protocol using benzantrone luminophores for the study of trematode musculature
3. Analysis of vitamin D content depending on the age and gender of children

In order to ensure the development of high-quality final theses, shortly before the defense, the structural units organize an intermediate control of work progress (pre-defense), during which the student presents what he has done, as well as receives recommendations from the structural unit for the improvement of the work of teaching staff and scientific staff.

As can be seen in figure 3.2.6.1., the average rating of the final theses of previous study programs is consistently high and ranges from 7.8 to 9.0. The drop in the rating in the 2020/2021 academic year is related to the difficulties in developing high-quality works during the pandemic, performing systematic daily work in laboratories.



3.2.6.1. figure. Average grade of theses

3.3. Resources and Provision of the Study Programme

3.3.1. Assessment of the compliance of the resources and provision (study provision, scientific support (if applicable), informative provision (including libraries), material and technical provision, and financial provision) with the conditions for the implementation of the study programme and the learning outcomes to be achieved by providing the respective examples.

The study program is basically implemented by the (DU DVAF) Department of Environment and Technology and the DU Institute of Life Sciences and Technologies (DZTI), which provide teaching and methodical work for both compulsory and limited optional part study courses – it creates and updates study course descriptions, ensures the implementation of relevant study courses (including practical, laboratory and seminar classes), management and defence of final theses, and performs other activities related to teaching, methodical and scientific work.

All the mentioned institutions are actively involved in the development of scientific projects, which contribute to the systematic renewal of the scientific-technical base, which is also available to students both during study courses and in the development of final theses. Since 2016 the realization of the study program mainly takes place in the new DU Life Sciences and Technologies building (Daugavpils, Parades 1A), which is equipped with modern laboratories and classrooms. Thus, the students are given ample opportunities during their studies to get acquainted with the basic methods and equipment of chemistry, chemical technology and biotechnology and to gain practical experience in their use.

The following rooms are intended for the learning process:

- 112.5 m^2 lecture hall equipped with computer (INTERNET, *etc.*), multimedia projector, drafting cabinet;
- 16.9 m^2large laboratory space designed for the preparation of lectures and demonstrations;
- 61.2 m^2general and inorganic chemistry laboratory equipped with a fume cupboard and all necessary reagents, vessels and equipment for practical lessons;

- 66.4 m^2laboratory of analytical and physical and colloidal chemistry, equipped with a fume hood and all necessary reagents, vessels and apparatus for conducting practical lessons;
- 16.9 m^2large laboratory room for the preparation of laboratory work in the two laboratories mentioned above;
- 66.3m^2organic chemistry and biochemistry laboratory equipped with a fume cupboard and all necessary reagents, vessels and equipment for practical lessons;
- 16.9 m^2large laboratory room intended for the preparation of laboratory work in the aforementioned laboratory;

The following premises are intended for research:

- 63.9 m^2environmental chemistry laboratory equipped with fume cupboards, furniture and equipment:
    - Atomic Absorption Spectrometer "Shimadzu AA-7000". Used to detectmetals and other elements in different environments (water, soil etc.);
    - Wave dispersive X-ray fluorescence spectrometer – Rigaku Supermini Benchtop WDXRF. Used for elementary analysis of various matrices;
    - Mineralization furnace for sample preparation – Multiwave3000 Microwave Oven. Designed for the preparation of various samples;
    - Spectrophotometer "CECIL 1021" UV and visible light range;
    - Flow injection apparatus "FIAlab-2500", autoclave. The mentioned facilities allow to carry out studies accordingto ISO methods;
- 43.4 m^2chromatography laboratory laboratory equipped with fume cupboards, furniture and equipment:
    - Multidimensional gas chromatography mass spectrometry system – "Shimadzu MDGC/GCMS-2010". It is used for the analysis of mixtures of complex organic compounds;
    - Ion chromatograph with sample preparation systemsfor surface water and atmospheric gas analysis;
    - Analyzer of esters, glycerides and bioethanol. Used to control biofuel and bioethanol production processes;
    - Gas chromatograph "Shimadzu GCMS-QP2010" with mass spectrometric detector;
    - HPLC chromatograph "Shimadzu LC20" with spectrometric diode matrix detector;
- 40.9 m^2renewable resources laboratory equipped with fume cupboards, furniture and equipment:
    - Density meter-DMA 4500 M;
    - Viscometer-Stabinger Viscometer SVM 3000;
    - The device for biomass pyrolysis process research. Used for pyrolysis and gasification of different types of biomass and analysis of their products;
    - Automatic calorimeter;
    - Equipment for the oxidative stability of oils. Used to determine the oxidative stability of various oils (*g.*biofuels);
    - Potentiometric titrator for fuels. Used to study fuel characteristics;
    - Coulometric titrator for water determination. Used to determine water in biofuel;
- 19.5 m^2laboratory of fluorescent analysis methods equipped with fume cupboards, furniture and equipment:
    - Spectrofluorimeter (Time-resolved spectrofluorimeter);
    - Automated thermostated titrator with spectrophotometer;
- 32.0 m^2organic synthesis laboratory equipped with fume cupboards, furniture and equipment:
    - Rotary evaporators;

- Moisture analyzer;
- Melting point measuring apparatus;
- Centrifuge;
- Distiller;
- Refrigerators;

More than 258,820 items of books and more than 29,692 periodicals are available in the reading rooms and specialized departments of the DU Library. Although compared to the previous year, the number of bibliographic items has decreased by 22,749, however, the decrease occurs at the expense of writing off books that are outdated in terms of content. At the same time, the funds of the scientific library are constantly replenished.

More than 21,938 books are available in the natural sciences subscription and reading room, including 2410 books in chemistry, 3225 books in biology, 3462 in environmental science;

There are known problems with the specialized literature published abroad in the sciences relevant to the study program, but the library is looking for opportunities to find more funds every year for the purchase of new books and periodicals published in foreign countries (Western Europe, USA).

The solution to the aforementioned problems for now is the use of modern literature available in the personal libraries of teaching staff in the study process and the possibility of using the electronic system "ALISE" (Advanced Library Information Service), to which the DU library is connected and through which it is possible to operate with the LU Academic Library, and other catalogues of the most important scientific libraries and later – to order books separately.

In general, it can be concluded that the resource and provision base meets the conditions for the implementation of the study program and the achievement of the study results.

3.3.2. Assessment of the study provision and scientific base support, including the resources provided within the framework of cooperation with other science institutes and higher education institutions (applicable to doctoral study programmes) (if applicable).

3.3.3. Indicate data on the available funding for the corresponding study programme, its funding sources and their use for the development of the study programme. Provide information on the costs per one student within this study programme, indicating the items included in the cost calculation and the percentage distribution of funding between the specified items. The minimum number of students in the study programme in order to ensure the profitability of the study programme (indicating separately the information on each language, type and form of the study programme implementation).

DU financing from the state basic budget consists of study base financing corresponding to the list of study programs and the number of students, which consists of funds for utility payments, taxes, infrastructure maintenance (including providing data for the register of students and graduates), for the purchase of inventory and equipment and for staff salaries, as well as funding for scientific activities, state budget grants and student funds are used for the implementation of the study program.

The number of study places is allocated after discussions with the Ministry of Education and Science *[Izglītības un zinātnes ministrija]*. Study base financing from the state budget is allocated to full-time studies. The amount of study base financing is determined on the basis of the state-determined number of study places at DU, as well as the state-determined study place base costs and study cost coefficients of the thematic areas of education.

Information on the calculation of costs per student in the academic bachelor study program "Chemistry" is reflected in Table 3.3.3.

According to the decision of the DU Senate on October 1, 2021, the following minimum number of students is determined in the academic bachelor's study program of DU to implement each of the specializations included in the program - starting from five students (the number of students in the specialization/sub-program, if up to 50% of the total amount of CP of the program is realized subgroups).

State budget grants for the study program have decreased during the reporting period. Costs per student have increased, which is justified by the overall increase in DU costs (utilities, building maintenance, etc.).

Tuition fees are determined in compliance with the instructions of the State Audit Office that tuition fees for students who study together with budget students cannot be less than the state funding for this service.

The specific development of each study program is the responsibility of each study program director, as well as the responsible faculty. For the development of all study programs, centralized funding is used for the renewal of the scientific library fund, the improvement and maintenance of shared auditoriums, public relations, program marketing activities, development and maintenance of information systems related to the study process and other activities.

3.4. Teaching Staff

3.4.1. Assessment of the compliance of the qualification of the teaching staff members (academic staff members, visiting professors, visiting associate professors, visiting docents, visiting lecturers, and visiting assistants) involved in the implementation of the study programme with the conditions for the implementation of the study programme and the provisions set out in the respective regulatory enactments. Provide information on how the qualification of the teaching staff members contributes to the achievement of the learning outcomes.

All academic staff of the study program meet the requirements specified in the third paragraph of the first part of Article 55 of the Law on Universities *[Augstskolu likums]*. The selection of teaching staff involved in the implementation of the study program is based on several criteria to ensure that the study courses are led by qualified lecturers who are specialists in their field with active scientific activity.

17 teaching staff are involved in the realization of the study program, of which two are professors, four associate professors, six docents, two lecturers, one assistant, one leading researcher and one researcher. 82% of teaching staff have doctorate degrees in chemistry, biology, mathematics,

geology, etc..

All involved teaching staff have versatile knowledge and skills in both academic, scientific and practical fields. 8 out of 17 DU teaching staff are experts of the Latvian Science Council, which attests to the competence of the teaching staff in current scientific topics. Qualification is also confirmed by active participation in study courses of other study programs, their teaching and participation in various institutional positions.

Short CVs of the basic teaching staff involved in the study program (full CVs are available in the appendix *2.4.4_CV_ENG*):

- chem., docent, lead. researcher **Jelena Kirilova** *[Jeļena Kirilova]* is the author/co-author of more than 60 scientific publications and 4 patents, has presented papers at 12 international conferences, is the manager of several projects. Supervisor of 11 master's and 9 bachelor's theses. Expert of the Latvian Science Council in the field of Chemistry (Organic Chemistry).
- chem., assoc. prof., lead. researched **Sergejs Osipovs** *[Sergejs Osipovs]* is the author of more than 13 scientific publications and 1 patent, presented papers at 17 international conferences, read 10 guest lectures at foreign universities and research institutes. Supervisor of 1 doctoral, 10 master's and 10 bachelor's theses. Expert of the Latvian Science Council in the field of Chemistry (Analytical Chemistry). Participant of several Latvian and International projects and programs.
- chem., lecturer **Arturs Zarins** *[Artūrs Zariņš]* is the author/co-author of more than 60 scientific publications, gave oral reports at 5 international conferences, manager/participant of several LZP and ERDF projects. Expert of the Latvian Science Council in the field of Chemistry (Radiation Chemistry).
- sc.chem, lecturer, researcher **Aleksandrs Puckins** *[Aleksandrs Pučkins]* is the co-author of 21 publications and 3 patents, has presented papers at 17 international conferences. Participant/executor of 8 projects of various scales (for example, the Horizon 2020 project "Optimal strategies for water and nutrient conservation and reuse in small agricultural catchments in different soil and climatic regions in Europe (OPTAIN)"). Supervisor of 4 bachelor theses. Has given 10 guest lectures at foreign universities and research institutes.
- biol., professor **Inese Kokina** *[Inese Kokina]*is the author/co-author of 27 publications, presented papers at 5 international conferences. Participated in 8 Latvian and European projects as manager/executor/expert. LZP expert in the field of Biology. Member of the Doctoral Council of DU, opponent of several theses.
- biol., lead researcher **Muza Kirjusina *[Muza Kirjušina]*** is the author/co-author of 29 publications and 1 patent, author/co-author of 6 monographs. Published in more than 100 conference abstracts. Participated in 7 Latvian and European projects as manager/executor/expert. Latvian Science Council expert in the field of Biology. Member of the Doctoral Council of DU, opponent of several theses. Supervisor of 6 doctoral theses. Has given more than 10 guest lectures at foreign universities and research institutes.

3.4.2. Analysis and assessment of the changes to the composition of the teaching staff over the reporting period and their impact on the study quality.

Since the accreditation of the study program in 2013, there have been no significant changes in the composition of the provided study courses –all the teachers involved continue to teach the courses.

In order to reduce the risks of not having substitutes, the number of lecturers was increased with

the new generation of academic staff (lect., MSc. chem. A. Puckins *[A. Pučkins]*; doc., dr. chem. A. Zarins *[A. Zariņš]*; visiting lecturer, MSc. chem. L. Avotina *[L. Avotiņa]*).

Changes in teaching staff have a positive effect on the quality of the study process. Students have the opportunity to get acquainted with a wider range of research equipment, to use it in the study process and in their research in final theses. Students are regularly involved in scientific and practical projects implemented in the faculty of various levels – this attracts young people to the university.

3.4.3. Information on the number of the scientific publications of the academic staff members, involved in the implementation of doctoral study programme, as published during the reporting period by listing the most significant publications published in Scopus or WoS CC indexed journals. As for the social sciences, humanitarian sciences, and the science of art, the scientific publications published in ERIH+ indexed journals or peer-reviewed monographs may be additionally specified. Information on the teaching staff included in the database of experts of the Latvian Council of Science in the relevant field of science (total number, name of the lecturer, field of science in which the teaching staff has the status of an expert and expiration date of the Latvian Council of Science expert) (if applicable).

3.4.4. Information on the participation of the academic staff, involved in the implementation of the doctoral study programme, in scientific projects as project managers or prime contractors/ subproject managers/ leading researchers by specifying the name of the relevant project, as well as the source and the amount of the funding. Provide information on the reporting period (if applicable).

3.4.5. Assessment of the cooperation between the teaching staff members by specifying the mechanisms used to promote the cooperation and ensure the interrelation between the study programme and study courses/ modules. Specify also the proportion of the number of the students and the teaching staff within the study programme (at the moment of the submission of the Self-Assessment Report).

The mutual cooperation between the teaching staff of the study courses and the linking of the courses was carefully planned during the creation of the study program. Study courses are grouped by study year in such a way that their learning is based on previously acquired knowledge and coordinated with the achievable results. Within one year, the study courses are thematically linked, thus strengthening the achievement of the goals of the study program. When creating the study program, each teaching staff familiarized themselves with the content and implementation method of the other study courses in order to prevent duplication of content and reduce the possibility of unlearned topics. In the joint discussions of the study program formation, points of contact between

the study courses were sought, which would allow understanding and experiencing the connection of the various fields of chemistry, chemical technology and biotechnology. Such targeted creation of the study program has enabled the teaching staff to realize the need for cooperation and the ways to achieve it.

At the end of each study year, there is an evaluation of the results of the teaching staff questionnaire and an exchange of experiences with the discussion of further cooperation. The conformity of the evaluation criteria and the achievable results of the study courses to the overall achievable results of the study program is an important part of the discussion.

The ratio of the number of students to teaching staff within the study program at the time of submitting the self-evaluation report is 31/23 or one teaching staff to 1.3 students.

Annexes

III - Description of the Study Programme - 3.1. Indicators Describing the Study Programme		
Sample of the diploma and its supplement to be issued for completing the study programme	3.1.2. ABSP_Diploma and supplement example_EN.zip	3.1.2. ABSP_Diploma un pielikuma paraugs_LV.zip
For academic study programmes - Opinion of the Council of Higher Education in accordance with Section 55, Paragraph two of the Law on Higher Education Institutions (if applicable)		
Compliance of the joint study programme with the provisions of the Law on Higher Education Institutions (table) (if applicable)		
Statistics on the students in the reporting period	3.1.4. Statistics about students_EN.xlsx	3.1.4. Statistika par studentiem_LV.xlsx
III - Description of the Study Programme - 3.2. The Content of Studies and Implementation Thereof		
Compliance with the study programme with the State Education Standard	3.2.1. ABSP_Compliance with the national educational standard_EN.docx	3.2.1. ABSP_Atbilstība valsts izglītibas standartam_LV.docx
Compliance of the qualification to be acquired upon completion of the study programme with the professional standard or the requirements for professional qualification (if applicable)		
Compliance of the study programme with the specific regulatory framework applicable to the relevant field (if applicable)		
Mapping of the study courses/ modules for the achievement of the learning outcomes of the study programme	3.2.1. ABSP_Course mapping_EN.xlsx	3.2.1. ABSP_Kursu kartējums_LV.xlsx
The curriculum of the study programme (for each type and form of the implementation of the study programme)	3.2.1. ABSP_Study plan_EN.docx	3.2.1. ABSP_Studiju plans_LV.docx
Descriptions of the study courses/ modules	3.2.1.ABSP_Study course description_EN.zip	3.2.1. ABSP_Studiju kursu apraksti_LV.zip
Description of the organisation of the internship of the students (if applicable)		
III - Description of the Study Programme - 3.4. Teaching Staff		
Confirmation that the academic staff of the doctoral study programme includes not less than five doctors, of which at least three are experts approved by the Latvian Council of Science in the branch or sub-branch of science in which the study programme intends to award a scientific degree (if applicable)		
Confirmation that the academic staff of the academic study programme complies with the requirements specified in Section 55, Paragraph one, Clause 3 of the Law on Higher Education Institutions (if applicable)	3.4.1.ABSP Chemistry_Statement_Article 55_EN.docx	Apliecinājums par ABSP Ķīmija akad.pers. atbilstību Augstskolu likuma 55. pantam.edoc